**REPUBLIC OF AZERBAIJAN**

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# ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

# INNOVATIVE DEVELOPMENT DIRECTIONS OF THE FOOD INDUSTRY IN AZERBAIJAN

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|---|---|
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| Field of science: | Economic sciences |
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**Baku – 2026**

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## GENERAL CHARACTERISTICS OF THE RESEARCH

**The actuality and the degree of problem development of the research.** In a period of global climate change and food security problems, the development of the food industry and the improvement of existing mechanisms are important issues. Along with this, the widespread application of high technologies, including digital mechanisms and artificial intelligence tools in various sectors of the economy, has created new realities. In such a situation, the problems of innovative development of the food industry are particularly prominent. Thus, it is necessary to assess the development potential of this strategically important industry. Ensuring the innovative development of the food industry, the development, adoption and application of new innovations are among the important conditions.

Climate change in the world is having a serious impact on food security. Cultivation of important food crops and creation of raw materials for food production remain relevant. Problems in this area are increasing, melting glaciers, reduction of arable land, or loss of land suitable for agriculture due to drought have created difficulties in creating food reserves. Along with these, problems in forming optimal food regimes, imbalances in the efficient consumption and distribution of food products due to waste and other reasons are also attracting attention. All this necessitates the acceleration and expansion of the application of high technologies, including "smart" technologies.

As an independent state, Azerbaijan has taken comprehensive measures to ensure its food and nutrition security, and these processes are ongoing. For the first time in the CIS, agrarian reforms were carried out and land plots were distributed to the population. In order for our people living in the regions to function effectively and for the rational deployment of labor resources, 4 regional state development programs have been implemented one after another - starting from 2004. Creative views have been formed based on ensuring food security. A Grain Fund has been established in the country and relevant state structures have begun to operate to ensure food security. Educational and promotional measures are being taken to ensure the rationality of food regimes. Scientific management of the agricultural sector is also a top priority.

In addition, in recent years, along with the improvement of the food industry development processes in Azerbaijan, important steps have been taken to strengthen food safety. The Food Safety Agency was established by the Decree of the President of the country dated November 13, 2017[1]. By another Decree of the Head of State dated April 29, 2019, the "State Program on Ensuring Food Security in the Republic of Azerbaijan for 2019-2025" was approved.[2] At the same time, in order to regulate and effectively organize innovative development in the country, the Cabinet of Ministers of the Republic of Azerbaijan approved the "Rules for maintaining a publicly open register of innovative projects and issuing a startup passport" by the Resolution of January 29, 2021.[3] All of this has created additional opportunities for more reliable food security in the country, and the application of effective mechanisms for the development and application of innovations is ensuring relative activity in this area.

Important goals such as improving the structure of the country's economy, developing non-oil and gas sectors, and ensuring high-tech and green economy-based activities are reflected in the "Azerbaijan 2030: National Priorities for Socio-Economic Development", approved by the Decree of the President of the country dated February 2, 2021.[4] To achieve these goals, the Socio-Economic Development Strategy for 2022-2026, approved by another decree of the head of state dated July 22, 2022, is currently being implemented.[5] Important documents have been approved to

[1] Decree of the President of the Republic of Azerbaijan on ensuring the activities of the Food Safety Agency of the Republic of Azerbaijan. Baku, November 13, 2017.

[2] Decree of the President of the Republic of Azerbaijan on the approval of the State Program for ensuring food safety in the Republic of Azerbaijan for 2019-2025. Baku, April 29, 2019.

[3] Rules for maintaining a publicly open register of innovative projects and issuing a "Startup" passport. Approved by Resolution No. 21 of the Cabinet of Ministers of the Republic of Azerbaijan dated January 29, 2021.

[4] Azerbaijan 2030: National Priorities for Socio-Economic Development. / – Approved by the Decree of the President of the Republic of Azerbaijan dated February 2, 2021.

[5] Socio-economic development strategy of the Republic of Azerbaijan for 2022-2026. Approved by the decree of the President of the Republic of Azerbaijan dated July 22, 2022. No. 3378.

accelerate the technological development of the economy. For example, the "Digital Development Concept in the Republic of Azerbaijan" was approved by the Decree of the President of the country dated January 16, 2025.[6] The Artificial Intelligence Strategy for 2025-2028 was approved by the Decree of the President of the country dated March 19, 2025. We believe that the priorities of state policy to accelerate innovative development in our country have already been established in official documents, and currently the main task is to ensure effective activity in these areas.

In modern times, there is a need to adapt our country's food industry to progressive world experience and create food industry enterprises based on higher technologies. Taking into account the development postulates and technological requirements of the modern era, complex approaches to the innovative development of the food industry are important. Unfortunately, the national innovation system in our country has not yet been fully formed. The number of enterprises producing innovative products is quite small, and in general, the volume of innovative products in Azerbaijan is at a low level. Mechanisms for stimulating innovative development and state support instruments need to be improved. There is also a need to adopt a law on innovation activity.

The creation of innovation centers operating in accordance with world experience in our country is at an early stage and there are still many issues awaiting resolution in this area. The potential for the creation of an innovative food industry, especially organic agriculture and high-tech agro-processing industry, is high in the liberated territories. In our opinion, it is necessary to organize and conduct more in-depth, fundamental scientific research in these areas.

These factors and the above indicate the relevance of the topic of the dissertation work.

Regarding the degree of development of the topic of the dissertation work, it can be said that the substantial scientific works of our country and foreign scientists and researchers on topical issues of the economy,

[6] Digital Development Concept in the Republic of Azerbaijan. Approved by the Decree of the President of the Republic of Azerbaijan dated January 16, 2025.

problems of development of the food industry in the context of modern economic changes and global challenges, and innovative development directions of this field attract attention. Among the Azerbaijani scientists - academician Z.A.Samadzade, E.A.Guliyev, B.Kh.Atashov, I.H.Ibrahimov, A.F.Abbasov, V.H.Abbasov, Y.H.Hasanli, T.N.Aliyev, G.A.Safarov, Sh.T.Aliyev, A.G.Aliyev, A.D.Huseynova, I.A.Aslanzade, A.H.Taghiyev, F.F.Babayev and others have scientific works in these directions. Foreign scientists R.M. Solow, P.E. Samuelson, J.A. Schumpeter, R.R. Nelson, M.E. Porter, K.M. Schwab, R.A. Fatkhuddinov, Y.B. Gerber, Y.A. German, N.D. Dmitriyev, A.N. Shatalova, Y.N. Sheremetyeva, T.N. Shmulova and others conducted research and put forward theories on economic development and growth, the formation and application of innovations, the efficient organization of the food industry, achieving innovative development in this field, and solving problems through productivity-oriented mechanisms of innovative activity.

In addition to the above, let us add that food security problems have become more acute at the global level in recent decades, and there is a need for more in-depth scientific research and studies on the issues of food safety, the cultivation of important food products that do not harm human health, the uninterrupted and stable provision of food products to the population, and the rationalization of food regimes.

**Object and subject of research.** The object of the study is the food industry and its subjects in Azerbaijan, the innovative development processes and styles of the food industry. The subject of the study is the study of the problems, regularities, and trends of innovative development in the food industry in Azerbaijan in terms of global changes, and the study of scientifically substantiated directions of action in this regard.

**Goals and aims of the study.** The main purpose of the dissertation is to investigate the theoretical and methodological problems of innovative development of the food industry in the context of global challenges and threats, to assess the current state of potential in this area, and to identify directions for the effective organization of innovation-oriented activities.

To achieve the stated goal, the following tasks were set in the research:

- study of the theoretical foundations of the innovative development processes of industrial sectors and disclosure of the problems of innovative development of the food industry and determination of methodological features;
- study of international experience in the effective organization of the food industry and innovative development;
- analysis and assessment of the current state of innovation-related activity processes and innovative development of industrial sectors of our country;
- assessment of the possibilities of intensifying the processes of applying innovations in the food industry of our country;
- state regulation of the problems of innovative development of the food industry and a realistic study of the legal framework related to this;
- investigation of the possibilities of improving financial mechanisms for the innovative development of the food industry;
- preparation of priority tasks of the Concept of Action for the intensification of the innovative development of the food industry of our country;
- identification of ways to accelerate the innovative development processes of the food industry of Azerbaijan, taking into account new challenges, and preparation of relevant recommendations and proposals in this regard.

**Research methods.** In the course of the research, scientific abstraction, analysis, synthesis, comparison, economic-statistical analysis, and also generalization methods were used. In addition to the above, various concepts (strategies) and theoretical-methodological approaches were taken into account on the problems of efficient organization and development of the food industry, innovative development models and mechanisms of this important industry. Also, scientific works of domestic and foreign scientists and researchers related to these problems and areas of activity were taken into account. Along with these, legislative acts on the

development of the food industry and ensuring innovative development, its efficient organization and acceleration, decrees and orders of the President of the country, as well as analytical materials of a research nature were used.

These are **the main provisions put forward for the defense.**

1. In the era of global trends and changes, taking into account food security problems, new approaches, theoretical and methodological views are required to develop the food industry on the basis of high technologies and solve the problems of its innovative development.

2. As one of the main problems of the millennium, there is a serious need to study and apply international experience in ensuring food security and stabilizing the production of important food products, forming more reasonable food regimes, and improving the control mechanism for food safety.

3. There is a need to analyze and assess the processes for organizing innovation activity in Azerbaijan, measures to eliminate obstacles that slow down development in this direction, and the current state of innovative development of the food industry.

4. It would be useful to ensure the innovative development of the food industry, take complex and systematic measures in this regard, conduct a study of the current state of innovative development of the food industry, and draw appropriate conclusions.

5. In order to achieve a solution to the existing problems in the food industry, it is necessary to attach serious importance to the application of innovative development mechanisms, to the investigation and assessment of the potential for expanding the application of innovations in this strategic industrial sector.

6. In order to more optimally regulate the problems of innovative development of the food industry, strengthen the legal framework, and accelerate the processes of applying innovations, there is a need to prepare an Action Concept for the innovative development of the food industry.

7. Within the framework of the priorities of socio-economic development and in terms of the potential of post-conflict areas, there is a need to prepare, apply and determine optimal directions of action more efficient mechanisms for the intensification of the development

of the food industry of our country and its innovative development.

**The scientific novelty of the study** is as follows:

- The main components of the innovation potential of Azerbaijani food industry enterprises have been identified, an algorithm-scheme of the stages of innovation strategy formation in the modern period has been given, and a block-scheme of the classification of innovations in the food industry and its enterprises has been developed, as well as modern theoretical views have been formed;
- Methodological approaches to the organization of the development of the food industry on the basis of high technologies and innovative development from the point of view of global challenges and threats have been determined, and the factors affecting the food industry and its enterprises have been schematically given;
- Mechanisms for the formation of innovative development of the food industry, expansion of innovation infrastructure, and increasing the efficiency and profitability of innovation activities have been developed;
- Action directions have been developed to solve the problems of innovative development of the food industry and expand the production of innovation-based food products in our country;
- Priority directions of cooperation between public-private sector entities in the innovative development of the food industry have been determined;
- Taking into account the problems of development and adoption of high technologies and innovations, the stages of application of innovative technologies in the food industry of Azerbaijan have been determined and financial support mechanisms for the innovative development of the food industry have been developed;
- Taking into account modern realities, objective difficulties and existing problems, important constituent elements of the Concept of Action for the innovative development of the food industry in Azerbaijan have been developed;

- Taking into account new challenges, ways of solving problems and directions of action in the activities of the food industry in Azerbaijan and its innovative development have been determined and proposals have been prepared.

**Theoretical and practical significance of the study.** The theoretical significance of the study is that the results obtained, new scientific approaches and conceptual views can be a reliable source for future research on this topic. From the point of view of the practical significance of the work, it should be noted that the results obtained during the study were summarized and relevant proposals were prepared. In general, these proposals and the given action mechanisms can be used to develop the food industry in Azerbaijan and solve its innovative development problems. For example, the proposals and recommendations given in the work can be useful in preparing a complex of measures, targeted programs, concepts and strategies. In addition, it is possible to use the materials of the dissertation work in writing textbooks and teaching aids, lectures.

**Approval and implementation.** The applicant has 10 scientific works on the topic of the dissertation, including 5 articles and 5 theses, of which 1 article and 2 theses have been published abroad in prestigious local and foreign journals recommended by the Higher Attestation Commission, and in conference proceedings of various levels.

The main scientific provisions of the dissertation are given in the articles "Theoretical approaches to the processes of innovation of industrial sectors and enterprises in the modern era" (Baku, 2023), "Assessment of the processes of expansion of innovations in the food industry in a global context" (Baku, 2024), "International experience in food industry innovation" (Baku, 2024), "The current state of innovation activity and innovation of industrial sectors in Azerbaijan" (Baku, 2025) and "Regulation of problems of innovation activity in the food industry and strengthening its legal framework" (Moscow, 2025).

In addition, the main provisions of the dissertation work were also reflected in the conference materials entitled "Directions of food industry innovation in Azerbaijan in the context of post-conflict areas" (Baku, 2024), "Strengthening the efficiency of mechanisms

for innovation of the food industry of Azerbaijan in the new conditions" (Moscow, 2025), "The strategic importance of innovation in industrial sectors in building a green economy" (Sumgayit, 2025), "Problems of innovation and development drivers of the food industry in the context of global transformations" (Baku, 2025) and "Modern problems and prospects of food industry innovation in the context of international experience" (Poland, 2025).

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

**The total volume of the dissertation, with a mark indicating the volume of the structural sections of the dissertation separately.** The total length of the introduction (16020 characters), chapter I (65901 characters), chapter II (73474 characters), chapter III (65935 characters), conclusion (15896 characters) and list of references (24060 characters) is 276920 characters. The total length of the dissertation is 237226 characters, excluding tables, schemes, diagrams and list of references.

## MAIN CONTENT OF THE DISSERTATION WORK

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

In the first chapter of the dissertation entitled **"Theoretical methodological aspects of the innovative development of the food industry"**, the theoretical foundations of the innovative development processes in industrial sectors are examined, the methodological features of the problems of innovative development of the food industry in the context of global changes are examined, and progressive experience in the innovative development of the food industry in countries and companies around the world is examined.

It should be noted that in terms of theoretical approaches to the innovative development processes of industrial enterprises, we have given special importance to a group of issues. From this point of view, the innovative development of industrial enterprises is the main

condition for organizing their effective activity. Currently, the role of high technologies and innovations in the development of economic sectors, increasing the attractiveness of entrepreneurship and the business environment is rapidly increasing. Academician Z.A.Samadzadeh notes: *"The important point is that as entrepreneurial activity expands, its structure also improves, and the interest in investing in areas requiring intellectual property, such as information technologies, telecommunications, etc., increases.*[7] We also believe that the application of high technologies in all sectors of the economy, including the food industry, is of the utmost priority. Professor E.A. Guliyev states: *"A systematic and comprehensive approach should act as one of the main principles in the formation of food security and the creation of its strong mechanisms of action".*[8] In this regard, the opportunities for the development of the food industry, which occupies an important place in the structure of the national economy, through various innovative economic mechanisms should be especially appreciated. Professor, Honored Scientist B.Kh. Atashov, in his research on the application of technical innovations in modern conditions, notes that *it is possible to achieve further stabilization of economic growth through the application of promising innovative technologies and the creation of material support and conditions for green economy development projects.*[9] *It is possible to add that in the current period, the role of innovative technologies in the formation of a green economy, including the green food industry, is of a decisive nature. Economists A.H. Tagiyev and G.A. Safarov, who are constantly studying innovation problems, consider innovation to be a set of purposeful, consistent and interconnected processes from the creation of a specific new idea to its implementation.*[10] *Noting that the authors are right, it is also necessary to pay attention to one point: sensitivity to innovation can be viewed as the ability not only to create, but also*

[7] Samadzade, Z.A. The economy of Azerbaijan in 100 years. Volume IV. / Z.A. Samadzade – Baku: Letterpress publishing house, – 2021. – p.294.
[8] Guliyev, E.A. Problems and strategic directions of strengthening food security. / E.A.Guliyev – Monograph. – Baku: Cooperation, – 2020. – p. 11.
[9] Atashov, B.Kh. Problems of developing green economy and green energy in Azerbaijan in the global context. – // Baku: Cooperation. – 2024. №3(74), – p. 7.
[10] Tagiyev, A.H. Management of innovation projects. / A.H. Tagiyev, G.A. Safarov – Baku: Elm, – 2013. – p.13.

*to apply technological innovations. Researcher A.D. Huseynova believes that innovation is understood as a certain novelty in the field of technological development, implementation of management decisions, organization of business processes based on the use of advanced achievements in various fields of science.*[11] *On the other hand, one of the characteristics of innovation is its feasibility for effective use in production processes and the possibility of obtaining economic benefits.*

*We believe that a well-functioning system for searching for innovative ideas is an integral part of innovative activity. The concept of innovation in relation to production was first used by the founder of innovation theory, J. Schumpeter, who considered innovation as a means of increasing efficiency, in addition to making a profit. In addition, J. Schumpeter classified 5 main categories of innovation:*

*1) Introduction of new types of goods;*

*2) Introduction of new production methods;*

*3) Opening of new markets;*

*4) Discovery of new sources of raw materials and*

*5) Changes in the composition of the industry.*[12] The information given in this classification is also very relevant for our modern era, both in terms of the development and application of new types of product technologies, the mastery of more cost-effective markets, the creation of reliable sources of raw materials, as well as the technological development of industrial sectors and enterprises are of great importance.

It should be noted that among the factors affecting the sustainable development of an innovation-oriented enterprise, special attention should be paid to the innovation factor, which is classified as a resource group and represents the most important resource for the modern development of economic activity. In general, the impact of each of these factors should be investigated, determined and taken into account.

Table 1 provides methodological approaches to the organization and innovative development of the development of the food industry of Azerbaijan based on high technologies.

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[11] Huseynova, A.D. Science and innovation activity: measurement and evaluation, // – Baku: TUNA, 2020, – p. 44.

[12] Schumpeter, J.A. History of Economic Analysis Oxford University Press, – 1954. – p. 648.

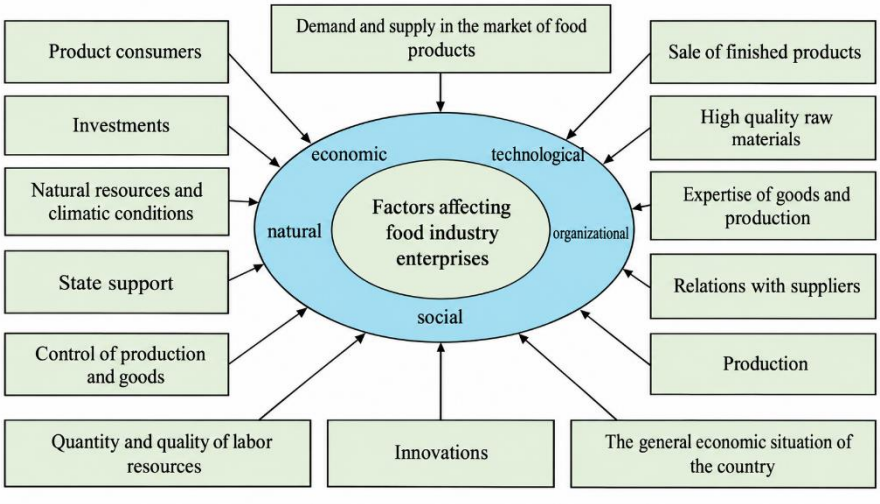
**Table 1.**

**Methodological approaches to the organization and innovative development of the food industry based on high technologies in terms of global challenges and threats**

| Methodological approaches | Brief essence and content of methodological approaches |
|---|---|
| The principle of adapting state policy and legal framework to world practice | - Formulation and implementation of state policy that responds to new challenges;<br>- Formation of a legal framework and adoption of laws that can intensify and stimulate the innovative development of the food industry. |
| Optimal approach to organizational and economic management mechanism | - Creation of a management structure that meets the requirements of the time;<br>- Determination of strategic and tactical tasks, taking into account short and long-term prospects and resources of the food industry;<br>- Improvement of organizational and legal mechanisms of the innovation strategy, preparation of a financial and credit mechanism, strengthening of marketing services and implementation of a digital strategy. |
| A principled approach to the formation of innovative production infrastructure | - Creation of an innovation-based production infrastructure that ensures high productivity and quality indicators;<br>- Ensuring the transfer of high technologies. |
| A systematic approach to the formation of the material and technical base of innovation activities | - Strengthening the financial support mechanism for sustainable and sustainable innovation activities, commissioning new technological facilities and aligning the material and technical base with strategic goals;<br>- Increasing the specific weight of fixed assets and production equipment in food industry enterprises;<br>- Ensuring the safety of products produced in food industry enterprises;<br>- Implementing the concept of improving the technical level of innovation-oriented enterprises. |
| A comprehensive approach to the development of cooperative-economic relations and integration of innovative food industry entities | - Formation of a raw material base for the production of food products;<br>- For this purpose, synchronization and strengthening of relations between the production, transportation and delivery of important food products to processing enterprises in various sectors of agriculture. |
| A priority approach to the formation and development of the innovative potential of the food industry | - Formation of an order system for innovative products;<br>- Creation of a network of food industry enterprises based on resource-saving and safer technologies and innovations;<br>- Improvement of technological innovative processes, etc. |

*Source: prepared by the author.*

We have grouped the factors affecting the development of the food industry and its enterprises in Scheme 1.




**Scheme 1. Factors affecting the food industry and its enterprises**
*Source: prepared by the author.*

Reviewing the experience of world countries on innovative development of the food industry and conducting related assessments can play an important role in ensuring self-sufficiency and supply of important food products. The innovation environment in Western European countries is relatively poorly developed compared to America and Japan, which is mainly due to the low propensity for risky operations. The main instruments for regulating innovation activity in the United States are: financing of innovative projects; benefits provided by the state tax and credit systems; forms of information and scientific and methodological support of innovation activity; stimulation of cooperation; increasing the competitiveness of manufactured goods, works and services.[13] In addition, developed countries have been able to achieve the development of their food

[13] Startseva, Yu.V. Regulation of innovation activity. US experience / Yu.V. Startseva // Current scientific research in the modern world. - 2020. No. 6-3 (62), - p. 262.

industries with the help of innovations. Innovations to increase the efficiency of the food industry are a key imperative for ensuring the sustainable development of the Chinese economy, which is currently strengthening its position among the leading players in the world economy. In addition, China's food industry is considered one of the most developed and important sectors of the country's economy. It involves the production and processing of various food products, including grains, meat, fish, vegetables, fruits, dairy products, etc. We believe that in order to achieve the goals of innovative development of the food industry, it is advisable to benefit from the experience of a group of countries. For example, in the development of fisheries, preference should be given to the experience of Japan. The experience of the United States and Great Britain can be more effective in organizing the production of organic agricultural products and creating a strong raw material base for producing high-quality food products. The experience of China is more useful in increasing the level of self-sufficiency in important food products. It may be useful to use the experience of Germany and France in terms of food safety standards and organization. The application of international experience in ensuring the innovative development of the food industry in Azerbaijan should be considered comprehensively. Thus, the main conditions should be which of the similar experiences is suitable for local conditions and allows for an increase in productivity.

In the second chapter of the work, entitled **"Analysis and assessment of the current state of innovation activity and innovative development of the food industry in Azerbaijan"**, an analysis of innovation activity and innovative development processes of industrial sectors in the country was conducted, the problems of innovative development of the food industry were studied, and the issues of expanding the application of innovations in the food industry of Azerbaijan were considered.

In Diagram 1, we have given the total volume of industrial output in Azerbaijan for 2015-2024.

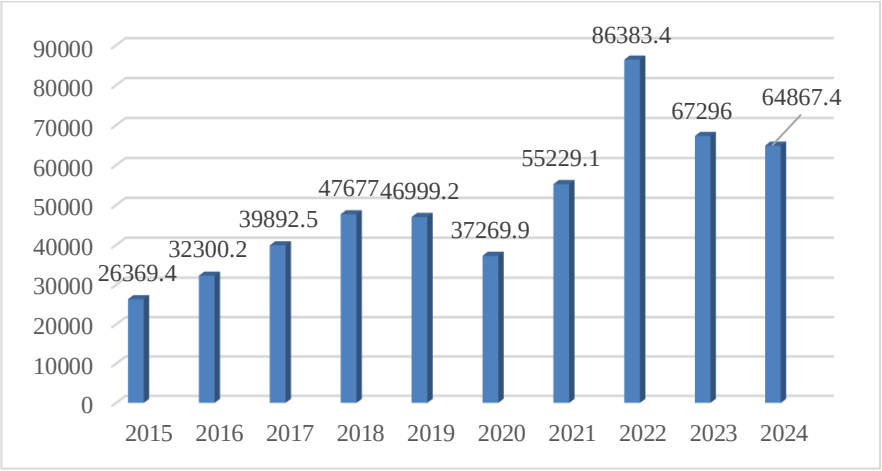



**Diagram 1. Total volume of industrial output in Azerbaijan for 2015-2024, million manats**

*Source: https://www.stat.gov.az/source/agriculture/. Prepared by the author based on data from the SSC*

The level of development of the food industry in Azerbaijan can be seen more clearly from the volume of product production in this area (diagram 2).

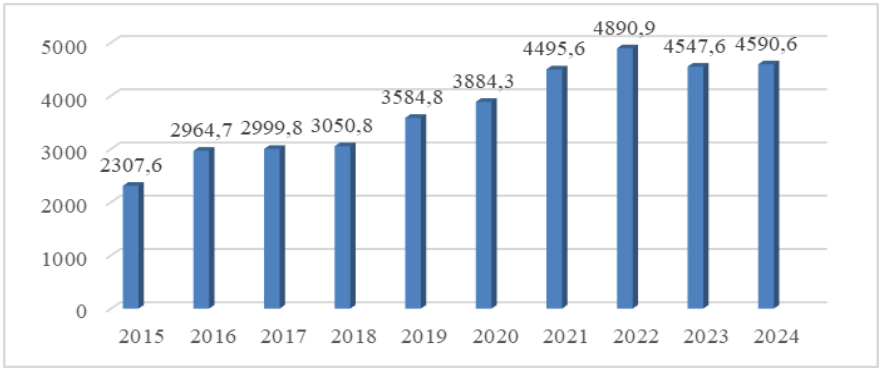



**Diagram 2. Value of food industry products in Azerbaijan (2015-2024)**

*Source: https://www.stat.gov.az/source/industry/. Prepared by the author based on data from the SSC.*

As can be seen, we can show that the production of food products has been continuously increasing over the studied periods and that in 2022 it was higher than in previous years. Thus, the value of the produced food industry product in 2022 was 4890.9 million manat, which is 2.1 times more than in 2015, 12.6% more than in 2020, and 8.8% more than in 2021. In 2022, the specific weight of food industry products in the country's total industrial product was 5.7%, and its specific weight in GDP was 3.6%. In 2023-2024, the production volume of food industry products also showed an increase.

Table 2 shows a group of key indicators of the food industry in our country.

**Table 2.**

**Value of industrial output in Azerbaijan, at current prices, million manats (2015-2024)**

| Indicators | 2015 | 2020 | 2021 | 2022 | 2023 | 2024 | 2015-2024 +/- |
|---|---|---|---|---|---|---|---|
| Total industry, of which | 26369,4 | 37269,9 | 55229,1 | 86383,4 | 67296,0 | 64867,4 | 2,46 times |
| Manufacturing industry | 7880,4 | 11848,3 | 15887,0 | 18116,4 | 18431,2 | 19323,8 | 2,46 times |
| Food production | 2307,6 | 3884,3 | 4495,6 | 4890,9 | 4547,6 | 4590,6 | 98,9 % |
| Beverage production | 197,7 | 427,6 | 490,9 | 563,0 | 703,1 | 811,4 | 4,1 times |
| Tobacco production | 27,2 | 436,0 | 677,9 | 768,9 | 949,3 | 996,5 | 36,6 times |

*Source: Prepared and calculated based on data from the ARSK. https://www.stat.gov.az/menu/6/statistical_yearbooks/source/senaye_2025.pdf. /).*

It can be seen from Table 2 that the growth of product production in the food industry in 2015-2024 was close to 99%. However, the growth in the general industry and the processing industry in the country increased by 2.46 times, respectively. This indicates that measures should be taken to ensure the dynamic growth of the food industry, and primarily to accelerate the innovative development processes of this sector.

In Table 3, we have analyzed the volume of innovative products that have undergone significant changes or have been newly introduced in our country by types of economic activity.

**Table 3.**

**Volume of innovation products that have undergone significant changes or have been newly introduced in the Republic of Azerbaijan by type of economic activity, thousand manats (for 2015-2024)**

| Types of economic activity | 2015 | 2020 | 2021 | 2022 | 2023 | 2024 | 2015-2024: +/- |
|---|---|---|---|---|---|---|---|
| Industry - total, of which | 929,7 | 11759,7 | 60977,2 | 72826,9 | 62400,8 | 67579,4 | 72,7 times |
| Processing industry, of which | 929,7 | 9344,2 | 58133,8 | 68854,8 | 62400,8 | 67579,4 | 72,7 |
| Food production | | - | 3859,2 | 7307,3 | 2500,0 | 4000,0 | 9,9 times |
| Beverage production | 758 | | | | 1919,0 | 4901,0 | 6,47 times |

*Source: Prepared by the author based on data from the Azerbaijan Statistical Committee. https://www.stat.gov.az/source/industry/*

It can be seen from Table 3 that in 2015-2024, the volume of innovation products that have undergone significant changes or have been newly introduced in Azerbaijan by types of economic activity increased by about 73 times. However, we believe that this does not correspond to the industrial potential of our country, including the potential of the processing industry. Thus, in 2024, the volume of the total innovation product in the country's industry was about 68.0 million manats, and this figure is not that high. In the production of food products, only 4 million manats of innovation products that have undergone significant changes were produced.

Table 4 provides an analysis of the volume of improved innovation products in our country by types of economic activity for 2015-2024.

It is clear from this table that in the indicated period, the volume of improved innovation products in types of economic activity in Azerbaijan increased by about 33 times.

**Table 4.**

**Dynamics of the volume of improved innovation products in the types of economic activity in the Republic of Azerbaijan, thousand manats (for 2015-2024)**

| Types of economic activity | 2015 | 2020 | 2021 | 2022 | 2023 | 2024 | 2015-2024: +/- |
|---|---|---|---|---|---|---|---|
| Industry - total, of which | 589,7 | 16828,4 | 8305,8 | 38662,6 | 19254,5 | 19419,2 | 32,9 times |
| Processing industry, of which | 589,7 | 16828,4 | 8305,8 | 38662,6 | 19254,5 | 19419,2 | 32,9 times |
| Food production | | - | - | 17692,7 | 5000,0 | 1500,0 | - |
| Beverage production | ... | - | - | - | - | | - |

*Source: Prepared and calculated by the author based on data from the Azerbaijan State Statistics Committee. https://www.stat.gov.az/source/industry/*

We have given the amount of spending on technological innovations in Azerbaijani food industry enterprises in Diagram 3.

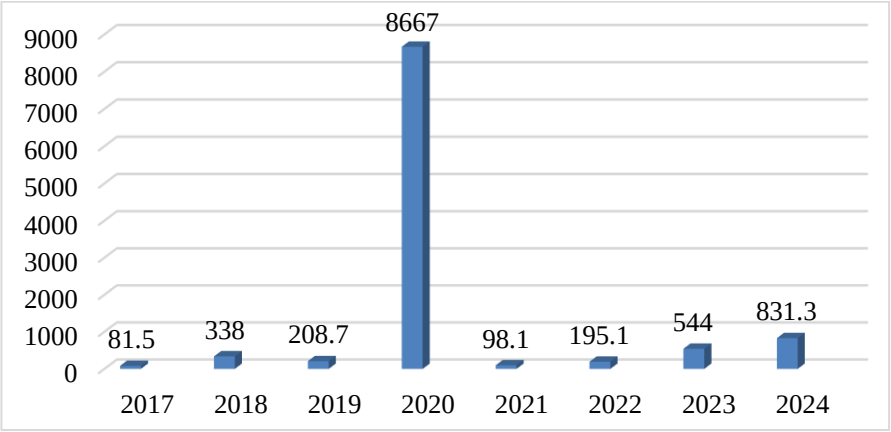



**Diagram 3. The volume of expenditures on technological innovations in the production of food products in Azerbaijan, thousand manats (2017-2024)**
*Source: SSC: https://www.stat.gov.az/source/industry.*

From the analysis of the diagram, it is clear that the volume of technological innovations spent on food production has increased unevenly. For example, in 2024, compared to 2020, the volume of expenditures on technological innovations for the production of food products decreased by 7,835.7 thousand manats or 10.4 times, while compared to 2023, it increased by 287.3 thousand manats or 52.8%.

In Diagram 4, we analyzed the volume of investments directed to the food industry in Azerbaijan.

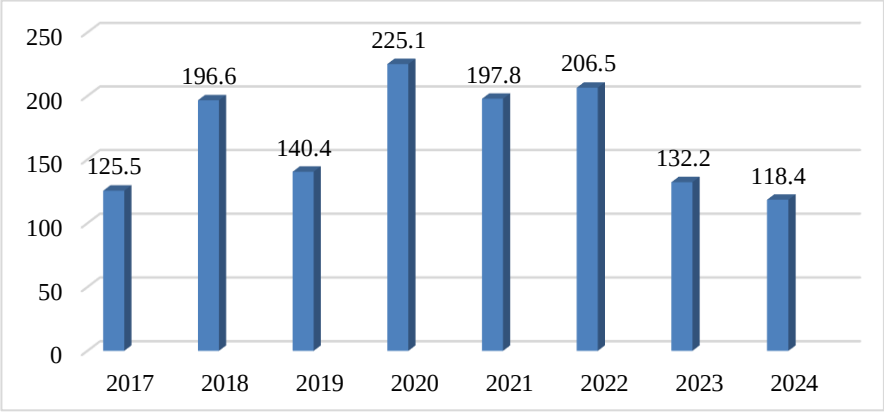



**Diagram 4. Volume of investments in the food industry in Azerbaijan, million manats (2017-2024)**

*Source: SSC: https://www.stat.gov.az/source/industry.*

As can be seen from the diagram, the volume of investments in the food industry has also increased unevenly. The volume of investments in this sector amounted to 118.4 million manat in 2024, which is the lowest indicator in the periods we studied. The specific weight of investments in this sector in investments in the country's industry was very small, namely 1.5%, which created difficulties in the innovation of this sector, which we observed in the analysis of expenditures on technological innovations and the volume of product output. In our opinion, the weakness of investments slows down the implementation of innovative initiatives in the sector.

It is known that financial provision plays an important role in expanding the application of innovations in food industry enterprises.

When analyzing the financial indicators of Azersun Holding for 2015-2024, several important trends emerge. In terms of sales revenue, the holding has generally shown growth during this period. Thus, while sales revenue in 2015 was 309.5 million manat, it reached 1661.6 million manat in 2024. However, this increase has not been stable over the years and a decrease is observed in 2017-2018. The cost of goods sold has also changed in the same direction and shows a rising trend in parallel with revenue, but sometimes a decrease in net profit was observed despite a higher growth rate in sales revenue. From the analysis of the main financial indicators in Table 5, it can be seen that the main financial indicators were more volatile in terms of net profit during the analyzed period.

**Table 5.**

**Main financial indicators of "Azersun Holding", million manats (2015-2024)**

| Years | Revenue from sales | Cost of goods sold | Net profit |
|---|---|---|---|
| **2015** | 309,5 | 212,6 | 96,9 |
| **2016** | 822,7 | 698,5 | 46,7 |
| **2017** | 792,7 | 694,5 | 27,1 |
| **2018** | 730,0 | 646,1 | 22,0 |
| **2019** | 1003,6 | 762,8 | 52,9 |
| **2020** | 952,1 | 664,9 | 72,87 |
| **2021** | 1522,4 | 1147,0 | 28,3 |
| **2022** | 1825,4 | 1360,3 | 15,2 |
| **2023** | 1810,9 | 1347,7 | 58,3 |
| **2024** | 1661,6 | 1213,9 | 43,97 |

*Source: Azersun Holding. Prepared based on https://azersun.com/az/about/maliyye-hesabatlari.*

This volatility shows that Azersu's revenue growth does not always coincide with profit growth, and the company's operating efficiency is directly related to cost and other expenses. From the analysis, we come to the conclusion that although Azersun has strong growth potential in terms of sales, it has had difficulty in achieving stability in terms of net profit. Cost growth and operating cost management directly affect the company's profit level, and this is one

of the main factors that cause volatility in financial performance. Indicators for 2023 show potential for recovery, but 2024's downward trend suggests that effective income management is still difficult. These or other uneven growth trends also cause difficulties for the holding's innovation.

It should be noted that the investment activity of "Azersun" has also been active, as we can see from table 6. When analyzing the investment activity of "Azersun Holding" in 2021-2024, the changes in costs for the purchase of intangible assets and land, buildings and equipment are noteworthy.

**Table 6.**

**Investment activity of "Azersun Holding", thousand manats (2021-2024)**

| Investment objects | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|
| Purchase of intangible assets | 371,2 | 1185,0 | 10366,2 | 1324,8 |
| Purchase of land, buildings and equipment | 49634,7 | 75128,3 | 79772,6 | 79505,9 |

*Source: Azersun Holding. Prepared based on https://azersun.com/az/about/maliyye-hesabatlari*

Investments in intangible assets amounted to 371.2 thousand manat in 2021, and increased to 1185 thousand manat in 2022, which is an increase of almost three times. In 2023, these expenses increased sharply to 10366.2 thousand manat, which is higher than in other years, which is most likely due to significant investments in new technologies, software or brand development. In 2024, expenses decreased to 1324.8 thousand manat, which means that after the sudden increase in 2023, they have relatively stabilized. Part of the investments is also directed to the agricultural sector. Modern irrigation technologies, seed production innovations and crop protection technologies are applied in this area. This increases productivity and minimizes losses in the production process.

This indicates that investments in long-term assets are carried out in a planned manner and are mainly aimed at strengthening

production, logistics or warehouse areas. These indicators reveal that the company attaches importance to technological modernization, material infrastructure, and that investments are made on the basis of a strategic plan. In general, the innovation strategy of Azersun Holding is one of the main factors ensuring the sustainable development of the company. The systematic application of technological innovations, digital solutions and environmental initiatives strengthens the company's market position and increases its competitiveness in local and foreign markets.

In particular, there are opportunities to create added value and gain more profit through innovative methods using food waste in the Azerbaijani food industry: 1) Biological and fermentation-based methods. 2) In terms of advanced extraction technologies, it is possible to form "green" alternatives for the recovery of bioactive compounds, including antioxidants, polyphenols, pigments, from waste. 3) Models consisting of Artificial Intelligence and machine learning integration technologies differ from traditional methods in their positive aspects in optimizing bioactive extraction. 4) In terms of recycling technologies, the demand for technologies to convert food waste biomass into value-added products has increased significantly. 5) Due to functional food and nutraceutical production technologies, additional opportunities are created for the production of important food products by creating a productive source of bioactive compounds, dietary fiber and proteins from by-products in the food industry. 6) Food waste management strategies, including biological conversion, thermal conversion, chemical conversion, mechanical and physical processing, through circular economy framework technology, help recover and utilize valuable resources from food waste.

We would like to pay special attention to one issue. Thus, in recent years, attention has increased to the application of high technologies in various sectors of the economy of Azerbaijan. In the digital environment and in connection with the intensification of the application of artificial intelligence mechanisms, the scope of similar technological applications is expanding further. Before these processes, the issues of using nanotechnologies were relevant.

Unfortunately, the situation regarding the application of nanotechnology in the food industry of Azerbaijan is currently mainly at the scientific research stage, and in this regard, we can say that the application processes on a large industrial scale are quite limited. We believe that a complex of special measures should be developed and implemented for the application of nanotechnologies in the food industry: 1) Active food packaging; 2) Nanomaterial-based protective coatings, medicines and medical devices, as well as packaging of food products, etc.

The third chapter of the dissertation titled **"Directions for solving the problems of innovative development of the food industry in Azerbaijan in the context of new challenges"** examines the state support, improvement of legal and financial mechanisms for ensuring the innovative development of the food industry in the country, the directions for preparing the Concept of Action for the innovative development of the food industry in Azerbaijan, and the ways to accelerate the innovative development of the food industry in Azerbaijan in the context of modern realities.

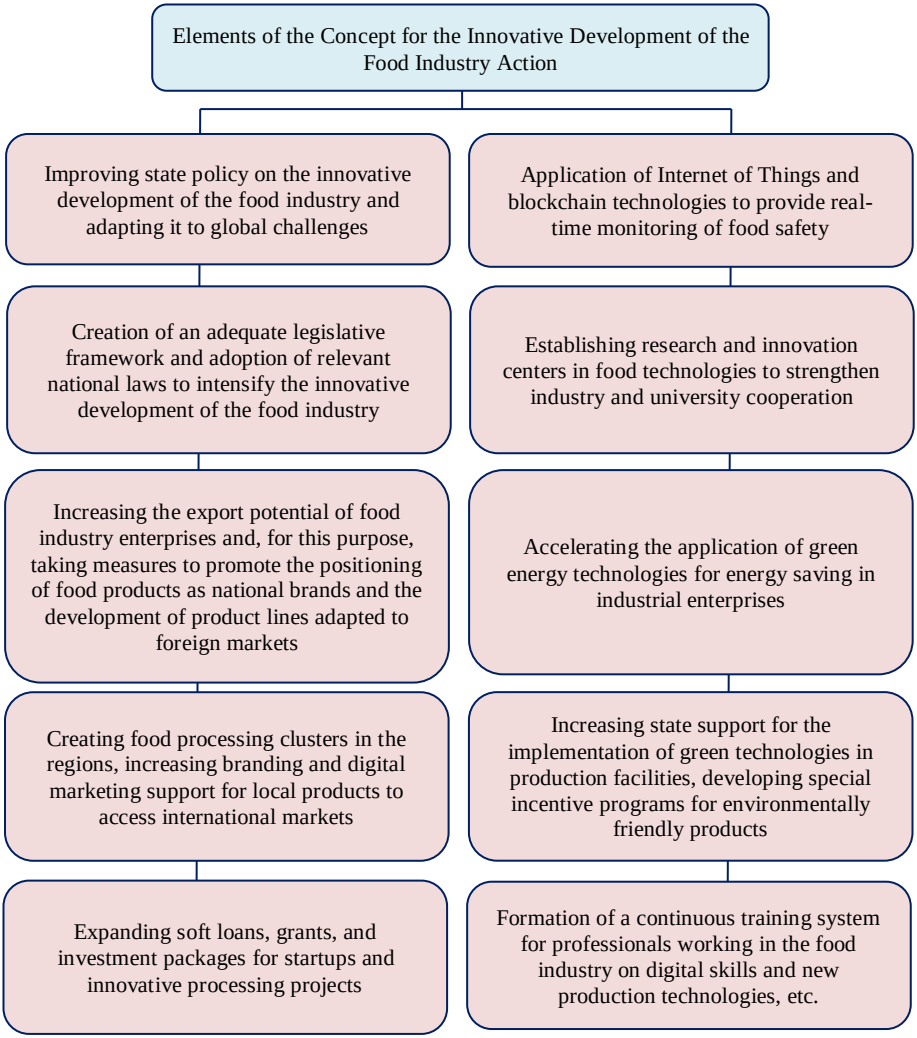
It should be noted that the role of legal factors and state support mechanisms in the more active application and transfer of innovative technologies in the food industry and its enterprises, and in taking into account scientific and technical innovations, is of exceptional importance. Thus, ensuring the innovative development of the food industry, on the one hand, strengthens the food security of our country, and on the other hand, forms additional potential for increasing the competitiveness of the non-oil and gas sector. In this regard, the role of a group of legal factors and state support mechanisms in the modernization, automation and digitalization of the food sector based on high technologies is great: 1) the regulation of innovative methods, digital and artificial intelligence mechanisms, as well as quality standards in the food industry plays an important role. 2) The Law of the Republic of Azerbaijan "On Food Safety" stipulates the creation of a risk-based control system at all stages of the food chain, including production, processing, packaging, transportation processes, and digital tracking of the movement of food products. 3) The Law "On Public-Private Partnership"

encourages the creation of agro-logistics centers, warehouses and innovative processing plants, which are of great importance for the food industry. 4) Within the framework of the "State Program on Ensuring Food Security in the Republic of Azerbaijan for 2027–2032", it is planned to provide family farms and small producers with innovative packaging, refrigeration systems and sterilization equipment, and to introduce mechanisms for subsidizing their laboratory tests.

It should be noted that ensuring the long-term sustainability of sustainable development, the formation of a "knowledge economy", the acceleration of high-tech production and the creation of new products are based on the expansion of innovation activity. Along with this, we would like to state that the environmental sustainability of the food industry is also an integral part of innovation. Waste recycling, the application of bioprocess technologies, the reduction of carbon emissions and the use of green energy accelerate integration into global environmental standards. The "smart village" and "green industry" concepts created in the East Zangezur and Karabakh economic regions of Azerbaijan can play the role of a pilot model in this direction.

State support for the innovative development of the food industry, effective organization of functional relations in the processes of legal regulation, financial mechanisms and the activities of international institutions, and determination of priority directions are important conditions. From this point of view, there is a need to take serious measures in terms of legal regulation and adopt relevant national laws. On the other hand, the state provides 10-year concessions to economic entities through technoparks, industrial parks, industrial districts, agroparks, and the relevance of this factor in the formation of reliable financial mechanisms is noteworthy.

The successful implementation of the Action Concept on Innovation of the Food Industry in Azerbaijan will create conditions for the formation of a high-tech, flexible, transparent and export-oriented industrial structure in the country's food sector, and we propose a group of key components of this Concept (scheme 2).




**Scheme 2. A group of key elements of the Action Concept on Innovation of the Food Industry in Azerbaijan**

*Source: prepared by the author.*

We believe that the proposals and directions of action provided in the Concept of Action can make a significant contribution to the innovation of our country's food industry. Thus, the implementation of the Concept of Action will create additional opportunities for the

innovative renewal of this industrial sector of Azerbaijan, the expansion of competitive product production, and the strengthening of the country's economic security.

During the research process, we identified a group of problems related to the functioning of the food industry in Azerbaijan and its innovation, and while summarizing important issues related to their solution, elimination of these problems, and measures that may have an impact, we also put forward a number of proposals:

– modernization and technical re-equipment of the country's food industry, expansion of the application of advanced technologies and product quality management systems have become a necessity of the modern era;

– optimization of the production capacities of the food industry and more active implementation of the transfer of high technologies should be brought to the fore;

– it would be useful to consider the issues of creating a wide network of supply points with a high level of centralization of agricultural raw materials sources, organizing cooperatives for joint processing and sale of products by agricultural producers and food production enterprises;

– we consider the design and creation of multi-component food products as one of the main directions of innovation activity in the food industry. The efficiency of these processes largely depends on the management of innovation processes. It is important to include in the scope of innovation process management in the food industry, first of all, the following: 1) deep processing of raw materials and 2) conducting research and experimental work that ensures the production of innovative food products;

– Since the food industry plays an important role in public health, food security, and social development, the quality, health, and hygiene indicators of this sector's products must be seriously considered.

**The following suggestions and recommendations of scientific and practical importance arising from the essence of the research are given in the "Conclusion" section of the dissertation.**

1) It is important to ensure investment attractiveness in the food industry and its enterprises for the production of innovative products, thereby attracting foreign investments and stimulating technology transfer. In addition, innovation-oriented enterprises should improve the qualification level of industrial personnel and create the necessary conditions for the development and implementation of innovation, research activities and the abilities and intelligence of enterprise employees. The application of an integrated approach to the innovative development of industrial enterprises will allow for their dynamic development and strengthening of competitiveness.

2) It is possible to ensure the interests of food producers and consumers, minimize food imports, develop the country's food industry, give a significant impetus to the development of agriculture and the main sources of raw materials for food production, and achieve food security of the country through the innovative development of the food industry.

3) The application of innovations in the food industry does not only consist of new technologies, but also requires strategic planning, sustainable management and a comprehensive ecosystem approach. If the Azerbaijani food industry takes consistent steps in this direction, it will not only provide the domestic market with quality products, but also strengthen the country's position in regional and global competition in this area.

4) In order to achieve the transition of the food industry and its enterprises, and the country as a whole, to a higher, qualitatively different level of development, there is a need to improve the management system of innovative development strategies and increase the efficiency of these strategies. The goals and objectives in this regard require the development of the “Concept for Effective Management of Innovative Activities of the Food Industry and Its Enterprises”, which covers all levels of innovation management.

5) The proposed Concept should be developed taking into account foreign experience in the field of innovation management and the

current state of innovation management of local enterprises, as well as the specifics of our country's transition to the path of innovative development. For this purpose, management of innovative development activities should be implemented systematically.

6) If the level of efficiency of management of innovative development strategies in the food industry and its enterprises is characterized as satisfactory, it is necessary to develop the potential for innovative development, further strengthen its strengths, and eliminate weaknesses.

7) Taking into account the near and far perspectives, in order to systematically consider and solve the problems of innovative development of the food industry, which are of strategic importance in our country, and to increase the production of innovation-based food products, we propose the preparation and implementation of the "State Program on Solving Problems of Innovative Development of the Food Industry in the Republic of Azerbaijan in 2026-2035". This can create more favorable conditions for the practical application of innovative development models derived from international experience during the implementation of the program and the preparation and implementation of mechanisms in accordance with the priorities of the economic and innovative development of our country.

**The main content of the dissertation work was published in the following scientific works:**

1. Theoretical approaches to the processes of innovation of industrial sectors and enterprises in the modern era. // – Baku: Western Caspian News, 2023, No. 04. – pp. 158-164.

2. Assessment of the processes of expansion of innovations in the food industry in a global context. // – Baku: Construction Economics and Management" journal, 2024, No. 02. – pp. 219-225.

3. Directions of food industry innovation in Azerbaijan in the context of post-conflict areas. // – Baku: Republican scientific and practical conference on "The role of the National Leader Heydar Aliyev in improving the environment in Azerbaijan", 2024, May 15, – pp. 233-239.

4. International experience in food industry innovation. // – Baku: Geostrategy journal, 2024, No. 06 (84). – pp. 198-202.

5. Strengthening the efficiency of mechanisms for innovation of the food industry of Azerbaijan in the new conditions. // – Moscow: XII International scientific and practical conference World globalization: Fundamental and applied aspects", January 30, 2025, – pp. 48-58.

6. The current state of innovation activity and innovation of industrial sectors in Azerbaijan. // – Baku: Scientific and practical journal “Cooperation”, 2025, No. 03 (78). – pp. 80-88.

7. Regulation of problems of innovation activity in the food industry and strengthening its legal framework. // – Moscow: Journal “Monetary economics and management”, 2025. No. 07. – pp. 158-165.

8. The strategic importance of innovation in industrial sectors in building a green economy. // – Sumgayit: I International scientific conference on “Actual problems of efficient use of economic resources of Turkic-speaking states” to be held at Sumgayit State University, jointly organized by Sumgayit State University, Malatya Turgut Ozal University and Osh State University, May 22-23, 2025. – pp. 311-314.

9. Problems of innovation and development drivers of the food industry in the context of global transformations. Materials of the international scientific and practical conference on “Economic and social development of Azerbaijan in the context of new realities: problems, challenges, prospects” dedicated to the 60th anniversary of the Azerbaijan Cooperation University, Baku, December 06, 2025. – pp. 571-575.

10. Modern problems and prospects of food industry innovation in the context of international experience. // – Poland: World Conference on Emerging Science, Innovation and Policy. –2025. Vol. 3, – pp. 82-92.



The defense will be held on 11 November 2026 at $16^{00}$ at the meeting of the Dissertation council FD 2.46 of Supreme Attestation Commission under the President of the Republic of Azerbaijan operating at Azerbaijan Cooperation University.

Address: AZ1106, Azerbaijan Republic, Baku city, Narimanov district, Najaf Narimanov street, 93.

Dissertation is accessible at Azerbaijan Cooperation University Library.

Electronic version of the abstract is available on the official website of the Azerbaijan Cooperation University (www.aku.edu.az).

Abstract was sent to the required addresses on 9 October 2026.

Signed for print: 07.10.2026

Paper format: 60 x 84 1/16

Volume: 43989 characters

Number of hard copies: 20 pcs