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## Economical Sciences

# THE ROLE OF INNOVATIONS AND THEIR IMPACT ON THE ECONOMY OF THE FOOD INDUSTRY IN THE NAKHCHIVAN AUTONOMOUS REPUBLIC

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## Abstract

Innovation is inevitable to ensure development in any field, and one of the areas to be developed is the food industry. Innovation strategies in the food industry should be based on the overall technology of the food system and should be associated not only with technological changes but also with social and environmental changes. Thus, during food production, it is necessary to develop a product that meets personal desires and social needs. The application of new techniques resulting from the development of technology in modern industrial enterprises is the main direction of economic activity in these areas. The replacement of existing equipment with innovation-oriented equipment, of course, has a positive impact on the activities of enterprises. Thus, the products produced by the existing technology lag behind modern requirements, and as a result, the enterprise suffers. When we look at the world experience, the widespread use of new technologies in production relations also ensures the competitiveness and flexibility of the production process by further increasing the existing capabilities of industrial enterprises. The article examines the share of food industry enterprises in the economy of the Nakhchivan Autonomous Republic and the need to apply innovative ideas and technologies to increase this share and notes the results obtained.

**Keywords:** Innovation, industry, food industry, R&D, economic development.

## I. INTRODUCTION

The word innovation is a combination of the Latin words "innovare" and "innovatus", which means "to renew or change" [12]. The founder of the theory of innovation is an Austrian political economist Joseph Schumpeter (1883-1950), a US citizen and professor at Harvard University. The professor clarified the concept of innovation in The Theory of Economic Development published in 1912.

According to Schumpeter, the competitiveness of products and the dynamics of economic development depend on "innovation", ie the growth of innovations. The economist divided innovation into 5 classes, which are as follows:

- Production of a new product or a new type of already used product
- Application of new methods in the production or sale of products
- Creating new sales markets
- Finding new sources of supply for raw materials or semi-finished products
- Creating a new industrial structure

It is expedient to carry out innovative activities to reduce the costs incurred during the production process and achieve high profits, along with the use of new techniques in the production of products in industrial enterprises, improvement as a result of changes in the technological structure of the enterprise. Based on Schumpeter's research, we can say that entrepreneurs who want to innovate their enterprises must use new ideas to increase the competitiveness of their products, conduct experimental research, produce a new product or a new type of existing product in accordance with consumer demand, and create a new management structure. Use new methods and conduct marketing research to prevent problems that may arise in sales markets.

At present, the level of productivity and production structure of the country's economies is of great importance in terms of ensuring sustainable economic development and improving welfare. At a time when the range of products and services is growing, there is a tendency for companies to focus on research and development activities in order to make a difference in the market, develop new products and take a step forward in this competition.

Research and development activities - development of new products, improvement of product quality or standard, application of cost-cutting and standard-raising methods, research for the development of new production technologies, and the creation of new techniques for the application of these research results, improvement of existing one's studies. This activity aims to produce a more efficient and cheaper production of an existing product or a product that has never been produced but is planned to be produced in the future. The research and development work carried out by the company is the basis of its innovative activities. The innovative activity of the enterprise has a significant impact on its commercial results, creating conditions for improving the quality and technical level of products, increasing and updating the product range. Research and development activities are divided into three types in terms of the use of results: fundamental research, applied research, and experimental development. In terms of the use of fundamental research, it is experimental or theoretical research aimed at acquiring new knowledge without defining a specific purpose. Applied research is research aimed at acquiring new knowledge for practical use in the development of innovations. Experimental development is an activity based on knowledge or practical experience gained as a result of scientific research and provides for the creation or future improvement of new products, materials, processes, equipment, services and systems, methods. There is a strong correlation between the amount of research and development expenditures of countries and their economic development, level of competitiveness, and income. Factors influencing the volume of research expenditures include the level of development of the country, the structure of the economy and industry, the number of large companies in the country, the level of training of technical staff, the country's science and technology infrastructure, access to foreign markets, government support. Can be attributed. Expenditures on such activities bring several advantages to the country's economy:

- Competitive advantage;
- Attracting foreign investment;
- Productivity increase;
- Reduction of technological dependence.

The share of the budget allocated to research and development expenditures in GDP, which shows the importance of science and technology, is one of the main indicators of a country's development. In developed countries, the share of these costs in GDP is more than 2%. Currently, about 20% of the world's research costs fall in about 20 developed countries. Developing countries, which make up 70% of the world's population, pay only 5% of these costs.

Research and development stimulate the development of science-intensive industries, which reduces the energy and resource capacity of production, creates new progressive materials, and ensures the transition to environmentally friendly production. In a market economy, scientific and technological development is one of the most important elements of economic strategy. An undervaluation of this element can result in an enterprise soon losing market share.

It is expedient to carry out innovative activities to reduce the costs incurred during the production process and achieve high profits, along with the use of new techniques in the production of products in industrial enterprises, improvement as a result of changes in the technological structure of the enterprise. Based on Schumpeter's research, we can say that entrepreneurs who want to innovate their enterprises must use new ideas to increase the competitiveness of their products, conduct experimental research, produce a new product or a new type of existing product by consumer demand, and create a new management structure. Use new methods and conduct marketing research to prevent problems that may arise in sales markets.

## II. DISCUSSION

As we have mentioned, the word Innovation appeared in the 19th century with a combination of the Latin words "innovare" and "innovatus". The founder of the theory of innovation is a professor at Harvard University, originally an Austrian political economist Joseph Schumpeter, and the world-famous scientist Nikolai Dmitrievich Kondratyev, one of the leading Russian economists of the twentieth century [6]. However, in the development of the theory and the emergence of new aspects, S. M. Valdaydev, B. Twiss, A. I. Yakovlev, M. A. Bendikov, Y. A. Muravyova, S. Y. Qlazyev, L. N. Vasilyeva, F. Aqion, Y. B. Lenchuk, T. A. Grosfeld, N. Nelson, N. Y. Pavlyuk, P. Xeovut, L. T. Qilyarovskaya, V. I. Kushlin, V. D. Parkhomenko, V. L. Baburin, D. Bell, Y. V. Ovsyienko, A. A. Dinkin, A. V. Basova, V. O. Kolosov, S. I. Kravchenko, N. M. Fongstein, G. Y. Goldstein, Y. A. Goxbert, I. G. Mantsurov, D. I. Kokurin, Y. V. Yakovets, V. J. Kelle, V. G. Matveykin, N. Nelson, S. A. Valdaytsev, G. A. Vlaskin and other scientists can be mentioned. In their works, the authors explore various aspects that positively and negatively affect the development of innovation in industry, the problems of innovation management and improving the level of the innovation process in enterprises. In Webster's dictionary, innovation is defined as doing something new or presenting it in a different way. (webster.com).

In the world economic literature, innovation is interpreted as the realization of potential scientific and technological progress, the embodiment of new products and technologies [16]. All technical, organizational, economic, and managerial changes are seen as innovations, in addition to existing practices within the organization. From the moment it is adopted for distribution, innovation acquires a new quality - it becomes an innovation. The process of bringing innovations to market is often called commercialization [13]. Innovation is the process of realizing ideas and information following the requirements that will ensure consumer satisfaction, the implementation of innovation, and the results of the creative process [15].

Innovation classifies it according to the method of work, the concrete results obtained from the innovation process, the degree of innovation, the content of the subject, the form of influence, the coverage of the main areas of activity. There are different types of innovation strategies, such as aggressive innovation strategy, protectionist strategy, transition strategy, absorption strategy, imitation strategy, and predatory strategy [14].

Problems and theoretical-methodological bases of development of innovative activity in the industry and increase of its efficiency Azerbaijani economists: S.Q. Karimov, A. F. Musayev, Z. M. Najafov, R. A. Agayev, F. H. Gasimov, V. M. Valiyev, Sh. A. Samadzade, A. D. Huseynova, G. A. Safarov, Y.R. Abdullayev, Y.U. Hasanli, T. N. Aliyev, A. A. Nadirov, R. T. Hasanov, R. M. Jabiiev, TA Huseynov, R. K. Isgandarov, A. H. Tagiyev, V. T. Novruzov, and reflected in the works of others.

T.A. Guliyev notes that innovation is the product of a new idea and classifies change as follows:

1. Intellectual sphere;
2. In the material elements of the productive forces;

3. On the basis of innovation of the national economy;
4. In the division of social labor;
5. Scientific potential;
6. Resource provision of innovation activity;
7. In the system of stimulating innovation activity;
8. In investing in innovation [10].

According to M. C. Atakishiyev and Q. S. Suleymanov, innovation characterizes the quality of investment as well as the combination of measures to offer the latest labor products to meet the needs of consumers based on the achievements of science and technology in a market economy [3]. A. Abbasov writes in his book Fundamentals of Business (2005): Some economists try to equate the concepts of "innovation" and "innovation". We strongly disagree with this opinion. Innovation is the result of fundamental, applied research, development, or experimental work to increase the efficiency of production in any field of activity. It can be in the form of innovation, invention, discovery, patent, trademark, rationalization proposal. Innovation is the result of the application of innovations to change the object of management and achieve economic, social, environmental, scientific, technical, and other effects [1]. Innovation is the result of applied innovation when we analyze the processes of innovation, we see that they also perform functions of a socio-economic nature. As noted in the world economic literature, innovation performs two main economic functions - stimulation and reproduction. By performing the function of reproduction, innovation acts as an important source of financing for large-scale reproduction. Revenues from the sale of innovations in the market act as a source of financial resources and at the same time a measure of the efficiency of the innovation process, creating entrepreneurial profits.

In the innovation literature, the food industry is generally classified as a sector with low research intensity and has one of the lowest R&D sales ratios of any industrial sector. Moreover, the rate of technological change in this industry, measured by the number of patented inventions, appears to be less dynamic than in other manufacturing sectors [7]. Recently, Beckeman & Skjolkebrand assessed the level of innovation in the food industry, noting that "very little innovation ranks first in the food industry" [4]. However, due to the transition of technology from the era of production to the information age, the era of service, the food sector continued to grow and continues to grow faster than in previous years.

Innovations in the food industry often focus on the development of important substitutes by following nutritional guidelines or following dietary supplements guidelines. These are usually new or improved consumer products and services and may focus on an area of food technology such as process engineering, product formulation, food quality, or consumer needs. Among all the innovations implemented in this industry, researchers recognize functional food as one of the most interesting areas of research and innovation [11]. Their relevance is associated with rising health care costs, a steady increase in life expectancy, and the desire of older people to improve their quality of life in later years [5].

### III. RESULTS

Markets are full of consumers with different requirements, constantly changing food choices. For a food industry to find a place in the market, it is important to obtain information about the new market, to study the ever-changing trends of consumers, and to be able to anticipate the social, economic, and political conditions. Building strong customer relationships is important to reduce the risk of failure when new products are introduced or when you "innovate" in the production or packaging of an existing product. The majority of consumers in the world market are aware of the development trends of food production and do not prefer large-scale industrialized foods. Thus, consumers pay more attention to "Clean Labels".

What is a Clean Label? Clean labeling means making a product using as few additives, colorants, or any other substance as possible in the product, and making sure that these ingredients are known to

consumers as useful or beneficial that they can use at home. Some consumers are frightened when they see a "scientific" substance in their favorite food. For example, if you mention that your product contains tocopherols, consumers may react negatively in fear. However, if you say that your product is rich in vitamin E, you will get not only a negative but also a positive reaction. The clean label shows both so that consumers do not have unnecessary doubts. Consumers' interest in natural, delicious, and safe products with a clean label is constantly growing. As consumer demand for carcinogenic substances (artificial flavors such as benzophenone, ethyl acrylate, pyridine, and styrene) decreases, manufacturers are trying to replace these substances with natural ones during production. To produce a competitive product, large companies were forced to abandon colorants and flavorings during production. Preferring the production of products that are accepted as a pure label to gain access to the world market and produce a competitive product will help to achieve a high level of development of the food industry in the autonomous republic. Consumers have a strong distrust of food producers when foodborne illnesses occur. Consumer consciousness and care have increased significantly in modern times. Thus, globalization has increased the transportation of animals, humans, and consumer goods, which in turn has led to the risk of the rapid spread of infectious diseases. Food safety pandemics, such as bird flu, swine flu, and the biggest problem today, Covid-19, are very difficult to prevent and spread, so food safety must be strictly adhered to.

The global clean label components market is expected to grow at a Compound Annual Growth Rate of 6.75% over the forecast period (2021-2026). Since the onset of the COVID-19 pandemic, people have become more attentive to food than ever before and are eating healthier than ever. COVID-19 has also taken the consumer's concept of cleanliness beyond labels or products. Consumers continue to pay attention to clean labels for indoor and outdoor shopping, so this factor further enhances the application of clean label ingredients in various food applications.

The growth of the market is mainly due to the growing interest among health-conscious consumers in identifying ingredients in food and beverages around the world. Free products have been growing rapidly on retail shelves in all formats in the recent past. The growing demand for transparent and natural ingredients for children has led parents to prefer foods with clean labels for their children. Europe is one of the leading markets for a wide range of innovative food preservation technologies and pure labeled ingredients [2]. This has been greatly facilitated by the presence of major pure label content producers who are constantly researching and promoting innovative products.

The high cost of pure components is a limiting factor in market growth. The beverage and dairy industry has the maximum share at the application level.

Pure label ingredients are natural, minimally processed, and contain no additives or preservatives. The Pure Label Ingredients market report includes a study of segmentation by type of ingredients such as colorants, flavors and enhancers, food sweeteners, preservatives, starches, and other ingredients. According to its application, the market is divided into beverages, bakery and confectionery, sauces and spices, milk and frozen desserts, meat and meat products, and other applications. Geographically, the market is divided into North America, Europe, Asia-Pacific, South America, the Middle East, and Africa. Market size and estimates are based on value for each segment (in millions of US dollars) [9].

The following table shows the volume of products that have undergone significant changes or are newly introduced as a result of the application of innovative activities in the field of industry in Azerbaijan.

Table 1. Volume of innovative product that has undergone significant changes or is newly applied, thousand manats

Economic activity	2016	2017	2018	2019	2020
All industry	35746,9	14676,7	28952,2	21698.1	11759.7
Mining industry	129,6	0	215,3	2495.7	2415.5
Manufacturing	35617,3	14676,7	28736,9	19202.4	9344.2

Of which:					
Food Industry	444,0	589,5	831,2	328,0	0

Source: Prepared on the basis of figures of the State Statistics Committee of the Republic of Azerbaijan.

The volume of innovative products in the processing industry mentioned in Table 1 in 2016 amounted to 35,617.3 thousand manat, of which 1% falls on the food industry. The main reason for the increase in this percentage in the coming years, i.e. 4% in 2017, 2.9% in 2018 and 1.7% in 2019, as noted in the State Program for Industrial Development in the Republic of Azerbaijan for 2015-2020, is "International experience shows that the growth rates and stages of development of the industry vary according to the income level of the countries. As countries develop, low-tech and labor-intensive food, light and furniture industries are gaining ground in mid-tech chemistry, metallurgy, shipbuilding, machinery and equipment." The reason for the 0% in 2020 was the spread of the pandemic in the world as a result of the spread of the COVID-19 virus, which caused serious economic crises that shook the world. The COVID-19 pandemic, which began in Wuhan, China in December 2019, has spread to 213 countries in a very short time, and as of May 2020, about 5 million people were infected and 330,000 people died. The COVID-19 pandemic has affected almost all social activities, from tourism, medical supplies, other global supply chains, electronics and financial markets, energy and food markets [8]. Now let's analyze the costs of technological innovation in industry in Azerbaijan.

Table 2. Expenditures on technological innovations by types of activity, thousand manats

Economic activity	2017	2018	2019	2020
All industry	16135.7	16135.7	16135.7	16135.7
Mining industry	31.7	1386.0	378.6	1001.1
Manufacturing	16104.0	32967.6	47658.5	34918.7
of which:				
Food Industry	232.5	338.0	27844.8	8667.0

Source: Prepared on the basis of figures of the State Statistics Committee of the Republic of Azerbaijan.

As can be seen from Table 2, the cost of technological innovations in the whole industry in 2017 amounted to 16135.7 thousand manat, which is the main share of the processing industry here and in the coming years. The highest increase in expenditures on technological innovations in the food industry was observed in 2019. Thus, expenditures on technological innovations in the food industry in 2017 were 1.44%, in 2018 - 1.03%, in 2019 - 58%, and in 2020 - 24.5%. The main reason for the high growth in 2019 compared to other years was the tobacco industry. During this period, the cost of technological innovations in the production of tobacco products amounted to 26994.1 thousand manat. Now, I have analyzed the results of the development of the food industry in the Nakhchivan Autonomous Republic, the labor market and, most importantly, the importance of innovative technologies and ideas for a special place in the development of the economy. The food industry in the Nakhchivan Autonomous Republic ranks first in terms of the number of employees and the amount of products produced. Thus, the indicator of socio-economic development of the State Statistics Committee of the Nakhchivan Autonomous Republic states that 127 types, 608 types of food, 257 types, 925 types of non-food products, a total of 384 types, and 1533 types of products were produced. The fact that the demand for 350 types of food products, including 242 types of non-food products, and 350 types of products is met entirely by local production, indicates a significant reduction in dependence on imports and meeting the needs of the population with quality products. The table below shows the number of employees in the food industry, where the number of employees in the food industry has been constantly increasing over the years and has maintained its leading position in this field.

Table 3. Average number of employees in industry in the Nakhchivan Autonomous Republic

Economic activity	2010	2012	2014	2016	2018	2020
All industry	12855	15095	15549	15987	16557	16913
Mining industry	92	126	492	582	697	688
Manufacturing	10037	12187	12101	12395	12829	13156
Of which:						
<b>Food Industry</b>	<b>4538</b>	<b>5100</b>	<b>5176</b>	<b>5196</b>	<b>5328</b>	<b>5458</b>
Manufacture of textiles and sewing	803	881	899	911	945	972
Manufacture of leather and related products	178	194	208	219	234	246
Manufacture of wood and woodwork	359	498	507	512	521	532
Paper products, printing production	363	395	411	418	432	453
Chemical industry	91	105	120	124	137	152

Source: Prepared on the basis of figures of the State Statistics Committee of the Nakhchivan Autonomous Republic.

As can be seen from Table 3, the food industry in the autonomous republic ranks first in terms of the average number of employees, and as the population grows, so does the number of people working in this field. The number of people employed in the food industry increased to 45% of those employed in the processing industry in 2010, 41% in 2012, 42% in 2014, 41% in 2016, and 2018 and 2020, respectively. In the year it was 41.5%. In general, between 2010 and 2020, there is a 20% increase in the average number of people employed in the food industry. As the food industry operates on the basis of local raw materials, this sector is constantly developing in the autonomous republic, and as a result, there is an increasing trend in both quality products and the number of people working in this field.

#### IV. CONCLUSION

Every enterprise that wants to operate effectively in a modern market economy must ensure the change of products, production and management processes, the purchase of new equipment, and the implementation of scientific research, quality changes in the production process. The introduction of new techniques is one of the main directions of innovation. The development of innovations based on new knowledge, technological processes in industrial enterprises depends on the formation of a national innovation system. It is necessary to create a national innovation system in order to ensure the role of innovation in the implementation of national security policy, economic, social and other development.

The main objectives of innovation activities in our country are:

- replacement of obsolete products with new ones;
- improving the quality of the product or service;
- expanding the range of products, types of services;
- creation of new sales markets along with maintaining traditional sales markets;
- ensuring compliance of the innovation process with modern rules and standards;

- ensuring the flexibility of the production process;
- reduction of material expenses and salary expenses;
- Ensuring environmental safety.

Ensuring the development of the food industry requires the implementation of the following measures:

- 1) Creation of new enterprises on the basis of modern technologies and strengthening of the local raw material base;
- 2) Study and application of foreign experience in the improvement of processing and production enterprises representing small and medium businesses;
- 3) Provision of necessary support by the state to enterprises in the direction of modernization;
- 4) Creation of a favorable environment for attracting investments and supporting investment projects, etc.

As the main indicator characterizing the development in 2021, the gross domestic product was 2 billion 907 million 810 thousand 500 manats, of which the first place was taken by the industrial sector with a share of 27.6 percent. The purposeful and successful implementation mechanism of the State Programs on socio-economic development of the regions contributes to the achievement of high prospects in the policy of industrialization and continues to do so. One of the key issues for the application of innovative technologies in the food industry is the availability of highly qualified professionals. When investing in these areas based on high technology, if human capital is low, it will not work. Thus, the volume of investments in human capital is growing rapidly in developed countries.

In countries with the highest competitiveness, high technology, and education, human capital is the main driving force. That is why it is important in our country to train professionally qualified personnel and increase investment in human capital, using the experience of advanced countries.

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# РОЛЬ ИННОВАЦИЙ И ИХ ВЛИЯНИЕ НА ЭКОНОМИКУ ПИЩЕВОЙ ПРОМЫШЛЕННОСТИ НАХЧЫВАНСКОЙ АВТОНОМНОЙ РЕСПУБЛИКИ

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## Аннотация

Инновации неизбежны для обеспечения развития в любой области, и одно из направлений, которое необходимо развивать, - это пищевая промышленность. Инновационные стратегии в пищевой промышленности должны основываться на общей технологии продовольственной системы и должны быть связаны не только с технологическими изменениями, но также с социальными и экологическими изменениями. Таким образом, при производстве продуктов питания необходимо разработать продукт, отвечающий личным желаниям и социальным потребностям. Применение новых технологий в результате развития технологий на современных промышленных предприятиях является основным направлением экономической деятельности в этих областях. Замена существующего оборудования на инновационное, безусловно, положительно сказывается на деятельности предприятий. Таким образом, продукция, производимая по существующей технологии, отстает от современных требований, в результате чего страдает предприятие. Если посмотреть на мировой опыт, то широкое использование новых технологий в производственных отношениях также обеспечивает конкурентоспособность и гибкость производственного процесса за счет дальнейшего расширения существующих возможностей промышленных предприятий. В статье исследуется доля предприятий пищевой промышленности в экономике Нахчыванской Автономной Республики и необходимость применения инновационных идей и технологий для увеличения этой доли, а также отмечаются полученные результаты.

**Ключевые слова:** Инновации, промышленность, пищевая промышленность, исследования и разработки, экономическое развитие.

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