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Modern Problems and Prospects of Food Industry Innovation in the Context of International Experience

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Abstract: The article examines the modern challenges and opportunities for food industry innovation in the context of international experience. The experience of developing and innovating the food industry across a group of countries worldwide is examined and summarized. The prospective directions of food industry innovation are studied. The factors and concepts of action that determine the development of the food industry in the modern era are taken into account. The importance of conducting an in-depth study of international experience is acknowledged, and its significance is noted. Solutions for food industry innovation are provided, and proposals are made in response to global challenges. The role and importance of international experience in the development of Azerbaijan's food industry are discussed.

Keywords: international experience, countries of the world, food industry, problems of the food industry, problems of innovation of the food industry, development directions of the food industry.



Introduction

In modern times, the development of the country and its industries is influenced by the proper use of its economic potential. The problem of efficient use of economic potential is one of the main problems of economic science. The essence of this problem is to find ways and means to achieve the greatest satisfaction of infinite social needs in conditions of limited resources. Accordingly, the general economic potential of the state should be examined from the position of the resources available and usable in the country's economy and from the position of the ability to carry out entrepreneurial activity in the production of products with the help of resources available in the country's economy (Aliyev Sh.T., 2014). Currently, systematic measures have been identified in our country to create a strong national economic potential capable of responding to global shocks, to improve food security and the quality of life of the country's population. In this regard, it is important to provide technical equipment to enterprises operating in the development of the food industry, attract foreign investments, technology and innovations, establish cooperative relations with other food and agricultural product manufacturers, and bring the quality of raw materials and finished products to world standards (Quliyev, Z.Q., 2021).

Research Aim and Research Questions

The purpose of the study is to systematically study and generalize international experience in the development and innovation of the food industry in the context of modern global transformations. In this regard, the concepts of action for the development and innovation of the food industry of a group of countries of the world were considered. At the same time, important issues for a more efficient organization of the food industry were considered in a comprehensive manner, and the importance of applying more advanced mechanisms and tools in this regard was substantiated from a practical point of view.

Research Results

In recent years, almost 30% of all projects implemented in the US food industry have been financed from the federal budget. Also, the largest source of resource support for innovation projects is the own resources of American firms and food industry corporations, whose share is almost 60% of all expenses incurred for the development of innovative products and technologies. Today, neither state laboratories nor universities can compete with the corporate sector in the food industry innovation market in terms of the number of inventors, the volume of expenses, and the number of patents obtained. Also, most scientific research is carried out in the commercial sector of the US food industry innovation market, and all technological innovations necessary to ensure high rates of innovative development of the economic system of this industry are mastered (Aliyev, Sh.T., Babayev F., Gafarli G., Galandarova U., Balajayeva T., 2023). The USA has one of the most developed organizational and legal infrastructures for supporting innovation activities. Despite the high activity of private business, the state has a significant direct and indirect impact on increasing the competitiveness of the national industry by supporting scientific and innovative activities. In recent years, almost 30% of all projects implemented in the US food industry have been financed



from the federal budget. A sufficiently high level of tension in internal competition in the Japanese food industry makes technological innovations an essential condition for the success and survival of innovation market entities. The important regions where China's food industry is developing are Shandong, Hebei, Hunan and Guangxi. These regions are known for their agricultural resources, high technology level and developed infrastructure (Китай: Земля легкой и пищевой промышленности, 2023). Foreign investment, which China's food industry has used for more than 20 years to rationally solve the problems of capital shortage, has recently become a tool for acquiring new ideas, technologies and experience. China has offered most Western investors full access to Chinese commodity markets and the exchange formula for this access with modern innovative technologies. After China joined the WTO, the food industry is trying to direct foreign investment to the development of enterprises that allow the industry to produce products with high added value.

The French food industry is associated with increasing the efficiency of the regional segments of innovation markets. For example, to ensure the growth of finance, production and mobility of people, it is important to have advanced technologies and innovation market entities and, first of all, regions that are ready to accept these entities. In order to strengthen activities in this direction in the regions, financial mechanisms must first be resolved (Алиев Ш.Т., 2009). Digər tərəfdən, In France, in recent years, a "regional innovation revolution" has taken place, which has led to a transformation of processes in the internal organization of the innovation space. A network model has been created that projects innovative relationships into a specific territory where innovation market entities and the food industry are located. The network model includes innovation clusters and food industry enterprises operating together with innovation market entities (Алиев Ш.Т., 2009). Relying on innovative technologies in the food industry, French regional authorities have included local geographical features in the priorities of the activities of innovation market entities. Important methodological prerequisites for the innovation of the food industry in France are considered to be: the development and implementation of projects for the introduction of innovations in the French food industry at the local or regional level. Industry is one of the factors determining the successful development of Germany. Because industrial enterprises reduce unemployment, new jobs are created at their expense. Developed industry in the country allows exporting more goods than importing, which affects the growth of GDP and the country's economy as a whole. With limited raw materials resources, the German economy is more export-oriented (Алиев, Ш.Т., 2015). The factor that determined the high competitiveness of manufactured products was ensuring their high quality. This allowed Germany to become a leader in European foreign trade and increase exports to 33% of GDP. Germany exports automobiles, vehicles, chemicals, metals, food and textile products from the country (Грамадик, Е.А., 2017). The main partners of innovation in the German food industry are the USA, Great Britain, France and Italy. The share of the innovative food industry in Germany has remained at a fairly high level for many years. Approximately 50% of the food industry interacts with innovation market entities. Accordingly, it has brought almost 40% of all innovative products produced and 45% of all innovative processes developed to the commodity markets.



The experience of Russia in the field of innovation in the food industry is also of interest. Positive dynamics are observed in the development of the food industry in Russia, which is associated with the increase in the production of local agricultural products and raw materials. In general, the problem of sustainable provision of the country's population with basic food products has been solved. At present, despite the development of the food industry in Russia, some problems remain here. The war with Ukraine prevents the solution of these problems. One of the main problems is the limited availability of raw materials. As agriculture declines, the country's population grows, and existing farms do not meet the demand for the production of eggs, milk and meat products. Due to continuous production and large volumes of products, equipment for the food industry quickly wears out and breaks down. Therefore, it is important to timely update the technical base to maintain the priority position of the country's food industry (Акимова, Р.А., 2022).

One of the promising areas for the development of the food industry is nanotechnology. Nanotechnologies for product packaging are of great interest to developed companies. The application of nanotechnologies in the food industry is of particular importance in solving the world's food problem. The world's largest food companies are actively engaged in research in this area. The United States leads in investment in the development of nanotechnology, followed by Japan, China and the European Union. In the United States, the government annually allocates about \$ 1.6 billion to the National Nanotechnology Initiatives program, aimed at creating food industry products. One of the most important problems at the current stage of development of the country's economy and society is the problem of food security and providing the population with food products (Алиев, Ш.Т., 2010). The objective need to saturate the country's food market with locally produced products implies the efficient operation of the food industry, because ultimately not only the standard of living of the population, but also the development of the economy as a whole depends on its volume. The food industry of Azerbaijan is one of the strategic sectors of the economy and is designed to continuously provide the population with the necessary quantity and quality of food (Алиев, Ш.Т., 2020). The food industry (food, meat and dairy products, fish, flour and cereals, etc.) accounts for more than half of the food turnover. This industry produces almost all the food products needed by the population, including special products for children. A developed food industry ensures rational nutrition of the population, helps to eliminate the uneven consumption of quality food products, allows for the efficient use of agricultural raw materials and reduces their losses. The importance of the development of the food industry is determined by the purposefulness of its activities. The objective need to saturate the food market with food products and the implementation of the import substitution strategy are possible only under the conditions of efficient management of the food industry (Шмулова, Т.Н., Козьева, И.А., 2018).

At the same time, any food industry enterprise must be competitive and take an active position in the market, which requires expanding its innovation application potential (Alguliyev, R.M., Aliyev A.G., Aliyev Sh.T., Shahverdiyeva R.O., 2014). The main activity of the food industry is to increase operational efficiency and introduce innovations at all stages of production and product life cycle. Innovative development of the food industry is a strategic task on a national scale. The most



important factor of innovative development is the development of qualified personnel and professional skills. In addition, in the context of the integration of ICT into all areas of economic activity, the application of digital competencies in the food industry is of great importance (Оводенко, Д.В., 2022).

Currently, one of the factors determining the development of the food industry is the formation, correct assessment and efficient use of its innovative potential. Correct assessment of innovative potential is important for the justification of innovation policy at various levels and the preparation of development programs taking into account the efficient use of innovation resources. One of the indicators characterizing the intensity and quality of management activities for the creation and implementation of innovations in the food industry is the innovative activity of enterprises in that sector. The main direction of innovative activity in the food industry is the expansion of the field of application of innovations. The application of innovation is an objective process that determines the development of the economy and its individual sectors (Piana V., Aliyev, Sh.T. and etc., 2009). İqtisadiyyat o zaman inkişaf edir ki, o, yenilənir və təkmilləşir. Beləliklə, ölkənin bütün iqtisadiyyatının, o cümlədən qida sənayesinin innovativ inkişaf yoluna keçməsi dünyanın inkişafının obyektiv tendensiyalarına riayət olunmasının nəticəsidir. Yəni, rəqabət qabiliyyətini, istehsalı artırmaq, gəlir əldə etmək, rentabelliği təmin etmək üçün qida sənayesinin innovativ inkişafına keçid vacibdir (Əliyeva, N.R., 2022). All this together will contribute to the intensification of investment and innovation activities in the food industry, an increase in the efficiency of investment, and the consistent implementation of the system of long-term tasks for the development of the food industry.

In modern conditions, the need to invest in the innovative development of the food industry is associated with the emergence of the potential for production growth through import substitution, but today, due to the high cost of credit resources, it is also necessary to optimize market mechanisms. In the conditions of instability of the financial and economic system, improving the market mechanisms of investment in the innovative development of the food industry is one of the most urgent issues today. At the current stage of the transformation of market relations, improving the investment processes of the main production funds of the food industry in the regions of the country should be based on the results of scientific research and forecasts, and should also include improving the material and technical base. The most important component of the material and technical base of the food industry is the main production funds. Their rational formation and use creates the basis for increasing production, reducing manual labor and increasing its productivity, and increasing the efficiency of the food industry based on innovative development. To strengthen the innovative development of the food industry, it is of particular importance to create stable economic and social conditions, the implementation of which will increase the efficiency of food production, the standard of living and quality of life of the population. Therefore, the development of a system and mechanisms for improving investment in the innovative activity of the food industry from a theoretical, methodological and practical point of view will help eliminate the existing imbalances between the country's economic potential and the quality of life of the population. In



order to increase the innovative activity of the food industry, the following directions can be proposed for optimizing investment activity in the country: structural optimization of investment resources within the ASK and elimination of investment imbalance; improvement of the technological structure of investments, which will lead to the formation of an optimal structure of fixed assets and increase the sensitivity of industrial enterprises to innovation; optimization of the territorial location of ASK enterprises; improvement of the sectoral structure of investments in order to mark innovative projects in the food industry as priority areas; creation of specialized investment institutions regulating innovation processes in the ASK, etc.

Investing in innovative projects will be more effective in regions or in enterprises with high investment attractiveness. It may be recommended to make wider use of public-private sector partnerships to strengthen innovation activities for entities that are not attractive for investment (Сайганов, А.С., Чабатуль, В.В., 2019). Today, the mechanism of public-private cooperation in various fields of activity for the implementation of the strategy of sustainable growth of the national economy and increasing the level of innovation activity in the country has exceptional attractiveness. Since neither the state nor the private sector can act completely independently and independently of each other to fully fulfill these tasks, there is a tendency to strengthen cooperation between the government and business. This form of combination is mutually beneficial, as it helps to increase the efficiency of the circulation of public funds, expand the share of investment and innovation in the economy, reduce budget expenditures and increase revenues. In fact, stimulating innovation through public-private cooperation is the key to successful management and the well-being of society as a whole (Алиев, Ш.Т., 2014). Investment in the food industry occupies one of the most important places in the technical re-equipment of enterprises in this sector. Technological re-equipment of the food industry is possible only if the state formulates an economic policy that helps increase the investment attractiveness of the food industry. Sustainable development of the food industry can be achieved only through large-scale foreign and domestic investments. In order to fully modernize the sector on the basis of innovative technologies, it is necessary to attract investments in the development of production. Investment costs for the application of innovative technologies in food industry production are one of the important factors determining the long-term growth of production and economic indicators (Əliyev, Ş.T., 2018). Innovative technologies in the food industry are characterized by a constant change in the range of products. Of particular importance for food industry products is the attractive appearance of the product, as well as ease of use. When applying innovative technologies for the production of products in the food industry, a special procedure for product certification is carried out. This procedure often represents the longest process, often at this stage the implementation of innovations ends (Грядобитова, Е.И., Тубольцева, Г.И., Торгунова, Я.Ю., 2015).

Innovative technologies in the food industry can be: 1) Innovative technologies of food products, additives and biologically active substances. 2) Resource-saving technologies for secondary resources and waste of the processing industry of the agro-industrial complex. 3) New equipment



in the processing areas of the agro-industrial complex. 4) Technology of training and retraining of personnel for the food industry. 4) Biotechnology in the creation of new generation products. The application of biotechnology is important, on the basis of which high-tech production can be created with more efficient production of the target product, reducing raw material losses, and the production of food products with various functional properties. For this, it is important to develop the infrastructure and logistical support of the food market, integrate enterprises into the system of interregional and global food markets, and ensure the competitiveness of food products at a new quality level. The innovative development of modern biotechnical processes for the processing of agricultural raw materials is of great importance, allowing to intensify production, reduce their energy consumption, expand their range, and increase the consumer properties of balanced, easily digestible food and beverages (Aliyev, S., Gulaliyev, M., Purhani, S., Mehdiyeva, G., & Mustafayev, E., 2024). By using innovative technologies in the preparation of new types of food products in the food industry, it is possible to better enrich the diet with the necessary nutrients and energy for the normal development and functioning of the human body. The demand for innovative technologies in food production is based on two factors: the increasing demand for high-quality products that have minimal negative impact on consumer health; the need to optimize the prices of finished products, which is typical for other industries (Мамедова, С.С., 2021). In the agro-industrial complex, the food industry is closely linked to agriculture and trade as a supplier of raw materials. The need to improve the activities of commercial, marketing and other segments of the food industry has changed the way enterprises work with information, opening up new opportunities. The most popular in the food industry are mobile technologies for improving business processes and creating mobile commerce by integrating telecommunication technologies into existing information systems (Гербер, Ю.Б., Балко, С.В., Якушев А.А., 2022).

Thus, ensuring the quality and safety of food products, new food technologies and biotechnology, the development of food engineering and the creation of healthy nutrition determine the need for innovative development of the industry, the use of digital tools. Digitalization plays an important role in the development process of the food industry. Despite the stable state of the industry, its further development and maintenance is impossible without the application of digital technologies (Mamedov, Z.F., Aliyev, Sh.T., Jafarova, N.A., 2020). Digital technologies are widely used in food production and are used to provide remote support, which allows you to identify production equipment and troubleshoot problems without the personal presence of a specialist (Шереметьева, Е.Н., 2022). Digitalization necessitates an intensive search for ways to increase productivity and reduce production costs. Based on market mechanisms, it becomes possible to increase demand, accelerate delivery and distribution of products. Thus, only through the joint use of various types of innovations can it be possible to maintain sufficient competitiveness, saturate the market with the necessary resources and increase production efficiency (Дмитриев, Н.Д., Рогозина, Е.А., 2020).

In particular, free economic zones are considered a fairly attractive and multifunctional economic mechanism for the adoption and implementation of new innovations (Алиев Ш.Т., 2008.; Араев



С.Г., Алиев, Ш.Т., 2004). In addition, free economic zones are considered a favorable operating environment for the development of entrepreneurship, including the application of innovative entrepreneurship in the food industry (Алиев, Ш.Т., 2012). In view of the above, the potential for the development of the food industry in post-conflict areas of Azerbaijan based on innovative mechanisms is high. We believe that all kinds of concessions and state support mechanisms for the development of innovative entrepreneurship in the Karabakh and East Zangezur economic regions can allow for more intensive innovation of the food industry (Aliyev, Sh.T., 2021.; Алиев, Ш.Т., 2022.; Алиев, Ш.Т., Меликова, Л.А., 2022.; Əliyev, Ş., 2020).

Conclusions

Thus, the analysis of world experience in the field of innovation-oriented development of the food industry showed that the process of innovation in the food industry should be implemented on the basis of principles that ensure the formation of real conditions that allow for this:

- Using foreign experience in the innovative development of the food industry, Azerbaijan can become one of the most competitive countries in the world market for the products of this industry;
- Currently, active work is being carried out in Azerbaijan in the field of innovation in the food industry, and for this purpose the capabilities of innovation structures are being used.
- In general, some of the most effective methods for stimulating innovation activity and organizing innovative development in the food industry in the USA, the European Union and the countries of the Asian region can be effectively applied in Azerbaijan and .
- The country's food security directly depends on the state of the food sector, and its development requires that it become a priority of national policy in this direction, and at the same time necessitates the acceleration of innovation in the food industry;
- Despite the important role of the state in the formation of the innovative potential of the food industry, the supply of food products is created precisely by commodity producers, and their innovative development should be based on the high activity of enterprises and private investors, in this case, innovative development in the food industry can lead to qualitative changes;
- The basis of qualitative changes in the food industry is the creation of modern innovative food products, for which new types of raw materials and high technologies should be used, in this case, it is possible to satisfy the demand of the local food market with high-quality finished products and at the same time enter promising world markets, etc.

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