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PROSPECTS OF USING INNOVATIVE AND CLUSTER METHODS IN ENSURING FOOD SAFETY BASED ON THE PROCESSING INDUSTRY IN UZBEKISTAN

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ABSTRACT

This article examines the state of ensuring food safety based on the processing industry in our country. In particular, the classification of the participants of the innovation cluster of the food industry and their mutual relations, the classification of the general necessary relations between the innovation clusters of the food industry and the main factors was analyzed. The experiences of foreign countries in the development of food safety industry policy were studied, and the model of ensuring food safety based on the innovative development of food industry clusters and directions for further development of the network were proposed.

KEYWORDS

Food industry, food safety, processing industry, food products, food raw materials.

Introduction

As mentioned in the previous chapters, the sustainable development of the food system in any country has a great impact not only on ensuring food security (economically), but also on its socio-economic and ecological development.

From this point of view, as well as the constant provision of high-quality (ecologically clean) products to the population's demand for food products, the food production (processing) industry is a strategic issue for countries.

In our opinion, food safety can be divided into two interrelated directions:

1. Economic security - constant supply of the population's demand for food products at a low cost and in the required amount;

2. Safety of human health - ensuring that the produced food products meet ecologically clean and veterinary-sanitary requirements.

Of course, the food safety food system, which combines these two directions, covers all the processes of "food raw materials - processing - cooking (preparation) - consumption".

In this regard, regulatory and legal frameworks have been developed in our country, based on established procedures, food safety and food processing quality control activities are organized and regulated.

In particular, the Law No. 483-I of the Republic of Uzbekistan dated August 30, 1997 "On the quality and safety of food products" was adopted. The law recognizes that "food product safety is compliance of food products with sanitary, veterinary, veterinary-sanitary, phytosanitary rules and regulations" [1].

At the same time, consistent reforms are being carried out in terms of economic security of food supply in the country, i.e., to ensure cheap, high-quality and complete food supply of the population, and to turn the industry into a profitable one by increasing the export of food products.

In particular, the decision of the President of the Republic of Uzbekistan dated January 26, 2023 "On measures to establish the International Institute of Food Technology and Engineering" No. [2] was adopted, in which the following are defined among the main tasks and directions of activity of this institute:

- development of education in areas such as production and processing technologies, market trends, safety and quality standards (codex), network management methods and product information;
- such as practical and innovative research in the field of food technology and training of scientific and scientific-pedagogical personnel based on modern requirements.

The above reforms show that one of the main goals is to achieve high efficiency by increasing the role of the processing industry and its sustainable development based on the introduction of new methods of ensuring food safety in our country. It is especially appropriate to use innovative cluster methods.

Research Methodology

Analytical comparison, logical and comparative analysis, grouping and expert evaluation methods were widely used in this research. Also, the research works of foreign and domestic scientists on the topic were widely studied and analytical conclusions were presented.

Analysis and Results

World experience also shows that the use of innovative and cluster methods in ensuring food safety based on the processing industry is promising.

So what does "use of innovative and cluster-based approaches to food safety in the processing industry" include?

In this regard, according to China's experience, the following approaches should occupy a central place in the development of food safety industrial policy in the country (Figure 1)

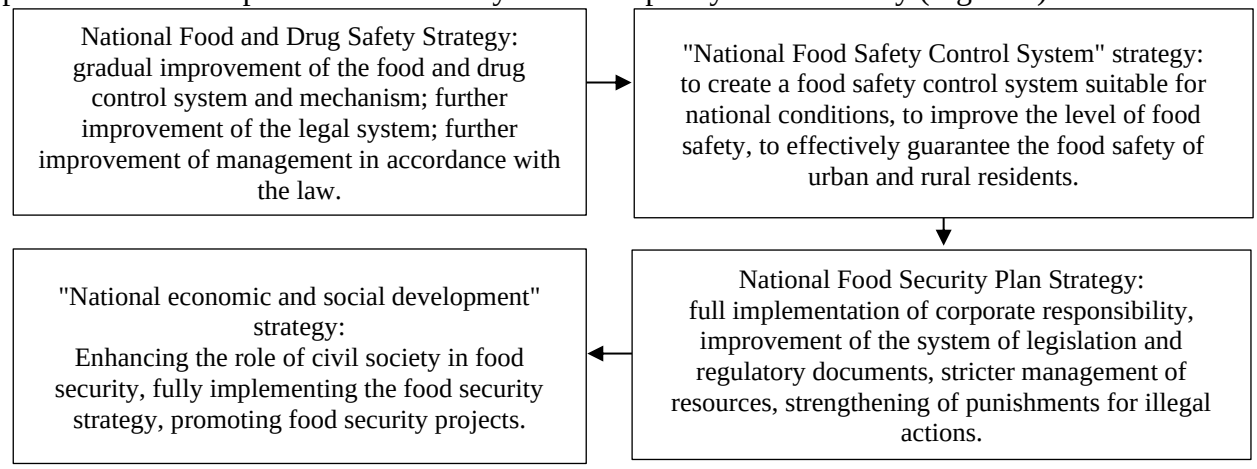

Figure 1. Food Safety Industry Policy Development Process (China's Experience) [3]

Also, in European countries, corporation, cooperation and cluster methods based on highly integrated and highly technological activities are widely used to ensure food safety.

In addition, any processes related to food safety are organized based on high-level technologies and knowledge. In particular, there is a "Smart Agrifood Industry" project within the "European Cluster Collaboration Platform" platform.

Smart Agrifood Industry is an ongoing program of events in a virtual format that brings together leading experts in technological innovation in the agrifood sector [17].

This program showcases cross-functional innovations applied to food safety and quality control in food processing. The goal of this program is to address major global challenges in the agri-food sector, such as environmental impact and biodiversity loss, food optimization, as well as food quality and safety, based on high-level technologies.

In other words, "Smart Agrifood Industry" is the measures that promote the creation of innovation trends to solve today's problems facing tomorrow's industry.

It should be noted that the basis of today's clusters is the system called "Localization economies" first proposed by Alfred Marshall in 1890. In the 1990s, Michael Porter's "The Competitive Advantage of Nations" came to the attention of the general public. After that, there was an increased focus on defined clusters within countries as a source of national competitive advantage. Because this demonstration, supported by empirical data collected as a result of the study of national economies, brought clustering to the fore in national, regional and even local economic strategic planning [4].

Of course, after that, the cluster method began to be used in various areas of the economy, and scientific research works on its further development and improvement increased. Including the definitions expressing the essence of the cluster. In particular,

M. E. According to Porter, a cluster is a geographical grouping of interrelated enterprises representing the same industry, their specialized suppliers and service providers, enterprises operating in related and auxiliary industries, and social institutions and organizations [5].

M.A.K. According to Jallal et al., a cluster is an integrated form of interaction of enterprises in production, procurement, processing, sales, control, and the use of consulting services of scientific institutions, the purpose of which is to create innovations and put them into practice [6].

Thus, the development of the industrial cluster against the background of the knowledge economy of globalization has become a global economic phenomenon. Especially this specialized cluster has become popular in developed countries. Due to a number of clusters around the world, "Economic mosaics" have been formed [7]. In the same way, the organization of clusters in agriculture led to the creation of "Agro-Industry Clusters".

Agro-industry cluster is a system of mutual relations between agricultural producers, food and processing industry enterprises, state bodies, educational and scientific institutions, infrastructure organizations, which are territorially localized and united with a single purpose of activity, and at the same time have their own characteristics. [8].

In our opinion, the main features of such an integrated structure in the form of a "cluster" are as follows:

- based on innovative direction;
- the presence of a synergistic effect.

Based on the main features of the "Cluster" method, it can be said that it is an innovative method of integration of interrelated enterprises under a single goal, another main feature of which is synergistic effect. That is, there is a high efficiency of organized "labor" (activity).

In addition, the following advantages of forming and using clusters should be recognized:

- ensuring competitive advantage;
- wide possibilities of attracting foreign investments [9];
- increasing productivity;
- increase in the possibility of reaching a new stage of development based on an innovative approach;
- including reducing technological dependence.

It should be noted that the cluster method is based on the implementation of full-fledged innovations. Therefore, in the development of clusters, the innovative environment in the country is important, and in our opinion, it is appropriate that the main goals of innovative activity in the country cover the following:

- diversification of existing products;
- improving the quality of products (services);
- reducing production costs of products (services) and losses (waste output) in this process;
- increasing the efficiency of the production process and reducing time consumption;
- creation of new trade markets (online trade) while maintaining traditional trade markets;
- ensuring compliance of the innovation process with standards;
- increasing the flexibility of the production process;
- reduction of material costs and labor costs;
- ensuring environmental safety.

Of course, based on the above goals, the following measures should be implemented in the innovative development of the food industry:

1) Establishment of new food industry enterprises based on modern digital (economical) technologies, modernization of existing ones and strengthening of local raw material base;

2) study of foreign experiences on improvement of small and medium-sized food processing and production enterprises along with food industry clusters and organize their effective use in the conditions of Uzbekistan;

3) Acceleration of providing necessary support by the state in the direction of modernization and capitalization of technologically outdated or "incapacitated" food enterprises;

4) Attracting investments, in particular, creating a favorable environment for foreign investors and creating additional opportunities for local investors, as well as comprehensive support for investment projects, etc.

In addition, adapting the socio-economic values of innovative industrial clusters to the regional value system is an integral part of the cluster development strategy. Because, in most cases, the main company of clusters has to choose between the strategy of acquiring additional structural enterprises and the strategy of individual development according to the priorities of the area where it is located. Such priorities include, first of all, social traditions, as well as innovative potential expressed by the availability of production, financial, labor and other resources for the successful development of the region [10].

Currently, clustering is one of the most effective ways to eliminate systemic problems and crisis processes in the economy.

Table 1 **The structure of the innovative industrial cluster [11]**

Initial stage	The next stage	Cluster type	Type of enterprises at a certain stage
Core	Innovative infrastructure	Innovation cluster	Enterprises and organizations developing technologies (research institutes, universities)
Center	Industrial infrastructure	Industrial cluster	Enterprises that produce innovative products based on advanced technology
	Marketing infrastructure	Marketing cluster	Enterprises engaged in the sale of products manufactured on the basis of new technology
Periphery	Technological infrastructure	Technological cluster	Technologically related enterprises
	Institutional infrastructure	Institutional cluster	Enterprises, organizations and institutions in an institutional structure

The effective organization of the cluster depends on the activity of individual components of the cluster structure, therefore, a comprehensive approach is required [12].

Based on the above, the importance of using the cluster method in the food industry can be explained as follows.

Today, food products as a primary product intended for consumption occupy the main part of the daily purchases of the population on a global scale. That is why it is urgent to further improve the processing capabilities of food processing enterprises and increase their economic efficiency. Increasing the economic efficiency of food processing enterprises directly depends on the development of a modern cluster system [13].

In addition, the use of the cluster approach and its implementation in the food industry meet the following requirements of the world market [14]:

- increase the level of international division of labor;
- modern marketing concept is consumer oriented;
- such as the limitation and shortage of energy resources and raw materials on a strategic scale for most of the countries.

Based on these requirements, food clusters implement the following activities in order to increase the level of competitiveness [15]:

First, the introduction of research and development, increasing the automation of production using resource-saving technologies;

Secondly, it is necessary to improve the use of new technologies and invest in the training and retraining of personnel who meet the requirements of the modern market.

At the same time, in most developing countries, especially in our country, there are a number of problems that seriously hinder the development of the food industry, including:

1) High cost of food production in agricultural enterprises and lack of efficiency;

2) The fact that existing capital funds in food industry enterprises are technologically outdated and fuel is not energy-efficient;

3) problems related to the mutual integration between food growing, manufacturing or processing enterprises and trade enterprises and logistics infrastructure (in particular, the quality of roads, fuel problems and high prices);

4) Problems related to rapid adaptability of food industry enterprises and adoption of innovative technologies (including lack of financial opportunities, lack of scientific approach, lack of qualified personnel);

5) Low institutional support or inefficient implementation of optimal organization and coordination of these measures by representatives of local authorities;
6) Lack of qualified personnel and insufficient qualification of existing personnel.
In our opinion, it is appropriate to use the cluster method effectively in solving these problems. However, this process should be organized on the basis of market principles and implemented on the basis of institutional support, as in the history of developed countries. Because, regardless of any economic system and any country, state reforms, along with existing natural and other resources, are of particular importance in its socio-economic development. In particular, it is known from the experience of Singapore, Japan, USA, Canada, China and European countries.
As part of the conducted research, the study of the competitive mechanisms of the effective functioning of cooperative integration structures (including clusters) showed that [16]:
- analysis of export potential of enterprises, identification of competitive goods, possible markets of industrial products;
- development of a program to adapt local enterprises to new conditions for rapid export development;
- formation of export production zones under the most preferential regime in the policy of export promotion and import substitution. Solving this problem will largely depend on the state policy aimed at attracting investments and developing the real sector of the national economy.
In this regard, it is appropriate to consider the socio-economic measures and reforms of the state as an important factor in ensuring food safety based on increasing the efficiency of the food industry through the use of innovative cluster methods in the country.
Therefore, based on the opinions, it is possible to include institutional institutions, scientific research institutes, financial institutions, food industry enterprises, agricultural enterprises, trade enterprises and direct consumers as participants in the food industry innovation cluster, and their mutual relations can be expressed as follows (Figure 2).

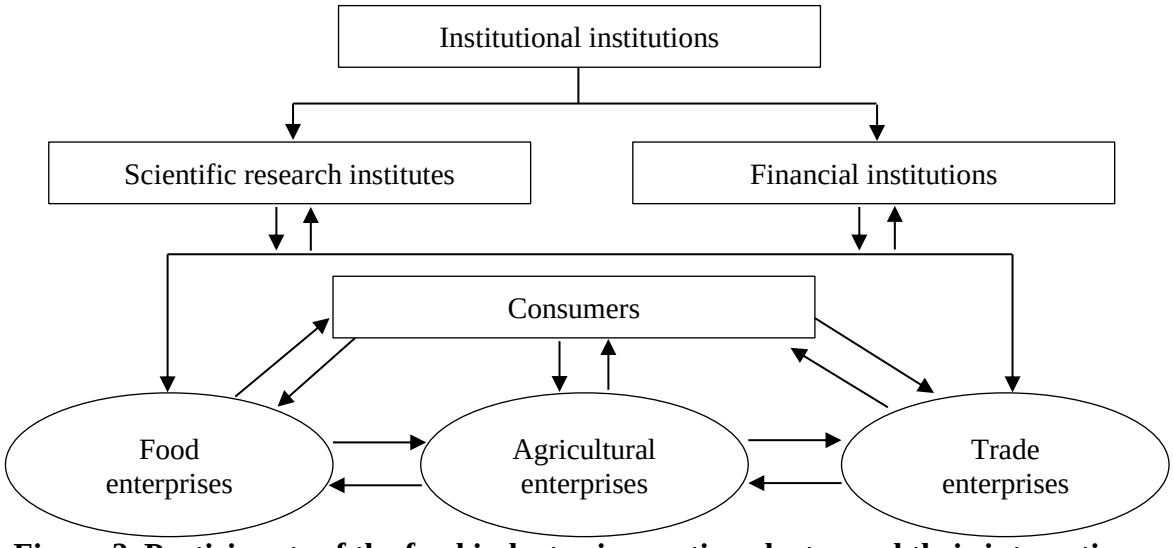

Figure 2. Participants of the food industry innovation cluster and their interactions

It should be noted that innovations and clusters are one of the main factors of success of food industry enterprises. Because, in the previous period, the food industry was a slow-growing and low-profit sector. However, in recent years, the application of innovations and clusters in the food industry has led to its rapid development and becoming one of the most profitable sectors. Of course, in the

development of the food industry, the increasing demand for food products around the world and, of course, the increasing price of these products are also important.

In our opinion, innovative approaches and innovative technologies are necessary for effective functioning of clusters in the food industry. Because only the use of innovations (technologies) ensures the dynamic development of food industry clusters and their competitiveness in domestic and foreign markets, and on this basis, their sustainable development.

Of course, in addition to the above-mentioned advantages, clusters also have a number of disadvantages:

- the absence of competitors in a particular cluster "eliminates" the need for continuous improvement of production and sales processes;
- dependence of the overall results on each cluster participant.

Based on the above, it should be noted that the effective development of the food industry on the basis of clusters is a complex process, in which high results can be achieved through effective organization and optimal management.

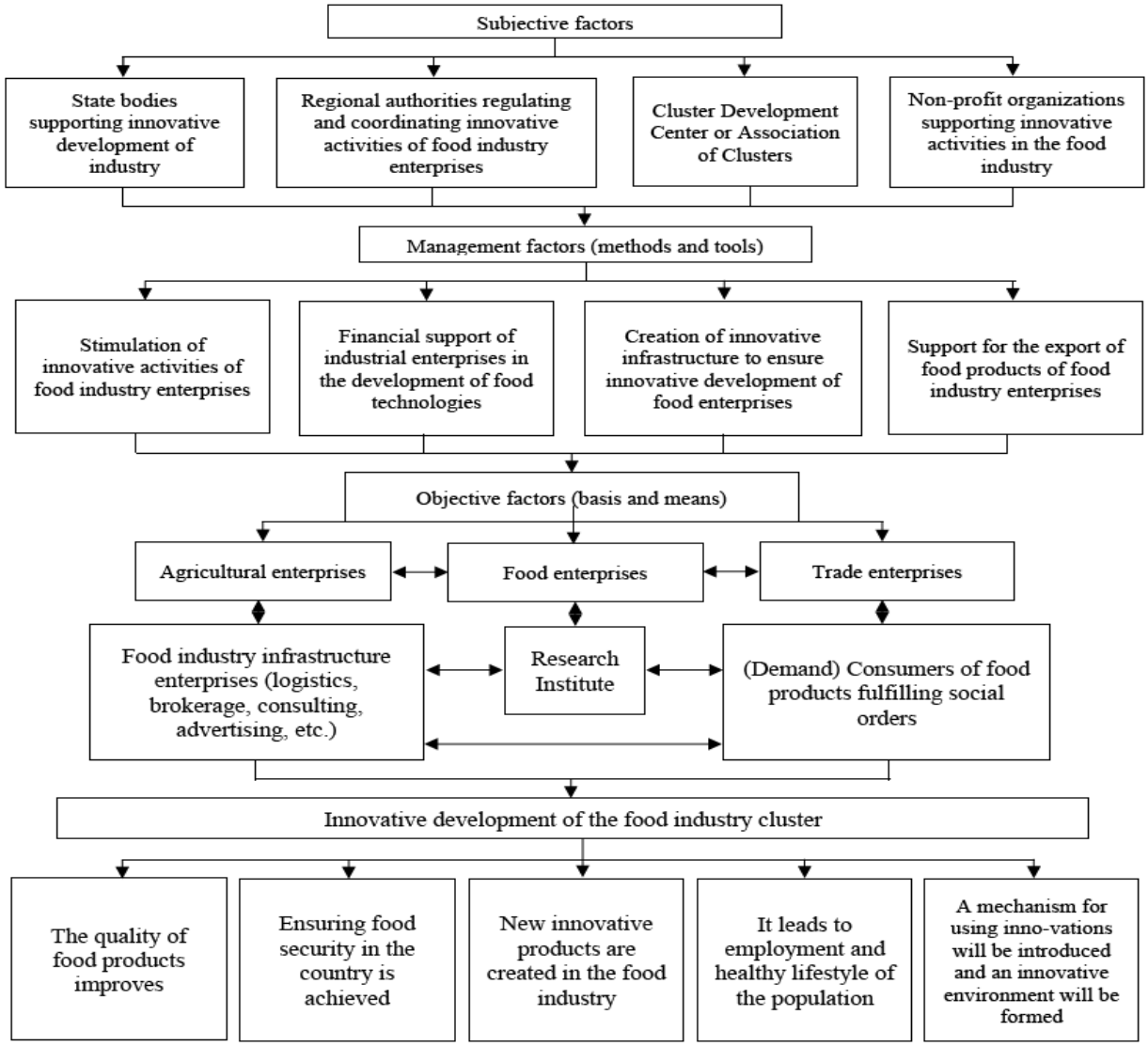

Figure 3. Model of ensuring food safety based on innovative development of food industry clusters

The advantage of the proposed "Model of innovative development of food industry clusters" is that it covers all stages and factors of innovative development of food industry clusters. That is, subjective factors, management factors (methods and tools), objective factors (organizational basis and tools) and resulting processes are presented.

Conclusions

Of course, like all economic processes, ensuring food safety based on the innovative development of food industry clusters is a complex process, and the effective functioning of this mechanism also depends on:

- it is necessary to achieve innovative synergistic efficiency, which ensures the capitalization of produced knowledge, acquired skills and technologies, which is one of the specific characteristics of food industry clusters;
- food industry clusters are highly flexible and effective structures, and it is necessary to introduce an effective mechanism of regional development based on stable relations between all cluster participants;
- it is the most effective form of development of economic integration in the country and it is an innovative cluster that ensures the increase of competitiveness of the economy. For this, it is necessary to create the necessary conditions for the rapid spread of new knowledge, scientific discoveries and inventions and their transformation into innovations;
- it is desirable to put food industry clusters as the main priority of economic activity in areas specialized in food production and to organize it efficiently.

In conclusion, world experience also shows that the use of innovative and cluster methods in ensuring food safety based on the processing industry is promising. In our opinion, the main characteristics of such an integrated structure in the form of a "cluster" are as follows: it is based on an innovative direction and the presence of synergistic effect.

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