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SPECIFICS OF FORMING AND ADVANTAGES OF DEVELOPMENT OF THE INNOVATIVE PROCESSES IN AGRICULTURAL ENTERPRISES

Summary

The research focuses on the specifics of forming and advantages of development of the innovative processes in agricultural enterprises. The agrarian enterprises account for almost one third of gross domestic product nowadays. But at the same time, agro-industrial production in Ukraine is lagging behind the European Union for productivity and efficiency. The search for such innovative solutions becomes extremely urgent, which would ensure the increasing of the efficiency of the functioning of the agrarian sphere, the rational using of natural resources and the increasing of the productivity of plant growing and animal husbandry in the conditions of limited natural resources. At present time, the constant implementation of the latest developments is the key of the sustainable development of agriculture. The expediency and necessity of introduction and realization of the advanced innovative and technological processes for the development of agro-industrial production and the obtaining of economic and social effect are determined. As a result of generalization of information on the essence and role of agro-innovations, the peculiarities of their implementation in the agrarian sector, the main directions of using the innovative technologies and factors that hinder their implementation are revealed. On the basis of the research of a set of indicators and factors it was found out, that the agricultural enterprises at a low rate make the transfer of innovation to their daily work, which naturally leads to the decreasing the quality of work. This is due to the low level of forming the huge agrarian enterprises and weak integration of farms. As a consequence, there is the inefficiency of using the modern expensive technologies and technical means of production. The using of innovations and technical and technological developments in the agrarian sector will allow increasing the competitive advantages, improving the efficiency of production and economic activity in general, because the agrarian sector in economically

developed countries is gradually transforming to the science-intensive industry of production. On the basis of the research, it was found that effectuation of a more extensive policy of implementation and realization of innovations will provide the increasing of the efficiency of the functioning of the agrarian sphere, as well as will promote the rational using of natural resources and the increasing of the productivity of plant growing and animal husbandry in the conditions of limited natural resources.

Introduction

In the transition to the innovative model of functioning and economic development, technological progress and innovation lead to more efficient using of labor and capital investment, and thus contribute to the growth of productivity as one of the main drivers of stable and efficient economic growth.

The using of the advanced innovation and technological processes is a priority area of agricultural development, which is aimed at the agility of agro-industrial production.

This, in turn, contributes to increased sales, increase in stockpiles and productivity, profitability, will affect the socio-economic development of rural areas and economic stability of the state. Therefore, the development of measures for the implementation and effective use of innovative technologies for economic and social impact is of great importance.

Nowadays, almost a third of gross domestic product is created by agricultural enterprises. However, at the same time, agro-industrial production in Ukraine is lagging behind the EU countries in terms of productivity and efficiency.

The search for such innovative solutions that would improve the functioning of the agrarian sector, rational using of nature and increase the productivity of agriculture and animal husbandry under conditions of limited natural resources becomes extremely relevant. Now the constant introduction of the latest developments is the key to sustainable agriculture.

Thorough researches of various aspects of innovation processes in the agrarian sphere have been carried out by leading domestic scientists, such as S. Demyanenko [2], P. Sabluk [12], O. Yankovskaya [13] and others. The problem of the need for the innovative provision and implementation of advanced technologies in agriculture has been explored by such well-known economists as V. Ambrosov, V. Andriychuk [1], M. Zubets, M. Kropyvko, O. Krysalny, P. Muzyka, V. Semynozhenko, V. Tregobchuk and others. Some aspects of agricultural production technologies were studied by V. Kaplunenکو, P. Kovalenko, M. Roik, V. Garmashov, M. Romashchenko, and S. Tribel. The authors' focus was on identifying the problems of using innovations in the agricultural sector and the need to introduce powerful technologies.

The purpose of the research is to study the peculiarities of the innovation activity of agro-industrial enterprises and, on this basis, to determine approaches to ensure their effective implementation and further development in the current economic conditions.

Part 1. Interpretation of the definition of innovation and the legal framework for their implementation in Ukraine

The analysis of scientific publications on innovation activities leads to the conclusion that innovation is a process in which an invention or idea becomes economically viable and profitable. In the economic literature, the term “innovation” is usually interpreted as the transformation of potential scientific and technological progress into real, embodied in new products and technologies and gaining economic meaning. In scientific researches of domestic economists the opinion prevails that “innovation is a technical and economic process, which, through the practical use of the products of intellectual labor – ideas and inventions – leads to the creation of better properties of new products and new technologies” and “innovation is a process bringing the scientific idea to the technical invention, to the stage of practical, profitable use” [1; 4; 6, p. 70-71].

An innovative product is characterized by a higher technological level, new consumer qualities of the product or service compared to the previous product. Innovation is understood to mean all scientific, technological, organizational, financial and commercial activities that actually lead to innovation or are designed for this purpose. Innovation also includes research and development not directly related to the preparation of a particular innovation.

In the Law of Ukraine “On Priority Areas of Innovation” there were defined technological modernization and development of agro-industrial complex among the strategic priority areas for 2011 – 2021; introduction of energy-efficient, resource-saving technologies, development of alternative energy sources; widespread use of clean production technologies and environmental protection [10].

A complex characteristic of agricultural enterprises' ability to innovate is their innovative potential.

The innovation process is impossible without the innovative potential as a set of scientific knowledge, information on the results of scientific and technical works, inventions, design and development, samples of new technology and products generated by research organizations, units, their scientists.

The evaluation of Ukraine using the international comparators. According to the report by the Global Innovation Index 2017, which was prepared jointly with Cornell University, the INSEAD School of Business and the World Intellectual Property Organization (WIPO), the Global Innovation Index 2017 covers 127 economies in the world and includes 82 indicators across the range of topics [14].

But it is worth noting that in comparison with the rating of 2017, Ukraine has lost 17 positions by the level of higher education (Table 1). In terms of patent activity, Ukraine occupies a fairly high position: 27th place.

The rating of Ukraine according to the Innovation sub-index in the 2017-2018 report corresponds to 61 places, i.e the fall is 9 positions.

Table 1

**Indicators of Global Innovation Index Bloomberg
for Ukraine for 2017-2018 years**

Year	Overall rank	Expenses on R&D in relation to the GDP	Technological capabilities	Productivity	Quantity of high-tech enterprises	Efficiency of higher education	Concentration of researchers	Patent activity
2017	42	44	47	50	34	4	44	27
2018	46	47	48	50	32	21	46	27

Source: based on [13]

Ukraine has downgraded its ranking in all indicators of this sub-index, except for the presence of scientists and engineers: 25th place against 29th in 2016 (Fig. 1).

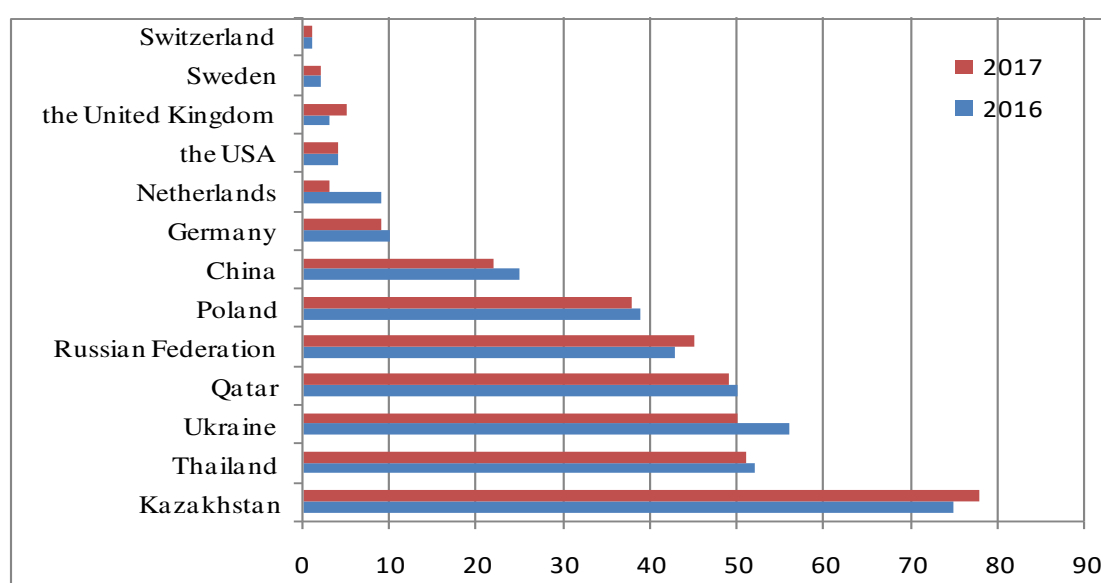


Fig. 1. Dynamics of the Global Innovation Index by country for 2016-2017

Source: based on [14]

The biggest drop was noted by the criteria: The public purchases of the latest technologies and products: from 82 to 96 rating position, “Relations between universities and industry in the field of R&D”: from 57 to 73 position [14].

Part 2. Innovation in the agrarian sphere of Ukraine

The agrarian innovation (agro-innovation) is an innovation implemented in the agricultural sector of the economy in order to increase the efficiency of its activity and ensure stable expanded reproduction of agro-industrial production, the implementation of research and development results in the form of new varieties of plants, species of animals and poultry, new technologies in crop, livestock and processing industry, new fertilizers and plant and animal protection, mineral fertilizers and plant and animal protection, new methods of preventing and treating animals and poultry, new or improved food, materials, new forms of organization and management of various spheres of economy, new approaches to social services that allow to increase production efficiency [7, p. 225-227]. The innovative processes in agriculture are directly influenced by the features of agricultural production.

The innovative activity in accordance with Article 3 of the Law of Ukraine “On Investment Activity” provides:

- production and distribution of fundamentally new types of machinery and technologies; progressive intersectoral structural shifts;
- implementation of long-term scientific and technical programs with long payback periods;
- funding the basic research for the implementation of qualitative changes in the state of productive forces;
- development and implementation of new, resource-saving technology. designed to improve the social and environmental status [4].

Thus, the essence of innovation in the agrarian sector of the economy lies in the development and implementation in the agrarian production of advanced farming methods, which are based on the methods of efficient production of products, the use of a new generation of technology, the use of new personnel policy, taking into account the accumulated scientific and innovative potential. The basis of innovation potential is the resource component (human, logistical, financial, information resources).

The main features of the forming and development of the innovation process in the agricultural sphere are [13, p. 304-305]:

- differences in the natural and climatic conditions of finding agrobusinesses and specialization of production;
- significant difference in the periods of production of certain types of agricultural products and products of its processing;
- variety of types of production by organizational and legal forms of ownership, size, subordination, etc.;
- dependence of agricultural production technology on natural and climatic conditions, road transport networks, remoteness from supply centers and markets for production and other factors;
- isolation of agricultural producers, remoteness from information and consulting services and organizations that produce scientific and technical products;

– different socio-educational level of agricultural employees.

The generalization of information on the nature and importance of agro-innovation, features of their implementation in the agro-sector, allows to identify the main directions of innovative technologies in crop and livestock (table 2).

Table 2

Directions for the using of innovative technologies in crop production

Scope	The possibility of using
Selection	Improvement of varietal qualities Increase resistance to soil and climatic conditions and pests Significant increase in productivity Obtaining seeds of elite varieties
Genetic engineering and GMOs	Resistance of plants to crop losses, diseases, pests Improving product quality and increasing yields Herbicide resistance Ability of plants to produce their own pesticides Reducing the process of care and processing of products Cost savings for GMO cultivation
Organic farming	Lack of pesticides and fertilizers Reducing the harmful effects of agricultural production on the environment Rejection of GMOs
Micro irrigation	Providing optimum humidity in arid conditions Saving irrigation water, electricity, fertilizers Avoiding soil erosion Possibility of development of land unsuitable for cultivation Reducing operating costs Ability to carry out the agricultural work with watering
IT technology	Determination of actual acreage Predicting harvesting productivity and crop loss Determining the level of use of logistical resources Ability to identify the hidden products and resources from accounting
Nanotechnology	Increasing of productivity Low toxicity of nano materials Promote photosynthesis of plants and ozone in the air Strengthening of the protective properties of plants

Source: based on [11]

It should be noted that the introduction and using of modern innovative technologies in plant production will have a positive effect, affecting yields,

cost savings, rational using of resources, and will enhance the economic potential of agroecosystems.

The main problems in the implementation of innovations in the field of crop production are the following:

- necessity for state subsidies;
- lack of legal support;
- high level of physical deterioration of domestic equipment;
- lack of technological equipment;
- lack of technology of creation of source selection material;
- necessity for highly qualified personnel, scientists.

The main objective for the livestock industry is to increase the production of gross production, which is possible due to the using of innovative technologies (Table 3).

Table 3

Directions for the using of innovative technologies in animal husbandry

Scope	The possibility of using
Biotechnology	Preservation of the animal gene pool Improving animal health Improving the quality of livestock products Improving animal performance using breeding methods Getting animals as donors of internal organs
Tribal work	Improvement of existing and creation of new breeds of animals Improvement of productive qualities of animals Using of the genetic potential of the best breeds
Feeding systems	Effective using of different feeding modes Reducing feed loss Free access of animals to feed through a modern feed system Increasing in weight gain Accuracy of feed dosage and distribution
Technical and technological support	Improvement of conditions of maintenance and service of animals Improving the working conditions Reducing unit production costs Improving the quality of animal products Save resources
Resource-saving technologies	Reducing cost price Specialization of works on raising and keeping animals Improving the reproductive ability of animals Effective organization of rest and diet of animals Efficient using of waste transportation and disposal systems

Source: based on [5]

In general, the introduction of the new modern technologies should affect the increase of crop yields and the animal productivity. Therefore, improving the efficiency of land using, increasing the return on animals, ensuring high yields and productivity of agricultural production are among the other signs of innovative development of the enterprise.

The main challenges in implementing livestock innovation are the following:

- necessity for the government subsidies and incentives;
- necessity for the research and involvement of highly qualified personnel;
- occurrence of the unwanted mutations;
- decreasing in the ability to reproduce;
- possibility of transmission of infections;
- uncontrolled process of results of breeding work;
- necessity to attract investment;
- high cost of equipment upgrades and upgrades.

The introduction of innovative technologies by agricultural enterprises is possible due to the interaction of the external and internal environment and the available resource potential.

Any progressive technology in the agricultural field is based on the integrated and rational using of soil, climatic, biological, technical, material and monetary resources to maximally meet the needs of plants or animals in the basic factors of life in order to obtain a high and stable effect. It organically combines three main directions of economic activity: technological, technical and settlement-economic.

The technological direction involves the development and sequence of technological operations, agro- and zootechnical requirements for them.

Technical direction is a complete set of machine-tractor units, the branded selection of tractors, agricultural and special machines and tools, equipment of livestock complexes, establishment of production standards and number of maintenance personnel.

A comprehensive approach to the introduction of innovative technologies by the agricultural enterprises makes it clear that the main purpose of innovation in the agricultural sector is to ensure the economy and environmental friendliness of agricultural production. But as in any activity, there are both negative and positive processes in the agricultural sphere, which slow down the development of the innovative component of agricultural enterprises (Fig. 2).

The advantages of using of the innovative technologies in the agricultural sector are:

- significant improvement in the quality of the products obtained, which meets to all environmental requirements for safe production of products;
- improvement of the conditions of keeping animals, reduction of diseases and prolongation of their economic using;

- increase of productivity of activity, which as a whole provides more income per unit of resource;
- efficient and flexible using of working time and reduction of labor input in the cost of production;
- benefit the consumers and society as a whole.

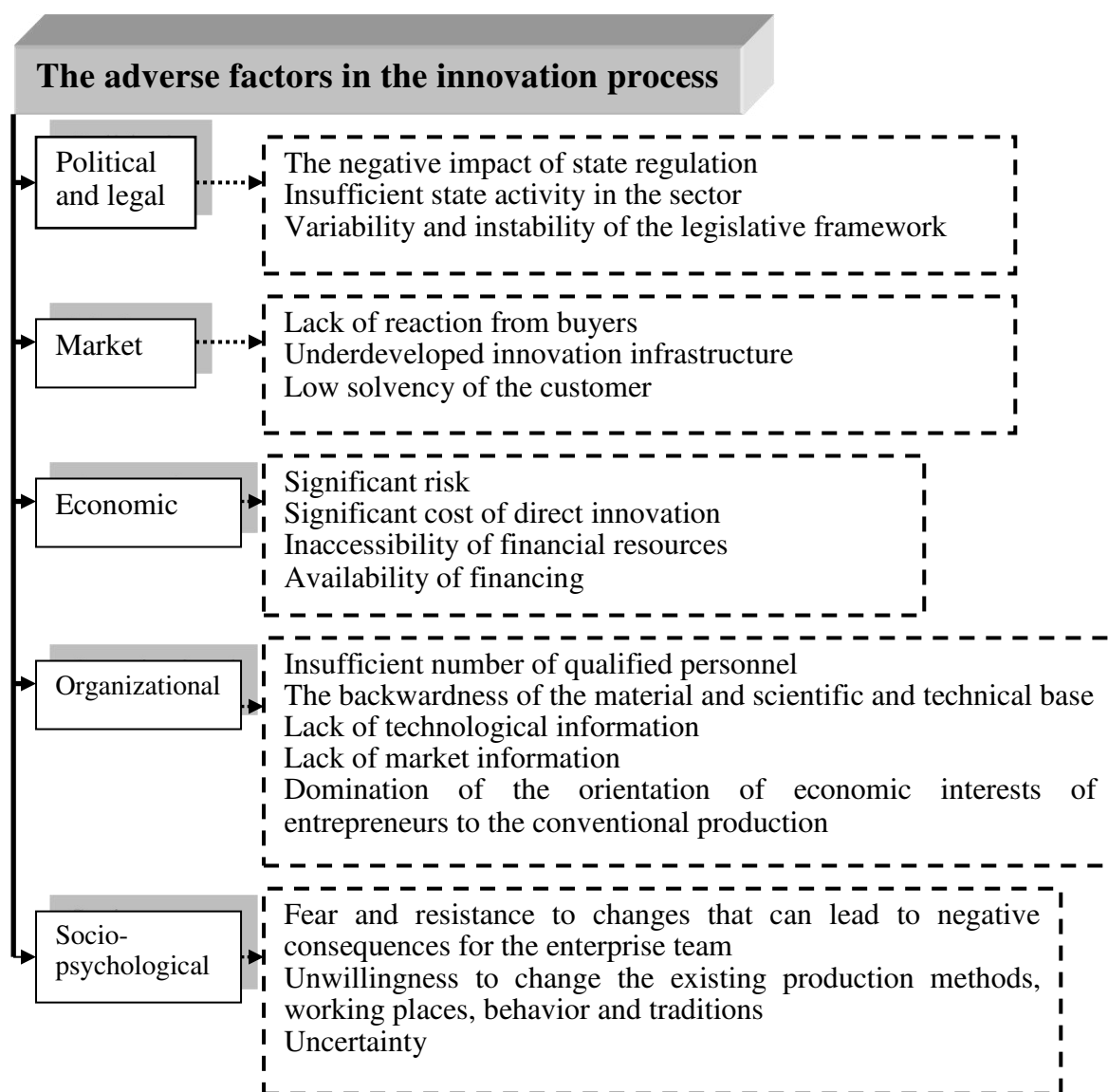


Fig. 2. The adverse factors in the innovation process

Source: based on [9]

The low level of utilization of the achievements of agricultural science by the agricultural production naturally leads to the decreasing in the quality of works. This is due to the low level of forming of large agricultural enterprises and the poor integration of farms, as a consequence, inefficient using of modern expensive technologies and technical means of production.

The using of innovations and technological developments in the agricultural sector will allow to increase the competitive advantages, improve the efficiency of production and economic activity in general, as the agricultural industry in economically developed countries is gradually becoming a high-tech industry [8, p. 439].

Conclusions

Therefore, the problem of innovation development in the agricultural sector is multifaceted and complex.

Based on the survey of a set of indicators and factors, it has been found that the agricultural enterprises are transferring innovations to their daily work at a low pace. This is due to the lack of effective economic incentives that would encourage enterprises to undertake the technological modernization through the active introduction of innovation into production. It is established that the implementation of a broader policy of introduction and realization of innovations will increase the efficiency of functioning of the agrarian sphere, as well as promote the rational using of nature and increase the productivity of agriculture and animal husbandry in the conditions of the limited natural resources.

In order to implement a broader policy of innovation implementation and realization, the main priorities for the development of innovative activity in the agricultural enterprises should be:

- improvement of the mechanism of management of the innovative activity of the agricultural enterprises;
- technical and technological re-equipment of the agricultural enterprises;
- activation of innovative activity of the agricultural enterprises by providing the various benefits, improving financing, expanding the consulting services;
- improving the efficiency of scientific research by improving the material and technical base, strengthening the staffing of scientific teams;
- integration of small enterprises into the large production structures.

The further researches in these directions should consider the processes of implementation of the latest progressive technologies in the agricultural enterprises as a systematic set of knowledge, informational, technological and organizational solutions to ensure the sustainable development of agriculture, strengthen the economic and technological security of the industry.

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