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GLOBAL PRACTICES IN PROMOTING INNOVATION AMONG SMALL ENTERPRISES IN THE AGRO-INDUSTRIAL SECTOR

Abstract

The purpose of this study is to analyze international practices in promoting innovation among small enterprises in the agro-industrial sector and to identify opportunities for their application in Kazakhstan. The research methodology is based on comparative analysis, synthesis of scientific literature, and the study of institutional mechanisms supporting innovation in the agricultural sectors of the United States, Canada, Germany, France, and the United Kingdom. The originality of the study lies in the identification of key factors contributing to the successful implementation and commercialization of innovations in small agricultural enterprises under different economic conditions. The results demonstrate that effective innovation development requires comprehensive state support, technology transfer systems, public-private partnerships, research integration, and advisory services. The study concludes that adapting advanced international experience can enhance the competitiveness, productivity, and sustainable development of small agricultural enterprises in Kazakhstan.

Key words: agro-industrial complex, agricultural innovation, small business, International experience, State support.

Introduction

It seems that the experience of the USA is especially important for domestic theory and practice, as a state with a territorial extent comparable to Kazakhstan, population size and similar natural and climatic conditions. It is noteworthy that the United States has not always been among the leaders of agricultural and industrial production and at one time experienced a period of painful transformation of agriculture after the abolition of slavery in the south of the country. However, at present, the United States has managed to create a powerful agricultural production with advanced technologies and the highest labor productivity, even in comparison with technologically advanced states [1, c. 134-158].

The United States is an example of a State striving for leadership in all branches of scientific knowledge, strengthening cooperation between the State, industry and research groups, training high-quality personnel, as well as improving the overall level of scientific and technical knowledge in the country. One of the main priorities of the domestic and foreign policy of the state is the promotion of scientific and technological progress and the widest possible implementation of its results in all spheres of public life [2].

The scientific boom was the result of the implementation of the strategic plan for the development of the country's innovation potential, adopted by the US government in the early 80s of the last century. The strategy provided for the implementation of legislative, organizational, economic, educational, cultural, educational and other measures aimed at activating scientific research, as well as the introduction into the mass consciousness of the dominant priority of science as the main condition for the progressive development of society and the basis of its well-being.

In the early 1980s, a package of laws aimed at creating a regulatory framework for the state's innovation strategy was developed and put into effect in the United States. The package included such legislative acts as the Law on Innovation Activity (1980), the Law on the Development of Innovation in Small Business (1981), the Law on Technology Transfer (1986). In addition, during this period, the US government issued a number of by-laws aimed at developing innovation activity and

facilitating access to science and technology for business entities. Further development of the legislative and regulatory framework of the NTP was developed in the laws «On Trade and Competitiveness» (1988), «On National Technology Transfer and Development» (1995), «On Commercialization of Technology Transfer» (2002), etc. As a result, effective mechanisms for the transfer of production technologies were created in the United States, the procedure for licensing inventions was simplified, industrial propaganda services were formed, and a favorable information background for research and innovation activities was created.

The innovative provision of the US agro-industrial complex today seems to be the most perfect in the world, being a role model for countries not only with transition, but also with developed economies. In the United States, the intensification of agricultural production is a very profitable area of capital application, the return on which is 30-50% per dollar invested and allows you to get up to 80% of the increase in production due to the development of science and technology [3, c. 110-121]. The strategic planning system created in the 1990s allows combining program and target planning with effective monitoring of compliance with federal and regional priorities in scientific and technical activities and the allocation of state financial and material and production resources in accordance with them for scientific research, their transfer and implementation in agricultural production. According to the US Department of Economics and Statistics, at least a quarter of scientific projects are brought to implementation (for comparison, in Kazakhstan no more than 2-3%), which contributes to the most rational spending of financial resources in the amount of up to half a billion dollars annually [4].

Despite the existence of a powerful sector of large capitalist farms in the US agro-industrial complex, the government proceeds from the fact that private investments are not enough to meet the needs of agricultural producers in R&D due to the fact that the implementation of a number of innovative projects requires costs exceeding the material, technical, organizational and personnel capabilities of even large agricultural companies and farmers' associations. Therefore, federal legislation considers the support of R&D programs (including in the agricultural sector) as one of the important economic functions of the state. In accordance with US law, the state provides private corporations, its contractors and non-profit corporations engaged in R&D with a wide range of various preferences and benefits.

An important element of state support for the innovative activities of small forms of agricultural production is the joint financing of university science and extension with regions and farmers' associations.⁴ Modern extension in the USA implies not so much the transfer of scientific knowledge from the developer to the direct producer, as their interaction with each other at all stages of STP. Thus, in many states, farmers' associations, being present on the boards of trustees of universities, contribute to the practical feasibility of innovations and influence the direction and quality of graduates' preparedness. The main burden of financing the extension cooperative service falls on state budgets. According to the Federal Statistical Service, in 2017, in the whole country, 18% of extension financing was carried out from the federal budget, 66% - from state budgets and 16% of funds were provided by local budgets [5].

Methods and materials

The theoretical and empirical basis of the study is the results of research by Kazakhstani and foreign scientists and specialists in the field of improving organizational and economic relations of participants in dairy production. The empirical and informational basis of the study was legislative and other regulatory documents regulating the process of implementing investment policy in the automotive industry, as well as concepts, programs and strategies for the development of livestock agriculture and dairy production.

Results and discussion

Another major area of innovation in agro-industrial production is the creation of public-private partnerships with the participation of the US Department of Agriculture, the purpose of which will be to use innovations for global development and economic growth of all branches of agricultural production. In particular, a partnership with the non-profit organization CABI is necessary to combine information on the diagnosis, treatment and dissemination of agricultural crops, pests and diseases

within the framework of the Plantwise initiative implemented by CABI. In addition, in partnership with the organizations Bioversity International and Global Crop Diversity Trust, a global bank of plant genes and breeding material with the properties necessary for scientific research is being created [6].

It should be recognized that the policy pursued in the field of agricultural innovations has put the United States in a leading position in the production of basic types of agricultural products. The country produces half of the world's soybeans and corn, 10-15% of cotton, wheat, tobacco and vegetable oils. In terms of agricultural efficiency, the United States is also a world leader. Currently, the agricultural sector of the US economy uses many innovative solutions that allow increasing production while reducing costs. The use of genetically modified seeds, direct sowing, modern technologies of storage and transportation of agricultural products leads to a reduction in costs and an improvement in the quality of manufactured products. Thanks to these factors, as well as a purposeful state innovation policy in the agricultural sector, comfortable conditions have been created in the United States for the development of agricultural production, the productivity of which has increased by almost 50% compared to the 80s of the last century.

Turning to the experience of Canada, it should be noted that until the end of the last century, the level of innovation activity in industry and agriculture in this country was significantly lower than in the United States. However, in the last two decades, a course has been chosen in Canada to build an innovative society based primarily on the high educational potential of the population. The Government has adopted a number of decisions on the radical reform of the entire educational, scientific and technical policy in order to involve the widest possible public structures in innovation and create a favorable innovation climate..

In accordance with the federal structure, the implementation of research and scientific and educational programs is the joint competence of the federal Government, ten provinces and three federal territories of Canada. At the federal level, the management of science and education is carried out by the federal Government, the relevant ministries and state scientific institutions included in their structure. For example, the Ministry of Agriculture and Food is responsible for 18 research centers, the Ministry of Environmental Protection - 15 centers, the Ministry of Health - 13 national laboratories. In addition, a number of Canadian provinces have their own ministries of scientific research. The structure of the state scientific, technological and innovation system of Canada is complemented by research institutions, universities and scientific sectors of industrial firms, including in-house research units of small and medium-sized businesses. Finally, the country has established the National Research Council of Canada (National Research Council of Canada), which is subordinate to 24 research institutes [7, c. 67-76].

The participation of the private sector in the development of the country's innovation potential is realized mainly through public-private partnership. Such associations of state institutions with business structures are created in order to consolidate the scientific potential of state research institutions, university science and industry in the form of regional innovation clusters. As a rule, universities, state research centers (primarily NRC) and high-tech production are concentrated in clusters.

In the leading countries of the European Union (Germany, Great Britain, France, the Netherlands, Denmark, etc.), along with the already traditional directions of innovative development, such forms of stimulating innovation activity as the creation of innovation centers and science and technology parks with the involvement of a relatively small number of large corporations, the so-called «national champions» – companies capable of competing on equal terms with the leading firms of the USA, Canada and Japan are also used. In the 1990s, in a number of EU countries (Great Britain, France, Germany, Denmark, etc.), programs were adopted and widely developed to create such innovation centers (IC) as reference points for the development and production of high-tech products. As a result of the implementation of these programs, zones of innovative activity were formed, large enterprises producing high-tech products were created, the latest technologies were developed and introduced into production using the latest achievements of scientific and technological progress, the

production of agricultural products using environmentally friendly and organic technologies was mastered, etc..

Innovation centers and science and technology parks play an important role in the innovative development of industrially developed European countries, where, along with research centers and university science, an important role is played by intra-company science integrated into the real sector of the economy. In EU countries such as the UK, France, Germany, Austria, the Netherlands, the costs of in-house scientific and applied research account for 62-70% of total science costs (for comparison: in the USA and Japan - 70%, China - 71%) [8, c. 21-30]. At the same time, companies' own scientific research (including large multinational corporations) They are actively combined with the involvement of research centers and universities in the implementation of innovative projects, which is carried out mainly in the form of outsourcing. Such an organization of innovation activities contributes to the development of its own scientific and technological potential, and also allows for the effective distribution of scientific efforts of all participants of the scientific and technological.

The most significant and potentially valuable for the domestic agro-industrial complex, undoubtedly, is the experience of Germany, one of the first European countries to begin the widespread implementation of the achievements of the scientific and technological progress in the agricultural production of small businesses. German production scientists have achieved the greatest success in the field of organic agriculture and the production of environmentally friendly products. Since 1989, the state has been providing large-scale financial support for this direction. Germany ranks first among EU countries (and second in the world after the USA) in terms of turnover of environmentally friendly products – 6.59 billion euros (2011), the lion's share of which is produced by farmers [9, c. 80-87].

The country has established and successfully operates a system of environmental unions that unite environmentally friendly farms in Germany. Membership in environmental unions allows farmers not only to count on additional financial flows through union channels, but also to receive consulting, methodological, informational, scientific, technical, and innovative assistance. One of the important advantages of membership in environmental unions is the possibility of certification and labeling of products in accordance with the sign of belonging to the union, land, state. In Germany, environmentally friendly products are subject to marking with the state seal and the seal of the relevant land where the products were produced. There is an extensive retail network in the country, which includes specialized biomagazine5, fairs, as well as ecological «counters» in traditional stores selling products equipped with bio-prints. The method of selling environmentally friendly products directly on the farm is gaining more and more popularity, including with the possibility of consumer participation in their production.

Summary and Conclusion

In the UK, state regulation of agricultural innovations is carried out mainly by indirectly stimulating R&D and activating the processes of introducing new equipment into agricultural production by regulating prices, lending, insurance and subsidizing capital-intensive technologies, etc. At the same time, financing of innovation transfer activities in the UK is carried out exclusively from private sources. The participation of the state is limited to providing organizational, informational and consulting assistance to subjects of innovative activity, within the framework of which regional technological consulting centers for the transfer of advanced technologies to industrial firms and agricultural producers are being created. Such centers, having access to regional and national sources of scientific and technological information and R&D results with the help of local and regional information networks (Niarnet and Supernet), carry out their activities at the expense of self-sufficiency by providing commercial services to business organizations, farmers, as well as other interested parties.

In France, innovation policy in the agricultural sector is based on the principles formulated in the Law on innovation, adopted in 1990. The mentioned law relies on the broad involvement of research organizations, educational institutions, industrial enterprises and agricultural producers to develop R&D in the field of biotechnology, computer science, environmental protection through the organization of incubators and technology parks. In incubators, scientific and technical means,

equipment, and production facilities are transferred to small firms for free for the period necessary for the implementation of an innovative project (usually this period does not exceed three years), loans are allocated (partially irrevocable), information, technological and other assistance necessary for the implementation of the project is provided. According to the European Commission for Cooperation and Development, the effectiveness of innovative projects implemented within incubators and technology parks is on average 2-2.5 times higher than in state educational institutions, research organizations and groups.

The state's innovation policy is aimed at bringing production closer to research organizations, university research groups and creating conditions for the wide dissemination of technical knowledge among entrepreneurs, farmers, farmers' associations, etc. Since the beginning of the law, 150 regional innovation centers have already been created to transfer technologies and promote the unification of scientific efforts of state research institutes and industry, as well as to assist entrepreneurs in the development of new technologies.

Summing up, it can be concluded that foreign experience indicates the need for active support of the innovation process in small forms of agricultural sector management at the state and regional levels. At the same time, the state policy of supporting the innovative model of the development of small forms of agricultural production should cover all stages of the innovation process, starting from the development, transfer of innovation, its commercialization, introduction into the activity of small forms of farming and ending with bringing it to the consumer. State and regional policy in this area should be implemented comprehensively, not limited to economic measures in the form of the return of costs for the purchase of innovative equipment, technologies, seeds, animals, subsidizing the interest rate on loans, etc.

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АГРОӨНЕРКӘСІП КЕШЕНІНДЕГІ ШАҒЫН КӘСІПОРЫНДАРДЫҢ ИННОВАЦИЯЛЫҚ ҚЫЗМЕТІН ЫНТАЛАНДЫРУДЫҢ ӘЛЕМДІК ТӘЖІРИБЕСІ

Түйін

Осы зерттеудің мақсаты – агроөнеркәсіптік кешендегі шағын кәсіпорындардың инновациялық қызметін ынталандырудың әлемдік тәжірибесін талдау және оны Қазақстан жағдайында қолдану мүмкіндіктерін анықтау. Зерттеу әдістемесі салыстырмалы талдауға, ғылыми әдебиеттерді жүйелеуге және АҚШ, Канада, Германия, Франция мен Ұлыбританияның ауыл шаруашылығындағы инновацияларды қолдау тетіктерін зерттеуге негізделген. Зерттеудің ғылыми жаңалығы әртүрлі экономикалық жағдайларда шағын ауыл шаруашылығы кәсіпорындарында инновацияларды тиімді енгізу мен коммерцияландыруға ықпал ететін негізгі факторларды анықтауда көрінеді. Зерттеу нәтижелері инновациялық дамудың тиімділігі мемлекеттік кешенді қолдауға, технологиялар трансфері жүйесінің дамуына, мемлекеттік-жекеменшік әріптестікті нығайтуға, ғылым мен өндірісті ықпалдастыруға және ауыл шаруашылығы өндірушілеріне консультациялық қолдау көрсетуге байланысты екенін көрсетті. Зерттеу қорытындысы бойынша, озық шетелдік тәжірибені бейімдеу Қазақстанның аграрлық секторындағы шағын кәсіпорындардың бәсекеге қабілеттілігін, өнімділігін және тұрақты дамуын арттыруға мүмкіндік береді.

Кіттік сөздер: агроөнеркәсіптік кешен, ауыл шаруашылығындағы инновациялар, шағын бизнес, халықаралық тәжірибе, мемлекеттік қолдау.

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МИРОВАЯ ПРАКТИКА СТИМУЛИРОВАНИЯ ИННОВАЦИОННОЙ ДЕЯТЕЛЬНОСТИ МАЛЫХ ПРЕДПРИЯТИЙ В АГРОПРОМЫШЛЕННОМ КОМПЛЕКСЕ

Аннотация

Целью данного исследования является анализ мирового опыта стимулирования инновационной деятельности малых предприятий агропромышленного комплекса и выявление возможностей его применения в Казахстане. Методология исследования основана на сравнительном анализе, обобщении научной литературы и изучении институциональных механизмов поддержки инноваций в сельском хозяйстве США, Канады, Германии, Франции и Великобритании. Научная новизна работы заключается в выявлении ключевых факторов, способствующих успешному внедрению и коммерциализации инноваций в деятельности малых сельскохозяйственных предприятий в различных экономических условиях. Результаты исследования показывают, что эффективное инновационное развитие требует комплексной государственной поддержки, функционирования систем трансфера технологий, развития государственно-частного партнерства, интеграции науки и производства, а также консультационного сопровождения сельхозтоваропроизводителей. Сделан вывод о том, что адаптация передового зарубежного опыта позволит повысить конкурентоспособность, производительность и устойчивость развития малых предприятий аграрного сектора Казахстана.

Ключевые слова: агропромышленный комплекс, инновации в сельском хозяйстве, малый бизнес, международный опыт, государственная поддержка.