OPEN ACCESS Int. J. Agr. Ext. Special Issue (02) 2021. 105-118 DOI: 10.33687/ijae.009.00.3968

Check for updates

Available Online at EScience Press Journals

International Journal of Agricultural Extension

ISSN: 2311-6110 (Online), 2311-8547 (Print)

http://www.esciencepress.net/IJAE

REGULATION OF THE ACTIVITIES OF TECHNOLOGY TRANSFER INSTITUTIONS IN THE AGRICULTURAL SECTOR OF THE ECONOMY

[a]Nadezhda V. Ukolova, [b]Juliya A. Shikhanova, [a]Lyudmila N. Pototskaya, [c]Vyacheslav G. Korostelev

[a] *Saratov State Agrarian University, Saratov, Russian Federation.*

[b] *Moscow University for Industry and Finance "Synergy", Moscow, Russian Federation.*

[c] *Institute of Agrarian Problems of the Russian Academy of Sciences, Saratov, Russian Federation.*

ARTICLE INFO

Article History

Received: July 12, 2021

Revised: November 23, 2021

Accepted: December 01,2021

Keywords

Agriculture

System of methods

Technology transfer

Institutions

Efficiency

Development economy

ABSTRACT

The importance of the administrative impact on the transfer mechanism provided through measures that differ in the level of execution and responsibility is emphasized in this study. The indicators of the export of high-tech goods in Russia, China, Japan, the USA, Germany and France are presented, as well as the share of organizations of the Russian Federation at various levels of government that carried out research and development. A conceptual model of a situation-oriented system of technology transfer methods in the agricultural sector of the economy is constructed. The methods of regulating the activities of technology transfer institutes are highlighted. The scientific foundations of the development of the formation of innovative and institutional transformations are revealed. The conclusion is made about the need for active development of the mechanism of technology transfer in modern agriculture based on regulating the activities of its institutions, accumulating information resources of various levels of government of the country. The conducted research will allow us to determine and scientifically substantiate the popular directions of effective development of technology transfer in the branches of the agro-industrial complex.

Corresponding Author: Nadezhda V. Ukolova

Email: nv-ukolova@singapore-uni.com

INTRODUCTION

Regulation of the activities of technology transfer institutions in the agricultural sector of the economy can be carried out through the development and application of an appropriate system of methods based on the use of system legislation in the field of intellectual activity provided by the use of a universal mechanism for the cooperation of subjects of the innovation process taking place under a preferential tax regime, the absence of bureaucratic barriers, the existence of an adaptive information space, meeting the capabilities and requirements of scientific and technological progress and the global digital economic system. The identification of existing mechanisms for supporting institutions for the transfer of agricultural technologies, the identification of authorities and legal entities interested and uninterested in the existence of such an institution is an important component of the institutional environment. To make effective management decisions on adjusting the functioning of digital technology transfer in agriculture, it is advisable to use tactical program-target documents for managing the introduction of high-tech products and innovative developments (state programs, departmental target programs, reports, etc.) (Export of high-tech goods, US dollars, 2021; Federal State Statistics Service, 2021;

North, 1993). The formation of technology transfer in the Russian agricultural economy takes place in an innovative environment regulated by the developed documents (the Strategy for the Development of the Information Society in the Russian Federation until 2030 and the program "Digital Economy of the Russian Federation"), which provides the possibility of rapid redistribution of federal budget funds with a predictable effect. The results of the implementation of the strategy and the implementation of the program should have a significant positive impact on the target indicators of technology transfer, in particular, on increasing production and improving the quality of high-tech products, increasing the availability of high-tech products of their production, increasing the level of profitability of innovations, reducing risks in the sub-sectors implementing innovative developments.

MATERIALS AND METHODS

To conduct the study, a multilateral approach was applied to regulating the activities of technology transfer institutions in agriculture, provided by the application of an appropriate system of methods through the use of systemic legislation in the field of intellectual activity in optimizing cooperation between transfer subjects.

An important stage of the research is to determine the essence and specifics of the formation of innovative and institutional transformations and to develop a system of methods of technology transfer based on the regulation of the activities of its institutions at the present stage. The institute is a set of sanctioned rules in unity with the social mechanism of their protection" (Tambovtsev, 2001). The founder of the institutional economic theory, North (1993), argues that the institute is "a restrictive framework that organizes the relationships of participants, sets the structure of motivations." Institutional changes determine how societies develop over time and thus are the key to understanding the emerging changes". In his later works, he transforms his understanding of the economic essence of the institution, interpreting it as follows: "these are rules, mechanisms that ensure their implementation, and norms of behaviour that structure repetitive interactions between people" (North, 1993), "formal rules, informal restrictions and ways to ensure the effectiveness of restrictions" (North, 1993). In the methodology of institutional economic theory, the category "institutional environment" is fundamental. Many domestic and foreign scientists have been engaged in the problem of studying the institutional environment, the most significant, in our opinion, are the works of North (1993), Auzan (2006), Tambovtsev (2001; 2010), Hodgons (2003), Nelson and Winter (2000), Vertakova (2005), Treshevsky (2015), Sukharev (2008), Nesterenko and Dementeva (2020), Zhedyaevsky and Altukhov (2014), Petrikov (2013), Serkov (1996), Ushachev (2002), Khitskov (2011). The works of Monakhov *et al.* (2020), Kohno and Kohno (2013), Rogova (2005), Solovyova (2016), Dubickis and Gaile-Sarkane (2015), Semieniuk and Mazzucato (2017) are devoted to the issues of technology transfer.

RESULTS AND DISCUSSION

A conceptual model of a situation-oriented system of technology transfer methods in the agricultural sector of the economy is shown in Figure 1. It reflects the dynamic interaction of technology transfer subjects. In addition, Decree of the President of the Russian Federation No. 203 of May 9, 2017 "On the Strategy for the Development of the Information Society in the Russian Federation in 2017-2030" (2017) and the program "Digital Economy of the Russian Federation" (2021) designed for implementation until 2024, formed in the context of the implementation of the above-mentioned strategy, will ensure the creation of a single innovation and investment space for technology transfer.

The organization of the rational functioning of the technology transfer mechanism provides for the development and implementation of an effective innovation and investment set of measures mediating the transfer mechanism, taking into account the influence of external and internal factors. Based on the analysis of the introduction and export of innovative goods in some countries in the period from 2015-2019, a diagram is constructed (Figure 2) (Export of high-tech goods, US dollars, 2021). The leading position, regardless of the chronology of the study, is occupied by China, Germany, and the United States. Russia is in 29th place in the ranking of countries exporting high-tech products. As a positive trend, we can note the increase in the volume of exports of goods with a high share of R & D by the Russian Federation in 2019. The share of organizations of the Russian Federation at various levels of government that carried out research and development in January-September 2020 is shown in Figure 3 (Federal State Statistics Service, 2021).

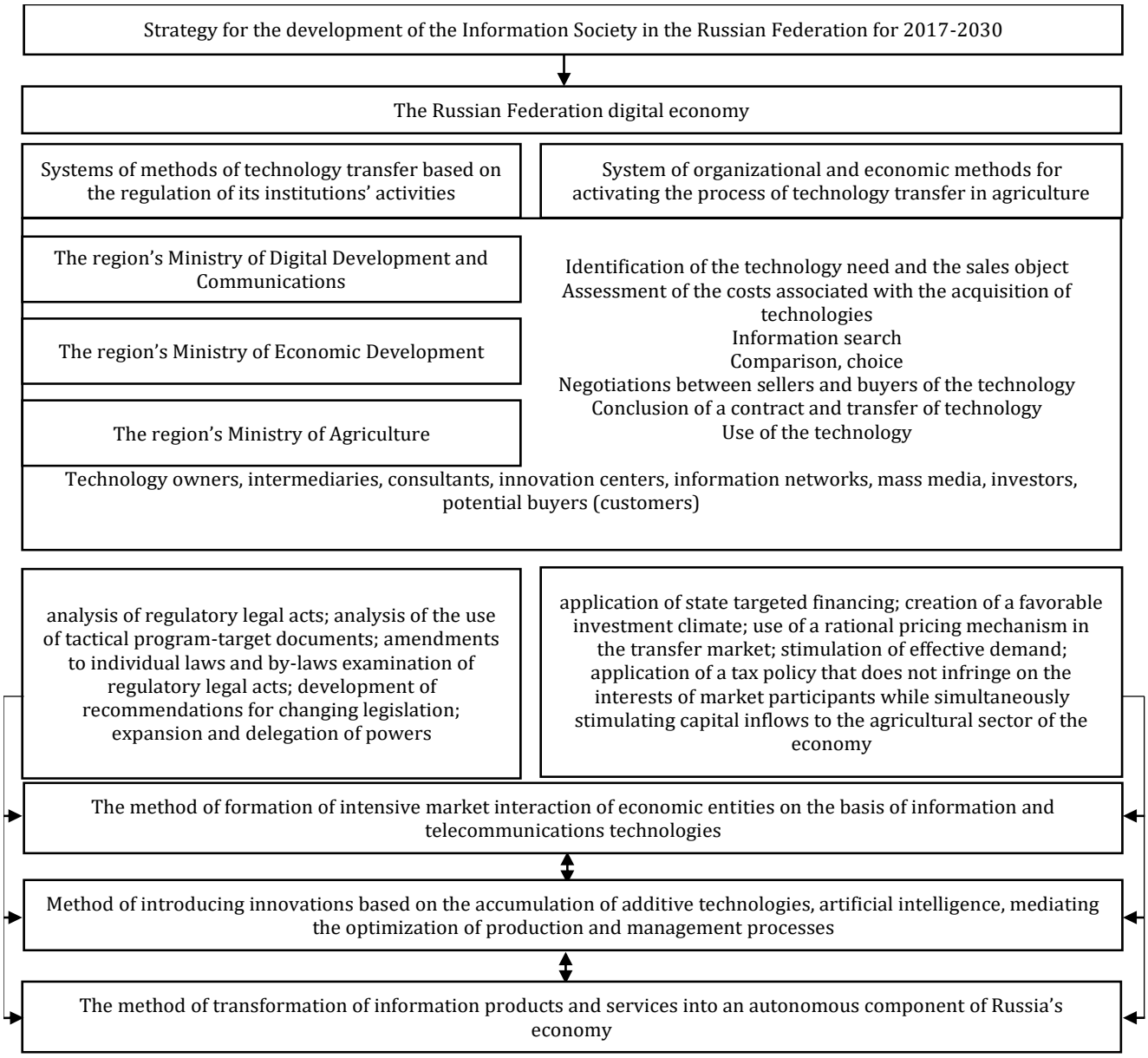

Figure 1. Conceptual model of a situation-oriented system of technology transfer in the agri. sector of the economy.

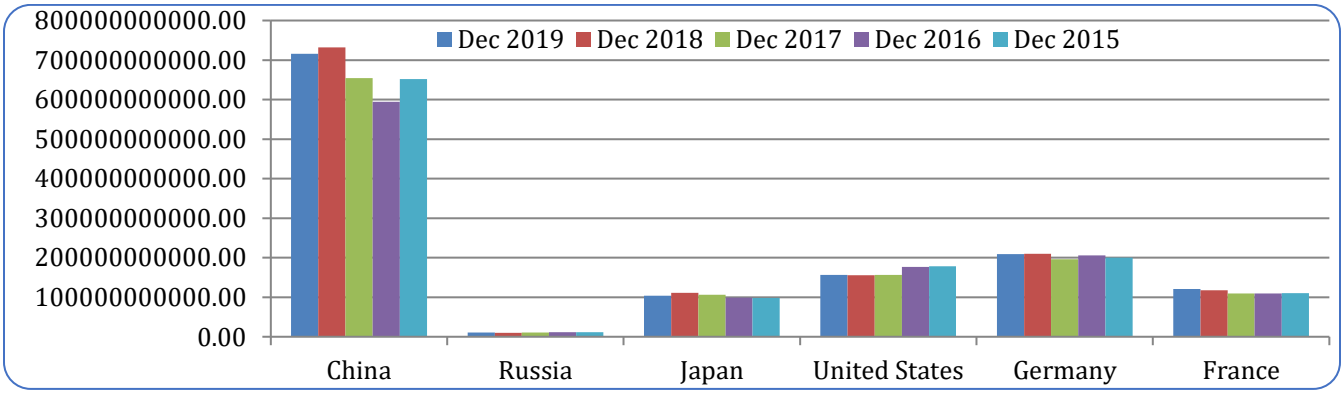

Figure 2. Chart of exports of high-tech goods in Russia, the United States, Europe and Asia, US dollars for 2015-2019.

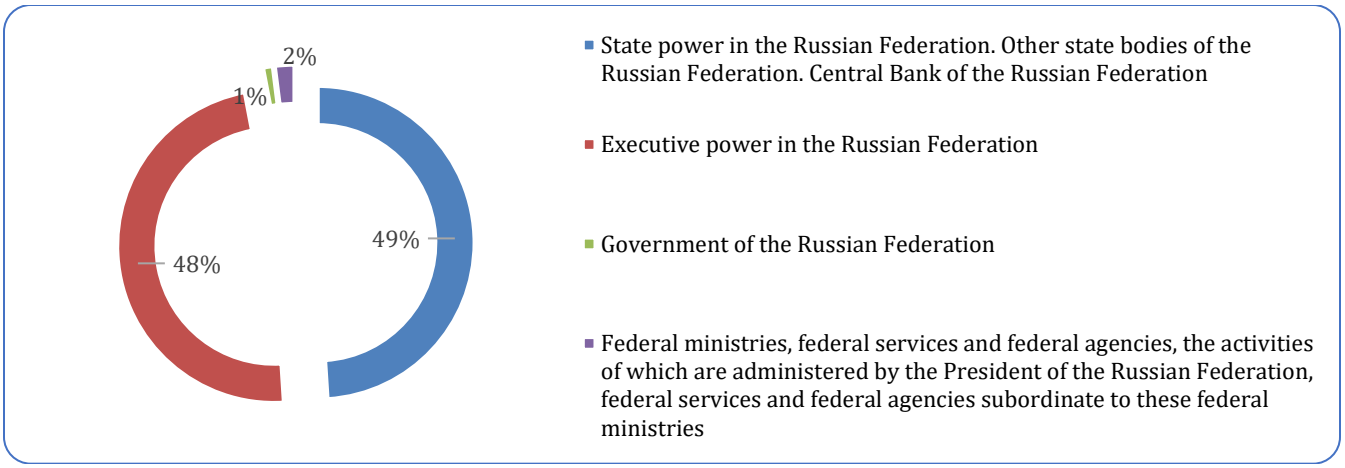

Figure 3. The share of organizations of the Russian Federation at various levels of government that carried out research and development in January-September 2020.

The conducted studies have shown that the costs of scientific research of organizations owned by the Russian Federation for the period under study amount to 97.2%, including 52.4% of state-owned organizations. The share of the considered expenses of federal property organizations is 51.4%, property of the subjects of the Russian Federation is 1.0%, the municipal property is 0.01%, property of public and religious organizations – associations) is 0.21%, private property is 19.5%, mixed Russian property is 18.5%. The costs of research and development of foreign-owned organizations amounted to 1.9% of the indicator for all forms of ownership. The share of internal expenditures on research and development financing from the federal budget of organizations owned by the Russian Federation for the study period is 99.8% (which is logical), including the share of state-owned organizations accounts for 67.1%. The share of the considered expenses of federal property organizations is 66.9%, property of the subjects of the Russian Federation is 0.15%, property of public and religious organizations – associations) is 0.02%, private property is 11.5%, mixed Russian property is 14.4%. Internal expenditures on research and development financing from the federal budget of foreign-owned organizations are not recorded. At the heart of the formation of an institutional environment for technology transfer that ensures its objective regulation is the development and application of effective areas of managerial influence at the federal and regional levels (Strapchuk, 2021; Mazur *et al*., 2021). The solution of some of the fundamental problems of the functioning of the system of institutions is based on the use of existing institutional principles by creating an optimal regulatory and economic environment for its regulation, taking into account the domestic and foreign experience of positive functioning (Sadykova, 2011; Bobyr, 2021). The continuous improvement of the efficiency and sustainability of the Russian agro-industrial complex largely depends on the level of innovation and investment development of the industry (Didkivska *et al*., 2021; Shulga *et al*., 2021; Strapchuk and Mykolenko, 2021).

The formation of the empirical base of institutional research needs to be streamlined, it is necessary to structure and describe the functioning of the institutional elements of the technology transfer system. Earlier in the study, it was noted that the identification of the scientific foundations for the formation of the institutional environment for technology transfer in the agricultural economy includes: the classification of positive relationships between manufacturers of high-tech products and consumers, the grouping of factors for the favourable functioning of the digital agricultural economy; substantiation of directions for improving technology transfer with limited financial resources by increasing and optimizing the use of the social, institutional and economic potential of the agricultural market (Ukolova et al., 2020).

CONCLUSIONS

Relations between state bodies of various levels, scientific organizations, manufacturers of high-tech products, financial institutions, participants in the innovation process are formed through technology

transfer. The choice of methods and means should be automated with the use of information and communication technologies. Financial institutions have the opportunity to provide manufacturers of high-tech products, developers of R & D, innovative enterprises implementing the results of R & D with appropriate funds. The development and implementation of the main directions that will significantly change and improve the functioning of the mechanisms of technology transfer and innovative development of the agro-industrial complex should be ensured by the combined influence of state authorities at various levels, financial institutions, scientific institutions, small innovative enterprises creating R & D. It is necessary to form an optimal and balanced mechanism for innovation and investment development and technology transfer based on a combination of effective methods of regulating technology transfer and organizational and economic methods of activating the process of its activation. At the same time, the successful functioning of the technology transfer mechanism is facilitated by improving the production and market infrastructure and increasing the innovation and investment attractiveness of agribusiness at the federal and regional levels. The formation of a technology transfer mechanism should be carried out following a logical sequence in stages, starting with an assessment of the existing level of innovation and investment activity of entrepreneurship, determining goals, tasks, elements, resources, tools and levers. The practical implementation and functioning of this mechanism will contribute strengthening the innovation and investment component of agribusiness and the transition to digital economy development.

ACKNOWLEDGMENTS

The reported study was funded by RFBR, project number 20-010-00324

REFERENCES

Auzan, A. 2006. Institutional economics: New institutional economics. INFRA-M, Moscow.

Bashmakov, A., I. Zhedyaevsky and D. N. Popov. 2014. Development of computer support tools for conceptual design of technical systems based on knowledge about resources in the technical and natural environment-address http://www.handbook-j.ru/index.php/archive-rus/302-040-045

Bobyr, S. V. 2021. Development and application of a simple model for calculating the quantum diffusion parameters of rubidium, hydrogen, and deuterium atoms. Scientific Herald of Uzhhorod University. Series “Physics”, 49: 19-25.

Decree of the President of the Russian Federation No. 203 “On the Strategy for the Development of the Information Society in the Russian Federation in 2017-2030”. 2017. http://www.kremlin.ru/acts/bank/41919

Didkivska, H., Z. Masliukova and Ye. Novytska. 2021. Influence of carbonized biomass on soil improvement, increase in yield of agricultural crops and mitigation of climate change implications. Scientific Horizons, 24(1): 93-100.

Digital Economy of the Russian Federation. 2021. https://digital.gov.ru/ru/activity/directions/858/

Dubitskis, M. and E. Gail-Sarkan. 2015. Prospects for innovation and technology transfer. Social and Behavioral Sciences, 213: 965-970.

Export of high-tech goods, US dollars. 2021. Knoema

Federal State Statistics Service. 2021. https://www.gks.ru/folder/14477

Hodgson, J. 2003. Economic theory and institutions: A manifesto of modern institutional economic theory. Hodgson. Delo, Moscow.

Khitskov, I. F. 2013. Innovative foundations of the system development of agriculture: strategies, technologies, mechanisms (Central Federal District of Russia). Research Institute of Economics and Organization of agro-industry, Voronezh.

Kohno, P. and A. Kohno. 2013. Technology transfer: Concepts and models. Society and Economy, 10: 96-111.

Mazur, V., I. Didur, O. Tkachuk, H. Pantsyreva and V. Ovcharuk. 2021. Agroecological stability of cultivars of sparsely distributed legumes in the context of climate change. Scientific Horizons, 24(1): 54-60.

Nelson, R. and S. Winter. 2000. The evolutionary theory of economic changes. Harvard University Press, London.

Nesterenko, M. A. and A. A. Dementeva. 2020. Theoretical aspects of the development of bioeconomics and sectoral convergence in

agriculture. Moscow Economic Journal, 11: 293-300.

North, D. 1993. Institutes, ideology and efficiency of the economy. In: L.I. Piyasheva, J.A. Dorn. From the plan to the market. Future Communist Republics (307-319). Catallaxy, Moscow.

Rogova, E. M. 2005. Organizational and economic support of technological transfer: theory and methodology: thesis of candidate of economy science. St. Petersburg State National University of Economics and Finance, St. Petersburg.

Sadykova, K. 2011. Institutional environment of technology transfer in the region. Innovation and Investment, 2: 227-230.

Semenyuk, G. and M. Mazzucato. 2017. State financing of innovations: new issues. Oxford Economic Policy Review, 33: 24-48.

Serkov, A. F. 1996. Indicative planning in agriculture. Informagrobusiness, Moscow.

Shulga, M. V., G. S. Korniyenko and I. V. Yakoviyk. 2021. Legal support for the activities of agricultural transnational corporations in Ukraine. Journal of the National Academy of Legal Sciences of Ukraine, 28(2): 234-242.

Solovyova, Yu. V. 2016. The mechanism of technology transfer in the innovative economy. Rudn, Moscow.

Strapchuk, S. I. 2021. Level of ecological and economic diversification: A methodology for assessing the sustainability of agricultural enterprises. Scientific Bulletin of Mukachevo State University. Series "Economics", 8(2): 101-107.

Strapchuk, S. I. and O. P. Mykolenko. 2021. Factors of sustainable intensification in agriculture of Ukraine: Evidence from the enterprises of the Kharkivska oblast. Scientific Bulletin of Mukachevo State University. Series "Economics", 8(3): 9-17.

Sukharev, O. S. 2008. Institutional and evolutionary economics: Problems of describing economic development. Publishing house of L.N. Tolstoy TSPU, Tula.

Tambovtsev, V. L. 2001. Institutional market as a mechanism of institutional change. Social Sciences and Modernity, 5: 25-38.

Tambovtsev, V. L. 2010. The emergence of institutions: a methodological and individualistic approach. Questions of Economics, 7: 84-98.

Treshchevsky, Yu. I., G. N. Franovskaya and A. N. Duvanova. 2015. Small business and socio-economic development of the regions of Russia. Economic and Legal Aspects of the Implementation of the Modernization Strategy of Russia, 2015: 222-225.

Ukolova, N. V., S. V. Monakhov, Yu. A. Shikhanova, E. V. Vasiliyeva, G. Korostelev, L. N. Potocki and N. A. Novikova. 2020. Technology transfer in agriculture: Introduction to the theory and improvement of the mechanism. Amirit: Saratov.

Ushachev, I. G. 2002. The state and prospects of development of corporate forms of management in the agro-industrial complex of Russia. Agroindustrial Complex: Economics, Management, 10: 21-31.

Vertakova, Yu. V. 2005. Econometric models in complex regional forecasting. Economic Forecasting: Models and Methods: Materials of the International Scientific and Practical Conference, 2005: 140-144.