INTEGRATED STRUCTURES FEATURES OF THE RUSSIAN AGRO-INDUSTRIAL COMPLEX

Natalia Leshchenko – Boris Koshelev

Abstract

The article reveals the theoretical and practical aspects of the development of integrated structures of the Russian agro-industrial complex. The study examines the prerequisites and conditions for the formation of new competitive players. The role of the state is manifested through the creation of integrated scientific systems of the agro-industrial complex. The article defines the barriers and prospects for creating integrated structures based on the centres of scientific agricultural research. The article examines trends and factors that affect the activities of individual players and their integration. In addition, the results of the study show the readiness of new integrated structures to implement the Sustainable Development Goals and join a new type of Agriculture. Russia has accumulated a significant scientific potential that can be realized at a new stage of development of the agro-industrial complex. The results of the study allow us to determine the role of integrated structures and strategies for the entry of the Russian agro-industrial complex into Agriculture 4.0 and the implementation of Global Goals.

Key words: integrated structure, sustainable agriculture trends, factor-analysis agro-industrial organizations

JEL Code: O13, Q18

Introduction

Recently, the integration processes are going very fast. Integrated structures are complex organizational and economic formations, associations of subjects of one or several industries in order to obtain a synergistic effect from joint activities. In strategic management, integrated structures are the process and result of value chains, the acquisition of new opportunities through the integration of active economic actors. The integrated structures of the Russian agro-industrial complex have been formed over several decades under the influence of various political, economic and climatic factors. The features of integrated structures are closely related to the industry specifics. While technological progress to some extent overcomes existing

restrictions, the impact of natural and climatic conditions on the activities of organizations remains.

Scientists from different countries pay much attention to the study of integration and cooperation in the agro-industrial complex. Now a large number of scientific papers on this issue have been accumulated. The study of integrated structures revealed the existing country specifics of their development and functioning. So, in Russia, integrated structures in the agro-industrial complex have been created for more than a century and periodically undergo stages of transformation. Until now, Russia has a system of scientific state institutions that was established during the Soviet Union: scientific institutes, laboratories, breeding stations, experimental farms. By organizing their activities, the state tries to combine them in order to obtain a synergistic effect. At the same time, attention is not paid to the specifics of the integrator organization, the features of the integrated structures being created, and, as a result, the reasons and factors that affect the low efficiency of such structures.

Therefore, the purpose of the study is to analyze the features of integrated structures created on the basis of state agricultural research centers. The objectives of the study are to identify opportunities and threats generated by trends in the development of the agro-industrial complex and global challenges; identify bottlenecks in the development of integrated structures; determine the readiness of organizations to implement the Global Goals and enter AgroTech4.0.

1 Methods

As noted, the purpose of our study was to identify and study the features of integrated structures created on the basis of state agricultural research centers. This included the impact of the concept of sustainable development on the activities of agro-industrial enterprises, as well as determining the level of their readiness for new challenges. When preparing the data, the methods of assessing the indicators of sustainability of agro-industrial organizations were considered. Some authors distinguish five approaches to assessing the sustainability of agricultural organizations (Chopin, Mubaya, Descheemaeker, 2021), others about ten (Schindler, Graef, & König, 2015). The presented methods are actively used in agriculture in developing countries. In Russian practice, this area of research is poorly developed and is represented by isolated works in different sectors of the economy (Baranovsky, 2019). The specifics of Russian methods are related to the fact that so far, they are limited to the assessment of the financial and economic condition of organizations and the conditional assessment of environmental and social factors.

Methods of factor-analysis and systematization of scientific data, methods of strategic analysis and forecasting, as well as the study of actual data of organizations were used in the work.

2 Results

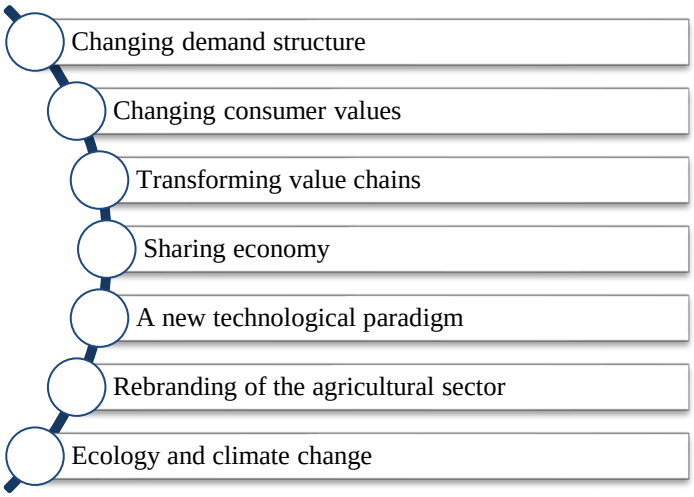
The first russian experience of combining organizations of the agro-industrial complex into integrated structures was the creation of scientific production associationsn in the end of 1960s, which included scientific institutes, agricultural organizations (experimental farms), experimental design bureaus, and breeding centers. As a rule, experimental farms were the basis for testing inventions and developments of scientific institutes and design bureaus. In the 90s of the last century, due to the radical transformations of the country's economy, the relations between organizations were transformed into market relations and ceased to form a single chain of creating innovative products in the agro-industrial complex.

The second round of integration in the last 70 years began in 2019. The integration of agricultural research centers with the most powerful farms in the regions is based on the decision of state bodies. The Ministry has decided to merge scientific institutes and experimental farms into a single integrated structure based on the territorial principle. The main goal pursued by the owner is to improve the quality of scientific products, bring developments closer to end users and form a strong player capable of entering the agro-industrial complex 4.0 and ensuring the country's food security.

The context of increasing uncertainty induces major challenges for agricultural systems. The need for more sustainable agricultural systems in an increasingly changeable environment implies a shift from the aim of maximizing agricultural outputs in a non-disturbed environment to the aim of maintaining desired levels of outputs in a context of unpredictable perturbations (Urruty, Tailliez-Lefebvre & Huyghe, 2016).

In this regard, the trends that affect the activities of agro-industrial organizations were considered. (Fig.1) They can become not only opportunities, but also a serious threat to organizations that are not ready to transform. According to a study of agricultural research centers, few of them are ready for the trends that are gaining momentum right now. By 2021, it was planned to launch 35 agricultural scientific breeding and seed breeding centers in Russia. At the moment, the centers on the basis of the existing ones operate in 18 regions.

Fig. 1: Trends in the agro-industrial complex



Source: compiled by the author

The creation of scientific breeding centers is accompanied by the process of integration of scientific organizations and agricultural organizations. At the same time, the key features of integration structures are closely related to environmental factors that directly affect the prospects for their further functioning. Table 1 shows the environmental factors that contribute to the specifics of the creation and functioning of integrated structures in the Russian agro-industrial complex.

Tab. 1: Directions of influence of environmental factors in the creation and functioning of integrated structures in the agro-industrial complex

Types of organizations	Positive	Negative
All Agricultural organizations	• Digital Innovation • Trends in healthy lifestyles, • Growth in conscious consumption • Growing demand for food • Large-scale territories • Reduced import dependence	• Climate change • Entry to the local market of multinational corporations • High speed of innovation by big players • Acquisition by large corporations of regional players • Monopolizing the industry based on modern information technology • Natural and man-made disasters; • Instability of the global market environment • Outdated regulatory framework

Agricultural producers	• The presence of a significant number of independent producers • Opportunity to achieve "scale effect" • Use of seeds (created by scientific institutions) adapted to local climatic conditions	• High risks of natural and climatic nature • Price disparity between companies of different redistributions • Discrimination against producers due to low digitization and informatization • Lack of human resources in rural areas
Recycling plants	• New technologies for deep processing of agricultural products • Opportunities to export deep-processing products	• Fluctuation in agricultural commodity prices, • Instability in agricultural raw materials • Bankruptcy of producers,
State scientific institutions	• State support for innovative projects (grants, subsidies) • State support for young scientists • New markets for innovative products • Changes in legislation on the protection of intellectual property • Results of interdisciplinary research and development	• Lack of demand for innovative products from local producers (hybrids, new cars, technologies, etc.) • High level of innovation of substitute products • Reduction in the level of state funding for basic and applied research • application by world leaders of the latest advances in genetic technologies compatible with the technologies of the new paradigm

Source: compiled by the author

So, the integrated structures are created in the context of increasing state attention to the effectiveness of subordinate organizations. The contribution of each organization to the integrated structure is not taken into account. Although the strengths of the merged organizations are the state support they have and the accumulated experience in creating innovative products or reproducing innovative products. The integrated organizations have a large list of weaknesses (Table 2), which carries significant risks.

Tab. 2: Analysis of the problems of agribusiness organizations

State scientific institutions	Agricultural producers
- Unbalanced patent portfolio - Low percentage of young scientists in the state - Lack of applied research in demand by the market	- Personnel shortage - Weak technological equipment

- Low publication activity - Isolation from the needs of the real sector - Obsolescent material base - Low quality of the scientific product - Low inflow of private investment - Lack of development commercialization skills	- High risks and dependence on additional financing - High level of depreciation of fixed assets

Source:by (Chopin, Mubaya, Descheemaeker, K. et al. ,2021)

Combining several weak players who are lagging behind in the main areas of development of Agrotech 4.0 is a high-risk event. The weaknesses identified in the process of studying these organizations are not compensated for by each other, but only reinforce the weakness of the integrated structure being created. At the same time, internal work to neutralize the weakness of organizations can lead to a positive effect within an integrated structure, in the case of targeted work. In addition, it is necessary to pay attention to the fact that the adopted development goals of organizations do not fully reflect the interest in achieving Global Goals. A significant impact on the implementation of integration programs was caused by the pandemic, as a severe situation, which showed bottlenecks not only in production processes, but also in processes related to the conservation of biodiversity and the environment.

The market-driven mantra of economic efficiency in production and trade created a fragile system that was shaken during the coronavirus outbreak. Uniformity and specialization of industrial farming has severely impacted biodiversity, whose loss is rated as the highest current risk for humanity. (Bisoffi S, Ahrné L, Aschemann, 2021)

Integrated structures created on the basis of agricultural research centers are able to overcome the existing difficulties only in the case of transformation of socio-cultural, behavioral and value attitudes. So, A. Auzan, (Auzan, 2015) studying the " Path Dependence" on the example of the development of countries, came to a conclusion that can be applied to the meso-level of economic development, as well as to the formation of integrated scientific structures. The transformation of any system should be carried out taking into account the socio-cultural characteristics that form the specifics and attitude to the development goals. Their changes and basic values determine a fundamentally new set of behavioral attitudes, as well as increase the level of competitiveness.

In addition, the integration of agro-industrial and scientific organizations should correspond not only to the interests of the state regarding the financial and economic efficiency of activities, but also to a greater extent to the goals of sustainable development. At the same time, we observe a low interest of the lower levels of the agro-industrial complex in the

preservation of biodiversity, soil fertility, and the conservation of forest and natural resources. According to the analysis, there is no methodology for assessing the sustainable development of an agricultural organization in Russia. Assessing the impact of an integrated structure on social and environmental factors is the work of the future.

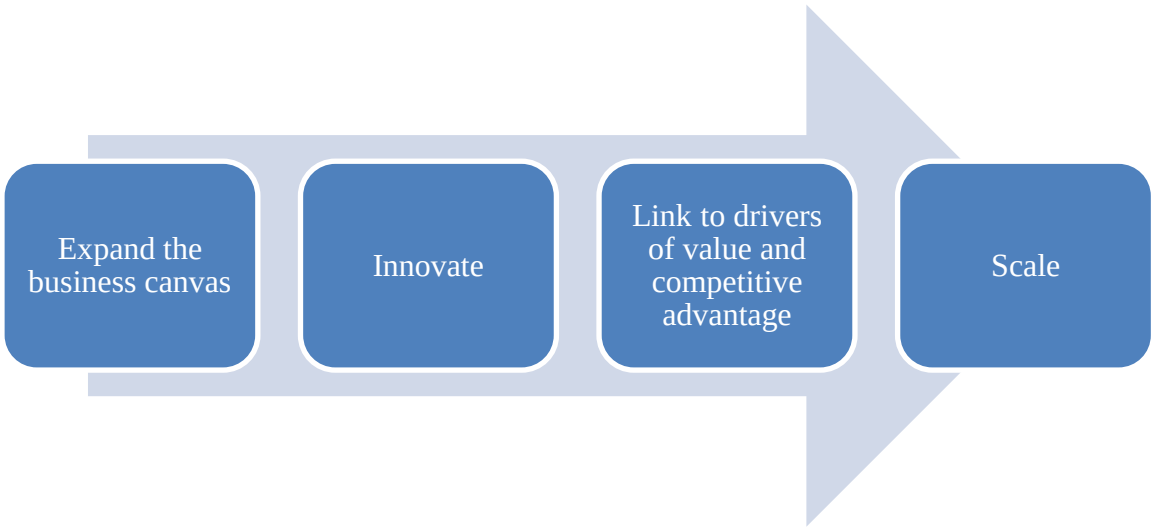
Digitalization actions in response to digital agriculture are often ad hoc, resulting in negative consequences and unjustified costs.

This contrasts with a more strategic approach, which would involve fundamentally changing organizational values (intangible identity), allowing for more flexibility of roles and processes and changing business models in order to deal with uncertainty (Klerkx, Jakku, Labarthe, 2019).

3 Discussion

As a result of the study, the low interest of the agricultural sector organizations in achieving the Sustainable Development Goals was revealed. Since 2019, the program "Digital Agriculture of the Russian Federation" has been implemented. So far, there are no real results of this program. At the moment, 18 of the 35 planned breeding centers are functioning. Active implementation of innovations and innovative products can be implemented within the framework of the innovation cycle proposed by the BCG (Fig. 2).

Fig. 2: Four-stage innovation cycle



Source: (Young, Reeves, & Gerard, 2021, January 08)

Therefore, integrated structures created on the basis of agricultural research centers have significant specifics in comparison with commercial integrated structures. A significant lag in

the Russian integrated structures is observed both in the field of product innovation and in the digitization of processes. In general, the practice of functioning of integrated structures with state participation shows the low efficiency of such formations.

The public sector is the dominant player in the development of agricultural science and innovation in Russia. According to the Higher School of Economics, the share of budget funds in the structure of internal expenditures on research and development exceeds 60%, while in recent years more than 95% of all current expenditures are accumulated by state institutions (by the end of 2019, about 80% of their volume is accounted for by research institutes and about 16% by universities). The main problem is that many of them are focused on the development of science within themselves, and the issues of applied science and the creation of products and technologies in demand by the market are not given due attention. (Innovative development, HSE, 2020)

Conclusion

So, the integrated structures created by the state require not only the regulation of legal relations, but also, to a greater extent, the transformation of the goals and strategies for the development of these structures. The goals and objectives lag behind what world leaders and multinational companies already are implementing, capturing regional markets.

As the BCG notes instead of managing short-term shifts in performance, resilience requires a focus on consistent long-term value creation and a balancing of short-run efficiency against long-run effectiveness. (Reeves& Whitaker, 2021)

References

Auzan, A. (2015). Path Dependence Problem: The Evolution of Approaches. *Moscow University Economics Bulletin, 2015*(1), 3-17. doi:10.38050/01300105201511

Baranovsky A. (2019). Assessing the sustainability of an agribusiness enterprise: methods and tools. *Problems of the economy*, (1 (28)), 3-12.

Bisoffi S, Ahrné L, Aschemann-Witzel J, Báldi A, Cuhls K, DeClerck F, Duncan J, Hansen HO, Hudson RL, Kohl J, Ruiz B, Siebielec G, Treyer S and Brunori G (2021) COVID-19 and Sustainable Food Systems: What Should We Learn Before the Next Emergency. *Front. Sustain. Food Syst*. 5:650987. doi: 10.3389/fsufs.2021.650987

Chopin, P., Mubaya, C.P., Descheemaeker, K. et al. (2021) Avenues for improving farming sustainability assessment with upgraded tools, sustainability framing and indicators. A review. *Agron. Sustain. Dev. 41*, 2021(19). doi.org/10.1007/s13593-021-00674-3

Innovative development of the agro-industrial complex in Russia. Agriculture 4.0 [Text]: docl. to XXI APR. scientific conference on problems of economic and social development, Moscow, 2020 / N. V. Orlova, E. V. Serova, D. V. Nikolaev, etc.; ed. by N. V. Orlova; NRU HSE, Moscow, Publishing house of the Higher school of Economics, 2020, 128 p. ISBN 978-5-7598-2075-8 (e-book, from https://conf.hse.ru/mirror/pubs/share/361056435.pdf

Klerkx, L., Jakku, E., Labarthe, P. (2019) A review of social science on digital agriculture, smart farming and agriculture 4.0: New contributions and a future research agenda, *NJAS - Wageningen Journal of Life Sciences*, 2019(12), 90–91. doi.org/10.1016/j.njas.2019.100315.

Reeves, M., & Whitaker, K. (2021, April 14). Back to the future: Resuming the long-term agenda for business. Retrieved April 29, 2021, from https://www.bcg.com/ publications/2021/ three-pivotal-themes-for-the-long-term-business-agenda

Schindler, J., Graef, F., & König, H. J. (2015). Methods to assess farming sustainability in developing countries. a review. *Agronomy for Sustainable Development, 35*(3), 1043-1057. doi:10.1007/s13593-015-0305-2

Urruty, N., Tailliez-Lefebvre, D. & Huyghe, C. (2016). Stability, robustness, vulnerability and resilience of agricultural systems. A review. *Agron. Sustain. Dev.36*, 2016 (15). doi.org/10.1007/s13593-015-0347-5

Young, D., Reeves, M., & Gerard, M. (2021, January 08). Why the new competitive advantage demands sustainability. Retrieved April 29, 2021, from https://www.bcg.com/ publications/2020/why-the-new-competitive-advantage-demands-sustainability

Contact

Natalia Leshchenko
Dostoevsky Omsk State University
644077, 55-a, Mira prospect, Omsk, Russian Federation
Mail: leshchenkonp@omsu.ru

Boris Koshelev
Omsk State Agrarian University named after P.A. Stolypin
644008, 1, Institutskaya square, Omsk, Russian Federation
Mail: bs.koshelev@omgau.org