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**LOGISTIC AGROINDUSTRIAL CLUSTER AS A STRATEGIC  
TOOL FOR REGIONAL DEVELOPMENT**

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***Abstract***

Regional cluster policy plays a significant role among the strategic tools for the socio-economic development of the region. The relevance of the cluster approach is due to the prevailing contradictions in the system of sectoral and regional planning and the unresolvedness of a number of tasks assigned to the territorial-sectoral complexes. As a result, there appeared a demand for the creation of organizational structures that level regional and sectoral contradictions and at the same time help to increase the competitiveness of business entities. Logistics clusters are part of the cluster policy of the territories, which shifts the emphasis towards business processes with greater added value based on the constructive interaction of partners. Both global trends and regional features of development are taken into account when designing logistics agro-industrial clusters. It is possible not only to increase the competitiveness of individual enterprises and regions, but also to provide the necessary institutional conditions for the formation of a global competitive agricultural and industrial complex of the country. Logistic agro-industrial cluster is traditionally considered as a means of increasing the competitiveness of a region. Analysis of the literature related to the concept of "cluster" showed that the interpretation of this term is so broad that it is difficult to identify not only specific, but also common cluster' features. The cluster approach in logistics contributes to the development of forms of economic flows of a higher level of organization. A lot can be transferred to the theory of clusters and logistics from business practice.

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## 1. Introduction

Design of high-technological clusters becomes the most important task to achieve the strategic goals of the region's development, and digital-type logistics clusters are necessary to maintain the agro-industrial sector, especially in the regions where this sector dominates. Russia's share in the structure of world exports of products of the agro-industrial complex (AIC) is about 1.3% according to statistics at the beginning of 2018. Current trends in the development of the Russian AIC indicate the possibility of implementing the scenario of a breakthrough development of this sector of the economy and increasing the share of world exports of the AIC to 3.4% by 2030. Authors believe, that such a breakthrough is possible due to the use of a cluster form of organization of logistic flows.

The growing global consumption of agricultural products and food forms a significant export potential for the Russian AIC. Realization of this potential requires a competitive system of product distribution, both in the country and in world markets. Consumer preferences dictate new requirements for modern logistics, which have to reconfigure the flow patterns, increasing their flexibility, efficiency, stability, balance and reliability. We can highlight the concept of supply chain management SCM, operating in a special communication environment of the platform type among modern logistics solutions that can significantly improve the competitiveness of the domestic AIC. We are talking about digital platforms that allow receiving, generating, analyzing information about the state of the distribution system, its qualitative and quantitative characteristics in a steaming mode (Afanasenko & Borisova, 2018).

## 2. Problem Statement

Despite numerous studies in the field of clustering, it is still not clear what the notion of "cluster" includes; there is no single, unified approach to determining the ability of a cluster to be combined with many other forms of organization. At the same time, the experience of many countries has proved the efficiency of cluster formation; cluster policy has become an important element of public policy. The cluster is presented both as an opportunity for active economic development and as a way of networking on a scale of the region. The unity of opinion of scientists is only that the cluster is a self-organizing system (Bergman & Feser, 1999; Porter, 2000; Marshall, 1890; Markov, 2015; Rosenfeld, 1997).

The works of Markov (2015), Lavrikova (2008), Popkova (Popkova, Ragulina, & Bogoviz, 2019) and Shastitko (2009) are devoted to the study of cluster tools in the context of the development of regional economy. Logistics clusters and their structuring are revealed in the works of Afanasenko & Borisova (2013), Evtodieva (2011) and others. International experience shows that enterprises united in groups according to the cluster principle, gain additional capacity for economic development and leadership in domestic and foreign markets (Porter, 2000).

A characteristic feature of objects in cluster formations is their certain affinity, similarity, which reveals their desire for unity; however, they are also distinguished by their individuality, and their ability not to dissolve into each other. However, they are different from objects in other clusters.

Typical organizational forms are designated in the theory of logistics: logistic chains, networks, channels, cobweb-like and cluster configurations of a flow. There is an evolutionary link and intersystem

movements between these organizational forms. It is important to plan impact on the organizational act consciously since logistical processes, conditioned by several reasons and filled with complex, controversial content can manifest themselves in several organizational forms. It implements the regulatory mechanism of the law of selection. Forms, less adapted to the external environment disappear, and more adapted survive from the point of view of the law of selection. The inconstancy of the environmental conditions and the stochasticity of the parameters of the elements-units of the structure determine the alternativeness of configuration of logistic flows in organizational forms (Afanasenko & Borisova, 2013).

The *logistics agro-industrial cluster* represents a higher level of organization of economic flows from the point of view of the degree of complexity and level of development of the form. It combines (formally and informally) a variety of different (multidisciplinary and inter-sectoral) structures, which requires an understanding of the *connectivity of cluster elements* into a functional whole. It should be noted that the logistic format of cluster system education deals with objective experience and practice of the *socio-economic organism*. This means that there are social laws along with economic laws. We can single out the main advantage of cluster formations - the possibility of additional reserves of self-development. The initiative, innovative activity of economic entities of a cluster is not suppressed. The logistics cluster is a multi-industry interbranch complex with a heterogeneous structure; a formal connection here coexists with an informal interrelation, from which the interaction of internal elements becomes closer than between individual sectors of the economy and structures. Interconnections and interdependencies here are enhanced by increasing the sustainability of vertical and horizontal technological integration based on a common target market.

The state stimulates those clusters that focus mainly on intellectualization, automation, and robotization of processes throughout its entire life cycle. It provides a public-private partnership, interaction with the scientific, educational and public sectors of the economy.

A new food market (Foodnet) is emerging today under the influence of digital transformations in the economy and growing consumer demands (The program of development of the digital (electronic) economy in the Russian Federation until 2035, 2017). Its structure includes a segment of the production of nutrients based on alternative sources of raw materials, genomics, organic farming, etc. Given this, it should be noted that it becomes very important to develop common standards and regulations for integration interactions for participants in new markets for the logistics agro-industrial cluster. A single data bank is being formed - a joint communication environment that allows receiving, generating and analyzing information on the market dynamics in a streaming mode. The use of technological platforms by the subjects of cluster formations in business processes will provide them with the opportunity to obtain standardized information and documents using a single pass channel for the implementation of all conditions of the process of product distribution.

Simplification of logistic procedures helps reduce time costs, optimizes operating costs and inventory structure, and provides constructive guidelines for target groups of consumers when entering new markets.

### 3. Research Questions

The dynamic development of clusters in the agro-industrial sector of the economy depends largely on the constructive state policy in this area.

Agro-industrial clusters in Russia have already shown positive experience of work. *Omsk agrobiotechnological cluster*, which was created in 2016 on the initiative of key processing agricultural enterprises in the region, can be given as an example. This vertically integrated cluster is supported by logistics companies and has a strong experimental research base in P.A. Stolypin Omsk State Agrarian University. The total volume of sales of goods, works and services by the cluster members amounted to 8.5 billion rubles in 2017. There are joint projects in the field of breeding and genetics, production of glucose solution and amino acids, as well as the development of elevator and mill complexes, poultry complex, meat processing plant, production of wheat gluten, starch, hatching eggs for commercial turkey, etc.

*Kemerovo agro-industrial cluster* united 130 regional agricultural producers with marketing, logistics and research organizations on the basis of horizontal links. The turnover of participants in this cluster exceeded 11 billion rubles in 2017. Kemerovo State Agricultural Institute provides scientific support for cluster business initiatives.

The integration of raw materials, procurement, processing and producing final products of companies, scientific organizations, non-profit innovation centers and the university is also characteristic of the *agro-industrial cluster of the Stavropol Territory*. This cluster was created in 2015 with the support of the cluster development center of the Ministry of Economic Development of Russia. Its distinctive feature is the support of small and medium-sized regional entrepreneurship. The cluster unites 115 organizations specializing in the production of fertilizers, feed, dietary supplements and food production using biotechnology, software development on the global and Russian markets.

Food innovation processes of milk processing are characteristic of "*Don Dairy Products*" cluster, whose members solve the problems of import substitution in this economic sector. Scientific support is provided by Don State Agrarian University and a branch of K.G. Razumovsky Moscow State University of Technology in Rostov-on-Don.

The analysis showed that the logistics component was underutilized in almost all the agro-industrial clusters that are functioning now. Objective prerequisites for the transformation of agro-industrial clusters into cluster-type logistics systems were outlined. Traditionally, clusters are classified by mission (goals), by composition of the participants, specialization, including logistics and others. Logistics organizational forms of cluster type can arise not only in the form of warehouse, transport, customs, service and in other clusters of sectoral and regional scale, but also in the form of a logistics transformation of traditional cluster typologies, that is, a cluster as a logistics system. It is in this context that we position the logistics agro-industrial cluster.

### 4. Purpose of the Study

The causality of the formation of logistics organizational forms of the cluster type should be considered in line with the *goals* of their creation and *functional utility*. In this regard, it is necessary to

pay attention to the causes, driving forces and the ultimate goal of designing cluster-type organizational systems. Since we consider the agro-industrial cluster as a logistics system, we face the problem of streaming process optimization. We identified the object to which the optimization management is directed; the subject of optimization, which is the direct process of management, in the study of optimization as the “optimal management of the logistics cluster”. The position of the subject of optimization has fundamental importance here: how truly it understands the goal of optimization; if it is able to choose this goal from a variety of alternative targets. Two points of view were formed on this issue: regulatory and descriptive. Regulatory approach involves planning the goals of the system and the basic trajectories of its development based on the consideration of economic laws. In the descriptive approach, the optimality is considered only from the perspective of an observer who is able to detect a following of a certain optimum or principle of optimization in a trajectory that has already manifested itself.

The choice of targets is determined by the individual characteristics of the cluster, as well as the evolution of its development. The historical background of the cluster concept allows talking about the possibility of developing *standards* of Russian logistics clusters. Considering the fact that the external macroenvironment directly influences the type of formation of the logistics cluster, its development vector, the trajectory of specialization and the intensity of institutional regulation measures, it should be noted that the configuration of economic flows is built in accordance with the Russian economic landscape. Successful functioning of logistics clusters depends on the internal connectivity of its constituent elements. Any complex logistical organizational form, especially such as a cluster, represents a known variety of elements-links and heterogeneity of the conditions of their functioning. Therefore, its elements, being in less favorable conditions, may die, while the elements of less complex organization continue to grow. A logistics cluster covering a larger and more diverse sum of elements-links is characterized as more stable with respect to the external environment, but only in the direct quantitative sense, that is, as having a greater amount of arguments opposing the external environment.

## 5. Research Methods

Obviously, the practical sustainability of the logistics cluster is predetermined not only by the number of elements-links concentrated in it, but also depends on the way they are combined and the nature of the organizational bundle. If the external conditions are experiencing unusual changes, i.e. significant transformational changes of parameters, then the ratio of “stable” and “unstable” may acquire the opposite nature. In this regard, the role of cluster integration, cooperation and partnerships (Bowersox & Closs, 2008), which strengthen the competitive position of the cluster due to reduced production costs of enterprises, stable strategic partnerships, optimizing of pricing policies, high quality products, expanding the cluster’s presence to domestic and foreign markets becomes actual. Qualitative changes in the structure and content of cluster links occur as a result of their digital transformation. The problem of forming a unified architecture of the cluster model, coordinating intersubjective breakthrough projects, and designing a new platform-type integration infrastructure arises. The task of the clusters of this type is to support digital business processes, new markets and products. In Russia, there is a considerable potential for the development of logistics clusters on the basis of modern technological platforms. In

recent years, digital and federal-level digital platforms have been created in our country that are comparable to the platforms of leading countries and in some cases have become examples for others.

A serious obstacle in the implementation of digital technologies is the condition of synchronization of the transition of all participants in the cooperation chain to work with them. The state can solve this problem, being the organizer of large holdings, technological platforms, or as a regulator, setting guidelines for the use of certain technological solutions. In the medium- and long-term perspective, digital technologies provide a positive effect from the synchronization of the implementation processes of typical technological solutions in the target segments of the economy. Shared digital platforms facilitate interaction between users; contribute to the emergence of network effects in which the value of platforms increases with an increase in the number of participants (Afanasenko & Borisova, 2018).

The demand for *integration* lies in the essence of logistics itself and its subject-object area, which is expressed in principle of a systematic approach to solving the problems of organizing the movement of economic flows. The state of connectivity of the various parts is manifested in the integration of the functions of forming logistic economic relations with the functions of determining the needs for transportation and the use of warehouses. For example, innovative wholesale distribution centers have been created in the Chechen Republic in order to achieve a complete organizational integration of transportation, storage and sale of grown agricultural products. The task was to launch integrated digital platforms on their base, leading in their technological niche. Within the framework of such platforms, it is possible to communicate on the improvement of basic technologies and the creation of innovative products.

With regard to the logistics agro-industrial cluster, this is related to the interaction of its participants on the development of new technologies for accelerated breeding, seed production, genetic engineering modification of plants and animals and joint use of vaccine production technologies, biological plant protection products and production technologies of modern types of equipment, etc.

The use of digital technologies (artificial intelligence, BigData analytics, cloud technologies, etc.) enhances the planning and operational management of logistic flows, ensuring the full integration of logistic operations within the wholesale distribution centers. Logistic integration is also reflected in the process of optimizing the total costs of moving goods through the economic interest of transport, commercial organizations and the firms they serve in streamlining the supply chains and selling finished goods.

The effectiveness of the use of information technology is manifested in the conditions of solving operational problems in time and geographical space. The loss of resources, time and money is inevitable throughout the supply chain. It is important to apply an integrated approach, as well as coordinated management to all business processes occurring in the system in order to reduce costs and increase profits to solve the problem of optimizing product distribution.

## **6. Findings**

The use of logistic approaches in the domestic agro-industrial complex will provide additional sources of growth in the speed of supply throughout the entire distribution system, which ultimately has a

significant impact on reducing costs, stocks in the system, increasing the quality of services provided, including through the online order placement and logistics cycle flexibility. Ultimately, this will help support agribusiness enterprises, expanding the presence of Russian products on the market and strengthening their export potential.

Comparison of different points of view on the nature of organizational forms of the cluster type made it possible to formulate the features of the logistics agro-industrial cluster more accurately. The cluster theory studies the objective laws of integration processes in the economy, but it does not reveal the fundamental essence of complex systems of cluster type apart from other hypotheses, in particular, from the logistic concept. We will define the *logistics agro-industrial cluster* as a form of organization of the economic flow in the form of a super-complex non-equilibrium, adaptive system uniting multi-industry interbranch complexes of different economic and non-economic structures in nature, which use formal and informal communication. The existence of such clusters is associated with the solution of system goals and depends on the environment (socio-economic space) (Afanasenko & Borisova, 2013).

## 7. Conclusion

Summing up, we can note that the logistic approach to the formation of agro-industrial clusters is fully combined with the already developed inter-industry balance methodology, which can serve as a basis for analyzing the matrix of digital interaction of partners. The use of a matrix interpreted in this way gives an idea of the dynamics and intensity of digital streams in a cluster. Its principal advantage is a shift in focus on the productive interaction of business entities and event management in the cluster-type logistics system. It is possible to track the dynamics of product distribution in the cluster using the well-proven module of monitoring, recognition and visualization of the status of goods – SCEM – Supply Chain Event Management (Ivanov & Ivanova, 2008). The module's algorithm allows real-time monitoring of the status of a product, visualization of data on the supplier, insurance stocks and carrier. Such event management in logistics agro-industrial clusters allows, if necessary, eliminating deviations in the supply chain quickly and reducing the time of the logistics cycle.

The variability of environmental conditions and the stochasticity of the parameters of elements-units in the structures determine the alternativeness of the logistic flow configurations in organizational forms. This circumstance is underlined by a number of researchers (Dobromirov & Lukinsky, 2016; Sergeev, 2016).

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