Transport and logistics cluster designing in the agribusiness complex: business barriers

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Abstract. The current state of the agricultural products market in Russia is determined by a growth trend, which is explained by the presence of sanctions on its imports in the recent years. The development of the consumer market in the agricultural products production and sale requires new approaches to the organization of supply and marketing processes. In this regard, the issues of integration of transport and agricultural companies by purchasing, producing and distributing agricultural raw materials and finished products become relevant. As one of the strategies for the integration of transport, logistics and agricultural companies, there is a cluster designing, which may further reduce the cost of delivery of material resources.

1. Introduction
The modern development of the agricultural market is characterized by positive growth trends. The annual growth of the Russian agricultural products market in the period from 2015 to 2018 is from 1 to 2.4%. The share of agricultural products in Russia's GDP is about 4.7%. This can be estimated as high taking into account the inclusion of the price factor and restrictions on the formation of the final price of products.

The governmental policy in the field of agricultural development is aimed at achieving the affordability of products for the population at a price, while maintaining its quality.

The affordable price of agricultural products can be provided by low distribution costs in the process of purchasing raw materials, their transportation, processing, as well as in the process of further physical distribution of finished products in the wholesale and retail network. Ways of reducing distribution costs seem to be in the use of production resources of transport and logistics companies [1]. Transport companies currently have more powerful vehicles and transshipment facilities, which allows ensuring the safety and quick agricultural products delivery. In addition, the use of third-party capacity would allow agribusiness companies to avoid the costs of maintaining fixed assets, as well as the costs associated with their depreciation [2].

Thus, the integration of agribusiness and transport and logistics companies in the process of carrying out operations for the delivery, storage and transshipment of agricultural raw materials is the key to ensuring the availability and quality of products.

2. Experience and barriers to the agribusiness environment
The current state of Russian transport and logistics services market development is determined by several trends:

- the customer’s commitment to service integrity;
the growth of inter-organizational integration of companies in the transport and logistics services market;
the predominance of transport and forwarding services in the structure of the market for supply and demand for logistics services;
the insufficient development of supply chain management services, both in the production and distribution [3].

Research of the market of transport and logistics services in various regions of Russia, annually conducted by the largest transport companies, indicates an increase in the profitability of transport services by increasing tariffs in the context of reducing the flow of goods [4]. The reduction in Russian freight traffic as a whole is due to a decrease in output, as well as a decrease in the shipment of traditionally exported raw materials and semi-finished products. Entering the market of agro-industrial products as a supply chain partner allows opening a new market for sales companies not only transport, but also for logistics services.

The growth of some economy sectors and their integration with logistics companies in the food and raw materials delivery could significantly reduce the cost of goods transportation and service, through the development of inter-organizational integration of agricultural and logistics companies in the regions. Currently, the share of costs for transport services in the structure of the cost of agricultural products on average by types of product takes about 20% [5]. There is a need to reduce the share of logistics costs. Given the specifics of logistics management in agriculture, the need for the formation and maintenance of stocks of agricultural products, cost reduction is possible in the organization of transportation and freight forwarding.

The agricultural enterprises leaders of different regions of Russia note the following barriers to the development of contract logistics in the supply of products:

- need to control of the supply chain in order to have the greatest impact on the final price of the product;
- need to select specialized means of the agricultural goods transportation in order to maintain the quality of supply;
- need to maintain a reference plan for the raw materials supply and work in progress of corporations, where logistics is a key function of the production process;
- need to cover more retail outlets in the distribution system of the city or region;
- agricultural companies’ interest in the development of a profitable segment for transport and logistics services providing.

Especially interesting are aspects of the development of contract logistics with corporate agricultural associations, which have different opinions about the prospects of interaction of companies in the market of transport and logistics services. Thus, the leaders of the company “RusAGRO” prefer to use vehicles of logistics operators or outsource external transportation. At the same time, the management of grain company “Russkiy Dom”, where all logistics processes are strictly regulated, are afraid of risks from the "third party" (logistics) and interference in the management of grain loading and shipment within the corporate association complex [5].

Another problem appears in the process of outsourcing the delivery functions to the retail network. One of the reasons for the refusal by agricultural enterprises of the logistics operator services is the lack of the developed retail network. It depends on the labor incentive system for drivers of delivery service companies. With hourly pay, the driver is not interested in increasing the retail outlets cruising. With developing the labor incentive system for own drivers of agricultural companies the number of retail outlets while cruising will increase.

Thus, the following functional areas of corporate integration are the most common in the management of logistics of agricultural companies:
- transportation of agricultural products in the production process;
- organization of distribution of finished agricultural products;
- transportation of agricultural raw materials waste;
- documentary support and preparation of products in trade, etc.

In addition to the above issues of integration, the combined approaches are becoming relevant, due to the introduction of the logistics operator in the physical distribution system. The role of the logistics operator in this case is improving the quality of logistics services, taking into account the specialization of the "third party transaction", which leads to logistics costs reduction. Thus, two logistic tasks are solved such as cost minimization and service quality growth in the process of goods distribution.

Another area of logistics integration in the agricultural production is the outsourcing of logistics functions such as product sorting and documentation support of goods. Most often, this integration scheme is used in the production of final (consumer) crop and livestock products. The purpose of such integration is reducing time for packaging and document management procedures, funds for the special packaging equipment maintenance and service, as well as delivery costs.

However, the most important issue for agricultural companies is the maintenance and service of their own vehicle, including the selection of vehicle types and rolling stock. In this context, the farmers prefer a strategy of focusing on leasing vehicles and technical means to conduct handling operations. This strategy allows minimizing transportation costs and increasing logistics operations speed time.

Generalizing the above material allows to classify the existing options and directions of logistics and agricultural companies integration (see table 1).

**Table 1. Options and directions of logistics and agricultural companies’ integration.**

| Integration option                  | Integration area                                                                 | Integration goal                                      | Integration period     |
|------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------|------------------------|
| leasing by entrepreneurs           | vehicle rental during production                                                | vehicle maintenance costs saving                     | short- and medium-term |
| vehicle leasing by logistics       | rent of transport and other technical means in delivery process                 |                                                       |                        |
| operators                          |                                                                                |                                                      |                        |
| producer – transportation -        | transportation of agricultural goods and raw materials                         | service speed increasing, costs reducing             | medium- and long term  |
| consumer                           | delivery of goods to the company's warehouse and organizing delivery in the     |                                                      |                        |
|                                   | distribution network                                                           |                                                      |                        |
| leasing + recycling + trade-in     | transportation cycle, return logistics, own trading network service            | logistics services quality growth, logistics costs    | medium- and long term  |
| purchase + in-production           | transport support of the supply and production cycle                           | reducing                                             | long term              |
| transportation                      |                                                                                |                                                      |                        |

Logistics companies’ leaders, including foreign ones, see the prospect of development of logistics outsourcing in the services for the agricultural products storage. This enables customers to most effectively allocating material resources and reducing the cost of transport and logistics infrastructure. It should be noted that the risks of agricultural products storage and transportation in the process of integration will be transferred to the transport and logistics companies, which will lead to cost saving for agricultural companies.
3. Methodology for the transport and logistics integration in cluster form

As one of the forms of agribusiness companies’ integration with transport and logistics ones is the design of a cluster in regions with a high share of agricultural production in the gross regional product.

The term "cluster" comes from the German “cluster” and means a class of related elements of the statistical population. From this arose the economic meaning of the term as a set of elements similar to each other and collected in one group [6].

Among others, there are the following well-known meaningful versions of the concept of "cluster" [7]:

- a group of objects selected by the methods of analysis by the formal criterion of their proximity to each other (for example, by the criterion of high correlation);
- a structural part of the population produced during the construction of cluster sampling;
- bunch, cluster of similar objects.

When designing a cluster in the agribusiness complex, the focus center is the association of agricultural companies managing the material resources movement within the framework of contract activity with the transport and logistics services market actors [8].

The motivation of agricultural companies to integrate with transport and logistics companies could be provided by a number of organizational conditions for the cluster functioning.

First, the interaction of companies is based on a contract controlled by the agricultural association, which will deprive the transport and logistics company of participation in transactions if violating any delivery terms.

Secondly, the selection of the transport and logistics company in the cluster should be carried out taking into account its infrastructure equipment, the experience in the agricultural products supply, as well as a number of key performance indicators of transport and logistics companies.

Thirdly, one of the intermediary selection principles should be bonus terms of delivery “from the volume”, which will ensure the stable relations "customer-supplier" between the agribusiness and the transport and logistics companies.

4. Conclusion

Thus, we can make the following conclusions:

- the contract logistics market in agriculture is at the stage of development and growth;
- there are problems of integration of logistics companies in the sphere of agribusiness, which is associated with the agricultural companies fears in saving the agricultural products quality and the risks of delivery times violation;
- there are problems in the selection of specialized equipment and vehicle types for the various types products delivery;
- logistics operators are able to find flexible schemes for the development of cross-functional integration with agricultural companies, and it is possible to expand them to the full cycle of logistics services;
- the formation of the cluster allows reducing expenses on vehicle service and receiving bonuses system when ordering the products delivery.

References

[1] Malanina Yu N and Freidman O A 2019 Logistic approach to improving the efficiency of machine-engineering enterprises Mechanical engineering: innovative aspects of development Mater. Int. Sci. and Pract. Conf. 183-90
[2] Simonova L N 2016 Russian market of transport and logistics services, the impact of sanctions and recession TransBaltica 2016 Mater. Int. Conf.
[3] Johnson J and Wood D 2005 Current Logistics 32-4
[4] Shindina T D 2014 Classification of logistics concept and Technologies *Journal of Ural Federal University Ser.: Economics and Management* **1** 189-91

[5] Klepikova S 2016 From the field to counter: contract logistics wisdom *Agrotechnics and Technology*

[6] Ushakov D N 2009 *Explanatory dictionary* (Moscow)

[7] Feldman M P 2005 Creating a cluster while building a firm: entrepreneurs and the formation of industrial clusters *Regional Studies* **39** 121-3

[8] Freidman O A 2014 The process of logistics cluster designing based on the problem-oriented approach and the method of analogies *News of Volgograd State Technical University* **3(158)** 127-34