Clustering the forest waste processing enterprises

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Abstract. The article deals with the analysis of industrial development, the scale and degree of raw materials use, as well as the dynamics of waste generation and accumulation and their impact on the environment, convincingly showed the need for a new resource-saving, environmentally and economically sound approach and the organization of industrial production, namely waste-free production. The key center for the development of the timber industry should be the associations of enterprises that aim not only to profit, maximize profitability and increase capital, but also deeply process wood resources as a priority and focus on integrated and comprehensive development.

1. Introduction
In a market economy, innovation is based on the implementation of specific projects aimed at the development and construction of effective materials, devices, equipment, machinery, technologies or technological processes. The need for combining enterprises is due to the complexity of the challenges facing the development of wood processing resources. In a competitive environment and limited resources, it is extremely difficult for the only enterprise to solve strategic governmental tasks and somehow effectively influence the entire industry. Even despite significant turnover, revenues and investment funds, most of the largest Russian enterprises do not set a goal (actual, not formal) to move to a qualitatively new level of development. The industry leaders are the groups of companies, shown in figure 1, could take on such a burden, but at this point in time, significant changes are needed. The formation of industrial clusters is one of the ways out of this situation.

2. Methods and results
When deciding whether to implement the project of the rocket and space engineering enterprise, it is necessary to take into account many factors that affect the success of such a project. One of the effective options for the development of the timber industry is the development of timber industry clusters on the basis of existing production complexes. World experience and national research support these reforms [1]. For example, for Finland, the development of this form of production organization in the forest industry has served as a driver for the growth of other industries. The management principles introduced by the Finns at the enterprises of the timber industry cluster have been translated into other sectors of the economy and, to date, the Finnish economy is one of the leading economies in the world.

At the same time, it is erroneous to believe that it is possible transferring tools working in another country to national enterprises directly, and the industry will prosper. A timber industry cluster is a complex, constantly evolving and changing structure that operates in a competitive international
environment and is present in a variety of markets that differ dramatically in terms of product requirements, production and enterprise management.

![Figure 1. Revenue of the largest timber companies in Russia in 2017, mln. RUB.](image)

Various options for the structures of forestry clusters are described in sufficient detail in the scientific literature [2]. A general cluster model may include many structural elements or contain only the most important elements.

The report on regional competitiveness and cluster policy in Russia concludes that competitive advantages are formed at the regional level, and clusters become the most effective tools for smoothing disparities in regional development and beyond.

Initially, you need to clearly define the essence and content of clustering. In this study, the use of this term is considered as a process of economic integration and localization of firms. It is very important to note that, despite the effectiveness, relevance and consistency of the cluster approach, there is no common definition of this economic phenomenon [3].

Today, in economic practice, from the point of view of one-dimensional features, two types of clusters are distinguished: sectoral and territorial. From the point of view of multidimensional features, they are considered as a combination of various combinations of their elements. At the same time, the center of industry clusters is a combination of companies on the basis of a single production and technological cycle, and territorial clusters represent the localization of companies in a limited space.

So, in the most comprehensive interpretation, “a cluster is a system of interconnected technological and territorial communities of enterprises, organizations, infrastructure facilities, financial institutions, research, implementation and investment firms, ensuring the optimal functioning of all structural elements based on innovative products and technologies” [4].

In this study, based on the "excursus" of author’s (researchers’) and official (normative documents) formulations, the authors identified the main identification features of the cluster:

1. production and technological relationship of companies forming a cluster;
2. industry specifics of cooperation according to technological changes;
3. territorial-industrial community of relationships;
4. availability of a developed infrastructure that provides knowledge and technology transfer;
5. flexibility of the composition and structure, absence of strict formal restrictions and barriers that prevent the expansion and contraction of the cluster;
6. openness of the cluster as a system.

Today, when the key task of the national economy is the transition to an innovative and high-tech type of development, it is particularly relevant to consider industrial industry clusters, taking into account the types of technological changes, the presence of both production and technological and territorial production communities, the above-mentioned points 1-3 [5]. All this is highlighted by the authors as priority components of clustering in the timber industry. Secondary to them, but the essential components are the points 4-6. But in the timber processing industry, these features are not sufficiently developed at the present stage.

Classification is one of the key conditions for the formation of the most optimal cluster structure. According to the criterion of institutional features of the organization of industrial clusters, the developers identified eight parameters, each of them represents a certain combination of key characteristics that ensure cluster stability:

- the degree of market relations of competition, cooperation;
- the presence of leading companies;
- small business development;
- innovation;
- internationalization;
- the presence of foreign direct investment.
- conditions for creating public-private partnerships;
- governmental preferences for clustering.

We can highlight several important points in the cluster structure, which, in our opinion, are extremely important for its real functioning:
1. The core of the timber industry cluster should be deep wood processing enterprises, including those that carry out a full cycle of wood processing, from harvesting to obtaining lumber and high-grade products (paper, cellulose, plates, alcohols, etc.).
2. The immediate environment of the cluster core should act as the:
   - raw material supplier;
   - processor of secondary wood resources from leading enterprises;
   - small producers of various products differentiated by quality characteristics in order to expand the markets of presence and competition.
3. The cluster infrastructure provides a range of opportunities for developing its own potential for all its participants, without exception.
4. The macro environment does not act as a restriction (primarily on the part of the state), but as an opportunity for development. In this case, new opportunities are opened by manufacturers of high-tech equipment, research centers, financial institutions, public organizations, etc. [6-7].
5. A key factor in the cluster's development is the integrated and comprehensive use of secondary wood resources [8]. It is access to the entire range of possible wood resources that is the center of business attraction, as shown in figure 2.
3. Conclusion
Thus, secondary wood resources are the most important tool for the organization and development of forest industry clusters. Their full and integrated use opens up wide opportunities to expand the potential of timber enterprises.

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