

Development of a model for increasing the competitiveness of forest industry enterprises

*Sergey Medvedev**, *Ekaterina Ivantsova*, and *Alexander Mokhirev*

Reshetnev Siberian State University of Science and Technology, 660037 Krasnoyarsk, Russia

Abstract. Competitiveness is one of the key characteristics for any commercial enterprise. This parameter is determined by many indicators and factors. At the same time, the most important condition for competitive advantages is the efficiency of various processes. The purpose of the work was to develop a model for increasing the competitiveness of enterprises in the forest industry. To achieve it, a set of tasks was solved using traditional research methods (static analysis, literature analysis, modeling). As a result, the key factors influencing the competitiveness of the timber industry enterprise were identified. These include a variety of resources, the external environment and internal capabilities that determine pricing policy. The paper presents a detailed analysis of these factors and their role in improving the efficiency of the studied objects. It is determined that resource conservation, adaptation and optimization of these factors are key to improving competitiveness. The developed model generalizes the presented approach and, when used, leads to an increase in the competitiveness of timber enterprises.

1 Introduction

Competitiveness is one of the key characteristics of any enterprise. It includes a wide variety of characteristics and parameters that determine the position of an economic entity in the market and its relationship with other participants in this market. Traditionally, the factors of competitiveness are: a variety of resources, the external environment and internal opportunities that determine pricing policy. At the same time, in different markets, it is possible to identify certain specific features that lead to increased competitiveness [1-3]. At the same time, these factors can also carry significant threats – unavailability of factors, rising prices for resources, a set of restrictions from the external environment, etc. The ability of the management of enterprises to find the optimal business strategy determines the competitiveness of the organization.

Considering the described set of groups of factors, it can be said that competitiveness is determined by how effectively an enterprise uses available opportunities and copes with threats. Thus, the terms "competitiveness" and "efficiency" are complementary to each other [4-7]. In practice, one is almost impossible without the other. This leads to the

* Corresponding author: medvedev_serega@mail.ru

following understanding of the peculiarities of enterprise development: the higher the efficiency in various aspects of its activities, the higher its competitiveness.

Assessing the current economic development of Russia, it should be said that a significant part of its industries is far from the maximum possible efficiency values. It should be borne in mind that the main role of the domestic economy in global production is the processing of natural resources and obtaining (for domestic production or export) a variety of products. Naturally, there are other business models, but the one described above should be recognized as the most common. Among the variety of economic sectors, the forestry industry can be distinguished, where the potential, according to various estimates [8-11], is very high. This fact is due to the superiority of Russia in wood reserves and the rather low efficiency of its processing [12].

The efficiency and competitiveness of the forest industry is studied in a variety of works [13-16]. At the same time, the main focus is either on analyzing the current state or developing specific measures for a specific problem area. Comprehensive studies are isolated and in practice are practically not used to radically change the situation. Obviously, to increase the competitiveness of the entire industry, significant changes are needed in a significant part of individual business entities. According to the author, the main part of the transformations is possible only at large and medium-sized enterprises. At the same time, small businesses will also have to change. Nevertheless, for the entire industry, exactly changes in the behavioral patterns of significant players in the market will increase overall competitiveness.

The main focus of this study is on assessing the impact of changes in competitiveness factors on its overall level. This approach has made it possible to develop a number of models that can find both theoretical and applied applications.

2 Materials and Methods

The purpose of this work is to develop a model for improving the competitiveness of forest industry enterprises. To achieve it, the following tasks were solved:

- research of the current development and competitiveness level of forest industry enterprises;
- research of individual competitiveness and efficiency factors of the analyzed objects;
- development of a model for the development of competitiveness of forest industry enterprises, considering their current state and key factors affecting efficiency.

When working on the study, a set of works by domestic and foreign authors were studied, as well as the practice of a number of large and medium-sized enterprises in the industry was studied. This stage of the work is based on a set of general scientific methods: analysis, synthesis, comparison, etc. Statistical analysis methods were used to obtain a quantitative assessment of individual competitiveness and efficiency parameters of enterprises. Modeling methods were used to develop the key result of the study. The information base for the work was open sources.

3 Results and Discussion

The current state of the Russian timber industry can be described as unstable. This is facilitated by various macroeconomic and geopolitical factors, which have led to significant difficulties in interacting with foreign partners. This was manifested, first of all, in difficulties with the sale of products and the purchase of equipment and components. At the same time, if it were not for the general difficulties of the country's economy, there is little

doubt that the forestry industry continued to develop successfully and increase the record values achieved in 2021 (Fig. 1).

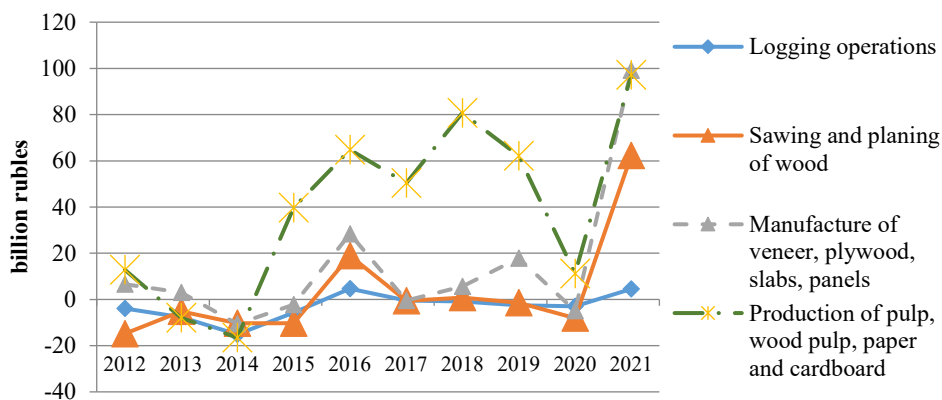


Fig. 1. Profit dynamics of key branches of the Russian forest industry in 2012-2021, billion rubles.

The figure clearly shows that 2021 has indeed become the most successful year in terms of a key indicator for enterprises – profit. At the same time, the previous year 2020 was characterized by a significant drop. This is due to the consequences of the coronavirus pandemic, which has caused significant problems for the global economy as a whole. Nevertheless, even a comparison with previous periods indicates significant successes in the forest industry in 2021. This is due to the general accepted course in the industry for modernization, active innovation, re-equipment, etc. Macroeconomic factors had an important impact – many industries of leading foreign countries tried to cover the failures of previous periods and actively bought up products of the domestic forest industry. The key factor, in the author's opinion, was the desire for resource conservation. This has influenced the expansion of the use of secondary wood resources, the creation and expansion of industries producing products based on them.

The presence of significant restrictions in 2022-2023 led to a drop in profits and many other parameters of the country's enterprises by 20-30%, and sometimes more. Nevertheless, from a theoretical point of view, the effect of competitiveness factors makes it possible to conduct fundamental research based on the array of available data (both before 2022 and after). The need for the formation of scientific knowledge in the field of competitiveness of enterprises in the forest industry is due to two positions. First, regardless of the external environment, the forestry industry requires changes, and such changes will occur regardless of the desire of any institutions. To get the proper effect from the ongoing transformations, it is required that they rely on proven tools (including modeling tools). Thus, the formed research results are necessary for practical implementation in industrial production conditions. Second, science development is a process of constant action. Obtaining new knowledge, forming modern models, algorithms, mechanisms, etc. is an integral component of knowledge that characterizes the scientific community.

Among the key aspects in the development of the country's forestry industry are the following:

- small volume of the domestic market;
- continued obsolescence of the technologies and equipment used;
- insufficiently efficient use of forest resources;
- poorly developed infrastructure (primarily in the forest area);
- insufficiently developed deep processing of wood resources;
- increased attention to environmental issues and modernization of production facilities.

The last noted trend to a certain extent already affects the solution of the complex of existing problems in the industry. According to some expert estimates, the forestry industry is growing at a faster pace relative to the overall economic development of the country. More efficient use of wood should be recognized as one of the key growth drivers.

Resource conservation should be considered as the implementation of one of the three factors highlighted in this paper to increase competitiveness. Wood biomass is a key resource for enterprises in the forest industry. But those are just the ones. In the context of increasing competitiveness, it is necessary to consider increasing the efficiency of using all resources – material, labor, financial, information, etc. Naturally, the more careful an enterprise (management, employees) are about a particular resource, the lower its costs. This, in turn, while maintaining the cost of manufactured products on the market, leads to increased profits, profitability, and competitiveness. It is necessary to separately highlight the key features of the use of these resources in timber enterprises.

1. Material resources. From the point of view of increasing resource conservation, it is necessary to involve secondary wood resources in production; reduce the use of expensive components (resins, adhesives, additives) due to technology changes; increase equipment productivity. Also, it should not be forgotten that increasing productivity leads in most cases to an increase in waste volume. The solution to this problem is the search for optimal solutions when choosing equipment and machinery, as well as high-quality configuration and debugging, and the involvement of highly qualified personnel.

2. The workforce is directly involved in the creation of products. Unfortunately, domestic timber enterprises do not have a high degree of automation, typical, for example, for the European forestry industry. This leads to low productivity, increased costs and a number of other problems. At the same time, staff reduction in this context is not an equivalent term for resource conservation. It is advisable to reduce the number of personnel while simultaneously introducing new technologies and improving the skills of personnel. In general, this may even increase the costs of the enterprise. Nevertheless, the performance gain should compensate for these losses.

3. Financial resources make it possible to carry out all operations and serve as the driving force of any transformations and processes in the enterprise. Enterprises in the forestry industry (especially full-cycle enterprises - from logging to the sale of deep processing products) are characterized by a long period of turnover of funds invested in production. It can be about a year or even more. Considering the large time gaps in monetary transactions, strict financial control is necessary. It is also important to work with accounts payable and receivables, conclude long-term contracts, reduce the risks of financial transactions, etc. Ultimately, saving money is one of the traditional and normal practices of any business.

4. Information resources are a rather unique type of resources for the forest industry. In most cases, many companies in the industry do not perceive them as something meaningful. At the same time, without proper information support in the modern world, it is extremely difficult for industry enterprises, especially large and medium-sized ones, to increase competitiveness. In this context, we should talk about the need to informatize the company's processes, search for new contractors, sales markets, alternative sources of resources and much more. Information about the availability and quality of resources in the forest area, the availability of highways, forecasts of fluctuations in prices for products and raw materials, etc. is also important.

The second factor in the competitiveness of timber enterprises is the external environment. It should be said that the impact of the external environment on enterprises of the forest industry has only a number of differences from the impact on other industrial enterprises. At the same time, the general aspects are fairly well represented in the scientific literature [17, 18]. The following key differences can be distinguished:

- natural and climatic features and topography are of high importance, which affects the logging process features;
- effect of specific legislation (the Forest Code is a key regulatory legal act regulating the industry);
- need for reforestation;
- limited availability of a number of valuable wood resources (due to remoteness);
- activities of Chinese consumers focused on the purchase of low-grade processed products;
- large number of small enterprises that generate secondary wood waste, which can be used by large businesses to expand the resource base, etc.

The most important condition for increasing the competitiveness of timber enterprises in assessing the environmental factor is the adaptability of the business. In a changing environment, this aspect, in the author's opinion, is the key to the effective operation of the business and its success in comparison with competitors.

The third factor of competitiveness is the internal capabilities of the enterprise. As mentioned above, they ultimately determine the pricing policy of the organization. This is made possible by setting up internal processes, optimizing, changing technological modes and features of production processes. As a result of possible changes, the company has the opportunity to regulate the production cost. This determines the economic efficiency and competitiveness of the business.

Based on the need to transform the internal environment, the following key areas can be noted that can lead to an increase in the competitiveness of forest industry enterprises:

- main and auxiliary equipment;
- organization of interaction between departments;
- information system;
- corporate culture;
- product range;
- R&D.

The allocation of these blocks as key ones is due to the practice of domestic enterprises. To increase their efficiency, it is necessary to introduce new equipment and products. In many ways, the possibilities are determined by scientific developments and their implementation in production. Efficiency, as practice shows, increases significantly with the acceleration of the movement of information between departments and interaction between various structural elements of enterprises in principle. Considering the trend towards greening production and the increasing role of socially responsible business, appropriate changes in corporate culture should serve as one of the effective tools for increasing competitiveness. In a broad sense, to increase competitiveness, it is necessary to optimize the internal capabilities of the enterprise.

Summarizing all the presented research findings, a graphical model of increasing the competitiveness of forest industry enterprises was obtained (Fig. 2).

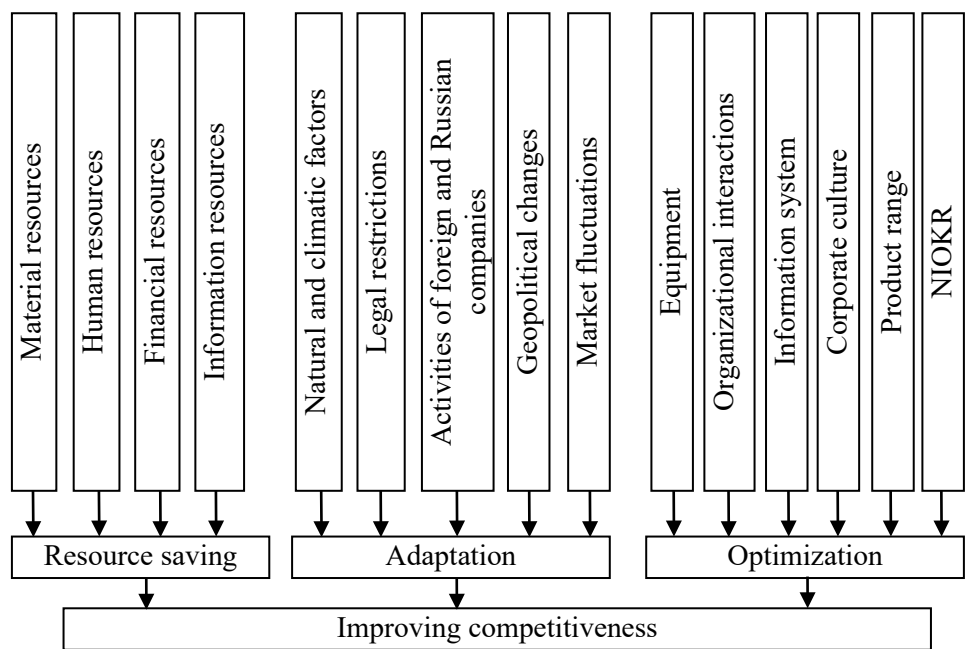


Fig. 2. The model for increasing the competitiveness of forest industry enterprises.

The presented model reflects the objective need for three key actions to realize the potential of competitiveness factors: resource conservation, adaptation and optimization. According to the conducted research, it is precisely this model of activity that will allow the forest industry enterprise to achieve the greatest efficiency and competitiveness in the market.

4 Conclusion

As a result of the work carried out, a model was obtained to increase the competitiveness of enterprises in the forest industry. Its key feature is three aspects: resource conservation, adaptation and optimization. They are aimed at a number of important elements that determine the factors of increasing competitiveness. The presented approach to achieving one of the most important goals of any business is based on a study of the current situation in the forest industry, a set of studies by domestic and foreign authors, as well as an analysis of specific competitiveness factors.

Increasing competitiveness is associated with the efficiency of enterprises. At the same time, it takes a long period of time for these phenomena to increase. In a changing environment, working towards increasing various qualitative indicators of the activities of timber enterprises is one of the most important.

The promising research of the team of authors is related to the approbation of the results of this work at the enterprises of the forestry industry of the country. This work will be related to the development of measures and orientation to specific goals of specific industrial facilities.

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