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CONTENTS

ECONOMICS, ORGANIZATION AND MANAGEMENT OF ENTERPRISES, INDUSTRIES, COMPLEXES

E. V. Boldanova, N. P. Bakalenko
Concession agreements as a means of attracting investment in transport infrastructure ......................................................... 4

REGIONAL ECONOMY

Dmitry N. Kiselev
Organization of the social and economic space of territories employing cluster and network structures ..................... 12

Valentina S. Vasilyeva
Assessment of the degree of accounting for global sustainable development goals in the Strategy for Socio-Economic Development of the Rostov Region (the Russian Federation) until 2030 ...................... 21

ECONOMICS OF NATURAL RESOURCES MANAGEMENT

Yuri R. Achokh
Improvement of the economic efficiency of protective forest plantations in the agricultural sector of the Russian Federation .................. 39

BUSINESS ECONOMICS

Tatiana S. Shipunova
Principles of public-private partnerships as a form of social entrepreneurship ........................................................................ 49

PRICING

Andrei S. Galkin, Ilya N. Gurov, Sergey S. Studnikov
Accounting mechanism for information signals about the imposition of sanctions in valuation of a company ......................... 57
Concession agreements as a means of attracting investment in transport infrastructure

KEYWORDS
concession agreements; public-private partnerships; infrastructure; transport; investment; efficiency balance

ABSTRACT

The relevance of the research topic is due to the need to ensure adequate investment for the development of transport infrastructure. State funds cannot provide for investment flows. The most flexible tool for attracting private capital is a public-private partnership in the form of concession agreements. Unfortunately, there is no standard methodology to assess the effectiveness of a public-private partnership project, which is a prerequisite for participation in a public-private partnership.

The assessment of the current market for public-private partnership projects is based on statistical analysis methods. The study revealed an increasing role of public-private partnership in the development of transport infrastructure. The author compares the existing methods for assessing the effectiveness of public-private partnership projects using comparative analysis methods. The evaluation methods do not provide for assessing compliance with the deadlines and quality of project facilities or services provided; they lack verification for the classical balance between price, timing, and quality. Further research might focus on direct and indirect effects from the development of infrastructure based on multicriteria decision-making and balance methods.


E. V. Boldanova, N. P. Bakalenko
INTRODUCTION

Government authorities cannot adequately finance the maintenance and development of infrastructure in general and railway infrastructure in particular. This is true not only for Russia but also for the rest of the world. The experience of foreign countries indicates that the mobilization of private sector investment is one of the effective alternatives for development. However, such mobilization implies using concession agreements and projects instead of privatization.

A new institutional environment based on a partnership between the state and private business has been forming since the early 1990s. The benefits of development in a market environment are becoming available to industries with strong state influence. Public-private partnership (PPP) is implemented primarily in the form of concessions.

Various publications have been published on PPPs and concessions. The World Bank made a significant contribution to the development of the theoretical base. Several national and international PPP research centers have been created worldwide: the National Bureau of Research (Cambridge), the Center for Global Infrastructure (Sydney, Toronto), and the National Center for PPP (Moscow).

The issues of interaction between state and private capital were considered in domestic and foreign literature, including in the analysis of the relationship between the roles of authorities and PPP forms (Metcalfe and Lapenta [21]), assessment of differences in the financial condition of public-private enterprises and fully state-owned enterprises (Monteduro [22]), the impact of the transaction costs economy on the concept of public administration in the transport system (Canonico et al. [15]), concession issues in transport (Varnavskii [7]), the issues of correlation of concession and franchising agreements (Vronskaya and Amaryan [8]).

The problems of assessing the economic efficiency of concession contracts were considered in the works of Tang and Lo [23], Kabasakal et al. [18], Eganyan [10]; Belikov examined the assessment of investment potential [5]. Other authors also studied the use of critical success factors for adapting PPP projects (Kulshreshtha et al. [19]), structural modeling (Lun et al. [20]), mathematical modeling for assessing economic and technical parameters (Christakos and Kalfakakou [16]), the influence of logistic factors and technologies (Kolodin [11, 12]), geopolitical changes (Korodyuk [13, 14]), and the analysis of socio-economic growth factors (Bylkov [6]).

Further disclosure of the PPP possibilities to attract investment in transport infrastructure requires considering the methods used to assess the effectiveness of concession contracts. It is the choice of the concessionaire and the conclusion of the contract that determine the future outcome of the interaction between the state and private capital.
MATERIALS AND METHODS

Legal documents of the Russian legislation, the World Bank’s statistical reporting [9] and the data of the National Center for PPP [17] served as research materials. To compare the existing methods for assessing investment PPP projects, the authors used comparative analysis methods with numerous criteria. To analyze the dynamics of investment in infrastructure, the researchers used methods of statistical analysis: analysis of statistical averages, correlation and regression analysis.

RESULTS

According to experts, losses due to infrastructural insecurity account for 10-20% of the Russian GDP annually.

At the same time, the largest volumes of extrabudgetary funding through the PPP mechanism is spent on the transport industry, namely road networks.

It is believed that the lifting of certain restrictions results in demand for the railway, port, airport, and other transport sectors.

Several Russian and foreign experts state that the railway sector can place a request for extra-budgetary projects in the amount of 10-20 billion US dollars annually for several years. However, due to numerous restrictions, this amount cannot be received in the nearest future.

According to the World Bank, in 2018, the transport sector outstripped the energy sector in terms of investments for the first time in 10 years. Nearly 60% of global PPP investments are directed to transport. This is primarily due to the significant increase in investments in China, India, and Turkey – their road projects have received the highest investment. Changes in the Chinese and Indian PPP regulations prompted the private sector to invest in infrastructure projects in the transport sector.

Based on World Bank data on income-aggregated groups of countries, the authors assessed the dependence of the PPP share of investments in transport in the volume of GDP ($I_{tr}$) on the average per capita GDP (GDP):

$$I_{tr} = 0.1012 \cdot GDP^{0.511}, \ R^2 = 0.9925.$$

With an increase in per capita income, the share of PPP investments decreases and stabilizes at one level. In absolute terms, investment in infrastructure grows proportionally to the growth of per capita income.

Russian economic reality has its own specifics. The capacity of its own financial system is insufficient to maintain the investment climate of PPPs. The analysis of PPP investment in transport infrastructure shows a significant increase before 2010. However, over the past five
years, these volumes have halved. This negative trend is due to numerous factors, not only economic but also political. This problem can be solved by attracting Russian and foreign private capital.

There are prospects for using Chinese investment. However, considering the upcoming financial and economic crisis due to coronavirus, this might be a big question.

At the same time, China is the absolute leader in PPP investments in general and in transport infrastructure in particular (World Bank data for 2017). In terms of PPP investments in transport, China is followed by Indonesia, India, Thailand, and the Russian Federation. Russia’s contribution to the global volume of PPP investment is about 5.5% (according to the World Bank).

The attraction of private capital for participation in PPP projects is regulated by internal legislation that describes the choice of a concessionaire based on the assessment of an investment project. The authors conducted a comparative analysis of existing methods and guidelines for evaluating investment projects implemented as part of PPPs, concessions, as well as those applying for state funding (Order of the Ministry of Economic Development of the Russian Federation of December 14, 2013 No. 741 [1]; Order of the Ministry of Transport of the Russian Federation of September 8, 2014, No. 1714-r [2]; Order of the Ministry of Economic Development of the Russian Federation of November 30, 2015 No. 894 [3]; Order of the Ministry of Transport of the Russian Federation of August 01, 2016 No. 221 [4]).

Almost all methods are based on a standard financial model that allows assessing the financial effectiveness of a project. In some cases, a single scheme is used to assess the effectiveness of the project as a whole, the efficiency of equity and budgetary effectiveness. All methods involve the calculation of the net present value.

There is no unity in approaches to assessing budgetary effectiveness. However, in most cases, they use the budgetary performance indicator and the budgetary net present value.

Most difficulties occur when assessing socio-economic efficiency: monetizing non-market effects, calculating macroeconomic effects. Furthermore, some approaches suggest calculating credit stability, evaluate risks, and compare with similar objects.

Such calculations should result in the definition of a comprehensive, integrated assessment in the form of a total point score or rating.

The comparative analysis of assessing methods in terms of multiple criteria of financial, budgetary and socio-economic efficiency concluded that the most complete and universal method was proposed in the Order of the Ministry of Economic Development No. 741. However, one must consider the potential outcomes of these methods.

**DISCUSSION**

All the methods discussed above do not imply an assessment of compliance with the specified time frame and quality for project facilities or services provided. Order No. 894
explicitly states that in determining comparative advantages one must not consider the quality of public services, innovative solutions, and delivery times. All of this translates into failure to comply with the classic balance between price, timing, and quality.

The results of applying the investment project assessment solely at the initial stage of investment can be seen from the example of other countries where this practice has existed for a long time. In the end, the concessionaire who offers the smallest sum wins, which does not always mean the best choice. This fact can be explained by the theory of declining choices. Therefore, the existing methods for assessing the effectiveness require further development to overcome the prevailing negative consequences. The effectiveness of the project should be evaluated throughout the life cycle. Besides, one must constantly monitor quality records and construction deadlines.

Decision-making in a multi-criteria environment is a complex task that requires multiple approaches. Using the final integral estimate does not always lead to an unconditional decision. When considering projects contrasting in terms of the price-quality-cost ratio, it might be useful to consider the Edgeworth-Pareto principle. Foreign authors suggest using a gaming approach. Furthermore, the selected form of PPP also affects the assessment of the effectiveness of the PPP project.

CONCLUSION

Over the past 10 years, the existing dynamics of the PPP investment in the Russian transport infrastructure illustrates a twofold decrease in activity. The intensification of the PPP in infrastructure sectors requires further refinement of methodology for assessing the effectiveness of public-private investments. When considering large infrastructure projects, it is necessary to assess all outcomes, including direct and indirect, not only cost indicators but also qualitative ones. Moreover, one must consider the chosen form of PPP.

Further efforts should be aimed at developing a complex assessment of direct and indirect outcomes from the project implementation. To address this challenge, the authors suggest using multicriteria decision-making methods, as well as balance methods.

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Successful development of the regional economy is impossible without creating special conditions and forming a mechanism ensuring balanced and sustainable socio-economic development of the regions of the Russian Federation. To achieve the goals outlined above, the authors propose a solution based on the creation of a conceptually new model for organizing the socio-economic space of territories through cluster-network structures designed to improve the life quality of the population and increase the competitiveness of the regional economy.

Various methodological approaches and a number of general scientific and unique research methods were used, including the system-structural approach, as well as analysis, synthesis, generalization, comparison, and modeling.

As a result of the research, the advantages of the cluster-network model, in contrast to the cluster model of organizing economic interactions, are justified. A conceptual model of the organization of socio-economic space through cluster-network structures is presented. The organizational and economic mechanism of functioning of cluster-network formations is developed. It is established that the cluster-network model, in contrast to the widely used cluster model, increases the competitiveness of the economy on a larger scale due to the multiplicative effect of clustering and networking processes.

The innovations proposed in this paper are intended to complement or expand existing scientific approaches to clustering and networking of the economy both at the regional and interregional levels.

INTRODUCTION

The main problem of the functioning and development of the Russian economy as a system of interacting regions is the exceptional heterogeneity and uneven development of the socio-economic space.

The problem of spatial heterogeneity initiates the creation of a new paradigm of territorial organization and accelerated transformation of socio-economic space, which requires structural changes in the economy and contributes to improving the economic efficiency of territories, stimulating positive and overcoming negative trends in socio-economic development based on the effective and rational use of existing potential in the Russian regions.

The regions currently face a severe task of economic efficiency of their activities. At the same time, the choice of a competitive model of regional development is mainly determined by the organizational economy structure.

One of the possible ways to overcome the existing problems of territorial development and the upcoming transformation is to build a new model of the organization of socio-economic space based on cluster-network structures (CNSs), each of which is a network relationship of the spatial distribution of economic entities that make up a network of relationships and interactions of structural elements of regional economies of adjacent territories both inside and outside of clusters [1].

DEGREE OF PROBLEM DEVELOPMENT

A significant contribution to the study of the clustering of the regional economy was made by the provisions of fundamental and applied research of domestic and foreign scientists. These works include the works of foreign authors: Man [2], Porter [3], Enright [4], Ketels [5], Engel [6] and others, reflecting the issues of the economic cluster approach in the regional aspect; in particular, their works substantiate the advantages and positive impact on the regional economy of territorial clusters.

The following works of domestic scientists must be noted: Kutsenko [7], Granberg [8], Abashkin [9], Alenkina [10], Stryabkova [11], in which the problem related to the mechanisms, tools for creating and functioning of industrial, territorial and innovative clusters in the regions is solved. The results of their research indicate that in the regions, the forms and mechanisms of organizing and supporting innovation activities as clusters are formed, emerging, developed, adapted, and tested.

The works of Blau and Scott [12], Homans [13], and Emerson [14] are devoted to the issues of networks as a representation of structures and exchange flows. Summarizing the theoretical conclusions of their work, one can define a network as a social group focused on achieving interrelated specific goals and forming highly formalized structures. The representation of
social networks as social capital is inherent in the works of Bourdieu [15], Jackson [16], Gradoselskaya [17]. These works explain that hierarchy ceases to be the dominant principle of the organization of economic structures, and the structures themselves no longer exist in their usual form.

Studies containing the main characteristics of the network organization and elements of the theory of economic interactions were conducted by Gui and Sugden [18]. In the works of Grewal [19], Yamashita and Eades [20], the relationship between the formation of the network economy and the globalization of the economy is considered. These studies indicate that the processes of globalization have an impact on clusters and economic networks, helping to increase their competitiveness in the world market.

The works of Shibaeva [21], Smorodinskaya [22] are devoted to the problems of networking of economic interactions. In particular, Shibaeva asserts that the processes of networkization activate interactions both within and between economic entities and lead to the emergence of a new network economy [21]. According to Smorodinskaya, the complexity of the structure and increased plasticity of systems during networkization is intended to obtain the ability to self-development based on continuous updates, i.e., to make economic growth innovation-oriented, and, consequently, more stable [22].

Despite a significant number of works devoted to the study of clustering of socio-economic space and the network approach in the economy, the problem of spatial and economic transformation, smoothing the spatial polarization of the regional economy and socio-economic differentiation of regions, remains relevant, which necessitates a further search for solutions by selecting and developing various tools and mechanisms that contribute to the territorial integration of Russian regions.

**MATERIALS AND METHODS**

The theoretical and methodological basis of the research is the works of foreign and domestic scientists-economists, who reveal the issues of theory and practice of the formation and development of economic clusters and networks.

Various methods of general scientific knowledge (analysis, synthesis, generalization, comparison, modeling) and a set of specialized methods were used in the research: system-structural approach, economic-statistical analysis, and synthesis.

The information and empirical base of the research consist of materials from the Ministry of Economic Development of the Russian Federation, legislative and regulatory documents of federal and regional authorities, methodological and analytical materials of the National Cluster Observatory, and Internet resources.
RESEARCH RESULTS

CNSs that represent the network relationship of spatial placement of economic entities in adjacent territories both inside and outside the clusters allow organizing the socio-economic space of the territories in such a way that the process of collective interaction is enhanced creating favorable conditions for the development of the corporate, network, and local megastructure and megaeconomic territories where they are based. It creates a propagation medium and active centers of global economic growth, leading to a cumulative effect of the internal and external aspects, which in turn contributes to increased productivity, innovative activity and development of organizations included in the cluster-network structure, increases the intensity of development of small and medium businesses thus intensifying the investment attraction and, as a consequence, ensures increased revenues to the state budget at all levels, improves the situation of individual industries and regions and the country as a whole.

A study of the literature of the last decade devoted to clustering and networking processes has shown that clusters not only consist of different types of networks but can also form a single network into a broader territory [23].

The cluster-network model is, first of all, a new management technology that allows increasing the efficiency of functioning of territorial entities. This is a complex multi-level, internally differentiated open system, through which a favorable socio-economic environment is formed [24], ensuring the implementation of three main principles of territorial development: stability, proportionality, and balance [25]. All these properties of the system are interconnected with each other and must be present simultaneously at any time. Sustainability involves maintaining the reproductive potential of cluster structures over a long period. Proportionality provides a functional and efficient reallocation of resources within clusters and between clusters over network connections. The balance is determined by the network interactions of all economic systems in the cluster-network structure of the region.

In the opinion of the authors, "organization of socio-economic space through CNSs" is a purposeful process of formation, functioning, and development of closely intertwined via circulating information and resource flow CNSs that form ordered integrity of effectively managed space by various economic entities, designed to improve the quality of life and increase the competitiveness of the territories’ economy. At the same time, the cluster-network mechanism of the organizational structure of the socio-economic space has a territorial and sectoral binding.

In contrast to the widely used cluster model for organizing economic interactions, the cluster-network model has several additional advantages. In the authors' opinion, the cluster-network model of organizing economic interactions provides an increase in the competitiveness of the economy on a larger scale compared to the cluster model, and higher results of economic activity due to the multiplicative effect of clustering and networking processes.

The proposed concept of the organization model of the socio-economic space via CNSs includes the definition of the stages of organization, goals, objectives, and principles of
organization of each stage, as well as the structural elements of the organization and their functional characteristics (Table 1).

**Table 1** A conceptual model of the organization of socio-economic space through CNSs

<table>
<thead>
<tr>
<th>Organization stages</th>
<th>forming</th>
<th>functioning</th>
<th>development</th>
</tr>
</thead>
</table>
| **Organization stages** | 1. Appearance, adaptation, and interaction of cluster elements  
  2. The origin of the cluster core from a group of individual enterprises united by a single production chain  
  3. Integration of infrastructure enterprises around the cluster core  
  4. Combining research and educational centers around the cluster core | 1. The output of the cluster to the domestic market  
  2. Improving technologies, reducing the cost of production and, as a result, increasing the competitiveness of the economy of the cluster's home region  
  3. Entering the foreign market  
  4. Organization of network interaction between subjects, including the definition of forms and methods of interaction | 1. Consolidation and integration of CNSs at the meso-level  
  2. Development of forms, methods, and conditions for multi-channel resource provision  
  3. Creating megaclusters – clusters based in adjacent regions at the macroregion level and united by a single production or industry chain  
  4. Cross-border expansion of megaclusters |

| Goal and objectives of each stage | Goal: the emergence of economic clusters  
  **Tasks:**  
  1) create conditions for the emergence of a cluster from a group of individual enterprises  
  2) ensure that clusters enter the domestic market  
  3) promote cluster networking | Goal: increasing the region's competitiveness  
  **Tasks:**  
  1) expand the system of cluster relationships with external agents  
  2) expand the resource supply channels through network interconnections  
  3) focus on cluster management by encouraging a network of relationships | Goal: consolidate the clusters and their integration into the megaclusters  
  **Tasks:**  
  1) develop multi-channel resource provision  
  2) create a unified information system  
  3) provide conditions for the development of the mechanism of CNS functioning  
  4) model cluster-network processes of regional economies |

| Principles of stage organization | 1. Interactions  
  2. Cooperation | 1. Competitions Rivalries | 1. Universal and mutual support  
  2. Limitations |

<table>
<thead>
<tr>
<th>Structural elements of the organization - the result of each stage and the functional characteristics</th>
<th>structural elements</th>
<th>functional characteristic</th>
<th>structural elements</th>
<th>functional characteristic</th>
<th>structural elements</th>
<th>functional characteristic</th>
</tr>
</thead>
</table>
| **Structural elements** | 1. Components of external influence  
  2. Components of self-regulation | Provide economic, institutional, informational and coordinating impact on emerging clusters | 1. Components of external influence  
  2. Components of self-regulation | Cluster evolution via the management of state regulation tools, the expert community and, as a result, the development of the self-regulatory component | 1. Components of external influence  
  2. Components of self-regulation | Contradictions in the cluster-forming core, leading to the progress or regression of the CNS development |

The analysis of Table 1 allowed concluding that the formation, functioning, and development of CNSs are carried out in stages, each with specific goals, objectives, and organization principles.
CNS structural elements are represented by components of external influence and self-regulation, which have different functional characteristics depending on the stage. Thus, at the stage of CNS formation, the components of external influence and self-regulation provide economic, institutional, informational, and coordinating impact on the emerging clusters. At the stage of functioning, clusters are evolving through the management of state regulation tools, the expert community, and, as a result, the development of a self-regulatory component. The development stage is characterized by the presence of contradictions in the cluster-forming core, leading to progress or regression of the CNS development.

It can be assumed that within the framework of the cluster-network model, it becomes possible to create an effective self-developing and self-supporting economic system that will not only ensure the active socio-economic development of regions but also solve the problems of their territorial disunity.

Since modern cluster theory does not consider economic clusters as system objects, the mechanism of their functioning remains unclear. The authors share the opinion of Reisberg and a number of other scientists who believe that the "economic mechanism" is "a set of processes, organizational structures, specific forms and methods of management, as well as legal norms that are used to implement the economic laws operating in specific conditions, the process of reproduction" [26].

In the authors' opinion, the concept of functioning of cluster formations (networks) is in the consistency of all the basic elements of the network itself. Goals and objectives set the necessary resources for their development, the configuration of the company's development, and the types of interaction between its structural divisions, as well as ways to achieve them.

Figure 1 Structural elements of the organizational and economic mechanism of functioning of cluster-network entities (compiled by the author)
In turn, the resources used must correspond to the selected structure and strategy for the development of network integration in terms of their characteristics, volume, and content [27]. Besides, the structure and strategy for developing network integration must be consistent with each other. If the balance between the basic components of the integration structure is disturbed, the company's goals and objectives are not fully achieved, and, as a result, the existence and activity of companies in the market are threatened.

The development and adaptation of the organizational and economic mechanism for the functioning of cluster-network entities consist of the balance of all its main elements, indicated in Figure 1 [28].

**DISCUSSION OF RESULTS**

The study of the mechanism of functioning of cluster formations as network structures allows drawing the following conclusions:

1. The structure of the mechanism of functioning of cluster-network entities consists of components of external influence and self-regulation, including a set of processes, organizational structures, specific forms, management methods, legal norms, and expert regulations. External influence is carried out through the use of tools of state regulation and the expert community. In turn, the self-regulation of cluster-network formations is based on the principles of the formation of primary links and a set of processes.

2. An essential aspect of cluster development is the presence of a contradiction between a pair of components that are a cluster-forming core, which can unfold in different modes that specify one of the directions of cluster development – progress or regression.

3. The essential relationships in clusters are those of direct/pathological support and direct/pathological restriction that arise from the distribution of system-cluster resources, such as the supply and demand of products and services produced by the cluster components. For supply and demand in cluster-network entities, competition between competing components occurs, which is supplemented by cooperation between cooperating components.

4. Identifying the nature of relationships and contradictions between cluster components allows selecting relevant management measures that contribute to the productive development of both cooperative relationships and intra-cluster contradictions.

**CONCLUSION**

Thus, the cluster-network model is, first of all, a new management technology that allows increasing the efficiency of functioning of territorial entities. This is a complex multi-level, internally differentiated open system, through which a favorable socio-economic environment
is formed, ensuring the implementation of three main principles of territorial development: stability, proportionality, and balance.

The cluster-network model, in contrast to the widely used cluster model, increases the competitiveness of the economy on a larger scale due to the multiplicative effect of clustering and networking processes.

The described mechanism of cluster functioning makes it possible not only to understand the nature of relations between the structural parts of the cluster but also to reflect the aspects of their development, implying the formation of new components and, accordingly, new inter-component relationships and contradictions. The above-noted allows providing further improvement of the functioning mechanism of cluster formation and obtaining positive socio-economic effects such as economic growth, improvement and development of the resource base, improving the reproductive structure of the innovation system, acceleration of scientific and technological progress and eventually improved economic competitiveness and welfare.

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Assessment of the degree of accounting for global sustainable development goals in the Strategy for Socio-Economic Development of the Rostov Region (the Russian Federation) until 2030

KEYWORDS
spatial policy;
spatial methods;
social policy;
strategic goals';
socio-economic development;
Rostov Region until 2030;
sustainable development;
economic policy

ABSTRACT


In 2018, the Strategy for Socio-Economic Development of the Rostov Region until 2030 (Strategy-2030), also based on the principles of sustainable development, was approved, within which an independent set of 12 goals was proposed, grouped within the framework of economic, social and spatial policies. The author made an attempt to assess the degree to which the global goals of sustainable development are taken into account in the goal-setting system in Strategy-2030, as well as an attempt to identify the degree of such accounting as applied to the existing socio-economic and environmental situation in the Rostov Region.

General scientific methods of logical and comparative analysis were applied, as well as ranking the goals to identify the most relevant ones.

It was revealed that the least attention in Strategy-2030 was paid to the goals of sustainable development of the environment. At the same time, the achievement of spatial policy goals can encompass the achievement of the greatest number of global sustainable development goals in the Rostov Region.

Based on the results of the study, some recommendations have been made on the use of spatial methods (clusters, growth poles, special economic zones, territories of priority development) as the most effective type of tools, further discussion of which will allow providing more detailed recommendations and suggesting specific mechanisms for achieving strategic goals using spatial methods.

INTRODUCTION

The concept of sustainable development, formulated in the last decades of the twentieth century and actively developed now, has firmly established itself as the basic paradigm for the existence of a developed, responsible society, taking into account the well-being of living members of the society, the interests of future generations and the state of the environment. It unites the economic, social and environmental sphere as a triune complex of goal-setting, ensuring the prosperity of mankind without harming the planet.

The concept of sustainable development has been recognized not only in academia, but has also been incorporated into strategic planning documents at the national and regional levels. The Strategy for Socio-Economic Development of the Rostov Region until 2030 (hereinafter referred to as Strategy-2030), approved in 2018, was formed in line with this system of views: “The conceptual basis of the Strategy of the Rostov Region is the idea of sustainable development – a coordinated and balanced economic, social and spatial development, taking into account and observing the interests of the present and future generations of residents of the Rostov Region” [2].

The United Nations General Assembly Resolution “Transforming Our World: The 2030 Agenda for Sustainable Development” [21] identified 17 areas, designated as sustainable development goals (SDGs), to which it was proposed to direct the combined efforts of governments of different countries. These goals are relevant not only for the global level, they are important at all levels of government. However, at each level, for each territory, in each period of time, their relevance and degree of problematicity somehow changes.

The purpose of this paper is to analyze the accounting for global SDGs in Strategy-2030 and to identify, on its basis, the areas that require developing of new or strengthening the implementation of existing strategic project initiatives to more fully take into account global sustainable development trends.

MATERIALS AND METHODS

To carry out the analysis, general scientific methods were used, such as logical and comparative analysis, as well as ranking of SDGs by relevance for the Rostov Region to highlight the development priorities of the region.

As an empirical and factual basis for the study, the author used materials from the official website of the UN General Assembly in the Russian Federation, official data from the Federal State Statistics Service of the Russian Federation and its territorial units for the regions of the Southern Federal District and the Rostov Region, information and analytical material “Rostov Region – Movement towards Sustainable Development”, and data from the official portal of the Government of the Rostov Region and the Ministry of Economic Development of the Rostov Region.
Figure 1 Global Sustainable Development Goals [21]

<table>
<thead>
<tr>
<th>Global Sustainable Development Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal 1. End poverty in all its forms everywhere</td>
</tr>
<tr>
<td>Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture</td>
</tr>
<tr>
<td>Goal 3. Ensure healthy lives and promote well-being for all at all ages</td>
</tr>
<tr>
<td>Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all</td>
</tr>
<tr>
<td>Goal 5. Achieve gender equality and empower all women and girls</td>
</tr>
<tr>
<td>Goal 6. Ensure availability and sustainable management of water and sanitation for all</td>
</tr>
<tr>
<td>Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all</td>
</tr>
<tr>
<td>Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all</td>
</tr>
<tr>
<td>Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation</td>
</tr>
<tr>
<td>Goal 10. Reduce inequality within and among countries</td>
</tr>
<tr>
<td>Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable</td>
</tr>
<tr>
<td>Goal 12. Ensure sustainable consumption and production patterns</td>
</tr>
<tr>
<td>Goal 13. Take urgent action to combat climate change and its impacts</td>
</tr>
<tr>
<td>Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development</td>
</tr>
<tr>
<td>Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</td>
</tr>
<tr>
<td>Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels</td>
</tr>
<tr>
<td>Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development</td>
</tr>
</tbody>
</table>
For comparison, the author used, on the one hand, the global SDGs presented in the Resolution adopted by the UN General Assembly on September 25, 2015 “Transforming Our World: The 2030 Agenda for Sustainable Development” (Fig. 1).

On the other hand, Strategy-2030 presents a goal-setting system formed with the goals grouped into three types of policies (Fig. 2).

Figure 2 The goal-setting system of Strategy-2030 of the Rostov Region [2]

Translate:
The goal-setting system of Strategy-2030

1. Social policy
1.1. Progressive improvement in the quality of social services provided to the public
1.2. Growth of the competitiveness of the social sphere in the struggle for human capital
1.3. Providing the economy with quality labor resources
1.4. Formation of the territorial accessibility of social services

2. Economic policy
2.1. Provision of material well-being and self-realization of the people
2.2. Increasing competitiveness and consolidating the leadership positions of economic entities in industry markets
2.3. Providing an economic basis for the development of the social sphere
2.4. Balanced territorial economic development

3. Spatial policy
3.1. Creating conditions for comfortable living
3.2. Development of a globally effective supporting territorial framework and ecosystem conservation
3.3. Removing infrastructural constraints for social development
3.4. Removing infrastructural constraints for economic development
The paper analyzes the conformity of the SDGs and the goals of Strategy-2030, compiles a rating of goals based on it, and, depending on the current state of the socio-economic system of the Rostov Region, identifies the priority of the global SDGs for the current period.

**RESULTS**

To identify the degree of conformity of the goals stated in Strategy-2030 with the global SDGs, a table was drawn up according to the matrix principle, in which horizontally (in rows) the global UN SDGs are reflected, and vertically – the goals formed in the goal-setting system of Strategy-2030, grouped by type of policy (social, economic, spatial) (Table 1).

Table 1 Assessment of compliance of the goals of Strategy-2030 with global sustainable development goals (SDGs)*

<table>
<thead>
<tr>
<th></th>
<th>Social policy</th>
<th>Economic policy</th>
<th>Spatial policy</th>
<th>Total</th>
<th>Place*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal 1</strong></td>
<td>x x x x x</td>
<td>x 0 x x x</td>
<td>x 0 0 x</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td><strong>Goal 2</strong></td>
<td>x x 0 x x</td>
<td>x x x x x</td>
<td>x x x x</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td><strong>Goal 3</strong></td>
<td>x x x x x</td>
<td>x 0 x 0 x</td>
<td>x 0 x 0</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Goal 4</strong></td>
<td>x x x x x</td>
<td>x 0 x 0 x</td>
<td>x 0 x x</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td><strong>Goal 5</strong></td>
<td>x x x x 0</td>
<td>x 0 x 0 x</td>
<td>x 0 x 0</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td><strong>Goal 6</strong></td>
<td>0 0 0 0 0</td>
<td>0 0 0 0 x</td>
<td>x x x x</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td><strong>Goal 7</strong></td>
<td>0 0 0 0 0</td>
<td>0 0 x x x</td>
<td>x x x x</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td><strong>Goal 8</strong></td>
<td>x x x x x</td>
<td>x x x x x</td>
<td>x x x 0 x</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td><strong>Goal 9</strong></td>
<td>0 x x x x</td>
<td>0 x x x x</td>
<td>0 x x x</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td><strong>Goal 10</strong></td>
<td>x x 0 x x</td>
<td>x 0 0 x x</td>
<td>x x x x x</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td><strong>Goal 11</strong></td>
<td>x x 0 x x</td>
<td>0 0 x x x</td>
<td>x x x x x</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td><strong>Goal 12</strong></td>
<td>0 0 x 0 x</td>
<td>x x 0 0 x</td>
<td>x x 0 x</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td><strong>Goal 13</strong></td>
<td>0 0 0 0 0</td>
<td>0 0 0 0 x</td>
<td>x x 0 0</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td><strong>Goal 14</strong></td>
<td>0 0 0 0 0</td>
<td>0 0 0 0 x</td>
<td>x x 0 0</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td><strong>Goal 15</strong></td>
<td>0 0 0 0 0</td>
<td>0 0 0 0 x</td>
<td>x x 0 0</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td><strong>Goal 16</strong></td>
<td>x x x x x</td>
<td>x 0 x 0 x</td>
<td>x 0 x 0</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Goal 17</strong></td>
<td>0 x x x 0</td>
<td>0 x 0 0 x</td>
<td>0 x x x</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td><strong>Total points</strong></td>
<td>9 11 9 9 9</td>
<td>9 5 10 6 15 12</td>
<td>11 11 11 11 11</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Place by SDG</strong></td>
<td>7 3 7 7 7</td>
<td>12 6 11 1 2 3 3</td>
<td>- - - - - -</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* – place of SDGs by the degree of accounting in the goal-setting system of Strategy-2030

Each cell of the table contains possible assessments of the degree of compliance of the goals of Strategy-2030 with the global SDGs:

“x” – complies, has a significant, direct, explicit impact on the achievement of the SDG;

“0” – does not comply or has a weak, indirect effect on the achievement of the SDG.

Table 1 shows that the system of goals of Strategy-2030 is mainly aimed at: a) eliminating poverty; b) sustainable economic growth and employment. Environmental goals are included

* Compiled by the author
in spatial policy and described only in 2 of its points: 3.1. Creation of conditions for comfortable living, and 3.2. Development of a globally effective supporting territorial framework and ecosystem conservation, while at the current stage, the importance and actualization of social and environmental spheres in the development of society has become universally recognized [3, p. 143].

On the other hand, the implementation of the first goal of the spatial policy “Creating comfortable conditions for living” is impossible without solving environmental problems in all areas (production, housing, food, recreation, etc.), as well as solving a number of economic and social problems of society, starting from providing accessibility to the population of material resources, and ending with the general availability of social and environmental services. In this regard, this goal covers the maximum number of global SDG.

It is man who is called the main value of the new generation of concepts for the long-term development of socio-economic systems. “Increasing competitiveness and leadership of economic entities” is, in the author’s opinion, more economic in nature, although it has a number of indirect but targeted positive effects in the social and environmental sphere. In this regard, the scope of this goal among the sustainable development goals is defined as limited.

**Table 2** Movement towards sustainable development goals (SDGs) 1 and 2 [16, 17, p. 27-39]

<table>
<thead>
<tr>
<th>SDG</th>
<th>Indicator</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal 1</td>
<td>Real cash income of the population (in % of the previous year):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Russian Federation</td>
<td>95.5</td>
<td>99.8</td>
<td>101.1</td>
</tr>
<tr>
<td></td>
<td>Rostov Region</td>
<td>96.7</td>
<td>100.6</td>
<td>102.3</td>
</tr>
<tr>
<td></td>
<td>Share of the population with cash incomes below the subsistence level (in % of the total population):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Russian Federation</td>
<td>13.2</td>
<td>12.9</td>
<td>12.6</td>
</tr>
<tr>
<td></td>
<td>Rostov Region</td>
<td>14.2</td>
<td>13.9</td>
<td>13.2</td>
</tr>
<tr>
<td>Goal 2</td>
<td>Production of agricultural products of the Rostov Region (millions of rubles; in farms of all categories; in actual prices)</td>
<td>252,777</td>
<td>254,431</td>
<td>255,129</td>
</tr>
<tr>
<td></td>
<td>Level of self-sufficiency of the Rostov Region with the main types of agricultural products (the ratio of the volume of production in % of consumption):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grain</td>
<td>436.9</td>
<td>474.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Meat and meat products</td>
<td>85.8</td>
<td>88.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Milk and dairy products</td>
<td>97.2</td>
<td>98.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Eggs</td>
<td>143.4</td>
<td>136.4</td>
<td></td>
</tr>
</tbody>
</table>

It should also be noted that spatial policy allows covering the largest number of global SDGs. The development of a territory allows raising resources for economic development, in turn, the attraction of labor contributes to the development of social services to the public. Thus, spatial methods can be especially effective within the framework of the “space-society-economy” system.
Next, it is necessary to analyze the main indicators of socio-economic development of the Rostov Region, characterizing the movement of the region in achieving global SDGs.

Each SDG can be characterized by a number of indicators.

As can be seen from Table 2, the movement towards goal 1 can be characterized by positive dynamics: outstripping growth of real cash incomes of the region’s population in comparison with the national indicator; second place in terms of average per capita cash income among the regions of the Southern Federal District; a decrease in the proportion of the population whose incomes are below the subsistence level [17, p. 31].

The movement towards goal 2 can be called even more successful due to the resource base and positive dynamics of the region’s agriculture. Being one of the three leaders in the national agricultural production, the region has a high level of self-sufficiency in main types of products, being one of the largest exporters of food products in Russia, and implementing innovative projects in agriculture [17, p. 43].

Table 3 Movement towards sustainable development goal 3 [17, p. 46]

<table>
<thead>
<tr>
<th>Incidence of tuberculosis in the Rostov Region per 100,000 people</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF</td>
<td>SFD</td>
<td>RR</td>
</tr>
<tr>
<td>-----</td>
<td>-----</td>
<td>----</td>
</tr>
<tr>
<td>53.3</td>
<td>…</td>
<td>39.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Incidence of malaria in the Rostov Region per 100,000 people</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF</td>
<td>SFD</td>
<td>RR</td>
</tr>
<tr>
<td>-----</td>
<td>-----</td>
<td>----</td>
</tr>
<tr>
<td>0.1</td>
<td>…</td>
<td>0.02</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Incidence of hepatitis B in the Rostov Region per 100,000 people</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF</td>
<td>SFD</td>
<td>RR</td>
</tr>
<tr>
<td>-----</td>
<td>-----</td>
<td>----</td>
</tr>
<tr>
<td>0.9</td>
<td>…</td>
<td>2.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of patients diagnosed with HIV in the Rostov Region, first identified, per 100,000 people</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF</td>
<td>SFD</td>
<td>RR</td>
</tr>
<tr>
<td>-----</td>
<td>-----</td>
<td>----</td>
</tr>
<tr>
<td>59.2</td>
<td>…</td>
<td>36.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mortality (number of deaths per 100,000 people) in the Rostov Region from:</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>malignant neoplasms</td>
<td>RF</td>
<td>SFD</td>
</tr>
<tr>
<td>201.6</td>
<td>200.8</td>
<td>182.1</td>
</tr>
<tr>
<td>diabetes mellitus</td>
<td>21.5</td>
<td>15.0</td>
</tr>
<tr>
<td>circulatory system diseases</td>
<td>616.4</td>
<td>647.1</td>
</tr>
<tr>
<td>respiratory diseases</td>
<td>48.0</td>
<td>36.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of doctors in the Rostov Region per 10,000 people</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF</td>
<td>SFD</td>
<td>RR</td>
</tr>
<tr>
<td>-----</td>
<td>-----</td>
<td>----</td>
</tr>
<tr>
<td>46.4</td>
<td>42.0</td>
<td>37.4</td>
</tr>
</tbody>
</table>

Goal 3 (Table 3) also has positive characteristics: there is a decrease in mortality for a number of reasons, and for some of them the regional indicator is lower than the all-Russian one. Measures are being taken to improve the health care system [17, p. 54]. However, due to the specifics of the region – its agricultural orientation, the spatial distribution of the population over the territory in many small settlements with a population of up to 1,000 people, and also due to the poor development of the peripheral infrastructure network, access to many medical services is limited by the capabilities of local rural health posts, and visiting specialized regional medical institutions may be associated with problems of a technical, material or other nature.
The movement towards goal 4 (Table 4) can be characterized as positive: the conditions for the provision of educational services at all levels are improving: teachers are being retrained, educational institutions are being repaired, technical equipment of educational facilities is being updated, etc., education is provided in a wide range of qualifications [17, p. 61].

Table 4 Movement towards sustainable development goal 4 [17, p. 67, 57]

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of pre-school educational organizations in the Rostov Region, having (in % of the total):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>all types of improvement</td>
<td>90.5</td>
<td>90.4</td>
</tr>
<tr>
<td>personal computers</td>
<td>92.0</td>
<td>95.2</td>
</tr>
<tr>
<td>personal computers available for use by children</td>
<td>23.6</td>
<td>2.7</td>
</tr>
<tr>
<td>personal computers with Internet access</td>
<td>83.3</td>
<td>87.9</td>
</tr>
<tr>
<td>Share of teachers of pre-school education organizations in the Rostov Region with higher education (in % of the total number)</td>
<td>46.1</td>
<td>47.9</td>
</tr>
<tr>
<td>Share of teachers of general education organizations in the Rostov Region with higher education (in % of the total number)</td>
<td>83.7</td>
<td>84.1</td>
</tr>
<tr>
<td>Share of teachers of vocational education organizations in the Rostov Region with a scientific title and academic degree (in % of the total number)</td>
<td>4.6</td>
<td>4.8</td>
</tr>
<tr>
<td>Share of academic teaching staff of higher education organizations in the Rostov Region with an academic degree (in % of the total number)</td>
<td>73.9</td>
<td>75.0</td>
</tr>
</tbody>
</table>

Based on the data of Rosstat (Table 5), goal 5 is not so easily achieved. Gender differences still remain in the Rostov Region – in terms of wages (according to a sample survey in October 2017, the ratio of women’s wages to men’s wages was 71.6%), in production, household and social work [17, p. 66]. This is due, inter alia, to the characteristics of the multinational composition and mentality of the population of the Rostov Region. Moreover, there are not many levers of direct state influence in this direction.

Positive dynamics are observed in the direction of goal 6, but half of the rural settlements do not have water supply. The network of water supply systems is being updated and expanded, including in terms of water treatment. For example, the volume of investments in the construction, reconstruction and modernization of facilities providing water intake and purification for the period from 2016 to 2018 doubled, and the volume of investments in organizations engaged in the collection and treatment of wastewater – almost tripled [17, p. 72].

There is also a movement towards goal 7: although the Rostov Region receives a certain amount of electricity, it produces 2 times more than it consumes. The electric intensity of the gross regional product (GRP) is reduced, which indicates a gradual rationalization of the processes of production and consumption of electricity. Alternative energy is developing: the share of renewable energy sources in the total amount of final energy consumption increased to 2.5% in 2017, and the region itself has favorable climatic conditions for the use of solar and wind energy (the implementation of projects for the production of components and the construction of wind farms has begun) [17, p. 78].
As part of goal 8, active work is underway to ensure employment (the unemployment rate in 2018 fell to 5.1%), but informal employment is noted (in 2018, 28.8%). Speaking of goal 5, the unemployment rate among women in the region is lower than among men, although the national situation is the opposite. The number of industrial accidents decreases [17, p. 86].

Table 5 Movement to sustainable development goal (SDGs)s 5-9 [16], [17, pp. 62-94]
Goal 9

Density of railways at the end of the year, km of tracks per 10,000 km² of territory

<table>
<thead>
<tr>
<th></th>
<th>Russian Federation</th>
<th>Rostov Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>50</td>
<td>182</td>
</tr>
<tr>
<td>2017</td>
<td>51</td>
<td>189</td>
</tr>
<tr>
<td>2018</td>
<td>51</td>
<td>188</td>
</tr>
</tbody>
</table>

Density of public roads with hard surface at the end of the year, km of roads per 1,000 km² of territory

<table>
<thead>
<tr>
<th></th>
<th>Russian Federation</th>
<th>Rostov Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>62</td>
<td>262</td>
</tr>
<tr>
<td>2017</td>
<td>62</td>
<td>263</td>
</tr>
<tr>
<td>2018</td>
<td>63</td>
<td>264</td>
</tr>
</tbody>
</table>

Share of organizations implementing technological innovations in the total number of organizations surveyed, %

<table>
<thead>
<tr>
<th></th>
<th>Russian Federation</th>
<th>Rostov Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>7.3</td>
<td>7.8</td>
</tr>
<tr>
<td>2017</td>
<td>7.5</td>
<td>7.7</td>
</tr>
</tbody>
</table>

To achieve goal 9, the Rostov Region has a favorable geographical position and a system of sea and river ports, a road and rail network developed and further developing. As for production, there is an excess of the level of innovative activity in the region over the national indicator, the share of innovative products, works and services is growing [17, p. 96].

Table 6 Movement to sustainable development goals (SDGs) 10-12 [16], [17, pp. 97-116]

<table>
<thead>
<tr>
<th>SDG</th>
<th>Indicator</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal 10</td>
<td>The Gini coefficient</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Russian Federation</td>
<td>0.412</td>
<td>0.409</td>
<td>0.411</td>
</tr>
<tr>
<td></td>
<td>Rostov Region</td>
<td>0.392</td>
<td>0.394</td>
<td>0.400</td>
</tr>
<tr>
<td></td>
<td>Coefficient of income differentiation, times</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Russian Federation</td>
<td>15.6</td>
<td>15.2</td>
<td>15.5</td>
</tr>
<tr>
<td></td>
<td>Rostov Region</td>
<td>13.5</td>
<td>13.7</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>Distribution of consumer spending by 20 percent population groups in the Rostov Region, % of total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>All households</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Group 1 (lowest income)</td>
<td>7.5</td>
<td>7.7</td>
<td>8.2</td>
</tr>
<tr>
<td></td>
<td>Group 2</td>
<td>11.7</td>
<td>11.2</td>
<td>11.1</td>
</tr>
<tr>
<td></td>
<td>Group 3</td>
<td>16.3</td>
<td>15.4</td>
<td>14.6</td>
</tr>
<tr>
<td></td>
<td>Group 4</td>
<td>21.9</td>
<td>23.1</td>
<td>22.5</td>
</tr>
<tr>
<td></td>
<td>Group 5 (highest income)</td>
<td>42.6</td>
<td>42.6</td>
<td>43.6</td>
</tr>
<tr>
<td>Goal 11</td>
<td>Total area of residential premises, on average per inhabitant, sq.m</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Russian Federation</td>
<td>24.15</td>
<td>24.71</td>
<td>25.31</td>
</tr>
<tr>
<td></td>
<td>Rostov Region</td>
<td>24.9</td>
<td>25.2</td>
<td>25.8</td>
</tr>
<tr>
<td></td>
<td>Share of emergency housing stock in total housing stock area, %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Russian Federation</td>
<td>0.6</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>Rostov Region</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>Capture of air polluting substances emanating from stationary sources, thousand tons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Russian Federation</td>
<td>49.2</td>
<td>50.7</td>
<td>46.7</td>
</tr>
<tr>
<td></td>
<td>Rostov Region</td>
<td>978</td>
<td>1165</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>Share of captured and neutralized air polluting substances in the total amount of waste polluting substances from stationary sources, %</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Russian Federation

<table>
<thead>
<tr>
<th>Goal 12</th>
<th>Share of intermediate consumption in the gross output of goods and services of the Rostov Region, %</th>
<th>73.9</th>
<th>74.4</th>
<th>73.3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>85.3</td>
<td>85.7</td>
<td>50.5</td>
</tr>
<tr>
<td>Share of material costs for the production and sale of goods (works, services) in the Rostov Region (in large and medium-sized organizations), %</td>
<td>52.0</td>
<td>53.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Share of expenses on the purchase of raw stock, materials, purchased semi-finished products and components for the production and sale of products (goods, works, services) in the structure of material costs (in large and medium-sized organizations) in the Rostov Region, %</td>
<td>65.0</td>
<td>65.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>74.8</td>
<td>70.9</td>
<td></td>
</tr>
</tbody>
</table>

To achieve goal 10, it should be noted that there is a positive trend in consumer spending and relative stability of the Gini coefficient (Table 6). However, the coefficient of funds (the coefficient of income differentiation) increased and reached 14.3, although it does not increase the all-Russian indicator (15.5). Because the share of wages in GRP is at the level accepted as the norm (40.7% in 2017), it is proposed to stimulate a steady increase in GRP to obtain a multiplier effect on the entire economy [17, p. 101].

The movement towards goal 11 is characterized, on the one hand, by an increase in housing security, a decrease in the share of emergency housing stocks, a number of improvement programs being implemented, however, there are no unambiguously positive dynamics in terms of protecting the environment and eliminating the consequences of its pollution [17, p. 111].

Goal 12 can be characterized by a decrease in resource consumption by both enterprises and the population in connection with the increase in tariffs for housing and communal services, modernization of production facilities and awareness of responsibility for the consumption of natural resources [17, p. 116].

Table 7 Movement to sustainable development goal 13 [17, p. 119-121]

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average annual air temperature in the Rostov Region compared with the norm of 9 degrees, degrees Celsius</td>
<td>10.7</td>
<td>10.1</td>
<td>10.5</td>
</tr>
<tr>
<td>Average annual rainfall in the Rostov Region compared with the climatic norm of 500 mm, mm</td>
<td>443</td>
<td>594</td>
<td>502</td>
</tr>
<tr>
<td>Dynamics of the number of all registered hydrometeorological hazardous events with annual discreteness in the Rostov Region (number of hazardous events)</td>
<td>17</td>
<td>25</td>
<td>23</td>
</tr>
</tbody>
</table>

In the movement to goal 13 (Table 7), the presence of climate change processes is noted: an increase in the average annual air temperature (years 2015-2017 are marked by an excess of the norm by 1.1-1.9 °C), and with aridity, heat and windiness [17, p. 120].

Goal 14 (Table 8): the Rostov Region has a favorable geographical position in relation to water resources, it is provided with marine resources and ranks second in the country for the production of live freshwater fish [17, p. 125]. In the region, the reproduction of fish resources is stimulated and they are protected from the negative consequences of economic activity in the region and climate change.
Goal 15: forests have a great impact on the conservation of soil, fauna, protection from natural hazards; in accordance with this, the volume of restoration measures and the funds allocated are growing. The situation with land degradation is more complicated: currently negative processes are spreading, the implemented set of measures cannot cope with them, systematic monitoring is being carried out to find a solution to this problem, which is exacerbated by the widespread use of land in agricultural production. Biological diversity is actively protected in 82 special natural territories with an area of more than 233 thousand ha, and the costs of their maintenance from 2016 to 2018 increased by almost 1.5 times [17, pp. 133-137].

Given that more than half of Russia’s national wealth as a whole is natural capital [5], environmental problems are of additional relevance.

Goal 16 was considered in two aspects: crimes and justice are characterized by a decrease in the overall crime rate and in the number of serious and especially serious crimes; the multi-ethnic composition of the region determines the importance of the state of interethnic relations, as sociological polls show, it is stable and controlled [17, p. 141].

Table 8 Movement to sustainable development goals (SDGs) 14-17 [16], [17, pp. 119-139]
Rosstat assigns an important role in moving toward goal 17 to information technologies, access to which in the Rostov Region is growing [17, p. 145]. It is worth adding that a number of economists note the insufficient methodological elaboration of the issue of the digital component in public life and suggest expanding the analysis with indicators that describe its properties: “provision people with digital benefits, digital competencies, quality of working life and social sphere in the context of digitalization, electronic government services to the population and security of people’s information activities” [12, p. 107]. One of the factors of digitalization of the population is public-private partnerships that can accelerate this process already in the short term [20, p. 21]. This approach can be supplemented by information on the foreign economic activity of enterprises in the region: in 2018, foreign trade turnover increased by 24% compared to 2017, the trade balance surplus increased more than 1.5 times (up to 6 billion 5 million US dollars), and the region ranked second in terms of export growth rates [6].

In Table 9, an attempt was made to assess the role of the goals stated in Strategy-2030 in achieving global SDG.

The more clearly their correspondence and influence, the closer the assessment will approach the maximum indicator, which is found in accordance with the state and dynamics of movement towards the goals and their relevance according to statistics for each sustainable development goal.

Table 9 Ranking the goals of Strategy-2030 by the degree of contribution to the achievement of sustainable development goals (SDGs)*

<table>
<thead>
<tr>
<th>SDG</th>
<th>max rank by SDG</th>
<th>Social policy</th>
<th>Economic policy</th>
<th>Spatial policy</th>
<th>Total points</th>
<th>Place*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1.1 1.2 1.3 1.4</td>
<td>2.1 2.2 2.3 2.4</td>
<td>3.1 3.2 3.3 3.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goal 1</td>
<td>0.9 0.7 0.8 0.7</td>
<td>0.6 0.8 0.7 0.8</td>
<td>0.7 0.7</td>
<td>0.8</td>
<td>0.8</td>
<td>6.6</td>
</tr>
<tr>
<td>Goal 2</td>
<td>0.9 0.6 0.5</td>
<td>0.7 0.7 0.6 0.7</td>
<td>0.7 0.7</td>
<td>0.6 0.8</td>
<td>0.8</td>
<td>6.8</td>
</tr>
<tr>
<td>Goal 3</td>
<td>1.1 1.0 0.9 0.8</td>
<td>0.9 0.9 0.6</td>
<td>0.7 0.7</td>
<td>0.8</td>
<td>0.9</td>
<td>6.8</td>
</tr>
<tr>
<td>Goal 4</td>
<td>0.9 0.8 0.7 0.9</td>
<td>0.8 0.7 0.7</td>
<td>0.7 0.7</td>
<td>0.7 0.8</td>
<td>0.8</td>
<td>6.8</td>
</tr>
<tr>
<td>Goal 5</td>
<td>1.2 1.0 0.6 0.5</td>
<td>0.6 0.8</td>
<td>0.6 0.7</td>
<td>0.7 0.7</td>
<td>0.7</td>
<td>4.5</td>
</tr>
<tr>
<td>Goal 6</td>
<td>1.1</td>
<td></td>
<td></td>
<td></td>
<td>0.5 0.7 0.6</td>
<td>2.8</td>
</tr>
<tr>
<td>Goal 7</td>
<td>1.2</td>
<td></td>
<td></td>
<td></td>
<td>0.6 0.8 0.7</td>
<td>3.5</td>
</tr>
<tr>
<td>Goal 8</td>
<td>1</td>
<td>0.6 0.7 0.9 0.7</td>
<td>0.8 0.5 0.4 0.9</td>
<td>0.7 0.7</td>
<td>0.8</td>
<td>7.7</td>
</tr>
<tr>
<td>Goal 9</td>
<td>0.8</td>
<td>0.4 0.7 0.4</td>
<td>0.6 0.7 0.7</td>
<td>0.8 0.5 0.7</td>
<td>0.8</td>
<td>7.7</td>
</tr>
<tr>
<td>Goal 10</td>
<td>1.1 0.5 0.8</td>
<td>0.7 0.7</td>
<td>0.9 0.5 0.5 0.8</td>
<td>0.9</td>
<td>6.3</td>
<td>6</td>
</tr>
<tr>
<td>Goal 11</td>
<td>1.1 0.7 0.7</td>
<td>0.6 0.5 0.6</td>
<td>0.9 0.7 0.6 0.7</td>
<td>0.7</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Goal 12</td>
<td>1</td>
<td>0.8 0.5 0.8</td>
<td></td>
<td>0.3 0.6</td>
<td>0.8</td>
<td>3.8</td>
</tr>
<tr>
<td>Goal 13</td>
<td>1.4</td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Goal 14</td>
<td>1</td>
<td></td>
<td></td>
<td>0.7 0.7</td>
<td>0.7</td>
<td>1.4</td>
</tr>
</tbody>
</table>

* Compiled by the author
The average value of indicator 1 characterizes the gradual progress towards the goal (average relevance). The highest maximum indicator was identified for goal 13, related to the fight against climate change, due to the lack of positive dynamics in it, the lowest – for goal 17, aimed at developing partnerships for sustainable development, since, according to the author, its achievement is largely the result of achieving other sustainable development goals.

According to the results of Table 3, the key role of the individual is confirmed, since even now, as applied to the goals of sustainable development, priority is given to the goal of spatial policy 3.1 “Creating conditions for comfortable living”, which in some way implies improvement of the economic condition, social sphere, and ecology of the region.

Also, the top five included: 1.2. “Growth of the competitiveness of the social sphere in the struggle for human capital”; 3.2. “Development of a globally effective supporting territorial framework and ecosystem conservation”; 3.3. “Removing infrastructural constraints for social development”; 3.4. “Removing infrastructural constraints for economic development”.

**DISCUSSION**

The results obtained allow concluding that, given the current state of the Rostov Region and the stated goals of Strategy-2030, spatial policy may be a priority as the most comprehensive in promoting the achievement of the sustainable development goals. Spatial development is closely related to the economic and social spheres, is a springboard and the result of their development, although for a long time the spatial factor was far from always standing out as a separate group of criteria for assessing the degree of sustainable development of the region [13]. Nevertheless, since the mid-twentieth century, space has been seen as an important engine in the development of the socio-economic system (patterns of distribution of agricultural production by von Thunen, “growth poles” by Perroux, the model of “center-periphery” by Friedman, the theory of economic clusters by Porter, the concept of the location of production by Soviet scientists, etc.) [10, pp. 32-33], inalienable in the transition to an innovative socially-oriented type of economic development [4].

As a recommendation on the results of this study, one can highlight the proposal to strengthen attention to spatial development methods:

- stimulation of cluster development;
- expansion of the system of growth poles;
• improvement of the socio-economic systems of single-industry towns (further development of the system of zones of advanced development);
• support for special economic zones of various types.

In the Rostov Region, the Strategy for Cluster Development has already been adopted, active stimulation is underway, and it is planned to expand the network of growth poles [1, p. 67] as strongholds that distribute the positive effects of the center on the peripheral territories, systems of special economic zones of industrial and agricultural production types, and special economic zones based on single-industry towns. Attention to strategic project initiatives of a spatial nature will provide a wide range of positive effects. The creation and development of spatial entities will ultimately make it possible to evenly redistribute resources, including labor, to make social benefits more accessible and to increase the average standard of living of peripheral territories. The concentration of economic resources and industries can attract and make modern technologies more affordable due to the competition of the firms offering them, which will ensure modernizing production facilities, increasing labor productivity, and introducing lean manufacturing principles. The development of the infrastructure network will not only simplify social interaction in space, but will also open new markets for manufacturers, and export directions for highly competitive products. Increasing competition between manufacturers for resources and buyers both in a limited spatial entity’s area and when entering regional, interregional, national and international markets will stimulate them to develop their facilities and products through the introduction of innovations. Given the green trends of world development, one of the key competitive advantages of a modern manufacturer may be environmentally friendly production. The spatial framework of the region that meets the requirements of time is able to ensure a balanced development of the socio-economic-ecological system in accordance with modern development trends [15]. Its importance is emphasized in assessing the competitiveness of a region along with economic factors [11]. Also, “identifying the spatial priorities of development of a strategy object is the creation of a socio-economic complex balanced according to the target benchmarks and types of economic activity, which should be based on reproduction processes that focus on growth points” [18, p. 11].

A methodological approach to coordinating the priorities of the spatial and scientific and technological development of the regions was proposed by Ural scientists (Fig. 3), who suggested at the macroregion level to coordinate, on the one hand, national priorities and on the other hand, regional projects [9].

Active research is being conducted on the relationship of spatial transformations with the sustainable development of the regional system to use the results in strategic planning in the following areas: research on territorial socio-economic asymmetry and promising development paths of regions; diagnostics of the conformity of the territorial and sectoral structure of regions; diagnostics of sustainability of a territory’s spatial development based on the process approach [7].

In addition, it is worth noting the opinion that the use of the territorial approach in the formation of a regional strategy for socio-economic development implies a wider application
of logical structuring and various methods of formalizing regional development problems, which allows taking into account spatial regional features and dealing with problems and contradictions of regional development on this basis [8, p. 31]. At the junction of modern technologies and the spatial approach, geoinformation systems (GIS) were formed, the practical utility of which along with neogeography methods in planning and evaluating the results can hardly be overestimated, for example, when using GIS in models to ensure competitiveness, sustainability and safety of development [14, p. 24]. Also, a territorial method such as mapping was proposed when compiling a system of maps for strategic analysis and planning of the socio-economic development of the region, which is notable for its visibility [19, p. 101].

Figure 3 Methodological approach to coordination of the priorities of spatial and scientific and technological development of regions [9, p. 1026]

CONCLUSION

In conclusion, to summarize, the author notes that as a result of the analysis of accounting in the goal-setting system of the Strategy for Socio-economic Development of the Rostov Region until 2030, the global sustainable development goals identified by the UN in 2015, as well as the state of the Rostov Region by each of the goals according to the official statistics revealed that spatial policy objectives provide the greatest SDG coverage. In this regard, it is proposed to increase attention to strategic project initiatives using spatial methods as a way to achieve goals of both economic, social and environmental nature.
REFERENCES


**INFORMATION ABOUT THE AUTHOR**

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Yuri R. Achokh

Improvement of the economic efficiency of protective forest plantations in the agricultural sector of the Russian Federation

KEYWORDS
protective forest plantations; forest belts; agro-industrial complex; agrolandscapes; agricultural land; productivity; land reclamation; economic efficiency

ABSTRACT
The condition and efficiency of land use is a determining factor in ensuring the balanced development of the agro-industrial complex, nature management, as well as environmental and food security of the country. The priority areas for ensuring sustainable development of the agro-industrial complex include the fight against deforestation; rational use of vulnerable ecosystems with desertification and drought; creation of compensating sites with forest vegetation; greening of land use through the new optimal planning of agrolandscapes.

The methodological and theoretical basis of the study is the studies and works of leading domestic and foreign scientists, materials of scientific and practical conferences of various levels in the field of protective afforestation and agroforestry. The information base for the study is the regulatory legal acts (the Forest Code, a number of federal laws, orders of the Federal Forestry Agency, etc.) that govern issues on the problem under study.

As a result of the research, an assessment of the state of protective forest plantations in the Russian Federation is given, potential advantages of using protective forest plantations in the agricultural sector are identified, the role of the state in solving environmental and social problems on this issue is determined.

State measures are proposed to solve the problems of increasing the efficiency of the use of protective forest plantations in the agro-industrial complex, including the transfer of protective forest plantations to the ownership of agricultural enterprises and farms with mandatory responsibility for their proper maintenance and preservation.

INTRODUCTION

The priority areas for ensuring sustainable development of the agro-industrial complex at the global level include the fight against deforestation; rational use of vulnerable ecosystems with desertification and drought; creation of compensating sites with forest vegetation; greening of land use through the new optimal planning of agrolandscapes.

The condition and efficiency of land use is a determining factor in ensuring the balanced development of the agro-industrial complex, nature management, as well as environmental and food security of the country.

It has been established by scientists that one of the main factors in reducing the productivity of land resources in the agro-industrial complex is the degradation of agrolandscapes due to the prolonged use of insufficiently ecological farming systems, the violation of the optimal structural and functional organization of the territory, the balance of its main stabilizing components, leading to a decrease in the erosion resistance of agrolandscapes, and the deterioration of their ecological state [1]. The ecological state of agrolandscapes in the state is characterized by a large-scale threatening manifestation of erosion processes that negatively affect the ecological state of the environment, reduce the productivity of land resources, and, consequently, crop yields. Many years of experience in agricultural production show that the use of only agrotechnical measures, even the most modern, does not ensure the stability of agricultural landscapes [2]. Therefore, the land reclamation measures should be used to stop the manifestation of degradation processes. The implementation of forest reclamation in combination with agrotechnical measures in the practice of agricultural production should be a strategic direction of agrolandscape management.

The aim of the study is to develop theoretical and methodological foundations of the economic efficiency of use and directions for the development of protective forest plantations in the agricultural sector in the context of the requirements of current legislation and environmental realities.

MATERIALS AND METHODS

The research materials are the fundamental provisions of the general economic theory, the works of domestic and foreign scientists in the field of economics and national economy management, nature management (forest management) in the agricultural sector, the legal acts on the issue under study (Federal Law of January 10, 1996 No. 4-FZ “On Land Reclamation”, Federal Law of December 27, 2018 No. 538-FZ “On Amendment of the Forest Code of the Russian Federation” and individual legal acts of the Russian Federation in terms of improvement of the legal regulation of the relations concerned with ensuring the conservation of forests on the lands of the forest fund and the lands of other categories, the FFA Order of December 5, 2011 No. 509 “On Approval of the Rules of the Use of Forests for Agriculture” and others).
RESULTS

Nowadays, the current state of protective forest plantations and their systems for various purposes does not ensure the protection of agricultural territories and the stable functioning of agricultural landscapes. Insufficient agricultural afforestation and protection, excessive plowing of protective forest plantations, and a low share of conditionally stable lands in the structure of agricultural lands – hayfields, pastures, perennial plantings – do not ensure the ecological sustainability of agrolandscapes.

Over the past decade, hundreds and even thousands of kilometers of protective forest plantations have been eradicated recklessly and with impunity. This leads to the massive devastation of agricultural land. Due to the lack of forest-protective activities, protection from pests, diseases, they are in an unsatisfactory sanitary condition, willfully cut down, and dying from fires. Despite the discrepancy in numbers, most scientists agree that on average 10% of the yield depends on the state of the protective forest plantation, correctness of its creation and grooming [3].

The level of forest coverage, in particular, the field protection of modern agrolandscapes remains low; no work is being done to create and restore the forest belts, which leads to the development of a number of negative processes, both in the use of land and in the management system. The importance of protective forest plantations in productivity improvement of the agro-industrial complex is noted in the writings of both domestic and foreign scientists. According to their studies, the growth potential of crop yields in the system of protective forest plantations can be up to 20%, pasture productivity can be up to 25%, dairy production can be up to 12%, etc. [4]. With a difference in forest cover of 1.5%, the differences in yield for winter wheat are on average 29.8%, barley – 37.1%, oats – 27.2% [5]. The yield increase for every 0.5% of arable land afforestation is from 0.75 to 3.5% [6].

Recently, there have been trends in climate warming and an increase in extreme weather events. In particular, climate analysis shows an increase in the frequency of hot years over the past decades, and this trend is expected to remain. Therefore, the correct placement of the system of protective forest plantations can create the appropriate microclimatic conditions and reduce heat stress for crops, animals and people.

Protective forest plantations are of particular importance for the development of the agricultural sector. They protect agricultural land from flooding, water and wind erosion of soils, contribute to the intensification of humification processes, regulate the water-air regime, and positively affect climatic conditions. They perform environmental-forming, climate-forming and water-regulating functions, positively affect the productivity and economic efficiency of agricultural land use. Their optimal combination in the landscapes of various natural and economic zones affects the location and specialization of agricultural production [7].

Protective forest plantations are zoned. The small contour of the worst lands, their dispersion between forests, swamps and lakes requires a special approach to the agricultural system.
Drainage of wetlands and waterlogged lands, radical improvement of meadows and pastures, land management of farms, crop rotation, soil cultivation, management of its water-air regime must be carried out taking into account afforestation of the territory and the influence of protective forest plantations on agricultural production conditions.

The expansion of the area of protective forest plantations, the improvement of their natural composition, and the rational system of forestry make it possible to increase the growth of commercial timber in the future and provide it with all household needs. A special type of natural resource is water, which is used in all sectors of material production, as well as a food product. It finds its application to provide water to industry and agriculture, rural and urban settlements [8].

According to Article 7 of the Federal Law “On Land Reclamation” dated October 1, 1996 No. 4-FZ, the agroforestry of lands is a complex of land reclamation measures that provide radical improvement of lands through the implementation of soil-protective, water-regulating and other properties of protective forest plantations [9].

Agroforestry is a holistic system of forestry activities aimed at improving the soil and hydrological conditions of a particular region, ensuring a higher level of environmental and economic efficiency of agriculture and increasing production in the food and processing industries of the agro-industrial complex by improving the quality of products.

Agroforestry of land includes the following types:
– anti-erosive protection – protection of land from erosion by creating forest stands on ravines, gullies, sands, river banks, and other territories;
– field protection – protection of land from the effects of adverse events by creating protective forest plantations along the borders of agricultural land;
– pasture protection – prevention of land degradation of pastures by creating protective forest plantations [10].

In accordance with Article 30 of the Federal Law “On Land Reclamation”, the construction of objects on reclaimed (being reclaimed) lands and other activities not intended for land reclamation should not impair the water, air and nutrient regimes of soils on reclaimed lands, as well as hinder the operation of reclamation systems, separately located hydraulic structures and protective forest plantations.

However, the uncertainty of the legal position of protective forest plantations, the procedure for their accounting and maintenance rules, ultimately made them ownerless, degraded, moreover, they became the sources of fire danger. Their reproduction was specially funded from the federal budget. On January 1, 2020, amendments to the Federal Law “On Land Reclamation” entered into force. The draft law provides for the obligation of the land rights holders to maintain and preserve ameliorative protective forest plantations. Moreover, in cases where the plantations are located in areas owned by the state or municipal property and are not transferred for use to third-party organizations, these responsibilities are assigned to the authorities.

According to Article 29 of the Federal Law “On Land Reclamation”, citizens (individuals) and legal entities that operate land reclamation systems, separately located hydraulic structures...
and protective forest plantations are required to keep these facilities in good condition and take measures to prevent damage to them.

The Federal Law “On Land Reclamation” develops the legal framework for agroforestry as the most important area of agricultural land reclamation, which is of particular importance for steppe and forest-steppe regions where there is a lack of moisture in the soil, and protection of field and pasture lands from erosion in all agricultural zones of the country.

Protective forest plantations are man-made forest belts. Their goal is to protect various objects from adverse natural and anthropogenic factors [11]. In the case of farmland, forest belts help to combat drought, soil erosion from water and wind. They are planted or sown mainly in the steppe, forest-steppe and semi-desert regions.

Protective afforestation is an integral part of the scientific system of agriculture, used to prevent the negative impact of natural and anthropogenic factors on field lands [12]. Such a system should be considered not only as a factor in a certain increase in soil fertility, but in a broader sense, as a factor in scientifically sound land management and the organization of optimal agricultural production and other activities. Under the influence of protective forest plantations, the risk of death of winter crops is reduced. Protective forest plantations have the ability to prevent the transformation of fertile lands into badlands in erosion-hazardous places (restraining the formation and growth of ravines).

According to the latest report of the Ministry of Agriculture of the Russian Federation “On the State and Use of Agricultural Land in 2017”, out of 10,485.44 thousand ha of arable land surveyed for the presence of wind and water erosion, wind erosion was detected on an area of 1,424.17 thousand ha (13.6% of the total area under study), water – on the area of 1,847.17 thousand ha (17.6%) [13]. The area of protective forest plantations in the Russian Federation has almost halved: 2.74 million hectares out of 5.2 million hectares are currently preserved. About 60% of all protective stands exceeded the permissible critical age [14].

Some regions allocated funds for the maintenance of protective forest plantations from regional budgets (for example, the Krasnodar Territory), partially the federal center co-financed these expenses in support of general regional land reclamation programs. As follows from the National Report on the Progress and Results of the Implementation in 2018 of the State Program for the Development of Agriculture and the Regulation of Agricultural Products, Raw Materials and Food Markets for 2013-2020, agroforestry measures were carried out only on an area of 119.1 thousand ha [15].

The Ministry of Agriculture of the Russian Federation has developed a program for involvement of agricultural lands in the turnover and development of the reclamation complex. Agroforestry should become part of this program. The new law, which comes into force on July 1, 2020, creates a legal framework for this.

The economic efficiency of the use of protective forest plantations in the agricultural sector should be based on the magnitude of the effect of the influence of the social and environmental functions of the protective forest plantations on increasing the efficiency of agricultural production and productive labor in agriculture. The problem of determining
the economic effect of the use of the environmental and social functions of protective forest plantations is quite complex, because, for example, soil protection, water regulation, and recreational functions do not have a material form, so it is difficult to make a quantitative measurement. However, the ecological function of protective forest plantations is important in the agricultural sector. The source of the effect is soil-protective plantations – field-protective forest plantations, shrubs along river banks, etc., which are used to protect agricultural lands from erosion and contribute to improving soil fertility, protecting plants from adverse climatic factors. The great value of protective forest plantations is especially evident in dry years, during floods and intense snowmelt. Special studies show that due to protective forest plantations, grain yield increases by 3-5 kg/ha, and the cost of crop production decreases. Each hectare of protective forest plantations protects 20-30 hectares of arable land, and the land allocated for the creation of protective forest plantations is offset by an increase in additional agricultural production [16].

Based on the economic assessment of the use of protective forest plantations in the agricultural sector, the opportunities are created to reflect their value as part of the national wealth of the state, maintain the state regional natural resource cadastre, justify the effectiveness of environmental protection measures, assess the amount of losses caused to nature by natural phenomena and unsustainable ways of exploiting natural resources, improvement of the economic regulation methods by the processes of environmental management.

**DISCUSSION**

Thus, the most important problem of the agro-industrial complex is to increase the economic exploitation efficiency of both new and existing production assets. In this regard, it is important to find out how the funds allocated by the state and agricultural enterprises for protective afforestation are used.

The evaluation of the actual efficiency of capital investments in protective afforestation is not limited to the volume of additional production and the size of the annual net income. As a result of obtaining additional products from the reclamation effect of protective forest plantations and an increase in this volume of annual net income, the cost of the main crop production decreases [17].

The economic efficiency of protective forest plantations is estimated as the effectiveness of auxiliary (for creating forest strips) capital investments in the agricultural sector, aimed at increasing labor productivity, increasing crop production, reducing its cost and increasing income. This is the differential rent received from additional investments to increase agricultural land productivity. It is based on the protection by protective forest plantations of part of the crop from adverse conditions, and in areas of wind erosion and the protection of the soil from blowing.

The creation of protective forest plantations is associated with additional costs: the main ones are for the creation of stands and the return is for the collection, completion, transportation
of additional products. At the same time, additional costs associated with protective forest plantations are 2-3 times less than the cost of crop growth. In this regard, in fields protected by forest belts, the cost of production is lower, and the profit and profitability of crop production are much higher [18].

One of the most important indicators of the economic efficiency of capital investments in protective forest plantations in the agricultural sector is the payback period. The smaller it is, the higher the investment efficiency. The payback period for the creation of protective forest plantations in the agricultural sector depends mainly on the main species and soil and climatic conditions that determine the height of the stands. The payback period for the creation of protective forest plantations from poplar on ordinary chernozems is five years, and ten years for oak protective forest plantations. Since that time, protective forest plantations begin to make a profit, it is the higher, the older the stands.

In addition to the payback period, the economic efficiency of the use of protective forest plantations in the agricultural sector can be characterized by such indicators as the volume of gross output per 1 thousand rubles of fixed assets, the reduction of the production costs and the profits from protective forest plantations and the like. The profit from protective forest plantations or agroforestry income can be calculated per 1 ha of protective forest plantations and per 100 ha of arable land protected by them. The calculation per 1 ha of forest belts can be done for one year, for a number of years, and for the whole life of plantations [19].

The volume of additional products from the use of protective forest plantations in the agricultural sector is determined by multiplying the area of the main crops under the protection of forest stands by the corresponding increase in yield.

A monetary assessment of the additional yield of grain and industrial crops (sunflower, sugar beets, etc.) is carried out at the current zonal purchasing prices, fodder crops (silage, herbs, root crops, melons, hay, etc.), then the result is transferred to feed units and evaluated at the price set for oats [20].

All data for determining the cost of manufacturing additional products is taken according to the accounting report, estimates or technological maps of crop cultivation.

The costs (capital investments) for the creation of protective forest plantations in the agricultural sector are calculated at the actual costs [21].

Thus, the economic efficiency of protective forest plantations in the agricultural sector is composed of:
- reduction of the damage caused by dust storms;
- crop increases due to agroclimatic effects of protective forest plantations;
- beneficial effects on the environment, fauna, labor productivity, livestock products, aesthetic and landscape improvement of the territory;
- reduction of agricultural land and a decrease in the volume of production due to the withdrawal of part of the field areas under protective forest plantations;
- the costs of the creation and growing of protective forest plantations [22].
**CONCLUSION**

Based on the above characteristics, it can be reasonably argued that it is impossible to achieve stable crop yields without the use of protective forest plantations in the agricultural sector. Implementation of agroforestry measures in accordance with natural and economic conditions favorably affects the indicators of increasing the environmental and economic efficiency of crop production.

The efficiency of the use of protective forest plantations in the agricultural sector at the state level can be improved through the implementation of an indicative list of measures:

1. The implementation of a package of measures to create protective forest plantations at the regional level.
2. The integrated accounting of protective forest plantations, including forest shelter belts.
3. The transfer of protective forest plantations for permanent use to forestry enterprises of the relevant departments, and in some specific cases to the ownership of agricultural enterprises and farms with mandatory responsibility for their proper maintenance and preservation.

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Principles of public-private partnerships as a form of social entrepreneurship

ABSTRACT

Social entrepreneurship takes many forms as a type of entrepreneurship. The least scientifically substantiated economic form of social entrepreneurship is a public-private partnership in the field of intangible services. The study aims to determine the principles of public-private partnerships as an economic form of social entrepreneurship.

To achieve the aim, the method of comparative analysis of the principles of public-private partnership by country and by the application in Russian scientific research was used. The principles of social entrepreneurship, taking into account economic activities, factors of legitimacy, and the context of the application were also compared.

According to foreign scientific publications, chronological analysis of the social responsibility concept, stakeholders and sustainable development, which all affect the formation of entrepreneurial culture, has been carried out.

As a result, the principle of corporate efficiency was formed, which includes six components: areas of corporate social responsibility, levels of microeconomic responsibility, stakeholders, social issues management, corporate social sensitivity, corporate social activity impact assessment. The principle of corporate efficiency can be applied in the preparation of recommendations on the interaction of public and private socio-entrepreneurial structures, which indicates its practical significance.

Further research may be carried out on the formation of tools that operationalize the mechanism of public-private partnerships as a form of social entrepreneurship based on the principle of corporate effectiveness.

INTRODUCTION

The relevance of substantiating the principles of partnership between public and private individuals is related to the coordination of efforts of public and private partners for the effective implementation of social and entrepreneurial initiatives in market conditions.

Social entrepreneurship takes many forms as a type of entrepreneurship [1; 2]. In a previously published study, such an economic form of social entrepreneurship as a public-private partnership in the field of intangible services has been studied [3]. It was found that public-private partnerships and social entrepreneurship had the same elements, namely, mission, results, processes, resources, and sectors of economic activity. They take the characteristics of business entities into account. Using a systematic approach, a dialectical unity between public-private partnership, as a form, and social entrepreneurship as content has been established. The dialectical unity of public-private partnerships as a form, and social entrepreneurship as a content, lies in the inseparability of their form and content, the ambiguity of the relationship between them, the contradictory nature of unity and optimal development [3; 4].

The characteristics of business entities are more studied in social entrepreneurship than in public-private partnerships. This confirms the ambiguity of the connection and the inconsistency of the unity of public-private partnerships, as a form, and social entrepreneurship, as the content. To better match the form and content of the two economic phenomena under consideration, the characteristics of business entities in a public-private partnership should be investigated in more detail.

If the characteristics of business entities as a subsystem of the social entrepreneurship system [3] are considered, then the elements such as motivation, the ability to find opportunities, and make changes using leadership skills [5] can be distinguished. Motivation, as part of the entrepreneurship culture, is formed on certain principles. In this scientific article, the aim is to determine the principles of public-private partnership as an economic form of social entrepreneurship.

MATERIALS AND METHODS

The research materials used were Russian and foreign periodicals, abstracts of dissertations by Russian scientists for the degree of candidate of economic sciences, etc.

To achieve the goal, the authors used the method of comparative analysis of the principles of public-private partnership by country and by the application in Russian scientific research, as well as the principles of social entrepreneurship, taking into account economic activities, factors of legitimacy, the context of application. A chronological analysis of the concept of social responsibility, stakeholders and sustainable development, affecting the formation of business culture, is made based on foreign scientific publications.
RESULTS

The need to formulate principles for the creation and functioning of public-private partnerships is recognized at the global level. The principles of effective management applied in the implementation of PPP projects include stakeholder engagement, following the rules without harming the environment and the public, transparency in the decision-making process, accountability to the public, fairness in following the rules by all members of the society, efficiency involving the use of “limited human and financial resources without loss, delay or damage, or without harming future generations”, sustainable development [32].

At the country level, while determining the PPP policy, principles are established that ensure the implementation of PPP projects and constitute a code of conduct following which the PPP project will be implemented. These are some standards by which those responsible for PPP implementation should be accountable. The principles confirmed by some countries (Australia, Brazil, Germany, Indonesia, Peru, Russia) in their concepts and policies in the field of PPP coincide in transparency, risk sharing and competition in the field of PPP. The operationalization of principles is manifested in rules (instructions, regulations) and processes. For example, in Germany, an instrument for operationalizing the principle of efficiency and economy is the analysis of the economic feasibility of any government initiatives related to the budget and financial effect, including PPP, simultaneously with the analysis of alternative projects [6].

Since the object of PPP is state assets or services, projects attract people interested in their effective implementation, as well as reacting differently to the implementation of PPPs at different stages. In this regard, it is important to involve stakeholders in advising on the value of the project for society and reducing information risks. Effective dialogue with stakeholders is facilitated by the principles of clarity, coverage of all relevant groups of stakeholders, publicity of the PPP project, sufficient time for consultations with stakeholders and feedback [6].

In the abstracts of dissertations, Russian researchers (see Table) also establish the principles of PPP. As the authors study the nature of PPP in the field of intangible services, the specifics of the industry in which PPP can be formed should be taken into account. The principles of PPP can be divided into:

- economic (management, distribution of project income, quantitative measurability of PPP performance indicators, project evaluation, socio-economic innovation, transparency of financial activities),
- social (reduction of social risks in the labor market), ethical (trust, responsibility, quality, pragmatism, openness),
- activity (organization, integration, partnership, division of spheres, dynamism).

In the field of social entrepreneurship, researchers (see Table) recognize either the very phenomenon of social entrepreneurship as a principle, or identify categories of principle. The principles of social entrepreneurship are applied in such areas as education, healthcare,
tourism, and hospitality. The factors of the legitimacy of the principles of social entrepreneurship are the concepts of social responsibility, sustainable social and economic development, the strong dependence of non-profit organizations on philanthropic and state funding, and the strengthening of the requirements of stakeholders. The context in which researchers apply the principles varies, including, but not limited to promoting social and economic growth, sustainable development of economic phenomena, and measuring social impact.

**Table** Principles of public-private partnerships and social entrepreneurship

<table>
<thead>
<tr>
<th>PPP principles</th>
<th>Principles of social entrepreneurship</th>
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<tbody>
<tr>
<td>• copyright principles of activity: regionalization, social partnership, transparency of financial activities, integration [7]</td>
<td>• principles of social entrepreneurship [16; 19; 23; 24]</td>
</tr>
<tr>
<td>• principle of distribution of project income [9]</td>
<td>• business principles that focus on the financial and social value [18]</td>
</tr>
<tr>
<td>• principles of agent theory of stakeholders [10]</td>
<td>• principles of biomimicry [20]</td>
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<tr>
<td>• principles of the social significance of improving the quality of services, socio-economic innovation, reducing social risks in the labor market [11]</td>
<td>• creating the social value and solving social problems in a more responsible, innovative and entrepreneurial way [21]</td>
</tr>
<tr>
<td>• principles of selection, diagnosis, a system of indicators for monitoring the assessment of PPP projects throughout their entire life cycle [12]</td>
<td>• principles of community practices [22]</td>
</tr>
<tr>
<td>• principles of transparency, trust, social responsibility [13]</td>
<td>• social and environmental principles [25]</td>
</tr>
<tr>
<td>• principles of the division of responsibilities between the participants in the partnership, the dynamism and structural integrity of the organizational structure [14]</td>
<td></td>
</tr>
<tr>
<td>• principle of trust management [15]</td>
<td></td>
</tr>
</tbody>
</table>

Business trends affect the formulation of principles. Since the mid-1950s, changes in the social environment influenced the foundations of the existence of organizations as economic entities legitimized by society. In the 1970s, scientists developed the concepts of corporate social responsibility, corporate social susceptibility, corporate social activity. In the 1980s, alternative topics appeared in the field of business social responsibility, namely, corporate social policy, business ethics, stakeholder theory. The 1990s and 2000s proclaim an era of global corporate citizenship and sustainable development [26].

The concept of corporate social responsibility has the longest history of the development of views with various interpretations. Social responsibility is defined as the circle of business responsibilities to society on the economic, legal, ethical and discretionary aspects of business activity. Justification of the types (categories) of corporate social responsibility [27] contributed to the recognition of social responsibility as a principle [28]. Categories of economic, legal, ethical and discretionary responsibilities evolve into principles.
The principles of corporate social responsibility should be considered at the institutional, organizational and individual levels, at which, accordingly, the legitimacy, public responsibility and voluntary responsibility of company managers are fixed. The principle of legitimacy at the institutional level, the level of the main obligations of the company as a business organization, is determined by the “iron law of responsibility”. The principle of public responsibility is formed at the organizational level. It is a level of specific conditions and relations of the company with the environment and means the responsibility of the business for results in the primary and secondary areas of contact with society. The principle of voluntary responsibility of managers [29], based on the consideration of people as active participants of the organization, is applied at the individual level.

A new perspective of the idea of social responsibility was given by the concept of stakeholders. It personalizes social responsibility by identifying specific groups or individuals that the business should take into account through the prism of corporate social responsibility [30].

The interaction of business and society is formed concerning certain problems or issues. The factors shaping social interaction include a comparison of social needs with corporate capabilities [27]. The social susceptibility of the organization forms the approach of implementing the principle of social responsibility [28]. The philosophical orientation of corporate social receptivity is the actions of the organization’s leadership in the social sphere: reactive, protective, adaptive, and proactive. There are three characteristic behaviors of the company: to monitor and evaluate the environment, pay attention to the needs of interested parties and draw up plans and policies (strategies) in response to changing conditions [29].

Current trends in the development of corporate social responsibility are strengthened by environmental concepts explicated in sustainable development, which is understood as the development that meets the requirements of today's generation without harming future generations in their needs and aspirations. The expanded concept of sustainable development at the microeconomic level includes economic, social, environmental dimensions and second-order requirements [31].

**DISCUSSION**

Summarizing the development of views on the responsibility of business to society, it is possible to formulate the principle of corporate efficiency, consisting of the following components: areas of corporate social responsibility, levels of microeconomic responsibility, stakeholders, management of social problems, corporate social sensitivity, assessment of the impact of corporate social activity (see Figure).

The business operates in three areas of corporate social responsibility: required (economic and legal environment), expected (ethical environment), and desired (discretionary or voluntary), as well as at three levels of microeconomic responsibility: institutional, organizational, and individual. The stakeholders’ requests of the present and future generations are taken into account:
owners (founders), consumers, employees, the local community, suppliers, competitors, social activists, and society as a whole. The top management of the organization manages emerging social issues by identifying problems, analyzing problems and responding to problems. Corporate social susceptibility includes two types of processes: the degree of response (philosophical orientation) and types of actions (functional orientation). The degree of response to stakeholders' concerns varies. Based on their philosophical orientation, organization responses can be reactive, protective, adaptive, or proactive. Types of functional actions include environmental monitoring and assessment, attention to the needs of stakeholders, and the organization's strategy in response to changing environmental conditions. An assessment of the impact of corporate social activity is presented in corporate social policy (program) and findings reports.

**Figure** Stages of the formation of the principle of corporate efficiency

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**CONCLUSION**

The dialectical correspondence of public-private partnerships and social entrepreneurship systematically proved in the previous scientific work of the author of this article strengthens the developed principle that forms the culture of interaction between business structures.

From a research point of view, the formulated principle of corporate effectiveness of public-private partnerships as a form of social entrepreneurship should be used to develop tools for public-private partnerships in the field of intangible services.

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Accounting mechanism for information signals about the imposition of sanctions in valuation of a company

KEYWORDS
sanctions;
stock value estimates;
intrinsic stock value estimation

ABSTRACT
Investors have to review regularly their forecasts and stock value estimates taking into consideration the imposition of sanctions against Russian companies. Due to the presence of behavioral effects, as well as to the incorrect accounting of incoming information, the risk of obtaining inaccurate stock value estimates increases. In this regard, a mechanism should be developed for adequate update of stock value estimates upon receipt of new information signals about the imposition of sanctions.

The study is based on such methods as analysis, synthesis, the longitudinal method, as well as the method of discounted cash flows. The study is based on the dynamics of financial indicators of stock returns of the 40 most marketable Russian companies.

A mechanism is proposed for accounting the informational signals about sanctions, which makes it possible to avoid behavioral effects and update adequately the intrinsic stock value estimates upon receipt of new information on the imposition of sanctions.

This mechanism makes it possible to consider both changes in expectations regarding cash flows and changes in the cost of capital for companies. At the same time, the research in this field should be continued in order to develop a methodology for equity capital valuation adjustment that will be instrumental in consideration of variance in bias and emergence of the so-called “thick tails” in the distribution of stock returns under receipt of information signals on the imposition of sanctions.

INTRODUCTION

Upon receipt of official information or rumors about sanctions, it is required to revise the estimates of the intrinsic value of companies. The lack of a holistic accounting mechanism for the impact of sanctions on a company's value can lead to negative consequences such as demonstration of behavioral effects by investors and analysts. In this regard, the present study is concerned with the development of an accounting mechanism for information signals on the introduction of sanctions in stock value estimation.

MATERIALS AND METHODS

The impact of sanctions on the economic environment, the activities of companies and the capital market conditions has been studied in a number of articles [1-6]. A study conducted by Hoffman and Neuenkirch [7] revealed that during the periods of particular tension in the Ukrainian conflict, the Russian stock market became more volatile by 6.5%, compared with the usual state (for comparison, the volatility of the Ukrainian stock market increased approximately by 8.7% on average). Kholodilin et al. [8] indicate that the impact of sanctions on the stock market is negligible, compared with the dynamics of the stock market over the past 10 years.

Despite the existence of conventional methods for valuation of a business based on a discounted cash flow model [9], in the authors' opinion, there is a need to develop an accounting mechanism for information signals on the imposition of sanctions, which can be used during the renewal of the intrinsic stock value estimates.

This study was conducted on the basis of data on Russian public companies for 2012-2017. The sampling included 40 Russian public companies grouped in 10 industries. Sanctions were imposed on 11 companies included the presented sampling [10], the rumors about the imposition of sanctions regarded 10 companies (but no sanctions were imposed). No sanctions were expected or imposed on the remaining 19 companies.

RESULTS

In accordance with the discounted cash flow model, the intrinsic value of a financial asset depends on expected cash flows and risks, the value of which reflects the capital value.

Either expected cash flows related to shareholders (for example, free cash flow for shareholders or dividends) or expected cash flows for all shareholders (for example, free cash flow for a firm) are used for the purposes of stock value estimation. In both cases, cash flow can be influenced by general economic factors (in particular, GDP growth rate, real disposable
household income), and industry factors (e.g., market volume growth rate), as well as the factors related to the company (expected market share, revenue growth rate, sales margins, capital investments, opportunities for debt acquisition). If information signals on the imposition of sanctions lead to a change in investors' expectations regarding any of these factors, then the assessment of the company's internal value should also change.

Likewise, a change in investors' expectations regarding any of the components of the capital value will result in a change in the company's intrinsic value. Practically, in the process of stock value estimation, either the weighted-average cost of capital or the equity value is used. The value of the weighted-average cost of capital depends on the debt load of the company, the marginal income tax rate, the cost of debt financing and the equity value. In accordance with the CAPM model, the equity value depends on the risk-free interest rate, the value of the market risk premium, and the company's beta coefficient.

Thus, the emergence of information signals affects the value of companies by influencing the following determinants of value:

1. Risk-free interest rate
2. Market risk premium
3. Non-leveraged company's stock beta coefficient
4. Debt load rate
5. Debt value of the company
6. Current financial performance of the company
7. Economic and industry growth rates
8. Expected change in cash flows of the company.

The imposition of sanctions can change the value of a company's capital (p. 1-5) and expected cash flows (p. 6-8). According to the authors' calculations, 34 examined companies of 40 had statistically significant changes in beta coefficients due to the imposition of sanctions. At the same time, the companies that did not fall under the sanctions, as a rule, had a decrease in beta coefficients (with some exceptions for oil and gas, construction, and telecommunication industries). The sanctioned companies had an increased beta coefficient only in the oil and gas industry, and a decreased beta coefficient in the metallurgy and banking sectors.

There was also a statistically significant increase in the risk-free rate and an increase in the market risk premium due to the imposition of sanctions. These results are adjusted to the effects of oil price drop. Interestingly, in some cases, the effect of an increase in the market risk premium turned out to be stronger than a decrease in the beta coefficient. For example, in 2015, the market risk premium for such companies as MMK, Acron, RusHydro, and Mosenergo increased slightly against the background of a significant drop in the beta coefficients of these companies. Along with the increase in the risk-free rate, this resulted in an increase in the equity value of these companies.

The industry affiliation and business model of the company determine the nature of the impact of sanctions on the cash flows of these companies. In this regard, when assessing
the impact of sanctions, not only the expected dynamics of macroeconomic indicators (in particular, GDP growth rates, real disposable household income, real population consumption) should be considered, but also the factors specific to the company (the volume of the market in which it operates, market share, restrictions on the import of components, fixed assets and export of products, investment and financial plans, level of costs) [11]. As for the expected cash flows of Russian public companies, analysts’ expectations regarding the cash flows of many companies with currency earnings were rather optimistic during the imposition of sanctions. It is also required to take into account the effect of the depreciation of exchange rates, as cash flows denominated in rubles may increase when the ruble depreciates against the dollar. In particular, the positive yield of shares of oil and gas and metallurgical companies for the period of ownership in 2015 is associated with the depreciation of the ruble (the dynamics of stock returns are presented in Table 1).

Table 1 Dynamics of stock returns of Russian companies for the period of ownership

<table>
<thead>
<tr>
<th>Sector</th>
<th>Company</th>
<th>Stock returns for the period of ownership</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Before sanctions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2012</td>
</tr>
<tr>
<td>Oil and Gas</td>
<td>Gazprom (c)</td>
<td>-11%</td>
</tr>
<tr>
<td></td>
<td>Rosneft (c)</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>Lukoil (c)</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>Novatek (c)</td>
<td>-10%</td>
</tr>
<tr>
<td></td>
<td>Gazprom Neft (c)</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>Tatneft</td>
<td>42%</td>
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<tr>
<td></td>
<td>Surgutneftegaz (c)</td>
<td>8%</td>
</tr>
<tr>
<td>Metals and mining</td>
<td>Nornickel</td>
<td>22%</td>
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<tr>
<td></td>
<td>NLMK (c)</td>
<td>-2%</td>
</tr>
<tr>
<td></td>
<td>Severstal</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Mechel</td>
<td>-22%</td>
</tr>
<tr>
<td></td>
<td>Polus</td>
<td>-9%</td>
</tr>
<tr>
<td></td>
<td>Raspadskaya</td>
<td>-41%</td>
</tr>
<tr>
<td></td>
<td>MMK (c)</td>
<td>-16%</td>
</tr>
<tr>
<td>Transportation</td>
<td>Aeroflot</td>
<td>-7%</td>
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<tr>
<td></td>
<td>NMTP</td>
<td>-10%</td>
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<tr>
<td></td>
<td>Utair</td>
<td>39%</td>
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<tr>
<td>Banks</td>
<td>Sberbank (c)</td>
<td>20%</td>
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<tr>
<td></td>
<td>VTB (c)</td>
<td>-7%</td>
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<td></td>
<td>Bank Saint-</td>
<td>-31%</td>
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For the purposes of accounting of the impact of information signals about sanctions on the value of companies, it is required to form expectations and update the financial model of the company. The mechanism proposed below is applicable both for the renewal of the intrinsic value estimates of the sanctioned companies and for the valuation of the companies affected by the sanctions only indirectly.

Figure 1 Accounting mechanism for information signals on the imposition of sanctions in the valuation of a company

### The receipt of information signals on the imposition of sanctions

1. Renewal of the estimate of the beta coefficient  
   - How will sanctions affect the industry beta coefficient?  
   - Will the company become more or less risky relative to the industry average?  

2. Renewal of the estimate of the expected risk-free rate  
   - Can the information signal lead to a change in the risk-free rate?  

3. Renewal of the estimate of the market risk premium  
   - Can the information signal lead to a change in the value of the market risk premium?  

4. Renewal of the estimate of the debt value  
   - Can the information signal lead to a change in the risk-free rate?  
   - Can the information signal lead to a change in the credit default spread?  
   - Can the information signal lead to a change in the financial situation and a revision of the credit rating of the company?
5. Renewal of the estimate of changes in the capital structure

Will the information signal affect the company's plans for implementing investment projects, debt service, dividend payout?
Will the information signal affect the change in exchange rates (if the company has foreign currency debt)?
Will the information signal affect the ratio of the stock market value to the market value of the financial obligations of the company?

6. Renewal of the estimate of expected cash flows

How do company cash flows depend on macroeconomic conditions?
How will the sanctions affect the macroeconomic performance of the company?
How will the sanctions affect the company's market share?
How can imposed sanctions affect the purchase prices of raw materials and fixed assets?
How can the imposed sanctions affect product sales prices (including export sales conditions)?
How will the imposed sanctions affect the company's ability to acquire technology and implement investment projects?
How will the sanctions affect the long-term growth rate of the company's cash flows?

Accounting for expected changes in the capital value estimation and in the financial model of the company

Renewed company's intrinsic value estimate

**DISCUSSION**

In accordance with the discounted cash flow model, the intrinsic value of a financial asset depends on the expected cash flows and risks, the value of which reflects the capital value.

Either expected cash flows related to shareholders (for example, free cash flow for shareholders or dividends) or expected cash flows for all shareholders (for example, free cash flow for a firm) are used for the purposes of stock value estimation. In both cases, cash flow can be influenced by general economic factors (in particular, GDP growth rate, real disposable household income) and industry factors (e.g., market volume growth rate), as well as the factors related to the company (expected market share, revenue growth rate, sales margins, capital investments, opportunities for debt acquisition). If information signals on the imposition of sanctions lead to a change in investors' expectations regarding any of these factors, then the assessment of the company's internal value should also change.

Likewise, a change in investors' expectations regarding any of the components of the capital value will result in a change in the company's intrinsic value. Practically, in the process of stock value estimation, either the weighted-average cost of capital or the equity value is used. The value of the weighted-average cost of capital depends on the debt load of the company, the
marginal income tax rate, the cost of debt financing [12] and the equity value. In accordance with the CAPM model, the equity value depends on the risk-free interest rate, the value of the market risk premium, the company's beta coefficient and debt burden [13].

Companies against which targeted sanctions were not imposed may also be negatively affected by the fact that sanctions may be of a sectoral nature or reduce economic activity in general. The accounting mechanism for information signals on the imposition of sanctions can also be applied to such companies, since it allows reviewing the indicators common to the capital market (risk-free rate, market risk premium), considering the change in the beta coefficient, and also updating the expectation regarding the cash flows of companies.

**CONCLUSION**

When the news background is filled with information about the imposition of sanctions, investors and analysts are especially likely to demonstrate behavioral effects. In this regard, it is required to adhere to a predetermined mechanism for estimates renewal. This will make it possible to give more accurate estimates than average market ones, since under the conditions of such a news background, the hypothesis of market efficiency in a semi-strong setting may be fulfilled [14], according to which: “if any information is immediately and completely reflected in the price of the asset, then the market, in which this asset is traded, can be called effective.”

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