

# Features of Sustainable Development of the Arctic Zone of Russia

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## ABSTRACT

The need to comply with the goals and objectives of sustainable development of the situation and the values of management objects determines a set of state policy priorities to achieve an acceptable level of safety and quality of life in specific territories of the country. The purpose of the study was to determine the features of sustainable development of individual land territories of the Arctic zone of the Russian Federation (hereinafter – the Russian Arctic or AZRF), taking into account the results of the dynamics of sustainable development indicators and the type of economy of these regions. To this end, the work presented problem areas of socio-economic development that hinder the successful achievement of the sustainable development goals (SDGs) of Russia and the attainability of the goals and objectives of strategic management of the development of these territories. To determine the type of economy and the characteristics of economic development, a structural analysis of the economy was carried out and structural shifts in dynamics were determined. The research methodology includes both general scientific methods of analysis and synthesis, and the author's approach to structural analysis of the economy, based on the three-sector model of the Clark-Fisher economy. The main results of the study include: systematization and clarification of the composition of national SDG indicators for the land territories of the Arctic zone of the Russian Federation, taking into account the peculiarities of their socio-economic development (regional indicators of the SDGs), a typology of the economy of the Russian Arctic regions based on the results of structural analysis; determination of the correlation between regional SDG indicators, goals and priorities of Russian national projects in these regions, and goals and objectives of strategic planning documents; on the example of the transformation of reindeer husbandry, the demanded and accessible digital technologies and methods of “lean production” have been identified, the application of which to the change in the traditional format of this economic activity is aimed at increasing labor productivity, ensuring the off-seasonality of animal husbandry in the Russian Arctic and achieving positive social effects, including regional SDG indicators.

**Keywords:** *sustainable development goals, the Arctic zone of the Russian Federation, structural analysis of the economy, strategic development priorities*

## 1. INTRODUCTION

The directions and goals of sustainable development (SDGs) at the level of a specific country and its regions are actively supported by many states within the framework of the implemented socio-economic policy, a set of

national projects and the entire system of strategic management of the development of territories, both urban and rural [1]. For Russia, this is also very relevant due to the large size of the territories, the heterogeneity of specific conditions and the disproportions in their socio-economic development [2]. In this regard, the practice of achieving the

SDGs in Russia is characterized by significant differences in the characteristics and priority areas for different territories, which is determined by natural and climatic, historical, cultural, social, demographic, and economic factors, and is reflected in the system of national SDG indicators. According to the Federal State Statistics Service, in the SDG system of Russia, which includes all 17 SDGs, 160 indicators are presented that allow for tracking the progress of the implementation of national priorities for achieving the SDGs in dynamics.

The regions belonging to the land territories of the Arctic zone of the Russian Federation (hereinafter – the Russian Arctic or AZRF) have their own characteristics associated with severe climatic conditions, low attractiveness for life, problems in ensuring the key SDGs in the field of health and safety of the citizens of the country living there [3]. Considering the natural and climatic conditions of this zone, great difficulties arise in ensuring the physical and economic accessibility of food, in the development of the agrarian sector in the corresponding northern regions [4]. There is practically no possibility to carry out the production of many types of crop products, many of which (for example, fruits and vegetables) are supplied from other regions of Russia, in connection with which they turn out to be significantly more expensive [5]. That is, the food security of the subjects of the Russian Arctic is much worse than in the country as a whole. And it is one of the main elements of the economic security of the state [6]. In addition, there are significant disparities in the development of rural areas [7], as well as a lower provision of infrastructure facilities necessary for a normal life in comparison with urban conditions [8, 9]. Naturally, all of the above does not contribute to the consolidation of the population in these territories, with the exception of indigenous peoples, which is a negative factor in achieving the SDGs for the northern territories of Russia [10].

Many authors in their works raised the issue of sustainable development of the Russian Arctic [11]. In particular, some believe that in modern conditions, to solve this problem, it is necessary to distribute social functions between the state and commercial structures that carry out production or are interested in developing the natural resources of these territories [12]. Others consider this issue from the point of view of legislative consolidation of a special status for the AZRF, which will strengthen not only the national security of Russia, but also ensure the development of the corresponding territories [13]. Recently, the problem of the impact

of human activity on the environment of this region, as well as the consequences of climate change, has been increasingly raised, which increases the risks in the framework of sustainable development of the Russian Arctic [14]. There are significant contradictions between different industries operating in the northern latitudes of our country. For example, the Arctic still plays a significant role in Russian fishing [15]. However, anthropogenic impact from industrial and mineral resource extraction enterprises reduces the fish population, which negatively affects the prospects of this industry in the northern regions of Russia [16].

To determine the features and priorities of state policy to achieve the SDGs of Russia for these territories, it is necessary not only to analyze and update the strategic planning documents of the country, but also to determine the availability of introducing new management technologies in traditional forms typical for these regions, including in the field of “Smart city”, “Lean production”. In this study, the authors present the results of their analytical work related to:

- defining the features of the national policy to achieve the SDGs of Russia for the indicated territories, based on the analysis of the dynamics and comparison of indicators of the SDGs of Russia;
- interpretation of the results of the structural analysis of the economy of the land territories of the Russian Arctic;
- the development of recommendations for the adaptation of strategic planning documents for these territories, taking into account the possibilities and prospects for the introduction of current digital technologies and management innovations.

## **2. MATERIALS AND METHODS**

The purpose of the article is to study the quality of goal-setting for the development of the Russian Arctic from the standpoint of the SDGs.

To achieve this purpose, the following tasks were set:

- to analyze the composition of regional SDG indicators for the AZRF;
- to conduct a structural analysis and typology of the economy of the regions of the AZRF;
- to analyze the strategic priorities and tasks of the development of the regions of the AZRF.

The information base for the study was the data of the Federal State Statistics Service. State strategic documents have become the regulatory and legal framework: “Fundamentals of the state policy of the Russian Federation in the Arctic for the period up to 2035”; “Strategy for the development of the Arctic zone of Russia for the period up to 2020”; “Strategy for the development of the Arctic zone of the Russian Federation and ensuring national security for the period up to 2035”, “The program of state support for the traditional economic activities of the indigenous peoples of the Russian Federation, carried out in the Arctic zone of the Russian Federation”. A quantitative analysis of targets at the national and regional levels is necessary to substantiate the significance of each of the 17 SDGs for the Russian Arctic. A graphical analysis of the most important social indicators for the regions of the Russian Arctic in comparison with the average values for the country shows the degree of urgency of systemic problems. Based on the structural three-factor analysis of the GRP of the regions of the Russian Arctic, a typology of the regional economy is carried out. Comparison of the SDGs with the strategic development objectives of the Russian Arctic makes it possible to determine the directions of the region's development, in particular, in the agricultural sector.

### 3. RESULTS

#### 3.1. Priority areas for sustainable development of land areas of the Russian Arctic

Some authors note that the AZRF is of strategic importance not only for the economic, but also for the national security of the country [17]. This is also confirmed by the actions of the authorities of other countries of the world with similar climatic features of certain territories (Canada, USA). That is, despite the traditionally highly subsidized functioning of the AZRF, solving the issue of their sustainable development and increasing the efficiency of economic activity is relevant and determined by the goals and objectives of strategic planning documents (“Fundamentals of State Policy of the Russian Federation in the Arctic for the Period up to 2035”, “Development Strategy The Arctic zone of the Russian Federation and ensuring national security for the period up to 2035”, the State program of the Russian Federation” Socio-economic development of the Arctic zone of the Russian Federation for the period 2015-2020”).

Understanding of sustainable development as ensuring the achievability and effectiveness of

measures to create safe and favorable living conditions while reducing the adverse impact of economic activities on the environment, taking into account the interests of future generations and the perception of the environmental factor as a factor that does not restrain, but stimulates economic development, we consider it necessary to pay attention to the following features of its achievement in the land territories of the Russian Arctic. First of all, the SDGs included in the List of National SDG Indicators in accordance with the UN General Assembly Resolution A/RES/71/313 of July 6, 2017, which reflect all 17 SDGs, and consist of 160 indicators, for data territories priority in terms of the period and scale of achievement are 64 regional SDG indicators for the Russian Arctic, distributed according to the SDGs of Russia as follows and making up 40% of the total number of national goals (Table 1).

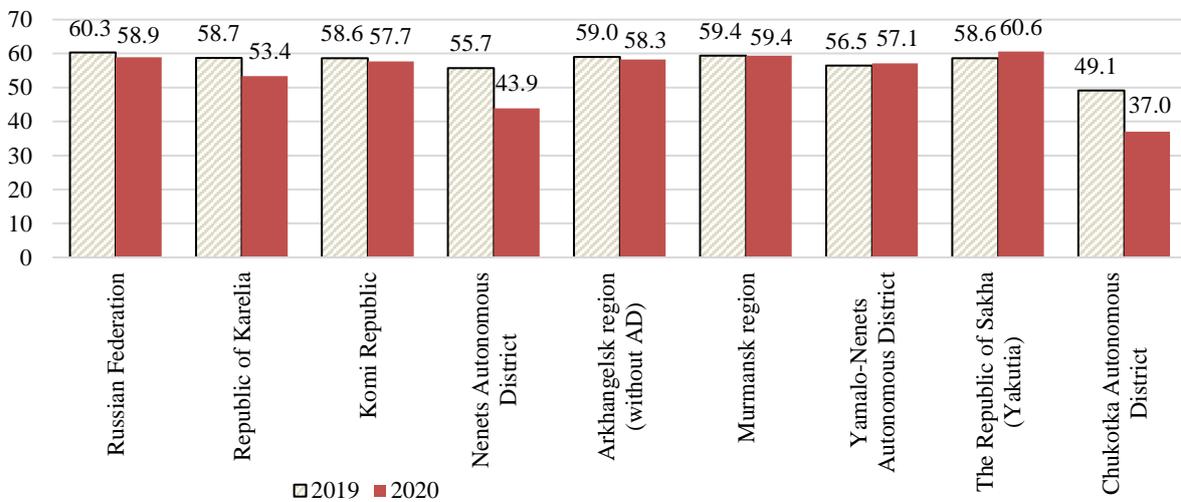
Secondly, despite the presence of historically formed forms and methods of conducting economic activities (mining on a rotational basis, fishing, reindeer husbandry), innovations associated with the introduction of both settled livestock (in a pen) and modern digital technologies are economically justified. aimed at regulating the number, composition of the herd, waste-free processing of livestock products, for the development of this economic activity and ensuring social effects for the small peoples of the north, associated with improving the quality of life, the possibility of cohabitation of adults and children, off-season economic activity and stability of employment and income. Thirdly, using the example of the land territories of the Russian Arctic, which include such regions of the country as the Republic of Karelia, the Komi Republic, the Nenets Autonomous Okrug, the Arkhangelsk Region (without the Nenets Autonomous Okrug), the Murmansk Region, the Yamalo-Nenets Autonomous Okrug, the Republic of Sakha (Yakutia) and the Chukotka Autonomous Okrug, we calculated a number of indicators based on data from the Federal State Statistics Service.

We found that these territories are characterized by certain systemic problems associated with the condition, quality of life of the population, health status, this is especially noticeable in the example of the indicator “healthy life expectancy”, the values of which for a number of land territories of the AZRF significantly differ from the average Russian level, for example, in the Nenets Autonomous Okrug in 2019 the value of this indicator was 55.7 years, in 2020 – 43.9 years, and in the Chukotka Autonomous Okrug 49.1 years and 37 years, respectively (Figure 1).

**Table 1.** Distribution of national and regional SDG indicators for Russia

SDGs of Russia	Number of Indicators		Correlation between Regional and National Indicators
	National Indicators	Regional Indicators	
Goal 1: No poverty	3	2	66.7%
Goal 2: Zero hunger	4	1	25.0%
Goal 3: Good health and wellbeing	36	22	61.1%
Goal 4: Quality education	7	7	100.0%
Goal 5: Gender equality	5	3	60.0%
Goal 6: Clean water and sanitation	6	4	66.7%
Goal 7: Affordable and clean energy	5	2	40.0%
Goal 8: Decent work and economic growth	18	8	44.4%
Goal 9: Industry, innovation and infrastructure	28	12	42.9%
Goal 10: Reduced inequalities	6	1	16.7%
Goal 11: Sustainable cities and towns	14	6	42.9%
Goal 12: Responsible consumption and production	8	3	37.5%
Goal 13: Combat climate change	2	0	0.0%
Goal 14: Conservation of marine ecosystems	3	0	0.0%
Goal 15: Conservation of terrestrial ecosystems	5	3	60.0%
Goal 16: Peace, justice and strong institutions	5	1	20.0%
Goal 17: Partnerships for sustainable development	5	2	40.0%
Total:	160	64	40.0%

Source: Compiled by the authors



**Figure 1.** Change in values of healthy life expectancy in the Russian Federation and the land territories of the Russian Arctic in 2019-2020

Source: Compiled by the authors based on [18]

Another example of critical values of the social indicator can be cited in terms of the indicator “Morbidity with the first time in life diagnosed with alcoholism and alcoholic psychosis per 100 thousand population”, when the values for a number of these regions are several times higher than the national average (Figure 2).

Fourth, the achievement of the SDGs of Russia for the land territories of its AZRF should have a great influence on such areas as the quality of life, safety of economic activities, ecological and economic safety of the environment, growth of labor productivity, which is closely linked with the goals of national projects of Russia and the content of

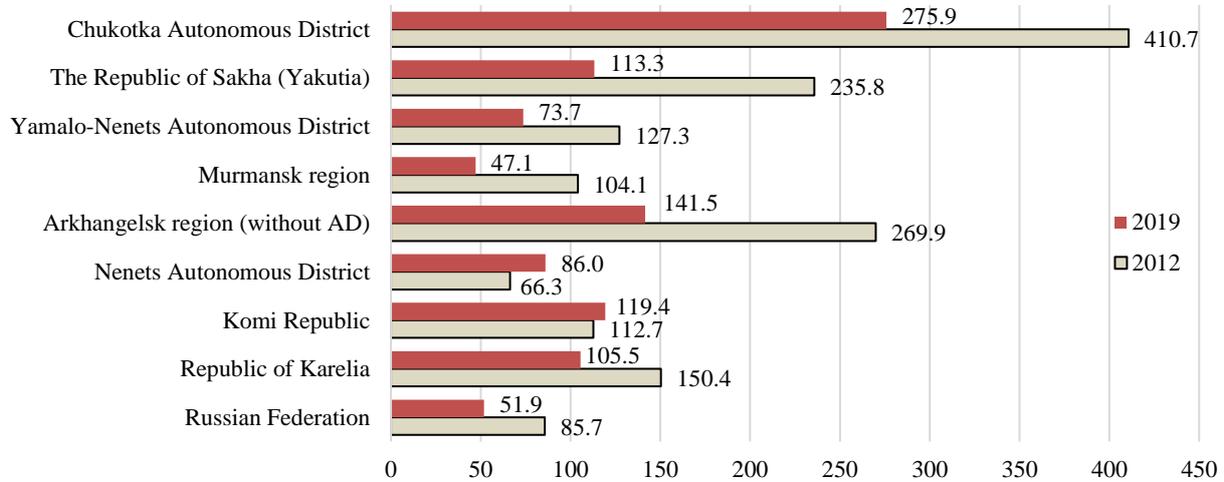
strategic planning documents for the analyzed territories.

### 3.2. Structural analysis and typology of the economy of the land territories of the Russian Arctic

The land territories of the AZRF are determined in accordance with the Decree of the President of the Russian Federation dated 05/02/2014 No. 296 (as amended on 05/03/2020) “On the land territories of the Arctic zone of the Russian Federation”, this study presents the main ones with the status of a subject Of the Russian Federation, and according to the structure of the economy of which the authors

carried out the following calculations according to the data of the Federal State Statistics Service “Sectoral structure of GVA by constituent entities of the Russian Federation for 2016 and 2019”:

according to the author's method of structural analysis (based on sources [19, 20]) analyzed structural changes for 2016 and 2019 (Table 2, Figure 3).



**Figure 2.** Change in morbidity values with a first-in-life diagnosis of alcoholism and alcoholic psychosis per 100 thousand population in the Russian Federation and the land territories of the Russian Arctic in 2012 and 2019  
 Source: Compiled by the authors based on [18]

**Table 2.** The results of a structural analysis of the economy of the Russian Federation and the constituent entities of the Russian Federation related to the land territory of the Russian Arctic

Territories	2016					2019					Economy Type
	$D_A$	$D_I$	$D_S$	$t_\alpha$	$t_\beta$	$D_A$	$D_I$	$D_S$	$t_\alpha$	$t_\beta$	
Russian Federation	5.0	32.0	56.3	6.4	1.8	4.1	33.8	56.7	8.2	1.7	Service-industrial: $D_I > D_A; D_S > D_I$
Republic of Karelia	5.9	36.3	54.3	6.2	1.5	5.4	40.5	50.7	7.5	1.3	Service-industrial: $D_I > D_A; D_S > D_I$
Komi Republic	1.8	49.9	38.3	27.7	0.8	1.5	55.8	38.7	37.2	0.7	Industrial: $D_I > D_A; D_S < D_I$
Nenets Autonomous District	0.9	75.9	15.2	84.3	0.2	0.3	80.2	13.7	267.3	0.2	Industrial: $D_I > D_A; D_S < D_I$
Arkhangelsk region (without AD)	6.4	29.6	59.5	4.6	2.0	5.5	32.1	58.0	5.8	1.8	Service-industrial: $D_I > D_A; D_S > D_I$
Murmansk region	11.4	31.3	50.6	2.7	1.6	12.4	32.1	48.4	2.6	1.5	Service-industrial: $D_I > D_A; D_S > D_I$
Yamalo-Nenets Autonomous District	0.1	59.8	23.3	598.0	0.4	0.1	77.4	13.9	774.0	0.2	Industrial: $D_I > D_A; D_S < D_I$
The Republic of Sakha (Yakutia)	1.7	57.0	33.0	33.5	0.6	1.4	55.3	33.7	39.5	0.6	Industrial: $D_I > D_A; D_S < D_I$
Chukotka Autonomous District	1.1	60.8	32.0	55.3	0.5	3.4	52.1	36.6	15.3	0.7	Industrial: $D_I > D_A; D_S < D_I$

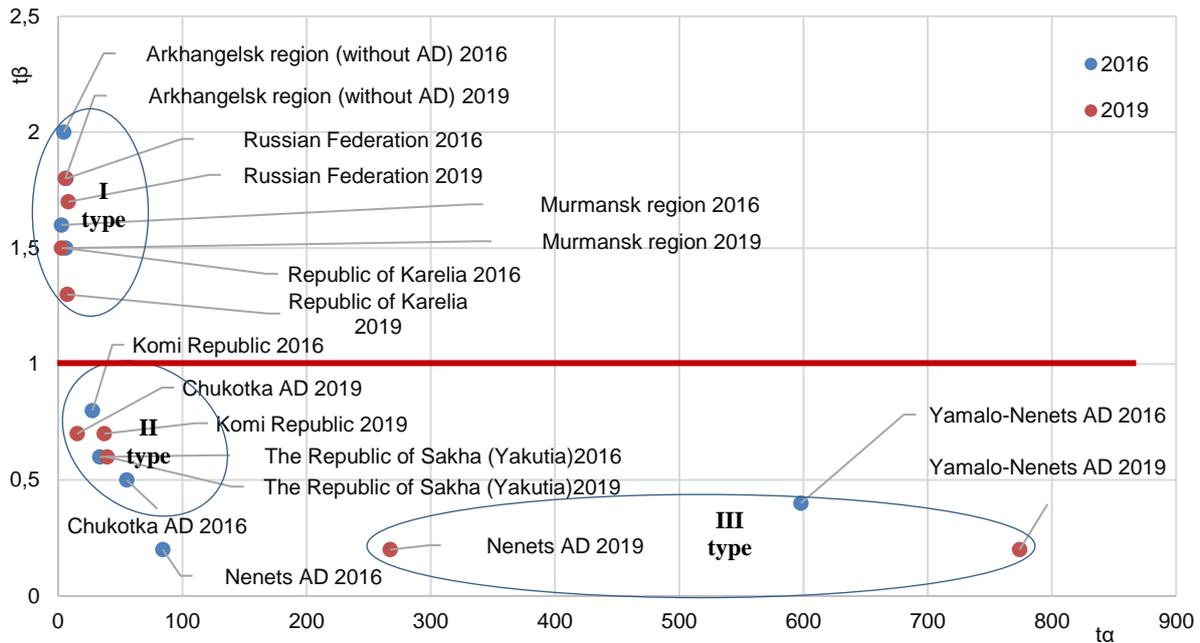
Source: Compiled by the authors

According to Figure 3, based on the results of the distribution of regions by the values of  $t_\alpha$  and  $t_\beta$ , one can talk about three types of their economic development:

- 1) Type I is focused on fairly high indicators of the development of the service sector (service-industrial);
- 2) Type II indicates a weaker service sector against the background of the priority of

industrial types of economic activity;

- 3) The Yamalo-Nenets Autonomous Okrug fell into Type III, in which, against the background of an almost zero  $D_A$  value, the  $t_\alpha$  values represent such high values, showing a higher dependence of the region on the state policy for the supply of goods, including food. Also, the Nenets Autonomous Okrug can be attributed to this type, taking into account the result of structural changes by 2019.



**Figure 3.** Distribution of constituent entities of the Russian Federation belonging to the land territory of the Russian Arctic

Source: Compiled by the authors

Localization coefficients were calculated and analyzed using the example of the Komi Republic in dynamics for 2016 and 2019 (Table 3). It can be seen that during the analyzed period, there were no significant changes in the contribution of the

economy of this region to the national economy, only for several types of economic activity (construction, administrative activities and related additional services) there are some shifts.

**Table 3.** The results of calculating the localization coefficient for the constituent entities of the Russian Federation belonging to the land territory of the Russian Arctic (using the example of the Komi Republic)

Sectors of the Economy	Komi Republic		Absolute Deviation
	2016	2019	
Agriculture, forestry, hunting, fishing and fish farming	0.36	0.37	0.01
Extraction of mineral resources	3.20	3.24	0.04
Manufacturing industries	0.69	0.55	-0.14
Electricity, gas and steam supply, air conditioning	0.77	0.79	0.02
Water supply, sewerage, waste collection and disposal, pollution elimination activities	0.83	0.83	0.00
Construction	1.49	0.74	-0.75
Wholesale and retail trade, repair of motor vehicles and motorcycles	0.29	0.30	0.01
Transportation and storage	0.96	0.90	-0.06
Activities of hotels and catering establishments	0.64	0.60	-0.04
Information and communication activities	0.47	0.37	-0.10
Financial and insurance activities	0.40	0.20	-0.20
Real estate activities	0.37	0.53	0.16
Professional, scientific and technical activities	0.47	0.37	-0.1
Administrative activities and related additional services	1.69	2.13	0.44
Public administration and military security, social security	1.22	1.09	-0.13
Education	1.03	1.00	-0.03
Activities in the field of health and social services	1.10	1.05	-0.05
Activities in the field of culture, sports, leisure and entertainment	0.75	0.60	-0.15
Providing other types of services	0.80	0.60	-0.20
Activities of households as employers	-	-	-

Source: Compiled by the authors

Russia views the Arctic region as a “storehouse” of enormous resources, and also constantly cares about the interests of national security, which the

Northern Fleet is protecting. Through the strategic development priorities laid down in the foundations of the state policy of the Russian Federation in the

Arctic until 2020 and until 2035, the Strategy for the Development of the Arctic Zone of the Russian Federation until 2020 and until 2035, it is clear that Russia's policy in this region is a national priority, with an emphasis on the development of resources in it, ensuring security and stability, the development of the Northern Sea Route and the sustainable development of the Russian Arctic as a whole.

The heterogeneity of the development of the regions is taken into account in the tasks and activities of the implementation of the Development Strategy of the Russian Arctic. Particular attention is paid to supporting the indigenous minorities as a factor in the sustainability of the development of the region. The program of state support for the traditional economic activities of the indigenous small-numbered peoples of the Russian Federation fixes 13 types of economic activities, including nomadic animal husbandry, dog breeding, commercial hunting, gathering, etc.

The priority is for projects that require the maximum involvement of new digital technologies and the implementation at the scientific, systemic level of methods of "Lean production" in order to increase labor productivity and economic efficiency of economic activity. For example, the "Smart Herd" pilot project in reindeer husbandry is aimed at ensuring the off-seasonality of livestock breeding, increasing its efficiency and waste-free processing of products by:

- ensuring sedentary reindeer husbandry, which guarantees greater safety, controllability of the herd size, its characteristics for processing and manufacturing full-cycle products;
- attracting modern reproductive technologies that guarantee the fulfillment of the necessary targets for the number of herds and the quality characteristics of the products obtained;
- adapting Lean Production methods, aimed primarily at identifying problem areas and minimizing costs as a result of using technologies and methods that have confirmed the effectiveness of the results.

#### 4. DISCUSSION

A differentiated approach to determining the composition of national SDG indicators and a high correlation of their values, problem areas with the goals and priorities of the system of national

projects, strategic planning documents allows us to talk about the criteria for the attainability of these goals and the correct distribution of public spending and attracted investments. For the analyzed land areas of the Russian Arctic, the priority areas of the SDGs can be defined as a group of social indicators aimed at increasing the expected healthy life expectancy, and a group of economic indicators associated with the transformation of traditional forms and types of economic activity through the active introduction of digital technologies using the example of the "Smart city", methods of "Lean production", demanded and available for implementation in the system of economic relations of these regions.

The results of the structural analysis of the economy of these regions allow us to draw the following conclusions:

- out of all of the analyzed subjects of the Russian Federation belonging to the land territory of the AZRF, the Yamal-Nenets Autonomous Okrug is characterized by the maximum orientation in the structure of its economy on the extraction of minerals, while the share of services (DS) by relative to the share of the industrial sector (DI) and denoted by  $t\beta$  decreased by 2 times over the analyzed period, which indicates a low growth rate of the service sector against the background of increasing mining and manufacturing;
- the most service-oriented among the analyzed territories in 2016 was the economy of the Arkhangelsk region without the Nenets Autonomous Okrug ( $t\beta = 2$ ) against the background of the all-Russian indicator  $t\beta = 1.8$ , but in 2019 it was this indicator decreased in all analyzed territories, except for the Nenets Autonomous Okrug and the Republic of Sakha (Yakutia);
- out of 8 analyzed subjects of the Russian Federation, only 3 (Republic of Karelia, Arkhangelsk Region without the Nenets Autonomous Okrug, Murmansk Region) have a developed service-industrial type of economy, while the remaining 5 regions are fully focused on development of industrial production against the background of a decrease in the share of services in GRP for the analyzed period.

If the implementation of digital technologies and methods of "Lean production" in the economic

activities of these regions is accessible and in demand both from the participants in economic relations and is supported by the state, the main problem may be their testing and acceptance by the performers in order to obtain the maximum return and positive effects. for the economy of the region as a whole.

## 5. CONCLUSION

The northern and arctic territories of Russia have a huge natural resource, economic and geopolitical potential [21]. Having indicated the breadth of the spheres of socio-economic processes affected in the national indicators of the SDGs of Russia, the authors, within the framework of the systematization of these indicators, came to the determination of the need to clarify the composition of these indicators for the Russian Arctic, and as a result, the composition of the regional indicators of the SDGs of the Russian Arctic was determined, including 64 indicators from the total which have a regional statistical base and priority in achieving, taking into account the peculiarities of sustainable development of these territories. Specifying the composition of regional SDG indicators is an important tool to ensure, including a high level of correlation with the targets of national projects and strategic planning documents.

The main result of the structural analysis of the economy of these regions is the division of 8 regions-objects of analysis into 3 types of economy according to the level of economic development in accordance with the theory of the three-sector economy of Clark-Fisher. The division of the land territories of the Russian Arctic into different types of economy and economic development indicates different opportunities for economic growth and different approaches to the strategic management of their development.

The authors also revealed a high correlation between the regional SDG indicators formed at the first stage of the study and the target indicators of strategic planning documents implemented in these regions. It is the priority in achieving the SDGs and their significance for determining the effectiveness of the entire public administration system that are the reasons for including them in the priorities of national projects implemented throughout the country, and the goals of strategic planning documents implemented in the Russian Arctic until 2035.

Taking into account the traditional problems of

doing business in the land areas of the Russian Arctic and the growing availability of “Smart Home” digital technologies, the demand for “Lean Production” methods in all spheres of the economy, the authors have identified the directions for introducing innovations using the example of reindeer husbandry and the development of the “Smart Herd” pilot project. aimed at the development and economic justification of the demand for such an approach to economic activity in these territories.

## AUTHORS' CONTRIBUTIONS

The contribution to this study from each of the authors is the following: Natalia E. Buletova – 0.6, Maria A. Romanyuk – 0.1, Rafail R. Mukhametzyanov – 0.1, Anastasiya S. Zaretskaya – 0.1, Elena N. Vasileva – 0.1.

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