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Management of Externalities in the Context of Sustainable Development of the Russian Arctic Zone

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Abstract: The territory of the Arctic is of interest from the point of view of the strategic development of the economy. However, the industrialization of the Arctic zone is accompanied by both a positive and a negative influence on the country's socio-economic development. An analytical review of the research which has been published previously allows us to discuss the issue of sustainable development in the Arctic through the prism of the theory of externalities. Considering this, the paper examines some relevant issues from the standpoints of the concept of sustainable development and scientific and technological progress. Against the background of the identified problems, the purpose of the research is to clarify management decisions in the field of internalization of the externalities of economic development of the Russian Arctic zone. As research methods, the authors have applied comparative analysis, dynamic analysis, the coefficient method, correlational analysis and cluster analysis. An analytical review of scientific works, research tooling and a statistical database concerning the development of the Russian Arctic zone provided the following scientific results: the category of "externalities" in the context of industrialization of the Arctic zone's territories and their systematization in a number of areas (environmental, innovation, investment, infrastructure, social, etc.) has been clarified; some trends in the degree of neutralization of negative environmental externalities in terms of environmental problems (pollution capture, waste disposal, recycling and wastewater treatment) have been identified; the dynamics of investment per unit of environmental pollution in the context of environmental approaches have been elucidated; the efficiency of investments in environmental preservation measures in the territories of the Russian Arctic zone have been evaluated; positive innovative externality from the investment of own funds in the fixed capital of enterprises have been revealed; the typology of the subjects of the Russian Federation that form part of the Arctic zone, according to the criteria of the intensity of costs for neutralization of negative externalities (territories with high, moderate and low intensity of costs) have been suggested; and a package of measures in order to manage the external effects of economic development of the Arctic zone of the Russian Federation in the context of sustainable development has been proposed. The practical significance of the results obtained lies in the possibility of taking all of them into account in the implementation of the state program "Socio-economic development of the Arctic zone of the Russian Federation", contributing to the qualitative development of the territories of the Russian Arctic and improving the well-being of the population of the corresponding constituent entities of the Russian Federation.

Keywords: externality; Russian Arctic zone; sustainable development; investments; innovative development; environment; cluster analysis

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1. Introduction

In the context of the search for strategic directions for the national economy's development, the Arctic zone becomes one of the priority objects of governance. In 2021, a new version of the state program "Socio-economic development of the Arctic zone of the Russian Federation" has been approved. It provides a number of tasks to be solved to accelerate the development of the Arctic until 2024 and allocates significant budgetary funds for the implementation of the program [1]. The development targets of the territory are creating conditions to stimulate private investment and facilitating sustainable socio-economic development. The achievement of the first goal involves the industrialization of the Arctic zone, the development of the oil and gas industry and high-tech industries, the implementation of the principles of the circular economy, among others.

At the same time, the development of the Arctic requires increased attention in the context of sustainable development, or eco-development as proclaimed by the UN. On the one hand, the Arctic zone is a major source of gross product: in 2019, enterprises located in the Russian Arctic zone shipped 5.2% of the total product volume in the country, and in 2018 it was 6.57%; this area is an attractive object of investment—in 2019, the share of investment in the fixed capital of organizations operating in the Arctic zone made up 9% of the total investment in Russia [2]. The dynamics of the economic development of Russia's Arctic zone are reflected in Table 1 and demonstrate an increase in financial results in recent years. In 2019, the growth in profit volumes accounted for 100.06% of the total. In addition, at the end of 2019, the participation of Arctic zone organizations in the formation of profits accounted for 12.35% of that in Russia as a whole. This confirms the priority of the development of this territory for the country.

Table 1. Economic development of the Arctic.

Indicators	2016	2017	2018	2019
Balanced financial result in the Arctic zone of the Russian Federation (million rubles)	993,438	750,570	972,680	1,945,903
Share in the total volume of balanced financial result in Russia (%)	8.57	7.27	7.05	12.35
Turnover of organizations (million rubles)	4,764,495.054	5,570,764.783	6,919,015.253	5,775,806.885
Shipment goods of own production, works (services) performed on their own (million rubles)	4,053,664.786	4,814,135.754	6,017,465.851	4,914,370.291

On the other hand, some damage to the environment of the Arctic zone due to pollution of the atmosphere, water sources, and land disturbance is natural.

Thus, the intensive development of Russia's Arctic zone is accompanied by both high economic results and, at the same time, negative socio-ecological aspects. This leads to an acute problem associated with the management of emerging externalities (mostly negative) at the background of the program's targets and intended results.

The economic development of the Arctic zone is largely determined by the development of natural resources, and scientists are closely focused on the study of the Arctic's oil and gas potential [3–8]. The Arctic's innovation potential is the subject of research in terms of technological development and the development of marine ecosystems [9], environmental protection [10], communication technologies [11], and other aspects of expansion.

There is a wide range of papers addressing the research of common industry development problems aimed at managing externalities through energy-saving technologies [12–15]. In the scientific literature, the research of externalities is presented in the context of innovation development, where the public good exceeds the private one [15–17]; the management of vehicle emissions and their impact on other sectors of the economy [18]; the impact of car use on rural and urban populations [19]; and the management of an innovative project and its associated internal and external environment externalities [20], among others.

Of the research comprehensively studying certain aspects of the impact of economic development in the Arctic on society and the environment (equated in this paper with externalities), we should mention research on the climatic effects of the anthropogenic impact [21], the economic, environmental and social consequences of the melting of ice in the Arctic [22], corporate social responsibility as a reserve for the growth of entrepreneurial activity in the Russian Arctic [23], the systematic risk associated with the development of hydrocarbon resources, oil spills [23,24], and problems regarding the sustainable development of the Arctic and the availability of relevant data, characterizing the development of the territory [25], etc.

In the paper by [26], the authors propose offset projects in the extractive sector of the Arctic economy. Their task is "ensuring the health of the local population, providing local communities with high-quality drinking water, [ameliorating] possible climatic changes due to the development of mineral deposits". The research by [27] examines the contribution of tourism to the sustainable development of the territory and reveals the fact that "tourists exhibit the strongest interest in sustainable tourism development in the Arctic region". The role of space systems in ensuring sustainable development of the Arctic is disclosed in [28], and it is argued that "space activities can contribute to sustainable development and life in the Arctic."

Within the framework of an analytical survey, it may be helpful to note that sustainable development of the Arctic is revealed fragmentarily. The authors in the paper [26] investigate mainly the influence of the industry of a given territory on the life of the local population, which makes it possible to judge the priority of the social component. If we talk about the theory of externalities in relation to the study of the Arctic, then, as such, its provisions can be found in the format of ecological destruction, but not in relation to the effectiveness of investments in the prevention of intense environmental pollution.

Thus, on the one hand, the scientific literature is replete with research concerning the Arctic's development, but on the other hand, there is little direct assessment of externalities in the sustainable development of the Arctic zone. In this regard, the authors consider it appropriate to focus on this issue and investigate the problem using the Russian Federation as an example.

2. Materials and Methods

2.1. Basic Research Methods

The research is based on the use of a mixed methodological approach that combines quantitative analysis of static data provided in the public domain by the Federal State Statistics Service in the framework of monitoring the Arctic zone's territories [2]. Information processing has been carried out through the use of quantitative methods—comparative, dynamic, correlation and cluster analysis, as well as the coefficient method. Based on the interpretation of the quantitative results, a qualitative analysis has been carried out, including an explanation of the correlations of the selected indicators, the description of the identified clusters and their characteristic latent features. The qualitative method is also applied in the case of the systematization of external effects and adaptation of the theory of externalities to the economic development of the Arctic zone.

In this research, under the term "externality" the authors classify the impact of the industrialization of the Arctic zone on the well-being of the population residing in these territories, and on the environment, which is not fully reflected in the price of the products manufactured in these territories. It is customary to distinguish between positive and negative externalities; hence, we will adhere to this classification. Relying on certain scientific research [18–20,29], we have systematized the typology of the externalities of economic development of the Arctic zone (Table 2). In addition to the noted ones, we should attribute to the positive externalities the improvement of state security at a global level, and the progressive development of related industries; to the negative ones we attribute the risk of technogenic catastrophes, the issue of climate change, etc.

Table 2. Typology of externalities of economic development of the Arctic.

Positive Externality	Negative Externality
Environmental	
Pollutant capture, recycling of production and consumption waste, purification of discharged wastewater, etc.	Pollution of the atmosphere and water bodies, land disturbance, increasing morbidity, etc.
Innovative	
Research and design development; knowledge-intensive technologies that serve the interests of numerous stakeholders; inflow of investment; labor skills accumulation and the accumulation of advanced technological and organizational experience [20]	Brain drain to countries that provide decent rewards for intellectual capital; automation of processes, accompanied by the replacement of manual labor with machine one and unemployment growth as a result
Investment	
When investing in production, increased productivity and quality of products; when investing in environmental protection measures, environmental externalities; when investing in human capital, scientific and technological development of the economic system	Corruption, inefficient spending of attracted funds
Infrastructure	
Development of transport infrastructure accessible to local people; development of industries requires the expansion of social infrastructure (health, education, etc.)	Destruction of natural objects, transport air pollutant emissions [18]; damage caused by exhaust gases, fuel evaporation, particle pollution, costs of ill-health [19]
Social	
Improvement of the quality of life, wage growth, increasing the number of jobs	Unemployment, the morbidity of the population of industrial areas

The research covers, firstly, an assessment of the degree of neutralization of negative environmental externality, specific investments per unit of environmental pollution, and the efficiency of investments in environmental protection measures, and innovative development of the territories of the Russian Arctic zone, and secondly, an analysis of the typology of the subjects of the Russian Federation that are part of the Arctic zone, according to the criteria of costs for environmental measures based on cluster analysis.

Our research focuses on environmental and investment externalities, and therefore utilizes indicators specific to these areas of research.

Based on the data on environmental externality resulting from the industrialization of the Arctic territories, we propose to calculate the following indicators:

1. K (pollut) is the pollutant capture factor (the ratio of the volume of captured and neutralized pollutants escaping from stationary sources to the total volume of pollutants emitted into the atmosphere);
2. K (waste) is the waste utilization ratio (the ratio of utilized waste to the total production and consumption waste generated);
3. K (recycl) is the recycling ratio (the ratio of reused waste to the total production and consumption waste generated);
4. K (water) is the wastewater purification rate (the ratio of purified wastewater to the total amount of wastewater discharged).

In order to diagnose measures minimizing the negative external effect resulting from anthropogenic impact in the Arctic zone of Russia, we have evaluated the dynamics of the volume of investments attributed to the magnitude of negative externality, in the context of areas of externality occurrence. For this evaluation, we propose to introduce the following indicators:

1. Inv (water) is the specific amount of investment per wastewater volume, defined as the ratio of fixed capital investment in water conservation and rational management to untreated wastewater, in RUB per cu. m.;

2. Inv (pollut) is the specific amount of investment per volume of discarded pollutants (the ratio of fixed capital investment to the volume of air pollutants emitted by stationary sources), in thousand RUB per tn.;
3. Inv (waste) is the specific amount of investment per volume of waste (the ratio of fixed capital investment for environmental protection from production and consumption waste pollution to the volume of generated waste), in RUB per tn.;
4. Inv (lands) is the specific amount of investment per unit area of disturbed land (the ratio of investment in fixed capital for the protection and rational management of land to the area of disturbed land), in thousand RUB per ha.

The substantiation of the effectiveness of investment in minimizing negative externalities has been carried out on the basis of correlation, within which the correlation coefficient has been estimated, reflecting the closeness of the relationship between the volume of neutralized negative external effects and the amount of investment in the field of impact on the atmosphere and water bodies. The assessment of the level of dependence has been carried out on the Chaddock scale, in connection with which we recognize a noticeable relationship, characterized by a correlation coefficient exceeding 0.6.

At the modeling stage, a cluster analysis has been carried out, which has made it possible to identify the nature of the economic development of the constituent entities of the Russian Federation as parts of the Arctic zone. The use of cluster analysis is aimed at identifying the latent patterns of development of Russia's Arctic zone in the context of territories, by means of the comprehensive accounting of several features. The clustering tree allows us to estimate the Euclidean distance at which the value of the criteria for the uniqueness of objects weakens.

Clustering has been carried out by means of two methods—joining (tree clustering) and k-means clustering. The first method allows us to identify visually the number of clusters and the number of objects at each node of the federation. The second method is based on the construction of a given number of k-clusters located at the greatest distances from each other. The assessment of the quality of clustering has been carried out according to the criterion of p-significance: signs are recognized as significant where the p-significance is less than 0.05, otherwise, the characteristic makes a low contribution to the difference between clusters; the difference between the intergroup (between) and intragroup (within) dispersion, which allows us to characterize the feature as the best or weakest among those analyzed, in order to identify those subjects belonging to clusters (with a high excess of the intergroup over the intragroup, one can judge the good classification quality of the feature).

In our research, the following indicators of operating costs (per capita) as signs of clustering have been used:

1. The collection and treatment of wastewater (X1);
2. The waste management (X2);
3. The protection of the air and climate change prevention (X3).

2.2. Information Basis of the Research

The research is based on statistical data provided on the Rosstat website [2]. This information is regarding the amount of pollution, pollution treatment, and investment in the development of the Arctic in Russia (Table 3).

Table 3. Analysis of variance.

Indicators	2017	2018	2019
Waste water discharged without treatment (million cubic meters)	603.6	607.4	576.3
Investments in fixed assets for the protection and rational use of water resources (million RUB)	2967	2046	4990
Emissions of air pollutants from stationary sources (thousand tons)	3356.5	3192.5	3284.6
Investments in fixed assets for air protection (million RUB)	18,873	21,393	23,042

Table 3. *Cont.*

Indicators	2017	2018	2019
Production and consumption waste generation (thousand tons)	32,564.5	351,626.1	410,361
Investments in fixed assets for environmental protection from production and consumption waste pollution (million RUB)	1551	2193	3351
Area of disturbed land (ha.)	22,051	22,050	35,481
Investments in fixed assets for the protection and rational use of land (million RUB)	767	395	2650

3. Results

3.1. Diagnosis of Measures for the Minimization of Negative Externality in the Russian Arctic Zone

The principles of the sustainable development concept define the objective need to implement measures, to ensure the balancing of economic, environmental and social goals, in association with which, the largest Russian enterprises (Gazprom, Gazprom Neft, Rosneft, LUKOIL and others) are actively developing environmentally friendly technologies and attracting funds to modernize production facilities that can improve safety and resource conservation in the organization of technological processes. Consequently, during 2017–2019, there has been a noticeable decrease in the emission of atmospheric pollutants, from 3356.5 thousand tons to 3284.6 thousand tons, in wastewater discharge, a decrease from 638 million cubic meters to 619 million cubic meters, and an improvement in waste recycling from 18.7 million tons to 35.5 million tons [2]. On the other hand, the area of disturbed land is growing as a result of the development of hydrocarbon deposits.

Considering the aforesaid points, a dynamic analysis of indicators reflecting the level of minimization of negative externality (Figure 1) has been conducted. It has been revealed that during 2017–2019, in the Arctic zone of Russia, despite active innovation and investment growth, the downward dynamics of the indicators of neutralization of negative externalities—pollutant capture, waste utilization and recycling—are prevalent. An opposite trend is characteristic for water resource management, the trend line of which is described by a linear function (the accuracy of the approximation, R^2, being 0.98).

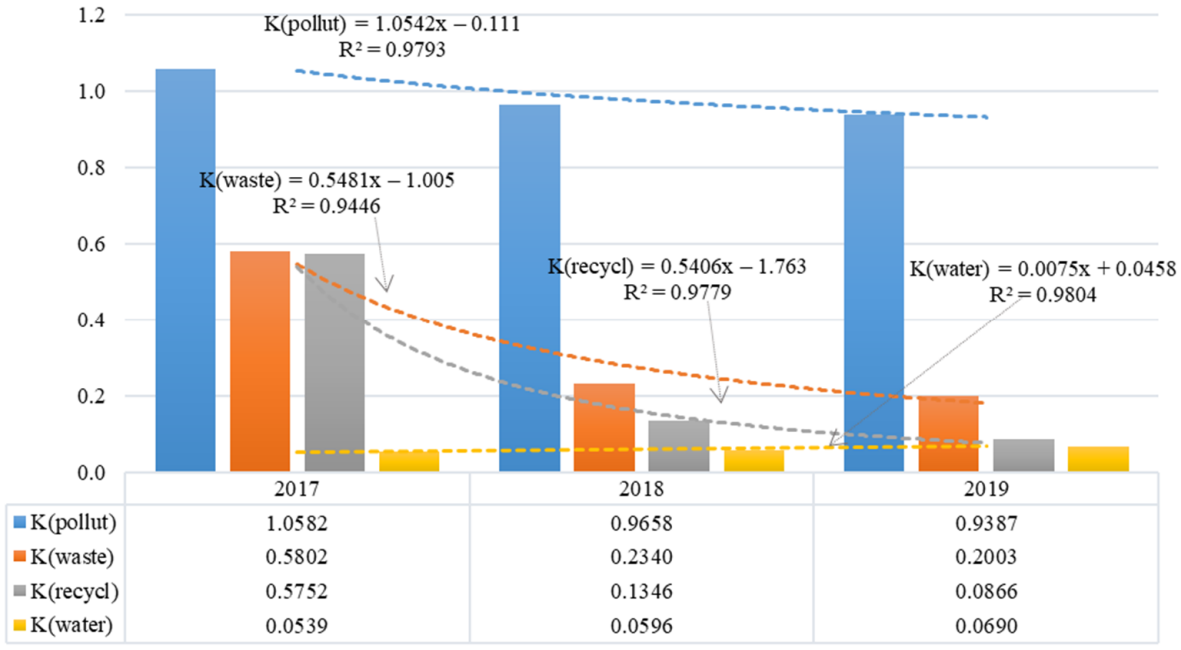


Figure 1. Dynamics of the degree of neutralization of negative externality in the Russian Arctic zone (as calculated by the authors).

Considering the ambiguous dynamics of the effectiveness of environmental externalities management, the research of investment externalities is of interest. In the context of adapting the industry to the requirements of the concept of sustainable development, an assessment of externalities and the search for tools for their internalization becomes a priority for socio-economic development. As a means of internalization, we consider the investments per environmental pollution unit (Figure 2), which is calculated by the authors based on the Rosstat data [2].

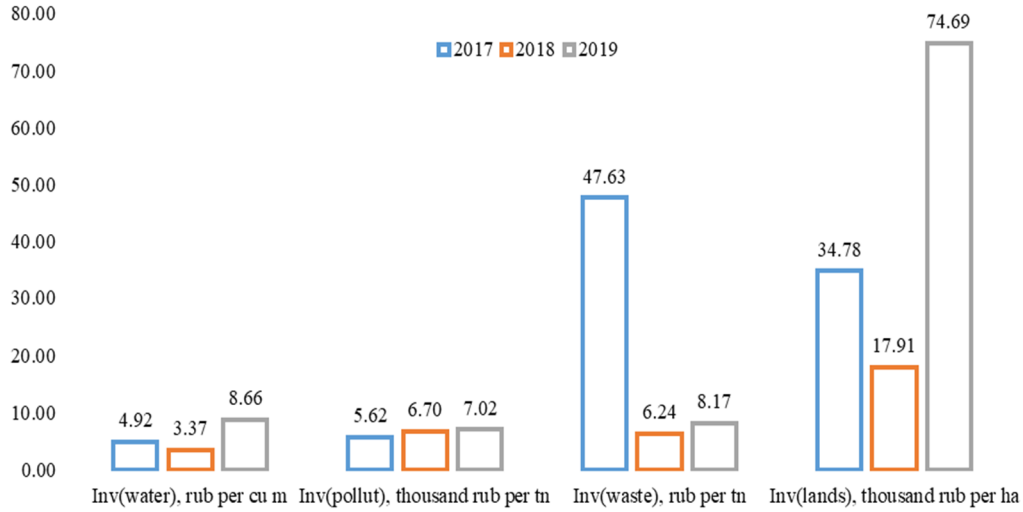


Figure 2. The specific amount of investment per unit of pollution/environmental violation of the Russian Arctic zone.

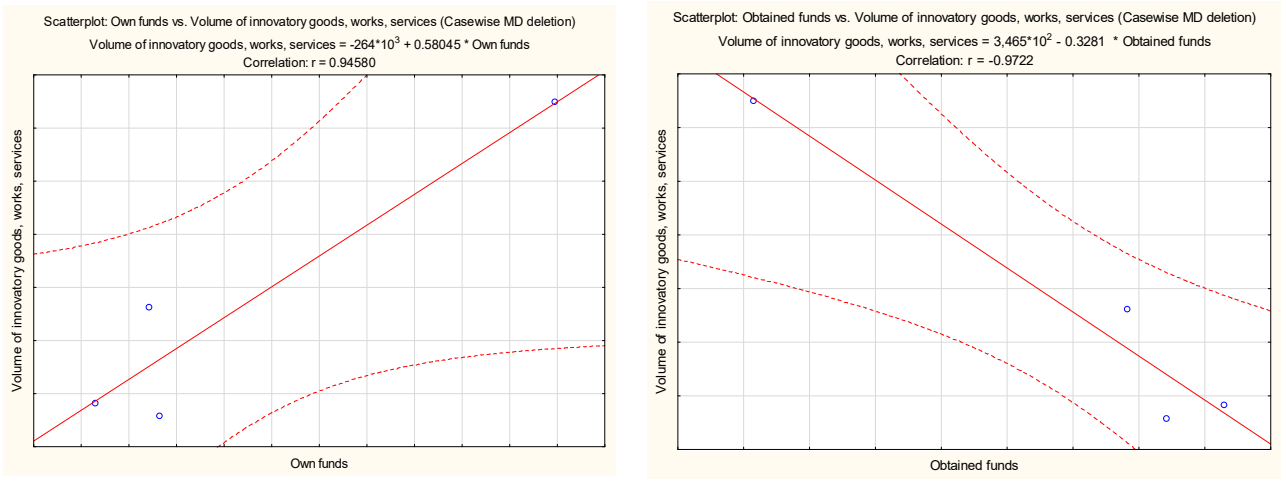
The analysis of specific investments of pollution per unit allows us to see the increase in the funds raised in the context of managing the externalities in water and land resources, as well as atmospheric air protection. In the first case, we can observe the growth of investment for every cubic meter of wastewater (unpurified or insufficiently purified) up to 8.66 RUB per cubic meter (an increase of 76.15%); the increase in investment in conservation, rational use and reclamation of land was 114.73%, and 24.76% in air protection measures. The opposite dynamics have been identified for the investments in fixed assets, designed for the disposal and recycling of production and consumption waste, which led to a decrease in the recycling coefficient K(recycl) (Figure 1).

On the one hand, the investment in environmental protection measures should aid in making production more environmentally friendly and reduce the negative externality, which confirms the close relationship between the volume of neutralized negative externality and the volume of investment in the following areas:

1. Atmospheric air protection—r = –0.92;
2. Wastewater purification—r = 0.68;
3. Waste management—r = 0.77.

On the other hand, we can observe the reverse strong impact of the volume of investment on the amount of captured pollutants, which may be due to the inefficient expenditure of investment in environmental protection that requires increased monitoring in this area. The least correlation has been identified for wastewater treatment activities.

Due to the fact that investment in environmental protection measures is accompanied by innovative development, the mathematical relationship between the total volume of investment in the development of the Russian Arctic zone and the volume of innovative goods and services (Figure 3) has been investigated.



(**a**) (**b**)

Figure 3. The dependence of externalities (in the form of innovative goods and services) on fixed capital investment. (**a**) Own funds; (**b**) Obtained funds.

The assessment of the pairwise correlation allows us to argue that the higher positive external effects are provided by own funds, which should be defined as one of the effective areas of the management of externalities of the economic development of the Russian Arctic zone. This is evidenced by the positive correlation (r = 0.95) in the case of own funds (Figure 3a), and the inverse dependence of the results of innovative development on the obtained funds (Figure 3b).

Thus, we have revealed ambiguous trends in the management of the environmental and investment externalities of the economic development of the Russian Arctic zone. The necessity of the primary focus on externalities arising from the use of land plots and the development of technologies for the disposal and recycling of waste was identified. As part of the investment policy, it is advisable to support the use of own funds for innovative development.

3.2. Simulation of the Development Management of the Territories of the Russian Arctic Zone

As part of the research of the negative externality of industrialization of the Russian Arctic zone, the entities of the Russian Federation that are part of the Arctic zone have been diagnosed in the context of their costs for environmental measures in the field of wastewater purification (X_1), air protection (X_2) and waste management (X_3). In order to objectify the management of externalities, these costs are determined per capita of the territory concerned.

The use of the clustering methods of joining (tree clustering) and k-means clustering provided the following results. First, the horizontal dendrogram was constructed (Figure 4), which clearly demonstrates the isolated position of the land territories of the Krasnoyarsk Territory, which are part of the Russian Arctic zone (both in absolute and per capita terms). The remaining eight territories can be classified into two groups.

In this manner, the k-means clustering method identified three categories of entities of the Russian Federation that are part of the Arctic zone, differing in the level of costs for environmental protection measures. Dispersion analysis confirms the high difference in the distribution of entities into groups, which is demonstrated by the significance *p*, not exceeding the level of 0.05 (Table 4). The largest difference between intergroup (between) and intragroup (within) variance is observed by the criterion X_2 (per capita costs for waste management), which allows us to characterize this variable as the best among the ones used to identify the affiliation of entities to particular clusters. A similar conclusion can be

drawn from the values of parameters *F* and *p*, namely the highest value of the first and the least value of the second of the variable X_2 among the three variables.

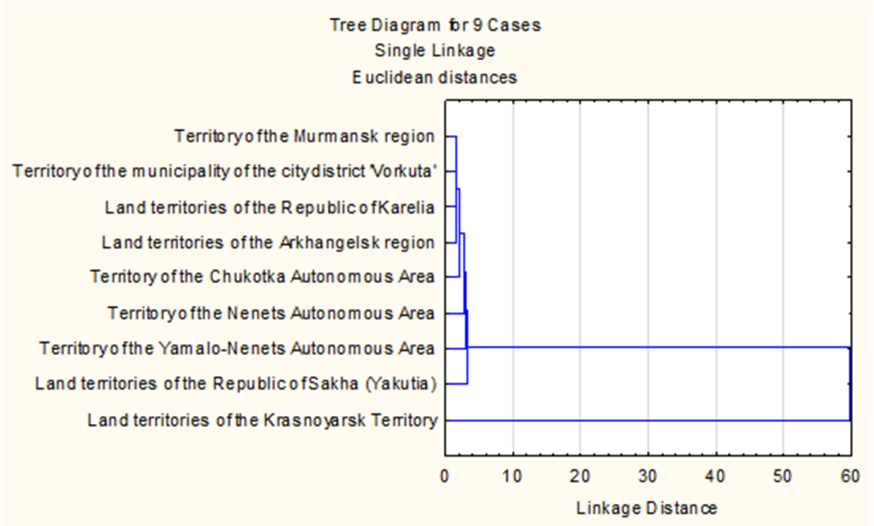


Figure 4. The dendrogram of clustering of the subjects of the Russian Federation that are part of the Arctic zone.

Table 4. Analysis of variance.

Variable	Between	df	Within	df	*F*	Signif. *p*
X_1	127.131	2	12.65463	6	30.1385	0.000742
X_2	3422.164	2	16.35386	6	627.7719	0.000000
X_3	65.006	2	2.08893	6	93.3583	0.000030

Thus, the results of clustering are considered successful (Table 5). The Krasnoyarsk Territory has been identified as an independent cluster, mainly due to the significant excess of operating costs for waste management of this region compared over the same period with the rest of the Arctic regions. The cost level for cluster 1 is RUB 14,695 million, followed by the territories of the Murmansk region with costs of RUB 2526 million, and the Yamalo-Nenets Autonomous Area, with a cost of RUB 1324 million [2]. Cluster 1 is designated as "Territories with high intensity of costs for neutralization of the negative externalities".

Table 5. Typology of Russian subjects that are part of the Arctic Zone.

per Capita Indicators of Operating Costs (on Average by Cluster) per:	**Cluster 1 (1 Subject)**	**Cluster 2 (4 Subjects)**	**Cluster 3 (4 Subjects)**
	– **The Land Territories of the Krasnoyarsk Territory.**	– **Territory of the Murmansk Region** – **Territory of the Nenets Autonomous Area** – **Territory of the Yamalo-Nenets Autonomous Area** – **The Land Territories of the Republic of Sakha (Yakutia)**	– **Territory of the Chukotka Autonomous Area** – **Territory of the Municipal Formation of the City District "Vorkuta" (Komi Republic)** – **Land Territories of the Republic of Karelia** – **Land Territories of the Arkhangelsk Region**
Wastewater collection and purification	13.51	5.10	1.15
Waste management	64.05	2.88	1.23
Air protection and climate change prevention	9.02	0.89	0.18

Regarding the entities united in the second cluster, we should note that the second cluster has significantly lower levels of indicators relative to the land territories of the Krasnoyarsk Territory. At the same time, a comparison with the third cluster "Territories with low intensity of costs for neutralization of negative externalities" makes it possible to designate the entities of the second cluster as "Territories with moderate intensity of costs for neutralization of negative externalities".

Based on the study, we propose a complex of activities within the framework of the management of externalities of the economic development of the Russian Arctic zone (Table 6).

Table 6. Effectiveness of managing externalities in Russian Arctic territories.

Characteristic	Atmospheric Air Protection	Wastewater Purification	Waste Management
Dynamics of the degree of neutralization of a negative environmental externality, K(i)	reduction	growth	reduction
Dynamics of specific investment, Inv (i)	growth	growth	reduction
Investment efficiency (r)	low	significant	high
A set of measures of externality management	monitoring the effectiveness of investments	maximizing wastewater purification	investing in waste recycling

4. Conclusions

Thus, this research of the economic development of the Russian Arctic zone in the context of emerging externalities of different kinds allows us to formulate the conclusions:

1. Industrialization of the Arctic territories is accompanied by the emergence of both negative and positive externalities, which are systematized by the authors in a number of areas: environmental, innovative, investment, infrastructure, social, etc. The most attention, in our opinion, should be paid to the management of the negative environmental and investment externalities.
2. As a result of the assessment of the degree of neutralization of negative environmental externalities resulting from the economic development of the Russian Arctic zone, a number of trends have been established: the decrease in pollutant capture, waste disposal and recycling, and conversely, the increase in the efficiency of wastewater purification.
3. On the basis of our diagnosis of investment activity in the management of environmental externalities, we recommend increased investment per cubic meter of contaminated wastewater (unpurified and insufficiently purified), investments in protection, management and land reclamation, and in measures of atmospheric air protection, as well as a reduction of unit investments in the utilization of waste and the recycling of production and consumption waste.
4. The effectiveness of investments in environmental protection activities in the Russian Arctic zone has been assessed: we observed high efficiency in the field of waste management, which is noticeable in the field of wastewater purification, and low efficiency in the field of air protection.
5. In the context of innovative development and the technological modernization of production facilities located in the Russian Arctic territories, it has been revealed that investments of own funds in fixed capital (as opposed to those obtained) provides a high positive externality in the form of innovative goods, works and services.
6. The typology of the entities of the Russian Federation that are part of the Arctic zone has been proposed, according to the criteria of the intensity of costs for neutralization of the negative externalities: territories with high, moderate and low intensity of costs for neutralization of the negative externalities.

The obtained results are consistent with the results of the authors' research [18–20,29] in terms of the need to internalize the external effect, as well as to effectively manage the negative impact of the Arctic zone's economic development [21–28]. Thus, this study develops theoretical aspects in the context of institutional economics, namely, an adaptation of the theory of externalities to the economic development of the Arctic zone.

The originality of the research results lies in the identification of latent patterns of development of the Arctic territories, from the standpoint of sustainable development, determination of trends and directions of development of the Arctic through the prism of managing externalities, which was previously published in fragments and in independent research papers.

The authors' results can be taken into account in the implementation of the state program "Socio-economic development of the Arctic zone of the Russian Federation" in the part of the program involving "Creating conditions for the sustainable socio-economic development of the Arctic zone of the Russian Federation." In the authors' opinion, for the representatives of the state, business, and science, taking into account the results of this research will not only facilitate the quality development of the Russian Arctic territories but also improve the well-being of the population of the Russian Federation's respective entities.

Further research will be aimed at comparing Russian and foreign experiences in implementing the concept of sustainable development in relation to the Arctic zone.

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