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Opportunities of Development of Eco-Tourism in the Karelian Arctic in the Conditions of the Existing Environmental and Social Challenges

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Abstract: The formation of a competitive tourist space in the Arctic regions is expedient from the standpoint of diversification of predominantly single-industry local economies and increasing the socio-economic sustainability of local communities. However, it is extremely important that the measures aimed at achieving these effects are correlated with the ecological and social context of the territories and, fully using their existing potential, do not lead to an aggravation of ecological and economic risks. The purpose of this work was to assess the prerequisites for the development of eco-tourism in the example of the Arctic region and economically related territories and consider the possibilities of forming ecotourism zones. Based on statistical data, cartographic materials, and content analysis of semi-formalized interviews of experts, this work investigated the current level of socio-economic development of the Karelian Arctic, the existing tourist infrastructure, natural, and cultural-historical objects. Strengths and constraints of eco-tourism development are emphasized. A number of innovative tools and approaches for the development of ecological tourism in the Karelian Arctic were proposed, the introduction of which will increase the tourist attractiveness of the territory, and ensure its sustainable development by reducing negative environmental impacts and depopulation.

Keywords: Karelian Arctic; ecological tourism; sustainable development; spatial development; tourist innovations; northern and Arctic territories; depopulation

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1. Introduction and Relevance

Tourism in general and its individual areas, such as ecological tourism, are becoming a driver for the development of the economies of countries around the world. For the Russian Federation, tourism also is aimed at solving a whole range of tasks at a significant country level. On the one hand, it is an economic sphere of activity for small- and medium-sized businesses in the non-resource sector, which forms 3.9% of gross domestic product and 0.7% of total employment in the country, taking into account the hotel sector, and 3.5% of the total employment in the country, taking into account tourism as a whole (The Rostourism Website n.d.). On the other hand, tourism and recreation are a necessary condition for ensuring high standards of living in terms of organizing people's recreation. At present, the domestic sector of tourism has experienced and continues to experience a number of serious shocks related to epidemiological, geopolitical, and technological limitations. These impacts once again emphasized the need to develop a national competitive tourist and recreational complex and the development of inbound, but mainly domestic tourism. Awareness of this need contributed to the fact that the Government of the Russian Federation has developed a set of measures aimed at supporting industry enterprises: national projects "Tourism and the hospitality industry", "International Cooperation and export", "Ecology", the Program of affordable travel (tourist cashback), compensation of

costs associated with the payment of recreation and healthcare for children, and preferential loans and grants for the creation of tourist infrastructure (Leonidova 2021; Efremova et al. 2021). All this creates conditions for the formation of an effective competitive national tourist market at the present stage. According to experts, thanks to these measures, the tourism sector in Russia has significant potential to accelerate growth rates (Karpova and Valeeva 2021; Kotlyakov 2021; Valkova et al. 2019; Rubtsova and Solodukhin 2022). Both well-known tourist destinations and new tourist spaces, which include the Russian Arctic, can contribute to this growth.

Arctic territories possess apparent tourist attractiveness (Sevastyanov 2017; Bertosh 2019; Kunnikov 2020; Cajaiba-Santana et al. 2020; Wang et al. 2018). However, it should be considered that natural and climatic features, unique landscapes, inaccessibility, which, among other things, form this attractiveness, ultimately affect the logistics, infrastructural and economic aspects of the organization of activities. The main directions of tourism development in the territories of the Russian Arctic have become sea cruises and ecological forms of tourism, including those based on the resources of specially protected natural territories. At the same time, not all Arctic territories are equally promising for tourism, especially mass tourism (Grushenko 2018; Ivanova et al. 2021), due to their inaccessibility and harsh climate. In this regard, the Karelian Arctic can be considered as a relatively prosperous Arctic tourist area, with a fortunate localization.

For the territories of the Karelian Arctic studied in this work and the territories of the Medvezhegorsky and Muezersky districts economically connected with them, two contradictory factors influence the development of tourism. On the one hand, these territories, due to becoming part of the Arctic Zone of the Russian Federation, receive additional opportunities that are provided by preferential economic modes (according to the Federal Law “On State Support for Entrepreneurship in the Arctic Zone of the Russian Federation” n.d.). On the other hand, these territories are characterized by narrowed reproduction of human capital, and gradual degradation of social, economic and ecological conditions, which leads to both a decrease of human capital quality, and its outflow to other regions, which in turn affects staffing of the tourism sector (Skufina and Mitroshina 2020; Volkov and Tishkov 2022).

It has been hypothesized that the development of tourism in the territories under consideration can become one of the directions of economic diversification using unique natural, cultural, and historical resources. At the same time, the tourism industry in the context of approaches to inexhaustible nature management and sustainable development will ensure the creation of jobs for the local population but will also neutralize the consequences of the accumulated environmental damage from other kinds of economic activity. Such examples can be found in Norway (Aanesen et al. 2018) and Finland (Kylanen and Rusko 2011). An important aspect here is that investment projects in the field of tourism can be implemented relatively in the short term, do not require significant (compared to high-tech industries) financial investments and the use of unique technologies, and do not depend critically on the qualification level of potential employees. In combination with the positive tourist image of Karelia as a whole, and its growing popularity in conditions of restrictions on the development of outbound tourism, it is advisable to assess the prerequisites for the activation of tourism in the Arctic territories from the point of view of spatial organization, and the opportunities and limitations of development.

Speaking about the already existing projects in the field of eco-tourism development in the Karelian Arctic, it is necessary to note the projects implemented by investors with the status of “Arctic Zone of Russian Federation (AZRF) residents”, in particular—“Construction of an eco-hotel in the Kemsy district” with an investment of 91 million rubles and 20 created jobs, as well as the organization of glamping on the coast of the White Sea in the Belomorsky district with an investment of 20 million rubles and 10 created jobs.

Among all types of economic activity of the “AZRF residents”, the tourism sector is in third place in terms of investment, second only to the traditional areas of the region’s specialization—mining and forestry. This is due to the existing measures of economic and

administrative favors, constituting a “special regime for the implementation of investments in the Russian Arctic” (Volkov et al. 2022). In terms of the number of jobs created / the volume of investments, which is highly important for maintaining the sustainability of local communities, the tourism sector is in the lead, along with the activity type “Fisheries and aquaculture” (see Table 1).

Table 1. Evaluation of economic activities by contribution to employment and investment.

Type of Economic Activity	Investments, Million Rubles	Number of Created Jobs	Number of Jobs/100 Million Rubles Investment
Mining	7630.2	342	4.48
Forestry	86224.8	660	0.77
Tourism and recreation	1176.6	211	17.88
IT	768	45	5.84
Fisheries and aquaculture	86.3	39	45.19

Most of the projects of “AZRF residents” in the field of tourism in the Karelian Arctic are either directly registered as “environmental” or have a pronounced environmental component.

It is expected that the impact of eco-tourism development on the well-being of local communities will differ depending on the spatial localization of the community, the degree of urbanization, and industrial development. The specifics of the ecological variety of tourism are more in line with remote areas, without a serious environmental burden from existing industrial enterprises. These territories also have a higher potential for the development of related, interdependent, or complementary types of tourism—ecological, natural, sports, gastronomic, etc. In this regard, it is the remote rural communities (for example, the historic fishing villages on the White Sea) that have the greatest potential in providing the final eco-tourism product. Urban communities traditionally in the Russian Arctic are economically connected with industrial production or the transport sector, and primarily have a transit potential for the development of eco-tourism, which is increasing due to the general sparseness of the economic space of the region. This distribution of functionality also determines the ultimate benefits for local rural and urban communities from the development of eco-tourism.

2. Review of Literature

The territory of Russia is characterized by a significant socio-economic, cultural-historical, resource, climatic and ecological diversity of conditions for the development of all types of economic activity. The desire to create a single accessible tourist space and make the most effective use of tourist resources presupposes reliance on methodological developments in the field of spatial organization of economic systems.

2.1. Classical Theories of Spatial Organization

One of the first researchers who tried to explain the patterns of development of economic entities was Smith (1976). He did this in his work “An Inquiry into the Nature and Causes of the Wealth of Nations” published in 1776. Later, his ideas about the division of labor, cooperation and regional advantages were developed in the works of Ricardo (1955). In this line of economic scientists, it is also worth mentioning F. Ratzel (1897), who researched the structure of the country’s economic space. A number of successive theories of spatial organization (Tunen, Weber, Christaller, Lesch) subsequently appeared. Another significant theory explaining the spatial patterns of the development of regional productive forces and inter-regional relations can be considered the work of the American economist Izard (1960), who proposed a model of the geographical distribution of demand. All these theoretical developments belong to the group of the so-called

“equilibrium” theories. In contrast to them, theoretical approaches were formed to study the patterns of spatial development of economic systems based on the idea of unbalanced economic growth and spatial imbalances. To this school can be attributed the works of Myrdal (1957); Perroux (1961); Boudville (1968); Pottier (1963) and Hagerstrand (1967). During the next stage of development of research on the spatial organization of economic systems, the most popular works were those of Krugman (1991) and Porter (1989).

2.2. Theories of the Soviet and Russian Schools of Spatial Economics

The basis of the Soviet and Russian schools of spatial economics and economic systems were the developments of the Commission for the study of natural productive forces, founded in 1915. Later in the Soviet period, this commission was transformed into 14 research institutes and several laboratories, which were mainly engaged in the development of the GOELRO plan (the electrification plan of Soviet Russia after the October Revolution). In the GOELRO plan, from a spatial point of view, zoning was carried out, which was used throughout the Soviet period, justifying not only the development of energy, but the entire national economy. One of the authors of the plan was the corresponding member of the USSR Academy of Science N.N. Baransky. His followers include Kolosovsky, Saushkin, Khrushchev, and Bandman. Currently, the aspects of spatial development of economy are represented by works of Granberg, Baklanov, Dvas, Kleiner, Minarik, Polterovich, Suspitsyn, Tatarkin and others.

2.3. Theoretical Features of the Spatial Organization of Tourism Systems: International and Russian Scientific Concepts

The above-mentioned and other theoretical developments served as a conceptual basis for the creation of scientific approaches to the study of the spatial organization of territorial tourist systems, as a special case of an economic system. Such examples include the spatial model of tourism development by Christaller (1964), which was developed as an application of the tourist system to the theory of the central place and a life cycle model of a tourist territory of Butler (1980) based on the concept of the product life cycle. Also, a significant contribution into the development of research on the patterns of spatial organization of tourist systems was made by such foreign researchers as Baud-Bovy (1982), Plog (1974), Lundgren (1982) and Opperman (1993). Prospects of development of certain kinds of tourism, such as ecological, are studied in the spatial aspect in such Nordic countries as Canada (Connell et al. 2017; Fennel and Weaver 1997), Norway (Bonusiak 2021; Khanra et al. 2021), Sweden (Koninx et al. 2018; Larm et al. 2020) and Finland (Puhakka and Siikamäki 2012), as well as in Scandinavia as a whole (Buckley 2007).

The specifics of the Russian tourist space and the processes of formation of the spatial organization of tourist and recreational systems were studied by V.S. Preobrazhensky in the monograph *Theoretical Foundations of Recreational Geography* (1975), who formulated the very concept of a recreational system, identified its main subsystems, and determined the functional links between them. Based on this approach, Mironenko and Tverdokhlebov (1981) developed it, putting emphasis on the significant role of recreational systems in the spheres of material and non-material production. Also, the concepts of spatial formation of tourist and recreational systems are presented in the works of such domestic specialists of the Soviet period as Vedenin, Rodoman, Zorin, Kvartalny et al.

At the present stage, the processes of formation and development of territorial tourist and recreational systems in Russia are studied considering the paradigm shift and the transition to market relations. When developing the concept of a geosystem approach to the formation and development of territorial tourist and recreational systems, Mazhar (2008, 2021) took into account the effects of their interactions with other integral social systems of space. Professor Aleksandrova (2017, 2018) considers the cluster form of tourist space organization the most corresponding to the modern market economy. Processes of trans-border district formation in the tourist sphere are researched by Kropinova (2016a, 2016b) and Kondrateva (2021) including cross-border areas of ecotourism

specialization (Sevastyanov et al. 2014; Qin et al. 2014). Features of spatial distribution, hierarchy, and interaction of different types of tourism Tarkhov (2019) suggests considering the basis for tourist zoning. In turn, Zyrianov (2018), Zyrianov and Gudkovskikh (2020) considers natural zonality as the basis for the spatial organization of tourist systems. It should also be mentioned that in addition to the above theoretical approaches, to solve scientific problems related to the spatial organization of tourist systems we used adaptive modeling (Aleksandrova and Dombrovskaya 2022), stage projecting (Vasilieva 2019b), cluster approach (Ermakova and Kholodilina 2021), classification based on rating (Kondrateva 2022), geographic design support (Jovanović et al. 2022) and other research methods.

The heterogeneity of the tourist space is characterized by the weakest development for the northern and Arctic territories. In this case, climatic and infrastructural factors play a role. In addition, it should be borne in mind that Arctic ecosystems are more vulnerable. Also, for these territories, more than for others, the trend for depopulation is characteristic, which limits the opportunities for tourism development. In such conditions, prerequisites are formed for the development of ecological tourism, including those based on natural resources of protected areas. At the same time, the limiting conditions of environmental vulnerability and depopulation can, on the contrary, be used in a positive development context in this case. On the one hand, the severe arctic climate limits the range of kinds of tourism that can be developed on this territory; on the other hand, it is the ecological types of tourism, including those based on the use of natural resources of protected areas, that are in greatest harmony with the goals of sustainable development and sustainable nature management, which is of critical importance for the Arctic territories and preservation of their ecosystems. As for the employment of the local population, it is assumed that the development of tourism by initiating the creation of new jobs and appropriate infrastructure will help to offset negative migration trends. At the same time, it is important to note that in terms of staffing, tourism is not a field of activity that imposes the strictest qualification requirements, the equipment of workplaces is not highly expensive, and women traditionally make up the majority of those employed in tourism. Considering all the above, this article suggests that the development of ecological tourism within the framework of the forming zones of ecological profile on the Arctic territories may become a way of solving certain socio-economic problems of such territories.

An analysis of the literature on the research issues and preliminary analysis of the socio-economic preconditions for the development of the Karelian Arctic region suggest that this region has significant spatial similarities with the Arctic and northern territories of Europe, which successfully develop eco-tourism as one of the directions for diversifying predominantly single-industry local economies. Thus, it is assumed that eco-tourism is a key promising direction for the development of tourism in the Karelian Arctic, having sufficient prerequisites for the development and minimization of the risks of the development of local communities.

3. The Goal and Methods of Research

Within the framework of the study, the aim was to assess the prerequisites for the development of ecological types of tourism on the example of the territory of the Karelian Arctic and the economically related territories of the Medvezhegorsky and Muezersky districts, in order to consider the possibilities of forming eco-tourist zones for this territory.

This article hypothesized that the territory of the Karelian Arctic, from the point of view of tourism development based on the use of natural resources, on the one hand, has a number of characteristics common to all Arctic territories, including weak infrastructure, spatial differentiation of territories in the area of tourist infrastructure, depopulation (Skufina et al. 2021) and the accompanying personnel shortage.

On the other hand, these territories possess some specific features, and some of them form mostly positive preconditions for the development of ecological tourism. For instance:

- the favorable recognizable tourist image of Karelia in combination with the expected negative effects of overtourism in the most visited areas of the republic (for example, Sortavalsky) will give an incentive for the redistribution of tourist flows, including in favor of the Arctic territories of Karelia;
- proximity of Karelia and Karelian Arctic to such large centers forming tourist flows as Moscow and St. Petersburg;
- considerable concentration of natural and cultural objects on the territories of Karelian Arctic;
- Based on these positions, and trying to confirm or refute the formulated hypothesis, the study will substantiate the possibilities of forming ecotourist zones, their spatial organization in the context of the socio-economic state of the territories, limiting factors and recommendations for the development of ecological tourism directions;
- During the study, a set of methods were used, that complement each other. Statistical analysis methods were applied; data that characterize several socio-economic indicators related to the characteristics of human capital and tourism presented also;
- Within the framework of the sociological approach, semi-formalized interviews of experts were conducted. The criteria for the selection of experts were the position held in the administration of the municipality (head of the district, his deputy for economic affairs and the head of the Department for Economic Development), an additional source of information was an interview with a tour operator from the Kallevalsky district. During the study, 19 experts were interviewed. Interviews were conducted in all regions of the Karelian Arctic in the period 2020–2021;
- During the interview, questions were asked from three thematic blocks: general problems and prospects for the development of the region; sectoral regional problems and prospects, including those related to the tourism sector; environmental restrictions on regional development. In particular, in relation to the tourism sector and ecology, the following questions were asked: “What, in your opinion, is the tourism potential of the region and what is its strength?”, “Name the weaknesses of the tourism potential that limit its development”, “How would you characterize the development of the tourism sector of the municipal area over the past 12 years?”, “What are the main environmental problems in the district that you can identify?”, “How does the activity of the main enterprises affect the ecology of the district and the Republic as a whole?” and “What types of negative impact do enterprises have on the environment of the district?”. These issues made it possible to conduct a comprehensive analysis of the opportunities and threats for the development of tourism and, in particular, ecotourism in the region;
- The primary information obtained in this way was processed and structured using the methodology of qualitative content analysis; as a result of the interpretation of the information, the qualitative features of the tourist potential of the territories of the Karelian Arctic were determined;
- The cartographic method was used to establish quantitative and qualitative characteristics of the development of tourist and recreational systems of the studied territories, the structure and relationships, the spatial organization of the elements of these systems. The studied cartographic materials were supplemented with information about the infrastructure and resources of tourism development from other sources (Atlas of the Republic of Karelia 2021). On this basis, new cartographic models were compiled, demonstrating a set of up-to-date data on the prerequisites for the development of tourism;
- The scientific methods used in the work are consistent with the information base of the study. The data from the territorial body of state statistics in the Republic of Karelia, Rosstat, the Department of Labor and Employment of the Republic of Karelia, cartographic sources, the results of a sociological survey conducted in the form of a semi-formalized interview, research results of colleagues and the authors’ own results of previous works were used;

- Due to the limited official statistics, the study used the results of earlier sociological studies by a team of authors in the field of environmental and economic development of the Karelian Arctic region. In particular, the work (Volkov et al. 2021) considered the specifics of the assessment of the local population of various components of the environment and their dynamics in the place of direct residence, in the region of residence and in the Arctic as a whole. The article shows the identified main threats to the well-being of the environment, according to representatives of local communities.

4. Results

4.1. Socio-Economic Development of the Karelian Arctic Districts

Presently, the socio-economic situation on the territories of the Karelian Arctic can be considered rather hard. From 2012 to 2020 the number of populations in the Karelian Arctic territories was reduced by 14.3 thousand people or 11.3%. In 2020, in all the districts of the Karelian Arctic, there was a natural population decline, and positive migration balance was registered only in Kostomuksha municipality (see Table 2). At the same time, it is Kostomuksha municipality that is characterized by the least natural loss and official unemployment, which may indicate the most favorable living conditions on the territory of this municipality. The maximum official unemployment was recorded in Kalevsky municipal district.

Table 2. Indicators of socio-economic development of Karelian Arctic districts in 2020.

District	Average Annual Number of Permanent Population, Thousand People	Natural Growth per One Thousand People, Persons	Migration Gain per One Thousand People, Persons	Number of Labor Resources, Thousand People*	Share of the Unemployed Registered with the Employment Service in the Total Number of Labor Resources, percent
Arctic zone of the Republic of Karelia entry 1	111.9	−68.0	−14.8	59.5	3.6
Arctic zone of the Republic of Karelia, Medvezhegorsky and Muezersky districts	147.9	−98.1	−29.1	76.9	3.8
Including:					
Belomorsky municipal district	15.3	−15.3	−3.1	7.29	5.6
Kalevsky municipal district	6.5	−7.5	−3.8	3.04	7.6
Kemsky municipal district	14.1	−12.6	−8.8	7.09	3.5
Kostomuksha municipality	30.2	−1.0	5.7	17.66	1.5
Loukhsky municipal district	10.7	−18.2	−1.4	4.99	5.8
Medvezhegorsky municipal district	26.7	−16.3	−4.9	13.30	4.3
Muezersky municipal district	9.3	−13.8	−9.4	4.12	4.1
Segezhsky municipal district	35.1	−13.4	−3.4	19.45	3.6*

* Labor resources include the able-bodied population of working age, foreign labor migrants, working citizens who are beyond working age. Source: calculated by the authors on the data of (The Department of Labor and Employment of the Republic of Karelia n.d.).

In economic theory, estimates of the effective rate of unemployment in the economy differ, usually it is determined at the level of 5% (Bukhalkov 2006). Correspondingly, we can admit that in approximately half of municipal formation, the regional depopulation creates certain limitations for the development of tourism.

In the Karelian Arctic, there are several professional educational organizations: “Kostomuksha Polytechnic College” (Kostomuksha) and “Northern College” (Segezha, a structural subdivision in Medvezhegorsk). However, these educational institutions currently do not provide training of specialists in the spheres of “tourism” or “hotel business”. At the same time, according to the Handbook for applicants to professional educational organizations of the Republic of Karelia in 2022 (Handbook for applicants to professional educational organizations of the Republic of Karelia 2022), these specialists are trained in the south of the region: in the cities of Petrozavodsk (higher education—Petrozavodsk State University, vocational secondary education—the College of Technology and Entrepreneurship, and Petrozavodsk Cooperative Technical School of Karelre-spotreboysuz) and Sortavala (Sortavalsky College).

4.2. Tourist Infrastructure of the Karelian Arctic

The presence of tourist infrastructure is a necessary condition of organization of tourist activity. Traditionally, the basis of tourist infrastructure consists of accommodation facilities, tour operators and travel agents, catering companies, museums, information centers, amusement parks, etc. At the same time, it is in tourism that an unusual model of competition arises. On the one hand, service providers in the territory compete with each other. On the other hand, a necessary condition for a successful tourist activity in general is the diversity of services and their providers, their sufficient concentration, and close cooperation among them, which corresponds to the ideas of cluster development of Michael Porter. In addition to the formation of this network within a certain spatial framework, an important aspect is the corporate responsibility of enterprises, both to customers and to social and natural regional systems. It is appropriate to explain here what potential risks are meant. The simplest example may be the case of providing a low-quality catering service to a tourist. Such a situation can not only spoil the overall impression of visiting the territory, but also pose a danger to health. The aspect of greening local products is also becoming important now (Oborin 2021). Exceeding the norms of anthropogenic load on natural objects can be a threat to their preservation (Evstropieva and Shekovtsova 2020) and a precondition for forming negative social effects, which are revealed in such definition as overtourism (Aigina 2019). In turn, to solve these problems and offset such risks it is necessary to redistribute tourist flows (Sibrijns and Vanneste 2021) and stimulate ecologically responsible behavior of tourists (Matova and Shagarov 2021).

In terms of spatial organization, there is no single correct solution either. Compact localization of service providers within attractive facilities and territories is convenient and reduces costs. On the other hand, it is excessive concentration that can lead to the risks described above. Thus, it is necessary to study the prerequisites for the formation of tourist zones in space.

The spatial organization of the existing elements of tourist infrastructure of the Karelian Arctic is shown on the map (Figure 1). The map prepared as part of the study identifies tour operators included in the register of 2021, whose offices are located directly on the territory of the Karelian Arctic. These companies are engaged in the development and implementation of tourist programs and the provision of individual services. Their localization gives grounds to assume that these enterprises can become centers of co-operation with other local suppliers of related services and contribute to the development of interaction networks. The inclusion of local representatives of small- and medium-size business as well as population into the processes of tourist services is one of the mechanisms for efficient tourism development (Bernhard 2021). In addition, the main accommodation facilities were indicated on the map, which were divided into three groups according to the capacity of the room fund. This information is supplemented by an indicator on the

total number of accommodation facilities registered in the districts according to Rosstat data for 2021.



Figure 1. Infrastructure of the tourist and recreational system of the Karel'ian Arctic and economically related regions.

In general, we can talk about a rather weak tourist development in the territory of the Karel'ian Arctic. There is a lack of all the basic elements of the tourist infrastructure and a significant spatial heterogeneity. Against the background of growing tourist demand for Karelia as a whole, even in the conditions of a pandemic, and the current concentration of these tourist flows mainly in the Sortavalsky district and Petrozavodsk, prerequisites for the development of additional tourist destinations within the region arise in order to ensure the most uniform spatial development of the tourist system. Such an alternative direction can be the territories of the Karel'ian Arctic with all its advantages and problems. At the same time, the tourist specialization of these territories relates to cultural and, to a greater extent, natural resources. The logic of such specialization is caused not

only by the growing popularity of ecological types of tourism, but also by the need for stricter standards for conducting any economic activity in the conditions of Arctic ecosystems.

Despite certain lack of infrastructure, the geographical location of the Karelian Arctic itself is a potential advantage. The territory is accessible to all the most popular modes of transport and is in close proximity to such large agglomerations as St. Petersburg and Moscow. In addition to transport connectivity with the agglomerations, the territory of the Karelian Arctic is provided with communication routes with the neighboring Arkhangelsk region and Finland. The advantages of the border position of the territory are currently debatable. Some risks thematically related to the subject of the study will be disclosed in the work further down the text. In addition to geographical wishes, the strength of the studied territories is its recreational attractiveness in terms of the concentration of various types of tourist resources.

Data on the spatial distribution of tourist resources and infrastructure in the Karelian Arctic are supplemented by qualitative information on the strengths of tourist and recreational potential, key components of tourist flows and constraining factors of tourism development in these territories, obtained during several expedition studies in the summer of 2020 and summer of 2021 in the interview format. The main results of the content analysis of the interview are presented in Table 3.

Table 3. Qualitative features of the tourist potential of the territories of the Karelian Arctic.

District	Strengths	Constraints	Key Elements of Tourist Flows
Kemsky district (respondents 1,2,3)	<ul style="list-style-type: none"> – Close proximity of Solovetsk Archipelago, – placements of different price categories (low and medium), – places of traditional residence and everyday life of the Pomors. 	<ul style="list-style-type: none"> – Lack of accommodation, – pronounced seasonality (summer), – “inflexibility” of service provision, – small number of entrepreneurs and staff shortage, – established “shadow” practices of providing services. 	<ul style="list-style-type: none"> – Transit tourism to the Solovetsk Archipelago, – historical and cultural tourism to Pomor villages of Gridino, Kuzema and Kalgalaksha.
Loukhsky district (respondents 4,5,6)	<ul style="list-style-type: none"> – Ecologically clean and remote natural territories, – existing diving centers and infrastructure of sport tourism, first of all, water tourism, – presence of a national park and an educational center in it. 	<ul style="list-style-type: none"> – The extreme shortage of the number of rooms in hotels and their unsatisfactory condition, – “grey” schemes of providing for est house rent by local residents, – undeveloped transport infrastructure, – small number of entrepreneurs and staff shortage. 	<ul style="list-style-type: none"> – Sport tourism (particularly, to the diving center in Nil’moguba), – recreational and ecological tourism (national park “Paanayarvi”).
Belomorsky district (respondents 7,8,9)	<ul style="list-style-type: none"> – Localization of ancient human sites (BesovySledki—Belomorsk petroglyphs), opening of the pavilion, – proximity of Solovetsk Archipelago, – places of traditional residence and everyday life of the Pomors, – hunting and fishing grounds, – ecologically clean and remote natural territories. 	<ul style="list-style-type: none"> – Poor road condition, particularly access to the sea, – Closing of the boat landing and canceling tourist transit to the Solovki from 2020, – complexity of solving land issues. 	<ul style="list-style-type: none"> – Cultural tourism (traditional Pomor villages, Belomorsk petroglyphs), – Transit tourism (before the closing of the boat landing), – military-historical tourism (museum of the “Karelian Front”).

Kalevalsky district (respondents 10,11,12)	<ul style="list-style-type: none"> – Historical and cultural potential, – ecologically clean and remote natural territories, – infrastructure of hunting grounds, – a great number of traditional Karelian fishing houses for rent. 	<ul style="list-style-type: none"> – Territorial remoteness and low transport accessibility, poor road condition, – small number of entrepreneurs and staff shortage, – established “shadow” practices of providing services. 	<ul style="list-style-type: none"> – Historical and cultural tourism (rune-singing villages, ethnographic museums, places of attraction related to Kalevala epic poem), – hunting tourism (hunting grounds, infrastructure in Voinitsa, etc.), – fishing and sport tourism (traditional Karelian fishing houses).
Segezhsky district (respondents 13,14,15)	<ul style="list-style-type: none"> – Accommodation of different price categories (low and medium), – transport accessibility of the territory, – objects of historical tourism (exile places, mines, infrastructure of the White Sea—Baltic Sea canal). 	<ul style="list-style-type: none"> – Industrial specialization of the district and ecological problems, – complexity of solving land issues during creation of tourist attraction objects, – poor development of tourist infrastructure, – lack of the mooring wall in the canal infrastructure. 	<ul style="list-style-type: none"> – Business tourism (objects of PAO “Segezha Group”), – fishing tourism (private fishing houses), – industrial tourism (Shavanskaya levee), – natural objects (e.g., Voitsky waterfall).
Kostomuksha municipality (respondents 16,17,18)	<ul style="list-style-type: none"> – Close proximity to the border with European Union (before the period of external shocks), – presence of a nature reserve and national park, as well as an educational center attached to them, – appearance of accommodation property, – presence of an industrial tourism object. 	<ul style="list-style-type: none"> – Long transport distance from Russian settlement centers, – lack of accommodation capacity. 	<ul style="list-style-type: none"> – Business tourism (Kostomuksha mining and processing plant), – international tourism (before the period of external shocks), – industrial tourism (Kostomuksha mining and processing plant), – recreational and educational tourism (nature reserve and national park).

The authors of this work used this information to formulate conclusions and recommendations.

4.3. Natural and Cultural-Historical Resources of the Karelian Arctic

As it was already mentioned earlier in the work, on the entire territory of Karelia, including the Karelian Arctic, a sufficient concentration of natural and cultural-historical objects for the development of different kinds of tourism can be found. The most famous tourist sites from a marketing point of view are the islands of Kizhi and Valaam, the Solovetsky Archipelago, Ruskeala Mountain Park, Kivach waterfall and Petroglyphs of Karelia. In the last decade two more outstanding tourist brands have formed—Karelian cuisine and fishing in Karelia. From the spatial point of view, both these brands can be successfully implemented also on the territory of the Karelian Arctic. As for the above-mentioned tourist sites, only one of them (the White Sea part of the Petroglyphs) is located on the territory of the Karelian Arctic. Kizhi Island is in Medvezhegorsky district, which is considered as economically connected with the territory of the Karelian Arctic. Near the territory of the Karelian Arctic there is another famous object—the Solovetsky Islands. Notably, these objects are included in the UNESCO World Heritage List (Figure 2).



Figure 2. Resources for the development of tourism in the Karelian Arctic and regions economically connected with it.

For vulnerable Arctic ecosystems, protected natural areas acquire a special role in the development of tourism (Golubeva et al. 2016; Barzut and Kondratov 2017). This potential resource should be considered in more detail. On the territory of the Karelian Arctic, specially protected natural areas of the federal level are localized: the Kostomukshsky Nature Reserve, as well as Kalevalsky and Paanajarvi national parks. Their areas exceed 228,000 hectares. Protected areas of regional and local significance are represented by types of territories such as landscape reserves, marshes, and hydrological monuments of nature. Their total area is over 220,000 hectares. According to the Federal State Statistics Service of Russia, the total area of the protected territories for the Karelian Arctic is 6.3 % (Federal State Statistics Service of Russia n.d.). Such availability, according to international and all-

Russian standards, is considered low. We would like to mention that according to the data of the Ministry of Nature of the Russian Federation, the average availability of protected areas for the Russian Federation by the end of 2020 is fixed at the level of 14% (State Report “On the condition and protection of environment in the Russian Federation in 2020” 2021; Kiprukhin 2017). At the same time, according to the national project “Ecology” (Passport of the national project “Ecology” 2018) in the part related to preservation of biodiversity, it is planned to increase the area of specially protected nature territories by 2024 by 5 million hectares in relation to the basic indicator in 2018. In the context of these trends, it is appropriate to provide information about planned and prospective protected territories in the Karelian Arctic and their areas. To date, this list includes 24 territories, the total area of which is about 850 thousand hectares. If these plans are implemented, the area of protected territories of the Karelian Arctic will be more than 18%.

However, in terms of the development of tourism based on the resources of protected areas, it is not the quantitative indicators of the area occupied by protected areas that are important, but their inclusion in the tourist and recreational regional system, organizational and financial capabilities, and the ability to develop and implement an effective model of cooperation between the administration of protected areas with companies that provide tourist and recreational services based on a system of harmonized development goals and environmental commitments. The previously researched experience of tourism development in Finnish protected areas has shown that such facilities are quite capable of acting as effective economic centers of ecological tourism (Vasilieva 2019a).

The nature reserve “Kostomukshsky”, the national parks “Kalevalsky” and “Paanayarvi” considered in this work can also become centers for the development of ecological areas of tourist activity. A feature of the protected areas in question can be considered their border position (objects are partially or completely included in it). In this regard, there are some restrictions that are associated with the need to issue a permit to stay in the border zone. However, until recently, this geographical characteristic was considered by experts as a potential or already partially realized opportunity to become the basis for the formation of cross-border areas of tourist specialization (Kondrateva 2021). For example, the Kostomukshsky Nature Reserve is part of the cross-border Russian-Finnish Druzhba Nature Reserve; all the protected areas under study have experience in developing and conducting cross-border routes. The current geopolitical situation associated with Finland’s entry into NATO may affect the possibilities of attracting tourist flows. For the border territories focused on the development of tourism, there are serious risks associated with the revision of the width of the border strip for the purpose of its increase and tightening the border regime. This can become a serious obstacle to the development of tourism within these potentially possible tourist centers. It should be clarified that, despite the unique recreational value, the ongoing work on the development of eco-tourism, we cannot say that these centers have been fully formed. Firstly, tourist flows cannot be considered significant, and the existing infrastructure is not sufficient. But, most importantly, currently there are no models of interaction between the administrations of protected areas with the local business community for effective involvement in the process of providing paid services to visitors.

4.4. Environmental Problems of the Region as a Limitation for the Development of Ecotourism

Increasing the attractiveness of the territory for tourists is directly dependent on the resolution of the existing environmental problems, whereas their pendency may lead to the exclusion of the territory under study from tourist routes.

It should be noted that in the territories of the Karelian Arctic and the economically related territories of Medvezhegorsky and Muezersky districts, the level of significance of various environmental problems is differentiated. For example, considering the current location of production forces for the city of Segezha, the urgent task is to reduce environmental pollution from JSC Segezha Pulp and Paper Mill. Currently, the company is undergoing a full-scale modernization, in fact, involving the closure of the old production

and the opening of a new one, with significantly less negative impact on the environment. In areas where trout farming is developed (in particular, in the White Sea area), the quality of lakes has significantly deteriorated (Volkov et al. 2021). In the town of Kem and in Loukhi, as well as in several other small settlements, there are no sewage water treatment facilities, therefore the water used by the population and partially by some industrial sites is discharged into water bodies untreated (Volkov et al. 2021).

Along with local problems of the territory under consideration, the system-wide problems are also typical, the main one being the lack of efficient garbage collection. On the other hand, it should be understood that a larger tourist flow also leads to a higher anthropogenic load on the environment, to large volumes of generated garbage. In the paper, the phenomenon of over-tourism and the risks associated with it have already been mentioned. Therefore, with the development of tourism, in order to ensure the environmentally safe life of the local population and local ecosystems, it is necessary to carry out measures to clean tourist routes, install additional containers for waste collection or increase the frequency of garbage collection.

To date, it is important for the Karelian Arctic to reduce the negative impact on the environment of both the local population and visitors. The high potential of the territory for ecotourism remains unrealized to a large extent due to the prevalence of spontaneous places of accumulation of garbage and illegal landfills. The reasons for their occurrence are the low level of environmental responsibility of the local population and tourists, the opportunistic activities of waste removal organizations (in an effort to reduce costs, they delivered waste not to the landfill, but to the nearest forest), and in some cases, until recently, the lack of container sites in many remote and sparsely populated areas (garbage collection was carried out in a batch way—on certain days of the week, the waste was taken by a visiting garbage truck). In turn, the high costs of waste collection and disposal in the Karelian Arctic are primarily associated with the remoteness of these territories and low population density.

The data in Table 4 show that in the Republic of Karelia in general in 2020 the volume of removed solid municipal waste per one inhabitant was significantly higher than in Arctic territories, which, in all appearances, is the consequence of the unsettled system of garbage collection.

Table 4. Indicators of solid municipal waste collection in 2020.

District	Solid Municipal Waste Removed per Inhabitant		Share of City Dwellers, %
	Cubic Meters	Tons	
Republic of Karelia	2.65	0.46	81.09
Arctic zone of the Republic of Karelia	2.09	0.43	83.70
Arctic zone of the Republic of Karelia, Medvezhegorsky and Muezersky districts	1.83	0.39	78.57

Source: calculated by the authors according to the data of Rosstat (Rosstat n.d.).

It should be noted that a smaller volume of municipal solid waste exported may also be associated with the prevalence of rural population and incineration/composting of garbage on a personal plot, however, the data presented in the table show that the level of urban and rural population in the region as a whole and in its Arctic territories is comparable. Also, of course, the amount of waste generated depends on the level of responsibility of residents: the use of eco-products and reusable goods reduces the amount of garbage. At the same time, early studies conducted (see, for example, Albrecht et al. 2020) do not allow us to speak about the more responsible behavior of the citizens in peripheral districts.

The COVID-19 pandemic only aggravated the environmental problems of many regions: there is more household waste due to the spread of disposable products and

packages of delivered goods (Sarkodie and Owusu 2021), and the flow of domestic tourists increased. This is exactly what happened in the Karelian Arctic.

5. Conclusions and Recommendations

Summing up the obtained results, some significant conclusions in the framework of this research were formulated. Analysis of the existing tourist infrastructure and tourist resources in combination with the forming current trends of tourism development in the country and Karelia allow us to assume that the Karelian Arctic can be regarded a prospective territory for tourism development, including that of ecological nature. Existing and planned tourist projects on the territory of the Karelian Arctic and economically related municipal districts (Medvezhegorsky and Muezersky) are formed based on tourist and infrastructural resources of the territory. The nature of spatial organization supposes forming not only intraregional tourist zones of ecological specialization, but also potential opportunities for the development of interregional and cross-border spaces.

At the same time, it should be noted that since ecological tourism is a new and untraditional area of tourist activity for the researched territory, it requires involvement of companies engaged in this sector and a number of innovations. Here are the principal ones:

1. Technological innovations: the use of modern technologies of wooden house construction, environmentally friendly materials and resources, including renewable energy sources, in accommodation facilities; provision of organic food, recyclable and decomposable dishes (for example, from bioplastics based on plant waste (Venkatachalam and Palaniswamy 2020; Tsang et al. 2019) in the public eating places. The Republic of Karelia has a significant potential for small hydropower and for the production of pellets—taking into account the high cost of the “northern import” to the territory of traditional coal and fuel oil, this type of biofuel is even economically feasible (Shcherbak et al. 2019). At the same time, in a number of industries, for example, in organic agriculture, further scientific research is needed to create effective environmentally friendly fertilizers: the current yield of organic crops is lower than traditional ones (Seufert et al. 2012). It is also necessary to develop eco-modules that would allow people to stay on the territory of national parks without harming the environment in harsh Arctic conditions.

Considering the growth of electric car sales (according to the International Energy Agency, in 2021 they made up for 8.57% of the world car market having increased in one year by 4.46 per cent and in 10 years—by 8.50 per cent (Electric Cars Fend Off Supply Challenges to More than Double Global Sales 2022)) and increase of their popularity in the Russian Federation and Finland bordering on Karelia, it is necessary to develop the charging stations for electric cars. Currently, in Karelia, thanks to the project of Roman Ananyev “GreenRoad10”, charging stations are being installed in the southern regions of the republic: Petrozavodsk, Sortavala, Ruskeala, Olonets; stations are planned in Medvezhegorsk, Segezha and Kem'. At the same time, it should be noted that the opportunity to visit the region with an existing electric car will certainly increase the flow of tourists, but the environmental friendliness of the electric car itself compared to traditional vehicles is a debatable issue (see, for example, Petrov and Kozhov 2018);

2. Organizational and managerial innovations: introduction of innovations in the field of regulating the resources of tourism companies, their personnel and motivation to work in the field of ecotourism and improve their competence—this is especially relevant in the current conditions of depopulation of the territory. Also, an important role, considering the significant negative consequences for the territory of anthropogenic impact, will be played by the management of a tourist product life cycle. It should be noted that the distribution channels of the product are often shifted to an external distributor, however, considering the current low level of environmental

responsibility of Russian citizens, the traditional work of the distributor may be ineffective; it requires the creation of its own distribution channels with an innovative approach to their promotion;

3. Marketing innovations: new methods of market segmentation, considering the level of environmental responsibility of citizens, and, consequently, new strategies for the coverage and development of each selected segment; the use of 3D modeling and augmented reality technologies in visit centers and tourist offices (even though these technologies can be applied to any tourist product they are especially effective for illustration the beauty of natural objects);
4. Economic innovations: the goal of tourist companies should be not just making a profit, but the sustainable development of the territory—meeting current tourist needs while preserving the environment and without compromising the opportunities of future generations. This implies, on the one hand, preparation of non-financial statements by companies, and, on the other hand, will give them access to the market of new “green” financing instruments. Besides, it is important to reconsider price strategies too. It is well-known that ecological materials and resources often cost more than their traditional analogues (see for instance, Addae-Dapaa and Wilkinson 2020; Nimon and Beghin 1999), however, increasing the cost of the tourist product may have negative impact on its promotion. Accordingly, an urgent task is to implement a policy of differentiated prices that consider the opportunities of citizens of different living standards, as well as the creation of a brand of the territory as a promising direction of ecotourism, since the brand increases both the confidence in the product and the loyalty of buyers;
5. Informational innovations: provision of information on Internet sites, in booklets and during presentations of tourist sphere not only concerning positive aspects of this kind of tourism for tourists themselves, but about their contribution into the sustainable development of the territory.

For the further development of ecotourism, regarding the results and conclusions, recommendations in the field of spatial development of the tourist sphere of the Karelian Arctic were developed:

- in order for the lack of qualified personnel not to become a restriction on the development of tourism, it is necessary to provide tools for attracting certified specialists to the Arctic (targeted admission, career guidance for local schoolchildren, improving the quality of life on the territory, etc.) or to organize training for the local population on specialized professional programs;
- sparsity of the settlement system of the Arctic Karelia and large spaces require the construction of recreation sites and maintenance of vehicles in relation to the identified spatial features of the formed tourist and recreational regional system;
- it is necessary to develop the network of regional roads, with transfer to the federal level those of priority significance for the prospective economic sectors, including tourism;
- it is necessary to shorten the procedure for transferring land from various categories to the category of plots for the possibility of carrying out tourist activities;
- it is necessary to develop and put into practice models of interaction between the administrations of specially protected areas with the local business community for their effective involvement in the process of providing paid services to visitors;
- improving the environmental safety of the Karelian Arctic requires consolidated actions of authorities (development of infrastructure for waste management), local community (improvement of environmental literacy and responsibility of behavior; implementation of private initiatives to improve the state of the environment, etc.), commercial and non-profit organizations, also within the framework of grant activities and international projects, as well as specially protected nature areas.

The study contributes to the development of scientific knowledge about specific prerequisites and conditions for the development of ecological areas of the economy of the northern, subarctic and arctic territories of the European part of Russia. As mentioned earlier, the Karelian Arctic has a number of typical strengths and weaknesses, which suggests that the results obtained in the work are of scientific and practical importance for other similar Russian Arctic territories. The article substantiates that the diversification of the economy of such regions is possible through the development of ecological tourism, which can be considered as one of the alternative ways to overcome the steady trend of outflow and degradation of human capital in the Russian Arctic territories. The principles of organization and innovative tools for the development of ecological tourism can be especially in demand given the growing economic, environmental, and social challenges, which in turn is associated with the need to maximize the effective implementation of the potential of the Arctic territories.

At the same time, there are some limitations of this study. Some of them are due to the shortcomings of the interview as a method of collecting information (in particular, the desire of respondents to give socially acceptable answers; insufficiently detailed answers to questions due to the desire to finish the interview as soon as possible, etc.) and content analysis as a method of interview processing (primarily turn, we are talking about the limitations of formalized analysis and the impossibility of completely eliminating subjective factors when encoding a text). Some limitations of this study are planned to be overcome at the next stages of work. As part of further research, it is expected that the approach will be conceptually expanded with data for example, supplemented by information collected during interviews, where various actors of the socio-economic development of the Arctic territories (representatives of regional and municipal authorities, the business community, the non-profit sector) will act as informants. This information will expand the understanding reached at this stage of the work on how to more effectively develop eco-tourism in such a way as to ensure the reproduction of human capital in the Arctic territories, taking into account existing resource constraints.

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