Prospects for the development of popular science tourism in the Yamalo-Nenets Autonomous District

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Abstract. The article analyzes the existing approaches to the definition of the concepts of scientific tourism and popular science tourism. The author's definition of popular science tourism is given. The main tourist resources of popular science tourism in the Yamal-Nenets Autonomous District have been identified. It has been established that despite the availability of resources, popular science tours in the region have not been developed. The availability of resources allows us to talk about the prospects for the development of popular science tourism in the Yamalo-Nenets Autonomous District.

1 Introduction

Scientific and popular science tourism are promising areas for the development of the tourism industry. In the Russian Federation, in recent years, at the state level, they have begun to talk quite widely about the need to develop popular science tourism. At the same time, the content of scientific and popular science tourism in strategic documents and in scientific publications is interpreted far from unambiguously.

In order to concretize the definition of popular science tourism, its purposes and objectives, improve development mechanisms in 2023, the Ministry of Science and Higher Education of the Russian Federation approved the "Concept for the development of popular science tourism until 2035", which is the basis for planning and determining the main mechanisms growth of popular science tourism in the subjects of the Russian Federation. The initiative for the development of popular science tourism has also become one of the directions of the Decade of Science and Technology, announced by the President of Russia [1].

Currently, in the Russian Federation, popular science tourism is most represented in Moscow (8 popular science tours), Novosibirsk (6 tours), Nizhny Novgorod (4 tours) and Tomsk (3 tours) regions. To a lesser extent, it is represented in the Amur, Irkutsk, Kaluga regions, Krasnodar Territory (two rounds each), St. Petersburg, Kaliningrad, Orenburg regions, Krasnoyarsk and Primorsky Territories (one round each), educational tourist route.

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In other regions, popular science tourist routes are not designed. In total, 34 popular science tours and 1 scientific and educational route have been developed in the domestic tourist market.

In the Yamalo-Nenets Autonomous District, popular science tourism is considered both as an opportunity for the development of the tourism sector and as one of the mechanisms for popularizing regional science. In 2022, the Governor of the Yamalo-Nenets Autonomous District Artyukhov D.A. approved the "Plan of measures of the Yamalo-German Autonomous District, carried out within the framework of the decade of science and technology in the Russian Federation in 2022-2031" which provides for the implementation of two popular science routes - "Yamal Cryopark" (reveals the role of permafrost in human life) and "Yamal Archaeological Expedition", dedicated to the archeology of the region.

Despite the fact that popular science routes are indicated in the strategic document, they are not being implemented today. This is largely due to the fact that there are no studies in the Autonomous District that reveal the prospects for popular science tourism as a new direction in the structure of the region's tourism industry. The potential of the Yamalo-Nenets Autonomous District in the development of this area and its resources have not been fully determined.

In this regard, the purpose of the article is to identify the existing potential for the formation of a popular science tourism product in the Yamalo-Nenets Autonomous District, as well as to determine the internal and external factors that affect the prospects for the development of this type of tourism in the region.

The main provisions of the study were formulated as part of the work on the project "Modern climate change and their impact on the landscape structure of the Yamalo-Nenets Autonomous District", implemented with the support of the government of the Yamalo-Nenets Autonomous District, as well as within the framework of the state task of the Institute for Water and Environmental Problems (No. FUFZ-2021-0007).

2 Materials and methods

The subject of the research is popular science tourism in the Yamal-Nenets Autonomous District. Statistical data, the legal framework and scientific publications characterizing scientific and popular science tourism, strategic documents providing state support for tourism activities, the results of the authors' own research were used as source material.

At the first stage, to streamline the terminology and characterize the structure of scientific and popular science tourism, the technology of a systematic review of foreign and Russian scientific works was used. In the course of the study, a comparative analysis, generalization was carried out, a structural-functional approach and the principles of formal logic were applied, which made it possible to describe the structure of popular science tourism.

The analysis of publications was carried out on the basis of selection criteria, which made it possible to systematize the bibliographic base. It includes those publications that most clearly disclose approaches to defining the concepts of scientific and popular science tourism, characterize the resources for organizing these areas in tourism, and the practical experience of their organization.

At the second stage, a sociological survey was conducted among participants in popular science projects of the Yamalo-Nenets Autonomous District and a SWOT analysis was applied, which made it possible to assess the current state and prospects for the development of popular science tourism in the Yamalo-Nenets Autonomous District, by considering both contributing and limiting factors, internal and external opportunities of the region.
Results and discussion

In the world tourism practice and the corresponding scientific literature, there is an active discussion about the content of scientific tourism, its types and forms of organization. The equally widespread term "popular science tourism" is used as a synonym for scientific tourism, and as an independent term. In general, in foreign and domestic publications devoted to the conceptualization of scientific tourism, there are two approaches to its interpretation. In the first case, scientific tourism is considered as an integral part of already existing types of tourism, such as ecological, educational, adventure, educational/academic, volunteer, industrial [2-9]. For example, in the works of P. West (2008), M. A. Lyubarskaya, A. N. Lyubarsky (2013), D. I. Maryshkin (2016), Wei Guo et al. (2022), the authors define "scientific tourism" as a form of tourism, not related to science, but aimed at self-education, obtaining new knowledge and broadening one's horizons.

In the second case, scientific tourism is considered as an independent type of tourism aimed at the implementation of research activities with obtaining scientific results [10-11]. A distinctive feature of scientific tourism from other forms is the motivation of tourists to engage in science. So, L. Molokacova and S. Molokac divide tourists into amateurs (tourists who, as a rule, strive for an in-depth study of a certain scientific discipline) and professionals - researchers who conduct scientific research [12]. According to M.R.G Revilla and O.M. Moure, the target audience of scientific tourism is limited only to students, teachers and researchers (postgraduates) from different fields of science, whose main goal is to expand and supplement their knowledge. Taking into account the motivation of the target audience, the authors defined scientific tourism as a visit to a tourist site in order to conduct observations and collect data that can be used for scientific purposes [13]. According to Yu. E. Kholodilina (2011), scientific tourism is the implementation of research (scientific) activities in a specific area that is not the place of permanent residence of a tourist for a period of 24 hours to 6 months in a row without extracting material benefits, the hallmark of which is active participation tourist in the tour program, and not just getting interesting information and contemplation of objects. In a joint article by Zh.A. Ermakova and Yu.E. Kholodilina (2014) identified 6 features of scientific tourism: 1) non-mass, exclusive type of tourism; 2) time-consuming to create a tourist product; 3) capital-intensive type of tourism; 4) combining features of various types of tourism; 5) due to secondary human needs; 6) use of non-traditional funding sources.

Lyubarskaya M.A., Lyubarsky A.N. (2013), Ermakova Zh.A., Kholodilina Yu.E. (2014) subdivide scientific tourism into three types: 1) introductory (survey) - tourists are shown objects of scientific research and provided qualified information on them; 2) expeditionary (auxiliary) - participation of a tourist as part of an expeditionary group as auxiliary personnel; 3) independent - the tourist conducts his research in cooperation with the scientific staff. In most cases, the tourist is a student and a graduate student.

It is worth noting that in Russia in 2019 the concept of scientific tourism appears not only in the scientific literature, but also in the regulatory environment. In the approved Strategy for the development of tourism in the Russian Federation for the period up to 2035, scientific tourism is understood as a trip without deriving material benefits in order to collect scientific information, conduct scientific research, and attend scientific events.

Krylova E.A. notes that scientific tourism can be used as a separate direction in the popularization of science. According to the author, the implementation of this type of tourism will contribute to: 1) improving the image of the Russian Federation abroad as an open scientific, technical and innovation center; 2) increasing the attractiveness of research, development and study in Russia; 3) increase in financing of science and education through domestic and foreign investment; 4) promotion of Russian science and education, popularization of scientific knowledge [14].
An interesting opinion was expressed by the Assistant to the First Deputy Chairman of the Siberian Branch of the Russian Academy of Sciences and Deputy Head of the Scientific Tourism Working Group Sergey Ti. In fact, he did not share scientific and popular science tourism, but defined this concept as artificially constructed, which is between science and tourism. He pointed out the need to take into account people who are professionally involved in communication, the creation of scientific events and content. In his opinion, popular science tourism is not at the junction of two spheres, but in the center of the triangle "science - tourism - popular media". The definition given by Sergey Tee includes all three areas: "Popular science tourism is when there is a product, and profit, and knowledge, and scientific communication." What distinguishes scientific tourism from promotional activities is the presence of profit.

Baranova A.Yu. based on the results of the analysis of publications, she presented the author's interpretation of popular science tourism. The author considers popular science tourism as a collective concept that includes business, environmental, cultural, educational, industrial, educational, rural types of tourism [1]. The main goal of popular science tourism is the solution of priority socio-economic, environmental and production problems, the preservation of the historical, cultural and natural heritage of a given territory, the development of equipment and technologies, the creation of innovative goods and services.

In the publication of Ponomareva I.Yu. and Savina V.Yu. popular science tourism is considered as a way to popularize science in an accessible and interesting format, combining travel with research of the surrounding world, acquaintance with unique scientific objects, leading scientists and their scientific schools [15].

In one of our works [16], a model of landscape cognition is proposed, which has prospects as one of the models of popular science and at the same time ecological tourism. This model can be implemented both directly in the course of field research, and on a specially designed route with the participation of a specialist with a large amount of knowledge about the landscape. The model initially contains such an algorithm for working with a tourist, when at the entrance a classic "beach" tourist acquires new motivations at the exit - the desire to join nature, the possibility of aesthetic satisfaction, the desire for self-development, etc. The model is implemented in three stages: acquiring knowledge about the landscape - understanding of the landscape is the comprehension of the landscape. It is based on the provisions of the landscape paradigm and can be implemented depending on the specifics of the conditions in one or several directions: knowledge of the landscape through various states (landscape transition from one state to another during the year), knowledge of the landscape as a palimpsest (consideration of each subsequent episode leading to landscape change as a separate "layer"), knowledge of the landscape through indicators of some phenomena (for example, climate change), knowledge of the landscape through its figurative and symbolic interpretations (sacred objects, resource areas, etc.).

The impetus for attention to popular science tourism in Russia was the order of the President of the Russian Federation V.V. Putin. Since that time, a number of scientific publications have appeared on the structure of popular science tourism and the prospects for its regional development [1, 14-17]. The Ministry of Science and Higher Education of the Russian Federation in 2022 approved the "Concept for the Development of Popular Science Tourism" (hereinafter referred to as the Concept), which is proposed as the basis for planning and determining the mechanisms for the development of popular science tourism. It includes training for the provision of popular science tourism, describes the target audience, the role of universities, research centers and regions in the formation of routes, as well as financial support. The authors of the Concept assume that popular science tourism will allow a wide audience to plunge into the atmosphere of scientific research, help to gain a clear idea of the work of a scientist and popularize this area as a whole. In the Concept, popular science tourism is presented as temporary trips (travels) of citizens of the Russian
Federation, foreign citizens and stateless persons from their permanent place of residence for educational, professional, business and other purposes, carried out along approved routes with visits to infrastructure facilities of organizations associated with scientific, innovative, educational, educational activities, in compliance with the safety requirements and the protection regime of these objects, contributing to the popularization of the achievements of Russian science and technology.

Thus, from the analysis of the presented definitions, it follows that scientific and popular science tourism have different goals. Scientific tourism is a niche type of tourism, it is a journey whose main goal is to obtain a scientific result by conducting research in a specific area. The consumers (target audience) of this type of tourism are scientists and "amateurs" (not scientists). The motivation of the former is to achieve their scientific goals when visiting the object of study, and the latter is to contribute to scientific research. The peculiarity of the formation of this type of tourism is that the accounting one acts as an organizer and provides content for the tour program, while an amateur (not a scientist) acts as a source of additional funding.

Popular science tourism, as a rule, is understood as this type of tourism, the main purpose of which is to attract public attention to science, its popularization through tourism forms. Tourism is used here as a means of communication between scientists and a wide target audience (from researchers, graduate students, students, schoolchildren to ordinary citizens). The resource base for the formation of the tourist product of popular science tourism are: 1) objects of scientific, academic and industrial infrastructure; 2) educational and scientific activities; 3) expeditionary research; 4) natural, historical, cultural, infrastructural objects of scientific importance.

In world tourism practice, the emergence of "scientific tourism" is associated with expeditions, which were financed by scientists themselves or rich people. Morse M.A. notes the relationship of scientific tourism with the "Grand Tour", which was popular among British aristocrats until the 19th century [18].

The first interpretation of the concept of "scientific tourism" appeared in 1989 in articles [19, 20]. The authors published their observations during a student internship in Costa Rica, and used the concept of “scientific tourism” to describe this academic activity. Their results show that science tourism, considered as a subcomponent of nature tourism, deserves serious attention in some small countries, such as like Costa Rica.

In the 2000s, the Center for Research on Ecosystems of Patagonia is engaged in a positive experience in the introduction of scientific tourism. The formation of this direction is carried out in order to develop sustainable tourism in the remote mountainous regions of Patagonia. Since 2007, the Center has been implementing whale census programs, archaeological expeditions, training and environmental volunteering programs, as well as training courses in geography and ecotourism. Over the course of several years, more than 100 local tourist operators, as well as about 200 scientists, have been involved in this work and covered more than 800 researchers, students, volunteers and adventurers [21].

In China, most scientists have recently focused on existing natural resources such as wetlands and parks and developed science tourism routes based on them. University campuses are also popular, demonstrating to the public the latest technologies in the field of environmental pollution control based on their own innovative environmental technology platform [Guo et al., 2022].

In Russia, "scientific tourism" as an independent direction appeared in 1980 on the initiative of the academician, president of the Geographical Society of the USSR A.F. Treshnikov. During this period of time, under the Presidium of the Geographical Society, the Scientific Tourism Commission was established in order to carry out expeditionary and research work to identify promising areas and tourism objects, study these areas, describe
the identified objects and monuments, develop new lines of tourist routes and excursions, draw up reports, tourist maps guides [22, 23].

In the Yamalo-Nenets Autonomous District today there is not a single realized popular science tour. However, there is a fairly wide range of activities where there are elements of popular science tourism. One such example is the projects to clean up the territory of the region from pollution left in the era of active development of the north of Western Siberia in the Soviet era. The work is organized in such a way that the cleaning itself is preceded by an assessment of the state of the environment carried out by the Scientific Center for the Study of the Arctic and the development of environmental measures, the implementation of which allows for a full-fledged reclamation of the territories. It is at this stage that scientists involve volunteers from the interregional public environmental and sociological organization "Green Arctic" in their environmental studies, who help to conduct field surveys: dig pits and learn to describe soil sections, inventory abandoned waste, perform geobotanical descriptions under the guidance of a geobotanist, study hydrological characteristics water bodies, etc. Popular science lectures are given for volunteers from different regions of Russia and foreign countries. Representatives of the mass media also participate in the work, covering ongoing research, making films about the work of scientists from the Scientific Center for the Study of the Arctic and volunteers of the Green Arctic IOEO [24]. Over the past five years, 7 such events have been held (on Vilkitsky Island - 3 expeditions, on the Yamal Peninsula - 4 expeditions).

A sociological survey was conducted among 208 participants of these projects about the purpose of participating in expeditions. It should be noted that the majority of respondents associate their participation in projects either with the desire to improve the state of the environment in the Arctic (22%) and join the environmental community (14%) or with the desire to learn new things about the nature of the Arctic, gain new knowledge and skills (18% ), to help scientists and ecologists (19%). For 15% of respondents, participation in these events is still tourism, and for a small part (3%), it is the collection of scientific and creative material (Fig. 1).

### Fig. 1. Results of a survey of volunteers on the goals of participating in environmental projects.

<table>
<thead>
<tr>
<th>Goal</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Become part of a large community of environmentalists, %</td>
<td>14</td>
</tr>
<tr>
<td>Learn new things about the nature of the Arctic and gain new skills, %</td>
<td>18</td>
</tr>
<tr>
<td>Clean up the Arctic from pollution, %</td>
<td>22</td>
</tr>
<tr>
<td>Help scientists and environmentalists, %</td>
<td>19</td>
</tr>
<tr>
<td>To be at one with nature, %</td>
<td>9</td>
</tr>
<tr>
<td>Tourism, %</td>
<td>15</td>
</tr>
<tr>
<td>Collect material for scientific and creative work, %</td>
<td>3</td>
</tr>
</tbody>
</table>

The collected sociological material suggests that popular science tours of ecological and landscape orientation should include three important elements: a theoretical and practical scientific part, interesting popular science lectures, and work necessarily associated with practical actions aimed at improving the state of the environment.
The lack of developed and implemented popular science tours is largely due to the fact that the assessment of the resource potential of the YNAO in this part was not carried out. In the course of our study, for the convenience of identifying resources that may be involved in the formation of popular science tourism in the Autonomous District, we divided them based on several criteria:

1. By thematic areas of scientific research: geocological, hydrological, biological, geocryological, engineering, archaeological and ethnological, etc.

2. For entities with scientific infrastructure facilities:
   - State Autonomous Institution of the Yamalo-Nenets Autonomous District "Scientific Center for the Study of the Arctic" (a scientific organization has laboratories that study the unique objects of the environment of the Arctic and Subarctic, the cryosphere, there is a carbon test site);
   - Arctic Research Station of the Institute of Plant and Animal Ecology of the Ural Branch of the Russian Academy of Sciences in Labytnangi, whose employees carry out year-round monitoring of the biota of the north of Western Siberia;
   - non-profit partnership "Russian Center for the Development of the Arctic" - the organization has an extensive network of scientific hospitals in various remote corners of the Yamalo-Nenets Autonomous District;
   - Specially protected natural areas located in the Yamalo-Nenets Autonomous District, within whose boundaries scientific research is carried out, various programs for the protection of both animals and plants are being implemented;
   - industrial facilities (Tyumen super-deep well SG-6. One of the deepest wells in Russia, drilled to a depth of 7502 meters. Located 80 km from Novy Urengoy, in the Korotchaevo region; near the village of Mys Kamenny, is intended for year-round shipment of oil from the Novoportovskoye oil and gas condensate field to tankers; Scientific and Production Association Sobsky fish hatchery in the urban-type settlement of Kharp, where viable juveniles of valuable whitefish species are grown for further release into the reservoirs of the Ob-Irtysh fishery basin in order to compensate damage caused to aquatic biological resources by business entities, etc.);
   - monitoring sites located on the territory of the Autonomous District.

3. According to the initiators of scientific and scientific-educational events:
   - scientific events held in the Yamalo-Nenets Autonomous District, including the Department of External Relations of the YaNAD and the State Autonomous Institution “Scientific Center for the Study of the Arctic”. For example, the scientific and practical conference "Obdoriya", the Yamal oil and gas forum, the All-Russian (with international participation) conference "Cryogenic soils in the Anthropocene", etc.;
   - activities provided for by the plan of the Yamalo-Nenets Autonomous District and carried out as part of the decade of science and technology in the Russian Federation in 2022-2031.

4. By belonging to cultural and leisure institutions, on the basis of which educational events are organized aimed at familiarizing with the natural, ethnocultural and historical and cultural features of the region:
   - museums, museum complexes (state budgetary institution of the Yamalo-Nenets Autonomous District “Yamalo-Nenets District Museum and Exhibition Complex named after I.S. Shemanovsky” (Salekhard), state budgetary institution of the YaNAD “District House of Crafts” (Salekhard), municipal budgetary cultural institution "City Museum of Local Lore" (Labytnangi), municipal institution of culture "Museum of Archeology and History of Nadym" (Nadym), branch of the municipal institution of culture "Museum of Archeology and History of Nadym - House of Nature" (Museum of Nature) Nadym), municipal budgetary institution of culture "Yamalsky District Museum" (Yamalsky District), municipal budgetary institution of culture "Priuralsky District Museum of Local Lore" (village Aksarka, Priuralsky District), municipal budgetary institution of culture
"Shuryshkarsky District Museum Complex" (Shuryshkarsky District), Ovgortsky Museum of Local Lore of E. I. Tylikova (Shuryshkarsky District), Municipal Budgetary Institution of Culture "Tazovsky Regional Museum of Local Lore" (Tazovsky District), Municipal Budgetary Institution of Culture "Krasnoselkupsky Regional Museum of Local Lore" (Krasnoselkupsky District), Municipal Budgetary Institution of Culture "Purovsky Regional Museum of Local Lore" (Purovsky District), Municipal Budgetary Institution of Culture "Urengoy Museum of Local Lore" (Purovsky). Novy Urengoy), municipal budgetary institution of culture "Khanymei Museum of History and Local Lore" (Purovsky district), municipal budgetary institution of culture "Ecological and Local Lore Museum of Muravlenko" (Muravlenko), municipal budgetary institution of culture "Museum Resource Center" (Muravlenko. Noyabrsk), municipal budgetary institution "Gubkinsky Museum of the Development of the North" (Gubkinsky), etc.;
- ethnographic complexes and parks (natural and ethnographic park-museum "Zhivun"; house-museum "Komi-izba"; events on the basis of the municipal cultural institution "Krasnoselkupsky regional museum of local lore"; municipal autonomous cultural institution "Natural and ethnographic complex "Gornoknyazevsk"; ethnocultural camp "Heart of Yagelnaya Zemlya").

In order to identify external threats to popular science tourism and determine internal opportunities for its development, a SWOT analysis matrix was built (Table 1). The data presented in it indicate that, on the one hand, the region has the prerequisites and opportunities for the development of popular science tourism. However, on the other hand, a number of factors have been identified that significantly affect the formation of this type of tourism.
Table 3. SWOT-analysis matrix of external and internal factors affecting the prospects for the development of popular science tourism in the Yamalo-Nenets Autonomous District.

<table>
<thead>
<tr>
<th>Internal factors</th>
<th>S-Strengths:</th>
<th>W-Weaknesses:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- availability of regional research centers and a plan for priority scientific research;</td>
<td>- lack of a regional strategy for the development of tourism and the hospitality industry;</td>
<td></td>
</tr>
<tr>
<td>- the presence of natural, ethno-cultural, historical, cultural and industrial objects of scientific value;</td>
<td>- a complex scheme for the delivery of groups of tourists to the place of implementation of the program;</td>
<td></td>
</tr>
<tr>
<td>- the interest of local authorities in the development of this area of tourism;</td>
<td>- underdeveloped tourism infrastructure and services;</td>
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<tr>
<td>- experience of participating in popular science excursions and lectures.</td>
<td>- the absence of specialized tourist operators focused on the formation of a popular science tourist product;</td>
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<td></td>
<td>- difficulty in obtaining permits to visit tourist display facilities located on the territory of protected areas and in the border control zone.</td>
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<tr>
<th>External factors</th>
<th>SO (Strengths + Opportunities):</th>
<th>WO (Weaknesses + Opportunities):</th>
</tr>
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<tbody>
<tr>
<td>- involvement of young people in scientific, scientific, technical and innovative activities;</td>
<td>- creation of a centralized management for the development of popular science tourism in the region;</td>
<td>- the high cost of a popular science tourist product;</td>
</tr>
<tr>
<td>- popularization of regional science among the general public;</td>
<td>- developing the potential of higher quality tourist facilities to compete with other regions.</td>
<td>- lack of desire among regional subjects of the scientific infrastructure to participate in the program of the popular science tour.</td>
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<tr>
<td>- establishment of interregional and international (friendly) relations.</td>
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<table>
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<tr>
<th>T - Threats:</th>
<th>ST (Strengths + Threats):</th>
<th>WT (Weaknesses + Threats):</th>
</tr>
</thead>
<tbody>
<tr>
<td>- not stable socio-economic and political situation in the world;</td>
<td>- the possibility of forming a flexible popular science tourist product;</td>
<td>- ensuring the safety of tourist groups;</td>
</tr>
<tr>
<td>- low income among the population from other regions of Russia and neighboring countries;</td>
<td>- formation of a strategy for promoting a regional scientific and popular tourist product.</td>
<td>- the lack of methods for training specialists who will provide quality services in the implementation of popular science tourism.</td>
</tr>
<tr>
<td>- formal attitude to the development of popular science tourism in the region;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- the influence of natural and climatic factors during popular science tours.</td>
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Undoubtedly, the fact that the government of the Yamalo-Nenets Autonomous District supports regional scientific activity is one of the strengths of the region under study. Plans for priority scientific research are being implemented in the Autonomous District, and a regional research center is operating. On the basis of the YaNAD Scientific Center for the Study of the Arctic, a number of areas are being developed to study unique Arctic and subarctic landscapes [25, 26], natural and natural-economic systems, the cryosphere, archeological objects [27], and ethnoculture. The first “Seven Larch” carbon test site in the Arctic is being built, appropriate laboratories have been created, on the basis of which not only local scientists, but also researchers from different regions of Russia conduct research, and conduct internships for students, undergraduates and graduate students of higher educational institutions in Russia and neighboring countries. In the YaNAD, financial and organizational support is provided not only to the regional scientific center, but also to federal research centers located in the Autonomous District (for example, the Arctic Research Station of the Institute of Plant and Animal Ecology of the Ural Branch of the Russian Academy of Sciences in Labytnangi). The international Arctic station "Snezhinka" is being created - a year-round and completely autonomous energy complex that will operate on the basis of renewable energy sources and hydrogen energy. The listed objects are fully suitable for the development of popular science tourism.

Another strength of the region is the presence of unique natural, ethnocultural, historical, cultural and industrial sites of scientific value. Currently, more and more researchers and travelers are seeking to visit these sites. In addition to the strengths for the development of popular science tourism in the region, there are a number of limitations that reduce the possibility of its promotion. Firstly, a complex transport scheme for delivering tourists to the place of implementation of the tour program, which directly affects the pricing of the tourist product. Secondly, the lack of a specialized regional tourist operator and, in general, the interest of tour operators in promoting popular science tourism. Thirdly, the lack of specialists who will provide quality services in the implementation of popular science tourism. Fourth, underdeveloped tourism infrastructure and services. Fifth, the lack of a regional strategy for the development of tourism and the hospitality industry. These disadvantages negatively affect not only popular science tourism, but also other areas of tourism activity, which the authors of the article pointed out earlier [28-30]. The elimination of these problems will allow more efficient development of tourism in the Yamalo-Nenets Autonomous District.

4 Conclusion

Popular science tourism is a type of scientific tourism, the main purpose of which is to attract public attention to science, its popularization through tourism forms. Tourism is used in this case as a means of communication between scientists and the target audience (from researchers, graduate students, students, schoolchildren to ordinary citizens). The resource base of popular science tourism is objects of scientific and industrial infrastructure, educational and scientific events, expeditions, natural, historical, cultural, infrastructure objects of scientific importance.

The Yamalo-Nenets Autonomous District has the necessary natural, climatic, historical and cultural characteristics that have attracted travelers, researchers and scientists for many decades. The scientific and environmental infrastructure that has developed on the territory of the District (a developed network of scientific hospitals, stations, laboratories, monitoring sites, the presence of specially protected natural areas, etc.), as well as scientific achievements and discoveries in the region in the field of geography, geology and engineering and geological surveys, geocology, ecology of animals and plants,
ethnography, archeology can become the basis for the formation of popular science tourism.

Integrated use of the tourist and recreational potential of landscapes, scientific potential and scientific infrastructure of the Yamalo-Nenets Autonomous District is able to form a popular tourist product.

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