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Logistic Basis for the Development of Arctic Tourism in Russia *

Aleksandr Yu. Tsvetkov¹✉, Cand. Sci. (Econ.), Associate Professor

¹ Northern (Arctic) Federal University named after M.V. Lomonosov, Nab. Severnoy Dviny, 17, Arkhangelsk, 163002, Russia

¹ a.cvetkov@narfu.ru✉, ORCID: <https://orcid.org/0000-0003-1092-1295>

Abstract. In our article we analyzed the transport accessibility of the subjects of the Arctic zone of Russian Federation for potential tourists. To do this, we estimated in points the material and time costs of tourists, traveling from the main centers of the formation of tourist flows in Russia (Moscow and St. Petersburg) to various Arctic destinations. For each administrative-territorial subject of the Arctic zone we have selected potential support logistic centers of the development of Arctic tourism, which will receive visiting tourists, provides them with basic services and redistributes them along tourist routes. These are mainly transport centers, connected with Moscow and St. Petersburg and with settlements on this territory. We referred to Murmansk, Apatity, Arkhangelsk, Naryan-Mar, Vorkuta, Salekhard, Norilsk, and Anadyr. As a result of the study, we have found that currently the most promising for the development of Arctic tourism is Murmansk region, its transport infrastructure is convenient for using by tourists and the development of Arctic tourist routes. Arkhangelsk Oblast and Yamalo-Nenets Autonomous Okrug are also promising, their support centers of the development of Arctic tourism are capable of receiving and redistributing tourist flows in Arctic directions. The least developed in terms of transport is the Arctic part of Yakutia, where there are no large transport hubs, capable of taking on the function of tourist distribution centers.

Keywords: Arctic, Arctic tourism, tourist flow, material and time cost, economic distance

Introduction

Tourism is one of the ways of socio-economic development of the Arctic territories and areas of international cooperation there [1, Lukin Yu.F., p. 96]. Due to the increased interest in the Arctic at the state level, the planning of Arctic tourism, the creation of a tourist product designed for the mass tourist, is an urgent task. The development of Arctic tourism is envisaged in the state program “Socio-economic development of the Arctic zone of the Russian Federation up to 2020 (with amendments up to 2030)”, in the “Strategy for the development of the Arctic zone of the Russian Federation and national security for the period up to 2020”, in “Strategies for the development of tourism up to 2030” [2, Sevastyanov D.V., p. 24].

The problem of availability of Arctic tours did not arise by chance. It is based on high cost of such travels, which, in particular, influenced the creation of a stereotype about Arctic tourism as entertainment for wealthy foreigners. Indeed, the accessibility of many potential tourist destinations in the Arctic is limited by the complexity of transport logistics. Most of the tourist attractions in the Arctic zone are located in hard-to-reach areas of specially protected natural areas [2, Sevastyanov D.V. p. 30]. The cost of travel from the place of formation of potential tourist flows to

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places of tourist interest makes up a large part of the price of the Arctic tourist product. Usually it is not possible to use regular flights, it is necessary to use custom-made transport, including special ones.

The so-called “pole” Arctic tourism is becoming popular. It involves sea cruises, the main purpose of which is to visit the North Pole. In terms of infrastructure, these cruises need icebreakers able to operate in difficult ice conditions of the Arctic Ocean. Due to high freight costs of nuclear-powered icebreaker cruises to the North Pole, the minimum cost of a trip is about \$10,000. Arctic cruises are organized by Russian and foreign companies (Quark Expeditions, Poseidon Expeditions, Aurora Expeditions, Hapag-Lloyd Cruises). However, this is mainly chartered by Russian icebreakers based in Murmansk (50 Years of Victory, Yamal). The season of polar cruises lasts during the period of the best ice conditions from June to September, their average duration is 10–12 days. There were 17 cruises in 2017, 15 in 2018, 23 in 2019, and 15 in 2021¹. Cruises usually reach the Franz Josef Land archipelago. Specialists of the Russian Arctic National Park, located on the Franz Josef Land archipelago and Severnyy Island of the Novaya Zemlya archipelago, have developed sea route schemes for cruises and organized landing sites for viewing the main objects of interest. The most popular stops for cruise icebreakers include Hooker Island (Tikhaya Bay), Champa Island (Cape Trieste), Hall Island (Cape Tegetthoff), Northbrook Island (Cape Flora) [3, Kunnikov A.V., p. 43]. Inspectors of the national park control the landing of tourists on the islands.

Cruises to the North Pole, due to the high cost, do not belong to mass tourism; on average, about 1000 people take part in them per season. But the shift from elitist orientation of Arctic tourism to mass one is evidenced by the research of domestic and foreign scientists [4, Zhelnina Z.Yu., Tereshchenko N.V., p. 73]. This can be achieved, among other things, through the rational organization of transport used by tourists. In order to create mass Arctic tour directions, it is necessary to plan transport logistics, to analyze existing regular flights connecting the Arctic territories with potential places for the formation of tourist flows, and to identify the main logistics centers in the Arctic territories that will be used to redistribute tourist flows to routes.

Analysis of experience in tourism development in the foreign Arctic has shown that the formation of tourist clusters should be based, among other things, on the development of transport infrastructure [2, Sevastyanov D.V., p. 33]. Reducing the time that tourists spend on a trip to the Arctic and the cost of travel will help make Arctic tourism more widespread. The purpose of this work is to analyze the time and economic distances between the centers of tourist flows formation and the Arctic regions that offer different types of Arctic tourism product; to identify the most promising current trends and possible ways of further planning of Arctic tourism in terms of logistical advantages.

Materials and methods

The problem of the development of Arctic tourism is widely covered in modern literature [1, Lukin Yu.F.; 2, Sevastyanov D.V.; 3, Kunnikov A.V.; 4, Zhelnina Z.Yu., Tereshchenko N.V.; 5,

¹ URL: <http://www.rus-arc.ru/ru/Tourism/Statistics> (accessed 19 November 2021).

Stewart E. J., Liggett D., Dawson J.; 6, Bayaskalova T.A., Kuklina M.V., Bogdanov V.N.; 7, Pashkevich A., Stjernström O., Lundmark L. et al.]. Approaches to the definition of Arctic tourism are conditional; it includes any type of tourism in the territories that are attributed to the Arctic zone of the Russian Federation. We believe that tourists' expectations should be used as the main criterion when planning Arctic tours, although they are usually stereotyped. Marketing research conducted in St. Petersburg and Murmansk among students showed that 80% of respondents want to go on an Arctic trip, which they see as an active or ecological type of tourism (for 50% and 40% of respondents, respectively). At the same time, potential tourists see icebergs, northern lights, polar bears, icebreakers, unique landscapes, Arctic plain-air, environmental volunteering, Arctic competencies in the images of their impressions [4, Zhelnina Z.Yu., Tereshchenko N.V., p. 75]. Consequently, we should consider the territories, where it is possible to see all this, as places for organizing the Arctic tours. They are located beyond the Arctic Circle, in the tundra zone, on the coast of the Arctic Ocean, on the Arctic islands.

If we consider the Arctic boundaries, the southern extension of the tundra is taken as the southern ecological boundary. Potential tourists can justify their expectations regarding the Arctic images within this natural area and to the north of it, which will facilitate their return there in the future. Therefore, the Arctic routes will bring income to their organizers.

In order to develop logistics schemes for the delivery of tourists, it is necessary to know the start and end points of the proposed Arctic tours. The most reasonable starting points for routes seem to be large cities — transport hubs that are places of tourist flows formation in any direction. Such cities are either places of residence for potential tourists, or serve as transportation hubs through which they can reach the final destination of their interest. In our opinion, the main places for the formation of tourist flows in Russia are Moscow and St. Petersburg — the most populated cities and the largest transport hubs. Another potential center for the formation of tourist flows are big cities — transport hubs that are connected by regular flights both with places of tourist interest in the Arctic and with other cities, which can redistribute the flow of tourists to the Arctic routes from the regions of Russia and from abroad. Novosibirsk, Ekaterinburg, Ufa, Omsk, etc. meet such criteria, in addition to those already mentioned. Of course, the list could be expanded after establishing appropriate regular flights to connect other potential transportation distribution centers to places of interest for tourists in the Arctic

Another side of the issue of logistics of Arctic tourist destinations is the choice of final logistics support centers in the Arctic territories, which will receive tourists, provide the necessary services and redistribute them according to tourist destinations ("supporting logistics centers for the development of Arctic tourism"). The criteria for choosing such centers is the availability of transport links with the places of tourist flows formation, their location in transport accessibility to potential places of tourist interest and the availability of necessary infrastructure. For areas of the Russian Arctic zone, such places can be Murmansk, Kirovsk, Apatity, Arkhangelsk, Naryan-Mar, Vorkuta, Salekhard, Labytnangi, Norilsk, Anadyr. There are airports in all these cities or their vicini-

ty, and in some cities there are railway, river and sea stations. There are regular flights from places of tourist flows formation and to the places of potential tourist interest in the Arctic.

The factors influencing the formation of the price and attractiveness of the tourist product are the time and cost of travel to the place of rest. As a criterion for the profitability of the transport and geographical position of the touristic supporting centers, we used the material and time costs when moving from the places of formation of tourist flows to them (economic distances). The measurement of the benefits of transport and geographical position of the objects is discussed in the work of L.A. Bezrukov, Ts.B. Dashpilov [8, Bezrukov L.A., Dashpilov Ts.B.]. The works of I.A. Potapov [9, Potapov I.A.] are devoted to the study of assessment of economic distance between the places of tourist flows formation and the centers of tourist interest. The authors see the choice of evaluation criteria in the priorities of tourists when moving. This is primarily the speed of travel.

We estimated the time and cost of travel to the place of rest based on data on ticket prices, travel time and regularity of flights available on the official websites of airports and railway stations. In order to compare different options for transport accessibility, we expressed these data in points according to the method proposed by I.A. Potapov [9, Potapov I.A.] (Table 1). The sum of points, in which the time and cost of travel when using regular flights were estimated, is a generalized indicator of the material and temporal costs for tourists. Additional criteria (corrections) for evaluating the profitability of certain destinations in relation to potential centers for the formation of tourist flows are the number of modes of transport that can be used to get to the supporting center in the Arctic and the regularity of flights (per week, per day) (Table 2).

Table 1

Assessment of the material and time costs (points) [9, Potapov I.A.]

Travel time	Point	Travel cost	Point
up to 2 hours	1	up to 1000 rubles	1
up to 3 hours	2	up to 2000 rubles	2
up to 4 hours	3	up to 3000 rubles	3
up to 5 hours	4	up to 4000 rubles	4
up to 6 hours	5	up to 5000 rubles	5
up to 7 hours	6	up to 6000 rubles	6
up to 8 hours	7	up to 7000 rubles	7
up to 9 hours	8	up to 8000 rubles	8
up to 10 hours	9	up to 9000 rubles	9
more than 10 hours	10	more than 9000 rubles	10

Table 2

Evaluation of regularity of flights (points)

Points						
1	2	3	4	5	6	7
The number of regular flights from the places of formation of tourist flows						
1 or more times per day	6 times per week	5 times per week	4 times per week	3 times per week	2 times per week	1 time per week
Number of modes of transport that can be used to reach a supporting center in the Arctic						
2 or more	-	-	-	-	-	1

The integral assessment of the advantages of the transport and geographical position of potential supporting tourist centers in the Arctic is calculated as the sum of points obtained for each of the listed criteria: the higher the total score, the greater the material and time costs of tourists.

Results and discussion

Let us consider each of the proposed supporting centers for Arctic tourism in the constituent entities of the Russian Federation, fully or partially included in the Arctic zone. Let us present them as transport hubs that redistribute tourist flows along the routes, identify their advantages and disadvantages that hinder the development of Arctic tourism in these territories.

The Murmansk Oblast occupies an advantageous geographical position in terms of opportunities for the development of Arctic tourism. Its border position, relative proximity to the centers of formation of tourist flows, as well as the availability of transport infrastructure make it accessible to tourists. Murmansk is an important logistics center for the development of Arctic tourism, as land, air and water transport routes converge here. This is facilitated by a railway connection to other regions of Russia, an airport, through which there is a regular connection to Moscow and St. Petersburg, and a sea port, which is used for cruise tourism purposes. The nuclear icebreaker fleet of Russia is based here, which is used for convoying ships in the Arctic Ocean and for Arctic cruises. Due to the compact network of settlements in the Murmansk Oblast, the dispersion of tourist facilities throughout its territory and the presence of several transport centers, other potential tourist centers can be identified. In particular, there is an airport “Khibiny” in the area of the cities of Apatity and Kirovsk, used by tourists-skiers, receiving flights from Moscow and St. Petersburg, and a railway station. We determined the economic distances and estimated the material and time costs of potential tourists in points (Table 3). For each center of tourist flows formation, a correction for the number of modes of transport that are available for these destinations for tourists was made. If they are accessible by one mode of transport, the correction is 2, if by two modes — correction is 1.

Table 3

Estimation of the material and time costs of tourists when traveling to Murmansk and Apatity from the centers of tourist flows formation (points)

Centers	Moscow		Saint Petersburg	
	Train	Plane	Train	Plane
Murmansk				
Travel time	10	2	10	1
Travel cost	3	2	2	3
Flight frequency	1	1	1	1
Correction for the number of modes of transport	1		1	
Total	15	6	14	6
Apatity				
Travel time	10	2	10	1
Travel cost	3	4	2	6
Flight frequency	1	1	1	1

Correction for the number of modes of transport	1		1	
Total	15	8	14	9

One can see that the supporting center Murmansk has approximately the same values of material and time costs and economic distances relative to Moscow and St. Petersburg when using two modes of transport. Apatity has a less favorable transport and geographical position when tourists use an airplane, since the cost of tickets from Moscow and St. Petersburg to the Khibiny airport is higher, as its workload is less.

The Arkhangelsk Oblast is administratively part of the Arctic zone. The northern districts of the region can serve as tourist arrival points on Arctic routes. Land, air and water routes converge in Arkhangelsk, which is why it is a center for the redistribution of tourists, an intermediate point for Arctic cruises and a starting point for polar expeditions. Arkhangelsk airport receives flights both from the main centers of tourist flows (Moscow, St. Petersburg), and from other large cities (Kazan, etc.). Local airlines operate flights across the region, including to settlements on the coast of the White Sea. Estimation of material and time costs of tourists is presented in Table 4.

Table 4

Estimation of the material and time costs of tourists when traveling to Arkhangelsk from the centers of tourist flows (points)

Centers	Moscow		Saint Petersburg	
	Train	Plane	Train	Plane
Travel time	10	1	10	1
Travel cost	2	4	2	3
Flight frequency	1	1	5	1
Correction for the number of modes of transport	1		1	
Total	14	7	18	6

As the analysis results show, the position of Arkhangelsk relative to St. Petersburg is less advantageous when using the cheapest railway transport. In this case, the reason for the increase in the material and time costs is the regularity of the Arkhangelsk-St. Petersburg train (2–3 times a week). The use of air transport from the places where tourist flows are formed to Arkhangelsk as a distribution center requires approximately the same amount of time and money.

Naryan-Mar is the only city, the largest settlement and the transport and distribution center of the Nenets Autonomous Okrug. It is represented mainly by air and water transport. Naryan-Mar airport receives regular flights from Moscow and St. Petersburg, connects settlements scattered over the vast territory of the district, which may be of potential interest to tourists. There is a river port on the Pechora, which serves cargo transportation and local passenger lines. There is no railway transport; road transport is limited to a small number of roads. Estimation of material and time costs and economic distance is presented in Table 5.

Table 5

Estimation of the material and time costs of tourists when traveling to Naryan-Mar from the centers of tourist flows (points)

Centers	Moscow		Saint Petersburg	
	Train	Plane	Train	Plane
Travel time	-	2	-	2

Travel cost	-	7	-	5
Flight frequency	-	1	-	5
Correction for the number of modes of transport	2		2	
Total	-	12	-	14

Thus, the accessibility of Naryan-Mar for tourists from the main centers of tourist flows formation is limited to one mode of transport. The probable reason for this is the lack of land roads and the small population size in Naryan-Mar and the Nenets Autonomous Okrug, which makes the profitability of regular flights low. For the same reason, the number of flights from St. Petersburg to Naryan-Mar is 3 times a week, which worsens the transport accessibility of the district's capital in this direction.

For the northern regions of the Komi Republic, referred to the Arctic zone, the main center for the development of Arctic tourism can be the largest city of Vorkuta. It has the necessary tourist infrastructure. One can use land and air transport to come there; there is a railway station and an airport. However, direct air communication with the centers of tourist flows formation is present only with Moscow. The estimation data of economic distances and material and time costs of tourists are presented in Table 6.

Table 6

Estimation of the material and time costs of tourists when traveling to Vorkuta from the centers of tourist flows (points)

Centers	Moscow		Saint Petersburg	
	Train	Plane	Train	Plane
Criteria / transport				
Travel time	10	3	10	-
Travel cost	4	10	5	-
Flight frequency	3	6	5	-
Correction for the number of modes of transport	1		2	
Total	18	20	22	-

The analysis of the table shows relatively high values of the material and time costs of travel to Vorkuta as a supporting center for the development of Arctic tourism in the north of the Komi Republic. Moreover, the position of Vorkuta relative to St. Petersburg is the least favorable. Another identified feature is approximately equal values of the total scores obtained when using a plane and a train. This indicates the unfavourable transport and geographical position of Vorkuta in the current organization of transport links with the regions of Russia. However, Vorkuta is located 130–150 kilometers from the proposed supporting centers of Arctic tourism in the neighboring Yamalo-Nenets Autonomous Okrug (the cities of Salekhard and Labytnangi) and is connected to the latter by railway, which can be used to organize joint tours and infrastructure development.

The Yamal-Nenets Autonomous Okrug is located almost entirely to the north of the Arctic ecological border and can offer ethnic and ecological tours to the tundra and the Kara Sea coast, which corresponds to the stereotypes of potential visitors about Arctic tourism. Two nearby cities may become supporting centers of tourism development — Salekhard, the capital of the Okrug (there is an airport and a river port), and Labytnangi, located 20 kilometres away on the opposite bank of the Ob River (with a railway station). One can get from Salekhard to Moscow and St. Pe-

tersburg by plane, as well as to other major transport hubs — Ekaterinburg, Novosibirsk, Omsk, Ufa. It provides a link to the district's population centers. Only a train from Moscow comes to Labytnangi on a regular basis. Due to the close location of Salekhard and Labytnangi, we will consider them as a single logistics center for Arctic tourism. The values of the assessment of economic distances and material and time costs are presented in Table 7.

Table 7

Estimation of the material and time costs of tourists when traveling to Salekhard and Labytnangi from the centers of tourist flows (points)

Centers	Moscow		Saint Petersburg	
	Train	Plane	Train	Plane
Criteria / transport				
Travel time	10	2	-	2
Travel cost	3	10	-	8
Flight frequency	2	1	-	4
Correction for the number of modes of transport	1		2	
Total	16	14	-	16

Thus, the total points obtained for the assessment of material and time costs of tourists traveling from Moscow and St. Petersburg are approximately the same, which indicates an equal position of this reference center in relation to the hubs of tourist flows formation. Tourists traveling via Moscow have an advantage, as they can choose from two modes of transport, including the cheapest train travel. The position relative to St. Petersburg may become more favorable with an increase in regular flights and the implementation of trains. The availability of regular flights from Novosibirsk and Ufa (once a week), Omsk (2 times a week), Yekaterinburg (3 times a week) expands the geography of potential centers of tourist flows formation in the Yamalo-Nenets Autonomous Okrug.

For the vast sparsely populated areas of Taimyr in the north of the Krasnoyarsk Krai, Norilsk could be a reference center for the development of Arctic tourism. It is the largest city that has an airport with flights not only to the centers of tourist flows (Moscow and St. Petersburg), but also to other potential hubs (Novosibirsk, Ufa, Krasnoyarsk). Rail transport is not involved in transportation of tourists from other cities; it is represented only by a short local line connecting Norilsk with Dudinka, a river port on the Yenisei River. In fact, the most populated area with transport infrastructure is the eighty-kilometer vicinity of Norilsk. Separate settlements of Taimyr are located at a considerable distance from it and are accessible only by air. The results of scoring the economic distances and material and time costs of potential tourists intending to visit Taimyr are presented in Table 8.

Table 8

Estimation of the material and time costs of tourists when traveling to Norilsk from the centers of tourist flows (points)

Centers	Moscow		Saint Petersburg	
	Train	Plane	Train	Plane
Criteria / transport				
Travel time	-	4	-	4
Travel cost	-	10	-	10
Flight frequency	-	1	-	6
Correction for the number of modes of	2		2	

transport				
Total	-	17	-	22

The analysis of the data in the table shows that Norilsk has the most favorable position relative to Moscow. The position relative to St. Petersburg is complicated by the regularity of flights (2 times a week). In general, the overall scores obtained when assessing economic distances are high. There are opportunities to expand the tourist market in the northern districts of Krasnoyarsk Krai due to the availability of regular flights to other cities of Siberia and the Urals. According to the criteria of transport, social infrastructure and recreation cost, some authors consider the Krasnoyarsk Krai as the most suitable for Arctic tourism [6, Bayaskalova T.A., Kuklina M.V., Bogdanov V.N., p. 117].

For the Arctic regions of the Chukotka Autonomous Okrug, the only suitable base for the development of Arctic tourism is its capital, Anadyr. Anadyr airport provides an air link of the entire district to the “mainland”; Chukotka cannot be reached by regular land transport. Of the considered centers of tourist flows formation, Chukotka is connected only with Moscow. Other potential centers, connected by regular flights to the Anadyr airport, include Vladivostok and Khabarovsk. The seaport of Anadyr can be used for Arctic cruises. Estimation of economic distances and material and time costs is presented in Table 9.

Table 9
Estimation of the material and time costs of tourists when traveling to Anadyr from the centers of tourist flows (points)

Centers	Moscow		Saint Petersburg	
	Train	Plane	Train	Plane
Criteria / transport				
Travel time	-	8	-	-
Travel cost	-	10	-	-
Flight frequency	-	4	-	-
Correction for the number of modes of transport	1		0	
Total	-	23	-	-

The point estimation of the material and time costs shows a relatively high result, indicating the unfavorable transport and geographical location of Anadyr in relation to Moscow. Its disadvantages are the regularity of flights (from 2 to 4 per week) and the high ticket price. The lack of regular flights to St. Petersburg narrows the potential tourist market for this destination. However, due to the presence of regular flights to Khabarovsk and Vladivostok, it is possible to expand the market by including not only the south of the Russian Far East, but also neighboring China and Japan.

Vast areas of the Arctic part of Yakutia lack large settlements that could become strongholds for the development of Arctic tourism. They are not connected to the “mainland” by regular land transport and there are no airports. Communication with other regions is possible via Yakutsk or along the Lena River during navigation. The latter circumstance makes it possible to develop river cruising, which can mitigate the lack of tourist infrastructure and regular transport links in the Arctic zone of Yakutia. The development of the settlement of Tiksi as a transport center serv-

ing the coast of Yakutia, the creation of a tourist infrastructure there can become the basis for the formation of a supporting center of Arctic tourism.

The results obtained in assessing the material and time costs of tourists traveling to the regions of the Arctic zone of Russia make it possible to compare and identify the supporting centers for the development of Arctic tourism, which can already successfully serve tourist flows. The analysis of the components of this assessment reveals the existing problems that reduce the transport accessibility of supporting centers and increase economic distances. Table 10 presents the final results of the study.

Table 10

Summary table of the results of estimation of the material and time costs of tourists and determining the economic distances between the hubs of tourist flows formation and potential supporting centers for the development of Arctic tourism (points)

Support centers / centers of tourist flows formation	Moscow		Saint Petersburg		Other cities with regular flights
	Train	Plane	Train	Plane	Any
Murmansk	15	6	14	6	Kazan, Kaliningrad, Krasnodar, Perm, Nizhniy Novgorod, Chelyabinsk
Apatity	15	8	14	9	Anapa
Arkhangelsk	14	7	18	6	Kazan, Krasnodar, Kaliningrad
Naryan-Mar	-	12	-	6	Arkhangelsk
Vorkuta	18	20	22	-	Syktvykar, Nizhniy Novgorod
Salekhard – Labytnangi	16	14	-	16	Ekaterinburg, Novosibirsk, Omsk, Ufa, Tyumen
Norilsk	-	17	-	22	Novosibirsk, Krasnoyarsk, Ufa
Anadyr	-	23	-	-	Khabarovsk, Vladivostok

As shown in Table 10, the lowest material and time costs are for tourists visiting the European part of the Russian Arctic zone, especially the Murmansk and Arkhangelsk oblasts. Against the general background of this Arctic sector, the potential supporting center of Vorkuta stands out: it has the worst transport and geographical position due to the low regularity of transport flights, high ticket prices and the lack of direct air communication with St. Petersburg. In the Asian part of the Arctic zone, the total score for assessing material and time costs is expected to increase, which indicates a less favorable transport and geographical position of these areas. A common feature of this zone is the lack of railway communication between the supporting centers for the development of Arctic tourism and potential centers of tourist flows formation, a great distance from them, which affects the price of tickets and the increase in economic distances between them. Against the general background in this Arctic sector, the supporting center of Salekhard stands out, having a relatively lower score of the total cost assessment. Besides, higher points are given to the costs of air communication with the centers of tourist flows formation. The Murmansk Oblast, Yamalo-Nenets Autonomous Okrug, the north of the Krasnoyarsk Krai (Taymyr) have prospects of expanding the tourist market. The

introduction of new regular flights and an increase in their regularity will give impetus to the development of Arctic tourism in other areas.

Conclusion

As a result of the study, we assessed the material and time costs of tourists and compared the economic distances between the potential centers of tourist flows formation in Russia (Moscow, St. Petersburg), identified the potential logistics supporting centers for the tourism development within the Arctic zone of Russia. Studies have shown that the Murmansk Oblast is currently the most promising region for the development of Arctic tourism. Favorable transport and geographical location, availability of diverse recreational resources able to meet stereotypical expectations of tourists traveling to the Arctic, proximity of potential centers of tourist flows formation both in Russia and abroad, transport infrastructure (including for Arctic cruises), two potential supporting centers for Arctic tourism development make this region the most attractive for planning of tourist projects

In general, the Arctic regions of the European part of Russia have the best estimates of economic distances. The exception is the potential supporting center of Vorkuta in the north of the Komi Republic: its transport and geographical positions are the worst due to the low regularity of flights, the high cost of tickets and poor transport connectivity with the centers of tourist flows formation. However, the proximity of Vorkuta to the supporting logistics center for the development of Arctic tourism in the neighboring Yamalo-Nenets Autonomous Okrug may contribute to the creation of joint tourist routes.

In the Asian part of the Arctic zone of Russia, the Yamalo-Nenets Autonomous Okrug is the most promising region in terms of transport infrastructure. This is facilitated by the availability of an extensive geography of regular flights between the hubs of tourist flows formation and the potential supporting center for the development of Arctic tourism Salekhard – Labytnangi. The advantage is its location on the banks of the Ob River, which expands the opportunities for tourism development. The least favorable is the transport and geographical position of the Chukotka Autonomous Okrug. Communication between the potential supporting center in Anadyr is carried out by regular flights only to Moscow. At the same time, there is a low regularity of flights and a high cost of tickets. This destination received the highest total points of material and time costs among all the centers considered. However, the southern regions of Siberia and the Far East may be the potential tourist market for the regions of the Asian sector of the Russian Arctic, as well as China and Japan. River cruising is promising, as great rivers (Ob, Yenisei, Lena) flow into the Arctic Ocean in the Arctic. This may reduce the need for transport infrastructure.

The most problematic in terms of transport connectivity to places of tourist flows formation is the Arctic part of Yakutia. This territory has regular communication only with Yakutsk. But the development of the settlement of Tiksi as a center of Arctic tourism development and as a transport center can mitigate this problem.

The general direction for increasing the prospects of Arctic tourism development is seen in the organization of regular transport links and increasing the number of flights on the existing routes between the supporting centers in the Arctic territories and potential centers of tourist flows formation.

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