Problems of entrepreneurship development in the Arctic: Russian and foreign experience of observing the principles of green economy

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Abstract. In recent years, interest in the Arctic regions has grown. Global corporations, policymakers, and research scientists became interested in the Arctic, as the climate in the Arctic regions changes and as the consequences in the global world directly or indirectly extend to all countries. The desire to understand and manage the new economic opportunities associated with the vast natural resources of the Arctic regions is common among all interested parties. However, the achievement of economic goals depends on many factors. It should be noted that among the factors facilitating economic development, we should consider important the factors of development of local communities and local entrepreneurship, and observation of the principles of green economy. In recent years, Russian and foreign Arctic research scientists have published a significant number of articles on the study of the Arctic regions and the development of entrepreneurship. The purpose of this work is to study entrepreneurship in the Arctic regions by analyzing Russian and foreign scientific publications. A common negative demographic factor for the Arctic regions is the change in the structure of the population, so the development of entrepreneurship can be considered important for the development of the Arctic regions, capable of providing livelihoods for local residents. The article considers the current conditions for entrepreneurial activity in the Arctic to determine the problems and prospects for the development of entrepreneurship in the Arctic regions from the point of view of green economy. In the article, the authors offer advice on engaging in entrepreneurial activities in the Arctic, following the principles of sustainable development and adhering to the principles of a green economy.

1 Introduction

Long distances, challenging climatic conditions, and long periods of darkness pose unique challenges when it comes to developing business activities in the Arctic [2,3]. Despite the fact that in recent years the fishing fleet, cruise tourism, and research initiative have significantly increased, and as the ice melts further, new shipping routes are being considered, to the point that expedition tours on small and medium-sized passenger ships carrying from 12 to 300 people are becoming increasingly popular, communication services, satellite coverage, radio communication in remote maritime areas with severe weather conditions due to the limited range of operation in marine areas in the Arctic territories leave much to be desired [5].

Studying Arctic entrepreneurship, the researchers face many paradoxes. The most important factors in the development of entrepreneurship in the Arctic, creating a mosaic picture of the situation in the Arctic territories, are: geographical location, island or quasi-continental position; presence of large resource corporations and the specific stage of their exploitation of the resource field; institutional structure of the local economy in terms of degree of nationalization. The combined impact of these factors creates a multifaceted picture, with the Murmansk region at one pole of extremely favorable conditions for business, and the Chukotka Autonomous Region at the other, characterized by extreme harshness [6].

The changing Arctic environment could lead to an "Arctic gold rush", where states compete with each other to develop oil and gas reserves and sought-after natural resources in marine areas by expanding the legal definition of the outer limits of their continental shelves. The Arctic contains about 90 billion barrels of oil and 1 669 trillion cubic feet of natural gas, accounting for 22 percent of the world's oil and natural gas reserves. In addition, as sea ice depletes, the Arctic could become an alternative corridor for international shipping. The Northeast Passage, a roundabout sea route through the Norwegian and Russian Arctic, is actually 37 percent

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shorter than traditional routes through the Suez Canal. However, before it becomes possible to extract natural resources or use the Arctic sea routes, it is necessary to eliminate huge technical, environmental, and operational risks [4], leading to the increased negative anthropogenic impact on the fragile environment of the Arctic.

In July 2020, the Federal Law on State Support for Entrepreneurship in the Arctic Zone of Russia, signed by Russian President Vladimir Putin [1], came into force. The new law establishes a system of preferences for residents of the Arctic zone of Russia and contributes to the development of northern territories, creation of appropriate conditions for attracting investment, and stimulation of the opening of new companies, including small and medium businesses. Experts expect that the law will aid in facilitating conditions for creating new jobs, developing infrastructure and improving transport accessibility. In accordance with the newly adopted law, support will be provided to individual entrepreneurs or resident companies of the zone that plan to start new investment projects with a planned investment capacity of one million rubles and above, including the cost of new construction, technical re-equipment, modernization of the main production facilities, repair of premises, purchase of machinery and equipment. An investment project is recognized as new if at the time of application, the volume of actual capital investments does not exceed 25% of the total cost of the project. According to the new law, the resident status implies a number of tax benefits and non-tax preferences. For example, a taxpayer with resident status in the Arctic zone of Russia may reduce the amount of mineral extraction tax by implementing a tax credit for investments in infrastructure. The law also provides tax incentives for projects not related to the extraction of minerals: reduction of federal and regional income tax, insurance payments, VAT cancellations for the sale of goods subject to the procedure of the free customs zone and for transportation of export cargoes by sea and related icebreaking operations. In addition, residents of the Arctic zone are granted non-tax preferences, such as duty-free import of equipment and export of finished products, interest rate subsidies on investment loans, reimbursement of the coupon rate on bonds. Residents receive the right to purchase land plots owned by the state or local municipalities without going through a tender procedure. The set of laws sets the timing of the provision of municipal services in urban planning. For example, the deadline for submitting a town-planning plan for a land plot in the Arctic zone is ten working days. It is assumed that these changes will attract more investment in the Arctic regions and improve the quality of life in the Arctic. We should note the lack of an environmental component in the law under consideration.

2 Results

Over the past few decades, climate change and globalization have dramatically changed the Arctic. As a result of global warming, Arctic sea ice is rapidly melting, potentially facilitating access to natural resources and opening up new sea lanes in the region. These changes have drawn the attention of the world community to potential commercial opportunities in the region [7]. We will consider some of them.

1. Cargo transportation. Linking Asia, Europe and North America, sea routes have become the main axes of container traffic. Now most of the cargo traffic originates in Northern China, with seven Chinese ports among the ten largest container terminals in the world. The northern polar routes between Asia, North America, and Europe include three main ones: the Northwest Passage (NWP) through the Canadian Arctic, the Transpolar Route (TPM), and the Northern Sea Route (NSR) along the coast of Russia. The Northern Sea Route runs from the Atlantic to the Pacific Ocean along the Russian coast of Siberia, mainly through Russian Arctic waters [19]. The special importance of the Northern Sea Route is clear, given its association with trade between Europe and the ports of the Far East of Asia, such as Yokohama and Busan, but also including Shanghai and Kaohsiung. Both Shanghai and Kaohsiung are ports with significant trade volumes. According to the World Shipping Council [8], Shanghai's trade volume per million twenty-foot containers (TEUs) was the highest in the world at 36.54 in 2015, and Kaohsiung ranked 13th with 10.26 million TEUs. Moreover, although the trade route between Asia and North America had the largest volume of cross-trade at 23 125 000 million TEUs in 2013, the trade route between Asia and Northern Europe took a clear second place with 13 706 000 million TEUs [8]. In terms of potential benefits, compared to the Suez Canal, the NSR could reduce travel time by 40 percent [9,10] or approximately seven days of travel between Yokohama and Rotterdam. According to [11], this represents a reduction from 11 200 to 6 500 nautical miles. Regardless of the exact distance, it is clear that sailing from these ports across the NSR will lead to a huge reduction in the number of nautical miles, and this route is rightly described as the one that "will connect East Asia (Japan, South Korea, Taiwan and China) with the Northwest Europe through the Arctic Ocean". This reduction in distance will save fuel, reduce emissions and save time, making it more energy-efficient and giving significant business opportunities to many countries. As an example, in 2017, a Russian tanker transported a cargo of liquefied natural gas (LNG) from Hammerfest in Norway to Poryong in South Korea in 19 days, which, according to expert estimates, saved about 30 percent of the time, compared with using the usual southern sea route through the Suez Canal [12].

In addition to decreasing the time and costs, and also lowering the naturogenic impact on the environment, a positive aspect of using the NSR is that there is no the problem of piracy [13].

However, there are many problems associated with choosing the NSR, which can be outlined as follows: sea ice and, therefore, a higher level of danger; high navigation needs and high cost of navigation equipment; higher unit costs per distance traveled, given the need to move through the ice and the corresponding support of

the icebreaker; higher costs in the construction of vessels: vessels should be ice-class, which are 10–30% more expensive to build; and the possible environmental impact of oil spills and increased air pollution, need for specific crew training, cargo protection, hull maintenance, and special ship equipment. In addition, navigating through sea ice means that it is impossible to accurately specify the time of the vessel arrival, which can pose a problem for navigation. It is also necessary to take into account the keel depth of ships, which may be limited on the NSR (especially when passing the Sannikov Strait, the depth of which is limited), which will reduce the possible volume of cargo transportation. Another specific problem is the lack of ready port infrastructure. All these factors are inextricably associated with the technical issues of costs, logistics, information, and anthropogenic impact.

2. Large oil and gas corporations. Localization of production technologies and development of technologies for offshore oil and gas production in the Arctic zone can be an incentive for further import substitution for Russia. Currently, the experience of Arctic defense enterprises in the production of equipment for the extraction and processing of oil and gas is becoming increasingly popular [14]. At the moment, the production of liquefied natural gas (LNG) is one of the most dynamically developing segments of the hydrocarbon market worldwide. An analysis of the general situation in the energy supply market shows that the high pace of development of LNG projects is likely to continue for a few decades. Russia is among the top ten largest LNG exporting countries, and it is expected to strengthen its position in this segment [20].

In the Arctic, the cost of developing oil and gas fields is extremely high, so large Arctic oil and natural gas fields become particularly important in terms of the future development of these hydrocarbons, since a large field is capable of offsetting the costs of infrastructure for the subsequent development of smaller fields.

The discovery of large Arctic oil and gas fields began in Russia with the discovery of the Tazovskoye field in 1962, and in the United States with the Prudhoe Bay field in Alaska in 1967 [21]. Oil and gas reserves in the Arctic territories are presented in Figure 1 and 2.

Country	At the end of 1987, billion barrels	At the end of 1997, billion barrels	At the end of 2006, billion barrels	At the end of 2007, billion barrels
United States	35.4	30.5	29.4	29.4
Canada	11.7	10.7	27.7	27.7
Russia	n/a	n/a	79.3	79.4
Norway	6.6	12	8.5	8.2
Arctic States	n/a	n/a	144.9	144.7
World	910.2	1 069.3	1 239.5	1 237.9

Fig. 1. Proven oil reserves in 1987–2007. Source: [21].

Country	At the end of 1987, trillion cubic meters	At the end of 1997, trillion cubic meters	At the end of 2006, trillion cubic meters	At the end of 2007, trillion cubic meters
United States	5.3	4.74	5.98	5.98
Canada	2.69	1.81	1.62	1.63
Russia	n/a	45.17	44.6	44.65
Norway	2.29	3.65	2.89	2.96
Arctic States	n/a	55.37	55.09	55.22
World	106.86	146.46	176.22	177.36

Fig. 2. Proven natural gas reserves of Arctic states and the world over time. Source: [21].

Large oil and gas corporations unequivocally have a negative impact on the environment, since their production always releases substances into the air, moreover, they produce hazardous chemicals that are washed away by wastewater.

Any production is designed for economic growth and capacity expansion, this is one of the problems: often at such enterprises environmental protection and the economics contradict each other, therefore, it is necessary to assess where the limit is for increasing production.

3. Tourism. In recent decades, tourism has become one of the main reasons for human presence in the Arctic, although the first tourists began to explore the Arctic more than 500 years ago [18].

The shrinking area of sea ice and the subsequent increase in accessibility of polar regions has opened up new routes for expeditionary cruise ships, which has led to changes in cruise travel patterns and in the types of passengers visiting the region. In addition, in recent decades, global changes in the polar environment have changed the focus of tourism marketing, and terms such as "last chance to visit" have been used to attract a new demographic tourists, some of whom are highly adventurous and interested in autonomous experiences. On average, cruise passengers tend to be wealthy and quite often elderly; industry professionals call the average age of cruise passengers "very high" and describe some cruises as "floating retirement homes" [23]. Some industry professionals note the high level of education and desire for knowledge of these elderly passengers, but recently, there has been an influx of younger, more adventurous visitors, seeking, among other things, the thrill of "adrenaline tours". In addition to the change in the demographic composition of passengers, the Arctic cruise traffic has increased dramatically in recent years, both in the high-altitude regions of the Arctic and in the lower and sub-Arctic regions. The total number of cruise passengers in the high-altitude Arctic destinations of Svalbard and Greenland, the Canadian Arctic and Franz Josef Land has grown from about 50,000 in 2005 to just under 80,000 in 2016, with significant growth in the smaller vessel segment of 100–200 passengers compared to more than 3,000 (with more adventurous routes) [24]. The Association of Arctic Expedition Cruise Operators (AECO), which represents the majority of Arctic expedition cruise industry operators, reviews the number of passengers carried annually by AECO members. In 2016, expeditionary cruise passengers accounted for a quarter of the total number of cruise passengers, and the number of passengers carried by AECO member vessels in key AECO areas (Svalbard, Jan Mayen, Greenland, Arctic Canada, Russian Arctic National Park, and Iceland) increased from 13,480 passengers in 2008 to 26,296 passengers in 2017 [22]. In recent decades, a significant number of publications have recognized the various changes that the Arctic is facing in terms of social, cultural, economic and environmental aspects. The Arctic is a vast region of diverse climates, communities, and landscapes. This region is also characterized by strong seasonality, offering a wide

range of experiences that cannot be attained in a single trip. For example, the northern lights and the midnight sun are phenomena that can only be seen in winter and summer, respectively. Therefore, to fully explore the Arctic, you need several trips to different Arctic regions. There is no doubt that tourism in the Arctic is different from tourism in other areas [26]. The reason for this statement originates in the form of exclusivity, since "very few other geographical regions are designated as a concept in tourism" [25]. However, it is now being questioned whether in the future there will emerge factors that contribute to the development of, for example, ski tourism in the Arctic regions of different countries. For instance, in Sweden, Finland, Norway, and Russia, conflicts in the field of land use arise in the case of the development of large ski resorts in their Arctic zones, especially around the specially protected natural areas, which in themselves are not only important attractions for nature tourism, but also traditional sources of livelihood for the indigenous inhabitants of the Arctic territories [15,30,31].

4. Animal husbandry. The paper of Reinert E. [16] lists an example of a sharp drop in the income of Saami reindeer herders in Northern Norway between 1976 and 2000, despite an increase in government subsidies. Saami reindeer herders maintain a legitimate monopoly on the supply of venison, a traditional luxury product in Norway. The reasons for this fall lies in the interaction of a number of factors, including: cyclical climate change in Northern Norway; a system with fixed prices for deer meat, independent of supply fluctuations, growing influence of natural cycles; increasing strict sanitary regulations forcing Saami reindeer herders to abandon the slaughter and procurement of reindeer meat; the oligopolistic market forces of non-Saami entities that undertake slaughter and processing. The paper confirms that the drop in the incomes of Saami reindeer herders was due to the failure of the Norwegian Ministry of Agriculture to understand the key factors that distinguish subarctic pastoralism from intensive farming. Sanitary requirements and the government's desire to achieve economies of scale in processing contributed to the fact that the volume of production was in the hands of non-Saami oligopolies. Thus, the Saami reindeer herders lost revenues from the production of meat, which had traditionally been the basis of both their culture and their economic livelihoods. This situation shows the devastating impact on aboriginal culture as a result of Norway's exclusive use of modern agricultural science to manage such systems.

5. Fishing in the Arctic is transforming under the influence of climate change. Thanks to the constantly growing demand for fish on the world market and the fact that most of the catch regions in other places are depleted, in recent years, the production of industrial fishing in the Arctic has remained relatively stable at about 5 million tons per year. For comparison, the global annual volume is unchanged on average, at about 80 million tons since 2003. These figures apply, of course, to industrial fishing, which accounts for more than 90 percent of all fishing. In Arctic fishing, small-scale fishing accounts for 5–7%. Subsistence fishing is between 1 and 2 percent, and recreational fishing is still an extremely small part of the total. Industrial fishing is an activity worth considering from the point of view of understanding the overall development of the green economy in the Arctic, as the ice recedes, and warmer waters are displacing commercial species to the north. By 2014, in the Barents Sea, for example, Norwegian fishermen were catching more than 11 percent of their annual quota in waters previously inaccessible to them. Greenpeace, after analyzing 18 million satellite location signals, reported that more than 100 fishing vessels had entered waters previously covered with ice [27].

3 Conclusions

The novelty of studying and covering the problems of Arctic entrepreneurship is primarily the recognition of it as a complex and multidimensional phenomenon, within which we can distinguish elements of oil and gas, ethnic, social, rural, innovative, and Arctic types of entrepreneurship, which have essential specificity.

Entrepreneurship in the Arctic zone of the Russian Federation is a unique type of business, which is distinguished by the "belt" criterion, in contrast to the "equatorial" or "tropical" entrepreneurship, which do not exist. Only for Arctic conditions, it has been recognized as necessary to single out a special concept of "Arctic entrepreneurship". And this is quite understandable, since it is in the Artic that e classic unified standards of state policy in the field of business support demonstrate their inoperability. Therefore, it becomes logical to separately study such phenomenon as Arctic entrepreneurship, as carried out in specific social and climatic conditions, which include the following:

1. The high cost of transporting goods to the Arctic territories (therefore, for example, the cost of vegetables and fruit in the stores of the Yamalo-Nenets Autonomous Region is 2.5–3 times higher than in stores of non-Arctic regions)
2. High risks of environmental accidents that are difficult to eliminate
3. Need to conduct business activities taking into account the northern deliveries in a limited period of Arctic sea and river navigation
4. Harsh natural and climatic conditions that leave their mark on all types of activities
5. Accelerated depreciation of fixed assets
6. Poorly developed roads, engineering, municipal infrastructure for doing business
7. Shortage of qualified personnel.

However, new business opportunities are emerging, and parties interested in the Arctic are playing a key role in facilitating and creating favorable environment for increased economic activity in the Arctic [29]. Currently, there is a wide range of business activities, of which the oil and gas industry, cargo transportation, and shipping are well developed. Recently, tourism and animal husbandry have been developing well. Nevertheless, the Arctic region has great economic potential for implementation in other areas, such as the green economy, tourism, innovation, and indigenous cultural

business, through entrepreneurial activities and policies that address the specific opportunities and needs of the Arctic zone of the Russian Federation. Business development in the Arctic must rely on human capital and strive for innovative development in which the unique resources of the Arctic become competitive on a global scale. Urbanization particularly highlights the need for business development in the Arctic, as the region's younger generation wants services, opportunities and education just like those offered in major metropolitan areas. The development of business in the Arctic is also an existential issue, since the creation of new modern economic centers could halt the outflow of young people from the Arctic regions.

Entrepreneurial activities in the Arctic, unlike similar activities in other regions, have significantly higher costs due to the specifics of local climate and geography.

At first glance, there is a lot of conditions in the Arctic making entrepreneurship unprofitable and sometimes simply impossible. However, the purpose of this article was to demonstrate the opposite: despite the harsh climate and the seemingly high costs and high risks compared to the "mainland" business, the Arctic today offers the greatest opportunities for the introduction and development of innovations, both in the oil and gas industries, and in tourism and animal husbandry. Following the principles of sustainable development and adhering to the principles of the green economy, entrepreneurship in the Arctic should be conducted taking into account the following provisions:

- The use of innovations to introduce energy-efficient clean technologies and renewable energy sources (among which wind energy (areas along the northern sea borders of the Russian Federation are characterized by an average wind speeds of over 6–7 m/s, which is quite attractive for the implementation of wind generation), solar energy, and in some areas, plant biomass energy and energy of sea waves and tides are key [28]). In its turn, support for enterprises engaged in innovative activities should become a priority in entrepreneurship development programs. In this context, it is necessary to continue the digitalization of public services; the efforts of the authorities and residents should be directed to retraining and re-education, taking into account the development of digital technology and training in entrepreneurship, reducing the digital divide.
- Restoring, protecting and maintaining the diversity and basic functions of marine ecosystems, introducing the principles of ecosystem policy, providing assistance to indigenous peoples in business development, due to the fact that despite the development of entrepreneurship in the Arctic territories, their natural, cultural and recreational authenticity should be preserved.

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