

Chapter 80

Competitiveness of Circumpolar Countries in the Digital Environment



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Abstract The paper is devoted to solving the fundamental problem of the countries which Arctic territories are rich in natural resources. This is a contradiction between the necessity of forming an innovative, digital model of the economy and the reality of the extractive economy. The aim of the research is to assess the competitiveness of circumpolar countries in the digital environment. The authors have revealed several deterrents holding back development of projects in circumpolar countries that are not related to the extraction and primary processing of natural resources; assessed the subjective prerequisites for using a digital product to solve the production and infrastructure problems of the circumpolar countries; compared circumpolar countries in terms of number of student—one of the factors of competitiveness in the digital environment; rated the circumpolar countries in terms of competitiveness in the digital environment.

80.1 Introduction

The developing crisis caused by the pandemic coronavirus is forcing to look for new ways of economic development. The crisis has already largely changed the economy of most countries of the world and changes continue to take place. The crisis has affected also circumpolar countries which have Arctic territories. Arctic territories are usually rich in minerals and this determines the development of the extractive-type economy.

Circumpolar countries run into such fundamental problem as the contradiction between the problem of building an innovative, digital economical model and the

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reality of the extractive-type economy. Recently, foreign researchers of the circumpolar countries have been increasingly referring to so-called notorious curse of natural resources [1–3]. This is a situation in which the territories, rich in natural resources, demonstrate lower economic and social indicators than the areas having not large natural resources. With regard to circumpolar countries, one more very important problem is fixed—there are several factors constraining the development of projects in the Arctic territories, not related to mining and primary processing of natural resources. The authors have already noted these trends in their papers [4–6].

At the same time, more and more extractive and processing enterprises start to operate in the digital environment. According to researchers' opinions, digital technologies raise labor productivity and safety and improve the environment [7–9]. In addition, the ability of business to adapt to external changes improves and this fact increases antirecessionary stability [10–12].

The aim of the research is to assess the competitiveness of circumpolar countries in the digital environment.

The objectives of the research are the following:

- to reveal factors constraining the development of projects not related to mining and primary processing of natural resources in circumpolar countries;
- to assess subjective prerequisites for the use of digital products in order to solve production and infrastructure problems of the circumpolar countries;
- to compare the circumpolar countries by the number of students—one of the factors of competitiveness in the digital environment;
- to determine the rating of the circumpolar countries for competitiveness in the digital environment.

80.2 Materials and Methods

The object of research is eight circumpolar countries which have Arctic territories.

The subject of the research is the competitiveness of the circumpolar countries in the digital environment.

To solve specific problems of the research, the methods of comparison and matching of information in the circumpolar countries were used. The method of summarizing the information obtained from various literature sources was used as well. The comparison of circumpolar countries was made in terms of student numbers, as one of the factors of competitiveness in the digital environment. To do this, the number of students has been calculated (students enrolled in higher education programs in educational institutions of higher and postgraduate education) per 1000 people. The calculations were carried out by the authors on the materials of the Internet portal Infotables. Ru [13]. The comparisons have been made for the circumpolar countries with Arctic territories.

In order to determine the ranking of the countries with Arctic territories in terms of competitiveness in the digital environment, the authors used the data of the Swiss

business school IMD [14]. For the formation of the IMD World Digital Competitiveness Ranking, 50 criteria are used. A total of 30 criteria are based on statistical data, and the rest ones are based on survey results. The criteria characterize the three components of the rating: “Knowledge” (quality of training, education and science), “Technologies” (regulatory surroundings, financial capital in the IT industry, and state of Internet and communication technologies) and “Future willingness” (level of readiness to use digital transformation).

80.3 Results and Discussion

80.3.1 Deterrents for the Development of Projects not Related to the Extraction and Primary Processing of Natural Resources in Circumpolar Countries

It is rather difficult to carry out economic activities in the high Arctic [15–17]. Having studied the features of economic activity in the Arctic territories of the circumpolar countries, we have revealed several deterrents for the development of projects not related to the extraction and primary processing of natural resources. Among them there are deterrents which, in varying degrees inherent to all Arctic areas. We have called them objective factors. Among these are:

- extreme climatic conditions;
- remoteness from administrative and financial centers;
- high cost of production;
- direct dependence on financing from the Federal budget;
- not well-developed industrial and transport infrastructure;
- small size of the population;
- high vulnerability of the natural environment.

Another group of the deterrents linked to poor governance of the Russian Arctic’s territories. We have called these factors subjective. They include:

- lack of coordination of Federal and regional authorities activities with organizations realizing projects in the field;
- fragmentary and not systematic solution to the problems of realization projects concerning digital product implementation;
- lack of reasoning of some projects from an engineering and operational points of view;
- lack of modern domestic equipment capable of operating in Arctic conditions;
- insufficient number of management personnel capable of managing implementation and working out of digital projects in difficult conditions;
- shortage of skilled labor force and its low quality.

Thus, we can see that there are lots of objective and subjective factors for the development of the circumpolar countries' Arctic territories. These deterrents are complex and various.

Under the circumstances, the introduction of digital technologies could be the problem-solving.

80.3.2 Subjective Prerequisites for the Use of Digital Products to Solve the Circumpolar Countries' Production and Infrastructure Problems

In a digital economy, the result of the realization of intellectual potential and the result of the work become "digital product" as a special one. It has fundamentally new and useful properties. This product is recorded in a digital code [18–20]. Digital products also include textual, graphical and other information meant for selling: software, e-books, scripts, video tutorials, etc. It is important to point out the dialectical nature of this particular product. On the one hand, like any product, it is meant for selling, exchange or other forms of commodity relations. Thus, its circulation involves making a profit or recovery of expenses. On the other hand, "digital product" serves as a means of self-expression and can be provided free of charge [21–23].

Among the subjective prerequisites for using digital products to solve the circumpolar countries' production and infrastructure problems, we highlight the following prerequisites:

1. High added cost of the results of digital products implementation. According to experts' opinions, the average sectoral ratio of final products and raw materials prices is 3:1. The ratio of the ultimate digital product price and its creation cost may be 10,000:1 and more [24]. This is due to the fact that the digital product added cost is created by its developer's intellectual potential, i.e., the renewable and growing resource that is not always appreciated, and, accordingly is not well-paid [25, 26]. Thus, such digital products as an innovative technology, product or service can be an actualized result of the intellectual potential use. This will contribute to high cost-efficiency of production problem-solving and solution of the problems in the circumpolar countries' infrastructure.
2. The increasing demand for digital products. Spread world crisis has revealed the inability of the economy focused on the extraction, primary processing and export of raw materials, to withstand external actions. The digitalization of the economy will promote the Arctic territories' way out of the crisis both with minimal losses, and with acquired development potential. It will reduce crisis vulnerability of industrial and infrastructure projects in future as well.
3. The multiplicative effect of the digital product implementation. The output of innovative digital products and services is often accompanied by the increase of the conjugate production in technologically interrelated branches of production. The positive effect of one project realization is superimposed on the effect of

another project and greatly intensifies at the same time. Thus, it can be seen the reflection of emergent properties of socio-economic systems, which manifest themselves through the increase. The result is the manifestation of positive multiplicative effect of digital products introduction. The results are manifested not only in individual circumpolar countries, but in the Arctic as a whole.

80.3.3 The Number of Students in Circumpolar Countries as a Factor of a Country's Competitiveness in the Digital Environment

The basis for the development of the digital environment, among other things, is the existing system of higher education. This system provides all sectors of a country's economy with diplomaed specialists, thereby promoting the creation of conditions for digitalization. As of 2018, higher education in Russia can be obtained at 607 state and 358 non-state universities. That is, the number of higher education institutions exceeds 1000. Since 1990, their number has doubled. The number of students over the same period increased to 68%: 4.7 million people in 2018 compared with 2.8 million in 1990.

It is of interest to determine Russia's rating among circumpolar countries by the number of students (Fig. 80.1).

The analysis shows that the number of students in Russia exceeds some economically developed countries' indices. Among the eight circumpolar countries, Russia takes 4th place in the number of students per 1000 population. This is a favorable but insufficient factor for increasing the country's competitiveness in the digital environment.

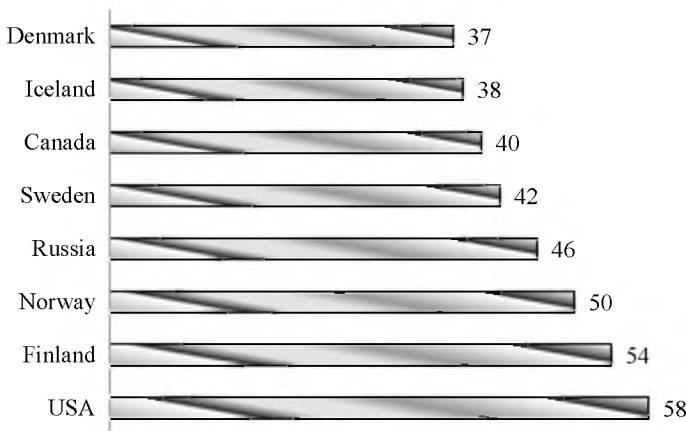


Fig. 80.1 Number of students per 1 thousand people of circumpolar countries' population (The authors' calculations based on the materials of the Internet portal Infotables Ru [13])

80.3.4 Circumpolar Countries' Digital Competitiveness Ranking

In the context of the digitalization of the economy, a country's competitiveness in the digital environment is of great importance. In order to determine Russia's rating in accordance with this index among the countries with Arctic territories, we use the data of the Swiss business school IMD World Digital Competitiveness Ranking [14].

For the formation of the IMD World Digital Competitiveness Ranking, 50 criteria are used. Thirty ones are based on statistical data, and the rest are based on survey results. The criteria characterize three components of the rating: "Knowledge" (quality of training, education and science), "Technologies" (regulatory surroundings, financial capital in IT industry, and state of Internet and communication technologies) and "Future willingness" (level of readiness to use digital transformation).

Circumpolar countries' Digital Competitiveness Ranking is shown in Fig. 80.2.

The competitiveness rating in the digital environment in 2019 was distributed in the following way:

- USA—1st place among circumpolar countries and 1st place in the world;
- Sweden—2nd place among the circumpolar countries and 3rd place in the world;
- Denmark—3rd place among the circumpolar countries and 4th place in the world;
- Finland—4th place among circumpolar countries and 7th place in the world;
- Norway—5th among circumpolar countries and 9th in the world;
- Canada—6th among circumpolar countries and 11th in the world;
- Iceland—7th place among the circumpolar countries and 27th place in the world;
- Russia—8th place among the circumpolar countries and 38th place in the world.

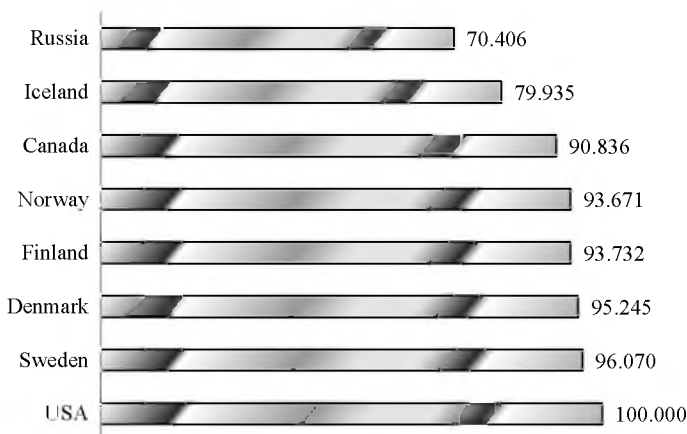


Fig. 80.2 Circumpolar countries' Digital Competitiveness Ranking (the authors' calculations based on the materials of the Internet portal IMD World Digital Competitiveness Ranking [14])

As we can see, most circumpolar countries have very high rates of competitiveness in the digital environment.

The diagram shows that the Russian Federation has the lowest rating among the circumpolar countries. Low values were demonstrated for all complex indicators: “Knowledge,” “Technologies,” “Future Readiness.” Even Iceland was ahead of Russia by 9.529 points.

It should be noted that the generalized competitiveness rating in Russia’s digital environment is gradually growing. In 2018, the Russian Federation took 40th place among 63 countries, and in 2019—38th. During the year Russia managed to get ahead of Chile and Thailand. However, Russia’s low ratings of in terms of Future Readiness indicator (43 ratings out of 63 in 2018 and 2019) and Technology indicator (51 rankings out of 63 in 2018 and 42 rankings in 2019) are depressing.

Thus, despite the relatively large number of students, Russia is not a competitor in the circumpolar countries’ digital environment. According to IMD experts’ opinions, the rating of digital development correlates with labor productivity in the country. Even better, productivity correlates with Future Readiness indicator [27].

We believe that the improving Russia’s competitiveness in digital environment among other circumpolar countries should be based on the following:

- firstly, to improve current legislation concerning the development of digital environment;
- secondly, to increase government funding for IT branch;
- thirdly, to involve big business, including venture capital for the development of digital environment;
- fourthly, to develop educational process in terms of digital environment requirements;
- fifthly, to involve public administration, population and business of the Arctic territories in the digital environment.

The implementation of these regulations, of course, will not change the extractive nature of the Arctic territories’ economy, but can extend its capabilities. Digital technologies not only increase labor productivity and safety, but will improve business ability to adapt to external changes as well.

80.4 Conclusion

The study concluded:

1. Arctic territories of the circumpolar countries, as a rule, are rich in minerals and that determines the development of the extractive-type economy. For all that more and more enterprises operate in the digital environment, increasing labor productivity and safety. Therefore, the circumpolar countries run into such fundamental problem as the contradiction between the problem of building

an innovative, digital economical model and the reality of the extractive-type economy.

2. Having studied the features of economic activity in the Arctic territories of the circumpolar countries, we have revealed several deterrents that inhibit economic development. Objective factors related to the natural, geographical, economic, infrastructure and demographic characteristics, in varying degrees, common to all Arctic areas. Subjective ones are associated with the imperfection of management of the Russian Arctic territories.
3. Our research has shown that the digital product has many subjective prerequisites for the use of digital products in order to solve production and infrastructure problems of the circumpolar countries. Firstly, high added cost of the results of digital products implementation. Secondly, the increasing demands for digital products. Thirdly, the multiplicative effect of the digital product implementation.
4. The analysis shows that the number of students in Russia exceeds some economically developed countries' indices. Among the eight circumpolar countries, Russia takes 4th place in the number of students per 1000 population. This is a favorable but insufficient factor for increasing the country's competitiveness in the digital environment.
5. In the context of the digitalization of the economy, a country's competitiveness in the digital environment is of great importance. The research has shown that, despite the relatively large number of students, Russia is not a competitor in the circumpolar countries' digital environment.
6. We consider that improving Russia's competitiveness in the digital environment among other circumpolar countries should be based on improving legislation concerning the development of digital environment; increasing government funding for the IT branch; involving big business, including venture capital in the development of digital environment; development of the educational process in terms of digital environment requirements; involving public administration, population and business of the Arctic territories in the digital environment.

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