Assessment of the state of the socio-economic sphere of the Arctic territories of the world's countries

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Abstract. The article gives an assessment of the Arctic as a special territory, and the main natural and geographical features are described. Special attention is paid to national and regional differences in population density and GDP, wages and unemployment in the Arctic countries. The authors assess the socio-economic sphere of eight countries: Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, USA. The authors compared the dynamics of macroeconomic indicators of the Arctic regions and the country in which they are located. An analysis was carried out that identified countries and regions with consistently high social and demographic potential, as well as countries with similar climatic and socio-economic characteristics that effectively complement each other (Norway, Sweden and Finland). Among the Arctic countries, Norway is characterized by oil and gas complexes and fish resources, Finland is characterized by innovative technologies for processing bioresources and mining, Sweden by mining of ore minerals, and the woodworking industry. The article suggests further study of Arctic countries with consistently high socio-economic indicators in order to apply their experience to the development of the Arctic territory of Russia. In order to achieve this, it is necessary to activate technological partnership with the use of innovative digital technologies. The authors emphasize the development of international cooperation as the most progressive mechanism for the development of the world. World Practice is a good basis for developing a unified Concept of the North, because different Arctic countries have identical socio-economic and scientific problems.

1. Introduction
The Arctic has a unique geographical location. This is the only natural geographical area on the planet with territories of continents in Europe, Asia and North America.

Despite the ambiguity of territorial affiliation, it is generally accepted that the Arctic includes not only territories, but also the continental shelf and economic zones of eight countries: Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, USA.

In the economy of a number of countries, uneven spatial development can be observed. Countries may have problematic territories with unfavorable economic conditions and a number of social problems, one of which is unemployment. Based on the center-peripheral model of territorial development, each region has its own laws in its development, which is manifested by the degree of concentration and intensification of economic activity. The concept of spatial inequality in this issue is based on factors that do not depend on the person, such as geographical location, the availability of
significant natural resources, as well as related to human activities (cost reduction, human capital development, the dynamics of the institutional environment).

The Arctic regions are rich in minerals and natural resources on the one hand, and differ, for the most part, in a harsh climate on the other. This led to the main direction of research in this article The Arctic can become a technologically and economically independent region. To do this, you need to create a large number of advanced technologies. Therefore, it is extremely important to create an Arctic innovation system, a technical and scientific concept, a work plan and identify sources and funding mechanisms. It is equally important to encourage investment in selected areas, create economic conditions for investors, create intellectual levers for scientists, engineers, technicians and other professionals, and also develop a system that provides training and support for employers.

The current economic development in the Arctic needs to be modernized on the basis of modern technologies. The development of fuel and energy complexes can give an impetus to the innovative development of the Arctic by creating new conditions for economic and social development. This development will require modernizing approaches not only in the field of extraction and processing of raw materials, but also delivery and environmental protection in the Arctic. It is necessary to create a full-scale system of Arctic technologies with all its industry components in one of the most specific regions of the world. The specifics of the Northern territories, which are common to all Arctic countries, will dictate a common technological, economic and organizational approach. For efficient development of the Arctic must target planning and a collaborative, cost-effective development of the technological bases in the Arctic.

Currently, various activities in the North are accompanied by additional costs and risks. Analyzing the activity in the Arctic, it can be noted that there is a weak adaptation of existing elements of the technological and technical environment to the conditions of the Arctic. However, today the world community, being in modern technological and environmental conditions, is able to create a Northern technological environment in accordance with the climate of the Arctic, which will provide a more viable economy. An example is the creation of an icebreaker fleet.

The global development of the Arctic, the development of deep-sea space in. The world's oceans, is a task that is equivalent to space research. To achieve this, you need to create an entire industry. Developing the Arctic on a rotational basis is simply inefficient. We need a modern urban network that will become the center of technologies for the development of the Arctic. In addition, you need equipment that can work in extreme Arctic conditions, moreover, the requirements for marine Arctic equipment are higher than for land-based equipment.

In order to effectively and safely develop the potential of the Arctic territories, it is necessary to intensify international cooperation, primarily between circumpolar countries. Coordinated behavior of participants and control of national strategic interests play an important role. Currently, within the framework of international plans to strengthen technological partnership and international cooperation in the region, as well as the development of new equipment, technologies and materials that are suitable for the climate characteristics of the Arctic, it is necessary to activate the technological partnership.

2. Data, model and variables

In order to address issues of sustainable development, the Arctic territories must have sufficient financial resources to implement the goals set. At the same time, the core-periphery model assumes a center that accumulates advanced technological solutions and social achievements in contrast to remote territories with weak socio-economic development. This led to the main direction of the study is a comparative analysis of macroeconomic indicators of the Arctic regions and the countries in which they are located.

The main indicators were taken as the gross regional product of the territory of the Arctic country, the level of wages, the population and the unemployment rate. However, using these indicators to estimate absolute values, with the exception of the unemployment rate, will not produce a representative result. The country's GDP is naturally higher than that of the region. The same is true
for the population. In addition, these data may suggest constant growth, which means that the average values of these values will be less informative. Based on this, the authors decided to evaluate the dynamics of relative changes in the studied macroeconomic parameters, with the exception of the unemployment rate, which is a priori represented as a percentage. The relative change was calculated as the current parameter value minus the previous value and divided by the previous value. The data sets are time series from 2007 to 2019 expressed in terms of purchasing power parity.

The main attention is paid to comparing the average values of the dynamics of macroeconomic indicators. At the same time, the hypothesis about the difference in the average is tested, due to the fact that the differences may be because of random factors. Furthermore, since the data is a time series, the degree of interdependence of the analyzed quantities is of interest.

Avg. - average value of the macroeconomic indicator.
P-val. - Two-tailed p-value of hypothesis testing (t-test. Null hypothesis: Difference of means = 0)
Corr. – the correlation of the indicators.

| Table 1. Socio-economic indicators of Russia and the Arctic regions of Russia |
|-----------------------------|-----------------|-----------------|-----------------|-----------------|
|                            | Russia (Avg.)   | Murmansk region | Nenets Autonomous district | Chukotka Autonomous region |
|                            | Avg. | P-val. | Corr. | Avg. | P-val. | Corr. | Avg. | P-val. | Corr. |
| GDP                         | 3,782% | 0.209 | 0.580 | 3,407% | 0.8858 | 0.219 | 5,359% | 0.5471 | 0.062 |
| Wages                       | 4.121% | 0.660 | 0.958 | 1,684% | 0.0234 | 0.840 | 3,769% | 0.6117 | 0.897 |
| Population                  | 0.188% | 0.001 | 0.1507 | 0.406% | 0.6239 | -   | -0.324% | 0.0565 | 0.1855 |
| Unemployment                | 5,967 | 3E-04 | 0.424 | 7,575 | 8E-04 | 0.355 | 3,975 | 3E-06 | 0.641 |

| Table 2. Socio-economic indicators of Russia and the Arctic regions of Russia |
|-------------------|-------------------|-------------------|-------------------|
|                   | Russia (Avg.)     | Yamalo-Nenets Autonomous district | Republic of Komi | The Republic Of Sakha (Yakutia) |
|                   | Avg. | P-val. | Corr. | Avg. | P-val. | Corr. | Avg. | P-val. | Corr. |
| GDP               | 3,782% | 2.837 | 0.5441 | 0.67 | 1.986% | 0.2558 | 0.496 | 0.3099 | 0.172 |
| Wages             | 4.121% | 2.023 | 0.0226 | 0.854 | 3.356% | 0.3576 | 0.895 | 0.3913 | 0.822 |
| Population        | 0.188% | 0.337 | 0.6334 | -0.1660 | -1.257% | 4E-05 | 0.2358 | 0.5281 | 0.1152 |
| Unemployment      | 5,967 | 3E-06 | 0.610 | 8,108 | 3E-05 | 0.786 | 3E-07 | 0.789 | 7,883 |

| Table 3. Socio-economic indicators of Russia and the Arctic regions of Russia |
|-------------------|-------------------|-------------------|-------------------|
|                   | Russia (Avg.)     | Krasnoyarsk region | Arkhangelsk region | Republic of Karelia |
|                   | Avg. | P-val. | Corr. | Avg. | P-val. | Corr. | Avg. | P-val. | Corr. |
| GDP               | 3,782% | 3.410% | 0.8195 | 0.402 | 6,063% | 0.3431 | -0.033 | 3,161% | 0.6360 | 0.735 |
| Wages             | 4.121% | 3.319% | 0.1054 | 0.956 | 4,060% | 0.9252 | 0.919 | 3,661% | 0.4254 | 0.948 |
| Population        | 0.188% | -0.077% | 0.1894 | 0.219 | -0.954% | 1E-04 | 0.1772 | -       | 0.0034 | 0.2951 |
| Unemployment      | 5,967 | 6,225 | 0.2330 | 0.814 | 6,475 | 0.1195 | 0.250 | 8,333 | 2E-05 | 0.342 |
Table 4. Socio-economic indicators of the United States and the Arctic regions of the United States

|                | USA (Avg.) | Alaska  | P-val | Corr. |
|----------------|------------|---------|-------|-------|
| GDP            | 3,232%     | 0,918   | 0,1723| 0,052 |
| Wages          | 2,130%     | 2,316   | 0,8345| 0,761 |
| Population     | 0,557      | 0,1764  | 0,446 |
| Unemployment   |            | 0,3260  | 0,876 |

Table 5. Socio-economic indicators of Canada and the Arctic regions of Canada

|                | Canada (Avg.) | Yukon | Northwest Territories | Nunavut |
|----------------|---------------|-------|-----------------------|---------|
| GDP            | 3,221%        | 4,828%| 0,1758                | 0,2924  |
| Wages          | 2,216%        | 2,508%| 0,2838                | 0,1188  |
| Population     | 1,061%        | 1,456%| 0,185                 | 0,931   |
| Unemployment   | 6,846         | 5,215 | 2E-05                 | 14,12   |

Table 6. Socio-economic indicators of Sweden and the Arctic regions of Sweden

|                | Sweden (Avg.) | Norrbotten | Vasterbotten |
|----------------|---------------|------------|--------------|
| GDP            | 3,560%        | 0,9667     | 0,717        |
| Wages          | 2,501%        | 0,2353     | 0,717        |
| Population     | 0,921%        | 3E-04      | -0,006       |
| Unemployment   | 4,300         | 0,0813     | 2,450        |

Table 7. Socio-economic indicators of Denmark and the Arctic regions of Denmark

|                | Denmark (Avg.) | Faeroe islands | Greenland |
|----------------|---------------|----------------|-----------|
| GDP            | 0,155%        | 5,046          | 0,025     |
| Wages          | 2,369%        | 2,390          | 0,950     |
| Population     | 0,533%        | 0,517          | 0,936     |
| Unemployment   | 6,226         | 3,483          | 0,733     |
Table 8. Socio-economic indicators of Finland and the Arctic regions of Finland

|                  | Finland (Avg.) | Lapland | North Ostrobothnia |
|------------------|----------------|---------|--------------------|
| GDP              | 1,051%         | 2,991%  | 1,480%             |
| Corr.            | 0,4005         | 0,365   | 0,8234             |
| P-val.           | 0,365          | 0,409%  | 0,0031             |
| Corr.            | 0,613          | 0,156   |                    |
| Wages            | 2,084%         | 0,678%  |                    |
| Corr.            | 0,0066         | 0,026   |                    |
| P-val.           | -              |         |                    |
| Corr.            | -              |         |                    |
| Population       | 7,938          | 10,36   | 0,586              |
| Corr.            | 3E-07          | 0,895   |                    |
| P-val.           | -              | 0,476%  |                    |
| Corr.            | -              | 0,8571  |                    |
| Unemployment     | 0,507%         | 0,236%  |                    |
| Corr.            | 0,895          | 0,8571  |                    |
| P-val.           | 0,191          | -       |                    |
| Corr.            | -              | 0,130   |                    |

Table 9. Socio-economic indicators of Norway and its Arctic regions

|                  | Norway (Avg.) | Nordland | Troms | Finnmark |
|------------------|---------------|----------|-------|----------|
| GDP              | 3,406%        | 4,264%   | 4,084%| 2,887%   |
| Corr.            | 0,569         | 0,569    | 0,397 | 0,4966   |
| P-val.           | 0,4747        | 0,4863   | 0,942 | 0,6379   |
| Corr.            | 0,588%        | 0,942    | 0,970 |          |
| Wages            | 2,651%        | 3,076%   | 3,041%| 2,962%   |
| Corr.            | 0,3842        | 0,2621   | 0,924 | 0,2318   |
| P-val.           | 0,877         | 0,0002   | 0,361 | 0,2318   |
| Corr.            | 0,191         | -        | 0,167 |          |
| Population       | 1,568%        | 0,277%   | 0,318 |          |
| Corr.            | 6E-06         | 0,681%   | 0,361 |          |
| P-val.           | -             | 0,0002   | 0,348 |          |
| Corr.            | -             | 0,167    |       |          |
| Unemployment     | 2,377         | 2,331    | 1,923 | 3,031    |
| Corr.            | 0,588%        | 0,653    | 0,0003| 0,0000   |
| P-val.           | 0,653         | 0,522    | 0,458 |          |
| Corr.            | 0,679%        | 0,380    |       |          |

Table 10. Socio-economic indicators of Norway and its Arctic regions

|                  | Norway (Avg.) | Svalbard |
|------------------|---------------|----------|
| GDP              | 3,406%        |          |
| Corr.            | 2,711%        |          |
| P-val.           | 0,5470        |          |
| Corr.            | 0,431         |          |
| Wages            | 2,651%        |          |
| Corr.            | 1,058%        |          |
| P-val.           | 0,0203        |          |
| Corr.            | 0,800         |          |
| Population       | 1,568%        |          |
| Corr.            | 1,931%        |          |
| P-val.           | 0,6790        |          |
| Corr.            | 0,380         |          |
| Unemployment     | 2,377         |          |
| Corr.            |              |          |
| P-val.           | N/A           |          |
| Corr.            | N/A           |          |

Analyzing the results obtained, it is possible draw conclusions about the dynamics of macroeconomic indicators of a particular Arctic region in comparison with the entire country in which it is located.

The population dynamics in the Arctic regions of the countries is mostly positive, but there is not much negative dynamics, (Sweden, Norrbotten region, Russia-Murmansk region and the Republic of Karelia, the Finnish province of Lapland, Northwest Territories in Canada, Greenland) this is probably due to migration processes within the country as a result of objective difficulties of living and development of social infrastructure. In many cases, there is no reason to reject the hypothesis of equality of averages. It is worth noting that the population of the Arctic region and the country in which this region is located, characterizes the demographic potential of the territories, and also indirectly reflects the level of relative "attractiveness" of living in the region.

The unemployment rate is almost universally higher only in the Northern territories of Russia. This was mainly influenced by the processes of dismissal of employees in connection with the liquidation of organizations, or with the reduction of the number of staff. In the Arctic regions of other countries, the situation is more ambiguous. This indicator is lower in some regions and higher in others. In some areas, based on statistical tests, the difference is due to random factors and does not indicate a systematic shift. The level of employment and self-employment is one of the important indicators of the socio-psychological climate of the territory and its economic development.

Almost all of the Arctic administrative-territorial formations of the positive difference of the dynamics of wages with the country indicator, with the exception of Alaska, where the dynamics of wages close to the national average level in Russia these regions are the Republic of Komi,
Krasnoyarsk Krai, Arkhangelsk oblast, Republic of Karelia. Analyzing the results obtained, we can draw conclusions about the dynamics of macroeconomic indicators of a particular Arctic region in comparison with the entire country in which it is located.

Due to the results of testing hypotheses about the equality of averages, we can state the fact that in the vast majority of cases, the dynamics of the gross regional product in the Arctic regions coincides with the dynamics of the country's gross domestic product. The reasons for such a situation in these regions, despite the low population density, are large-scale industrial production and a high level of costs. The economic structure of almost all Arctic territories, including the Russian segment, is dominated by mining, primarily natural gas, oil, and various ores.

Fishing and fish processing (for example, shrimp fishing in Greenland), reindeer herding, and traditional fisheries play a significant role in the economy of many countries. Manufacturing industries are poorly developed. Some areas include shipbuilding and ship repair (Arkhangelsk and Murmansk regions, Alaska), agriculture (sheep farming in the Faroe Islands), energy (including nuclear in Russia and geothermal in Iceland), and tourism.

Since the goals set in this paper were aimed at comparing the dynamics of the macroeconomic indicators of the Arctic regions and the country in which they are located, Iceland was excluded from the above data, since the entire region is an Arctic region. It is worth noting that it is not correct to exclude socio-economic indicators of a country from the analysis on the one hand, but it is also incorrect to compare the entire country with other countries due to their different socio-economic development and geographical location (including the length from North to South). Based on this, the authors found it necessary to evaluate some parameters of macroeconomic indicators from the position of descriptive statistics (Table 11).

| Table 11. Social and economic indicators of Iceland |
|-----------------------------------------------|
| GDP  | Wages | Population | Unemployment |
| Mean | 0,0327 | 0,0211 | 0,0128 | 4,5846 |
| Standard error | 0,0393 | 0,0187 | 0,0026 | 0,5253 |
| Median | 0,0728 | 0,0206 | 0,0114 | 3,9917 |
| Standard deviation | 0,1361 | 0,0648 | 0,0089 | 1,8939 |

If we compare the average values of the studied indicators with similar values of other countries, we can state that the dynamics of the main indicators of Iceland exceeds those of a number of countries.

Analyzing the socio-economic indicators of the Arctic countries, it can be noted that Norway has a consistently high social and demographic potential in the Finnmark, Troms, Sweden and Iceland regions. The experience and development strategy of these territories require further study in order to apply them to the development of the circumpolar zone in General and the Arctic regions of Russia in particular. In most cases, the positive correlation between the dynamics of indicators of regions and the country as a whole allows us to conclude that the development of the Arctic regions is in the mainstream with the economy of larger territorial entities.

3. Conclusion.
In the twenty-first century, the Arctic became the territory of active observation of all countries of the world. The Arctic region is acquiring a new quality status. Its importance depends on the availability of large reserves of natural resources, the Northern sea route, the need to protect the environment and preserve the indigenous population.

It is important that industry has the largest share in the gross domestic product and determines the state of the country’s technical level and affects all sectors of the national economy and social sphere. Thus, the dynamics of industrial development is the driving force of the industry that determines the
overall state of social development. However, due to the geographical location and climate features, it would be feared that the Arctic regions may show lagging dynamics of the main economic indicators.

According to the results of the analysis, it can be stated that the development of the Northern territories, according to most of the estimated macroeconomic indicators, does not show a negative dynamics, while the whole country shows a positive one. Quantitative assessment allows us to judge that the Arctic territories demonstrate economic development rates comparable to the rates of the country in which they are located.

This allows us to hope for further development of these areas, as well as for cooperation in the economic, environmental and economic spheres. International cooperation is the most progressive mechanism for the development of the world. In the Arctic, there is clearly a close relationship between different countries, this is due to the common fragile natural environment, the shortest sea and air routes, and the uniqueness of the spiritual and cultural heritage of the indigenous population.

The basis for international cooperation in the Arctic is the identity of socio-economic and scientific problems. Nevertheless, there are difficulties in developing a unified Concept of the North, primarily due to the diversity and diversity of the Northern territories.

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