Information and communication technologies as a component of the innovative potential of the Murmansk region

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Abstract. The article describes a special resource of the innovative potential of the regions - information and communication technologies (resource ICT). The features of the ICT development are analyzed, their impact on the innovative potential of the industry in the Murmansk region. The level of development of information and communication technologies provides the necessary coordination of the actions of participants in economic activity. The characteristic of the most important industries of the Murmansk region is given. The main factors of innovative potential are characterized and the influence of ICT development on the innovative development of industry is determined.

1. Introduction
The development of all areas of the economy, especially industry, is largely determined by the level of development of information and communication technologies (ICT), which today are one of the main factors of innovative potential. Therefore, it is so important to raise this factor to the appropriate level and use it effectively for the prospective innovative development of a country or region.

A preliminary analysis showed that development ICT in the Russian Federation is low compared to other regions of the Arctic, there are significant differences between the regions of the Russian Arctic. These differences are determined by the level of innovative development of industrial enterprises.

2. Lines of research
2.1. Features of the development of ICT in Arctic countries
At the present stage, in connection with the increasing activation of regionalization processes, increasing the competitiveness of countries and regions is becoming a priority for their economic development [7], [8]. Therefore, the development and research of the natural resources of the Arctic today has become a priority for the Arctic states due to the growing demand for information and communication technologies, mineral resources, biological and other resources. The results of studies [1], [2] devoted to the analysis of the development of ICT in the Russian regions show that since 2015, negative trends in the dynamics of the development of digital infrastructure have been observed, due to a number of micro and macro-economic and geopolitical factors. For example, in regions of the Arctic zone of the Russian Federation with a low population density, broadband connectivity is weak due to wide geographical distances, lack of necessary infrastructure and service providers, and also because of the high cost of connection. The costs of information and communication services tend to decrease in many regions, with the exception of those in which large industrial projects are being implemented.
The development of ICT in the regions is determined by the general level of ICT development in the country. The data table 1 indicate that there is a significant lag of the Russian Federation in the development of information and communication technologies from the countries of the Arctic zone.

There are also studies that prove the existence of the so-called digital inequality among Russian regions.

Table 1. Information and Communication Technology Development Index (Based on the data https://www.itu.int/net4/ITU-D/idi/2017/index.html)

| IDI 2017 Rank | Economy         | IDI 2017 Value | IDI 2016 Rank | IDI 2016 Value |
|---------------|-----------------|----------------|---------------|----------------|
| 1             | Iceland         | 8.98           | 2             | 8.78           |
| 4             | Denmark         | 8.71           | 3             | 8.68           |
| 8             | Norway          | 8.47           | 7             | 8.45           |
| 11            | Sweden          | 8.41           | 8             | 8.41           |
| 16            | United States   | 8.18           | 15            | 8.13           |
| 22            | Finland         | 7.88           | 21            | 7.83           |
| 29            | Canada          | 7.77           | 26            | 7.64           |
| 45            | Russian Federation | 7.07     | 43            | 6.91           |

2.2. The characteristic of industry potential
Murmansk region is a strategically important region of Russia. Through the White Sea, the Murmansk region borders on the Arkhangelsk. The area of the Murmansk region is 144 902 square meters. km, the population for 2016 amounted to 762.2 thousand people.

The Murmansk region consists of 12 urban districts, 5 municipal districts, 23 settlements, of which 13 are urban, 10 are rural. The region has a good geographical location, a developed transport network and communications, which provide the necessary conditions for interaction with other countries. Murmansk region is part of international Barents Euro-Arctic cooperation. The region is based on the Northern Navy, which guards’ countries on the northern borders. A nuclear icebreaker fleet is based in Murmansk, which made it possible to make navigation in the western sector of the Arctic year-round.

The city of Murmansk has the most powerful northern port in Europe.

The basis of the economy this region is made up of the raw material sectors: mining, mining and chemical, metallurgical, fishing and fish processing. One of the strategic advantages of the regional economy is the high level of development of the mining and metallurgical complex [11].

One of the features of industrial development in the Murmansk region is the orientation to the exploitation of natural resources. The prevalence of elements of extensive development is observed, the excess of resource base consumption over its reproduction, due to which comes the depletion of the nature of the region.

2.3. Features of industrial development
The main directions of the development strategy of the Murmansk region until 2025 [3], the following are considered as priorities of regional policy in the scientific and innovative spheres:
- assistance in the creation of innovative technologies and bringing them to the stage of commercial attractiveness, including through the creation of testing ranges capable of providing full-scale testing and certification of oil and gas and industrial equipment intended for geological exploration and production in the Russian Arctic;
- promoting the adaptation of existing and developing technologies to the conditions of the Arctic, as well as the creation of innovative companies specializing in the production of new materials using the resource base of local mining enterprises, by forming an innovative cluster of Arctic technologies.

It is also planned to form a technological cluster for hydrocarbon production and processing in the Russian Arctic by 2022, a mining chemical and metallurgical cluster by 2023, a regional marine service cluster by 2024, an Arctic technology innovation cluster by 2025, etc.

Consider the most important projects that can significantly affect the economic growth rate of the Murmansk region.

The Shtokman gas condensate field is of strategic importance for Russia as a whole, since it will create a powerful reserve for the future development of hydrocarbon resources in the Arctic. The project provides for underwater natural gas production, construction of a liquefied natural gas plant. From the Shtokman gas condensate field, natural gas will be supplied via the Teriberka-Murmansk-Volkhov trunk pipeline for consumers in the North-Western region of Russia and for export deliveries to Western Europe, as well as liquefied natural gas to European markets.

It is also planned to build a northern tidal power station in the Dolgaya Bay of the Barents Sea, build the Kola NPP-2, build an oil refinery on the Kola Peninsula, build wind farms, build and reconstruct power grid facilities in the Murmansk Region energy system, and the People's Tariff project (modernization and construction of boiler houses in Murmansk areas).

The development of strategically important sectors of the Murmansk region is largely determined by the level of innovative potential of the region, which includes an information component. The formation of the considered clusters and industrial projects and their successful functioning is possible provided that innovative technologies are used, which, in turn, are based on the use of digital technologies [9].

Since ICTs are one of the factors of the region’s innovative potential, it is important to consider the features of its definition and the strategies for which it is compiled.

A feature of the strategies of innovation regions is the choice of directions and the determination of the scale of the proposed changes. Moreover, their desired pace and scale mainly depend on their scientific and technical potentials and the state of the external environment - the innovation climate.

Assessment of development potential is not reduced to one absolute indicator and is based on a comparison of a set of indicators of the innovation region.

The blocks of estimated indicators for determining innovative potential are distinguished: grocery; functional; resource; management; organizational; informational [10].

Currently, an important component of the innovative potential of the region is information. The successful use of information technology is determined by the current level of ICT. Creating a common network, establishing a common information space is possible using ICT. The information and communication component of innovative potential includes the region’s ability to provide accessible communications of various kinds for all economic entities.

Describe the direction of digital technology in the Arctic.

2.4. Features of the development strategy of information and communication technologies in the Arctic zone and the Murmansk region

The digital technologies in the regions of the Arctic zone primarily include mining, in particular, the development of offshore deposits, oil and gas engineering.

Information and telecommunication technologies in the Arctic zone of Russia and, in particular, the Murmansk region should be developed systematically and with state support. These principles are implemented in the framework of the regional projects "Information Infrastructure", "Information Security", "Digital Public Administration".

Currently, various types of communications are developing in the region: satellite, shortwave, tropospheric. Various enterprises are building their networks, primarily oil and gas producers, but,
according to experts, the lack of system and inconsistency in the development of telecom technologies leads to inefficient capital investments, costs and loss of our country’s position in the Arctic region.

Projects that will contribute to the development of ICT in the regions of the Arctic zone of the Russian Federation involve the construction of a fiber-optic communication line Murmansk - Vladivostok through the Russian Arctic and its integration with the FOCL of Rostelecom.

The main task for the development of the ICT in the Arctic is the creation of a modern unified digital communication environment, which will become the basis not only for the provision of communication services, but also for the operation of control and security systems, television and radio broadcasting, emergency services [4].

3. Conclusions
1. The development of ICT in the region involves the creation of legal, economic conditions for creating a common accessible network for all potential users, the creation and implementation of telecommunication systems for the formation of information resources of the region’s industry.

2. The development of the information and communication sector in the Murmansk region is extremely important to maintain the functioning of the industrial sector up to date. ICTs are necessary for all industries that are concentrated in the Murmansk region.

3. If we take into account the latest events that are caused by the coronavirus pandemic, then information and communication technologies (resources) will be one of the prevailing factors in the further adjustment of the innovative potential of the Murmansk region in particular.

4. Directions for future research
Further research areas suggest a statistical analysis of the influence of the main parameters of the development of information and communication technologies on the innovative potential of the main industries of the Murmansk region.

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