

## Conference Paper

# Improving the Training System of Water Transport Management Specialists in the Arctic Zone of the Russian Federation

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## Abstract

The article discusses the issues of building a competitive system of higher education in the Arctic region and formation of specialists' professional competencies for solving urgent scientific and technological problems within the concept of the Arctic economy innovative development. It is concluded that in order to be competitive, the new regional higher education system must undergo rapid changes to meet the modern economy requirements. That being said, the formation of Arctic competences is on the one hand a specific condition of professional training of specialists for the Arctic economy, which is not secured by the legislation; on the other hand, it is an important factor in maintaining competitiveness of both the regional vocational education system as a whole and that of a specific university.

**Keywords:** world-class research and education center (REC), Arctic competences, maritime education, water transport management.

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Received: 24 December 2019

Accepted: 9 January 2020

Published: 15 January 2020

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Knowledge E

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BRDEM-2019 Conference  
Committee.

## 1. Introduction

The issue of training personnel that meet the modern requirements is as relevant as debatable against the background of emergence and growth of global transition problems to the post-industrial society. These problems are characterized by the dynamic and rapidly changing production and technological conditions, associated with the scientific and technological progress, including the digital transformation of the economy and the society. It is obvious that the model for constructing the Russian vocational education system (including the regional level) should correspond to the global trends, where competitiveness and uniqueness as the basic criteria of competitiveness are the key factors in the modern VUCA world (VUCA is the acronym which stands for the English terms Volatility, Uncertainty, Complexity, Ambiguity), which is utterly fragile, complex, tentative and ambiguous, and in which according to K. Roberts: "...it's

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worth focusing not on the new, because new is already old, but on the present and currently central» [8]. That means that we are facing the task and the need for the new methodological approaches in order to develop VUCA strategies in the system of vocational education (higher vocational education above all), which should be adaptive to the changes in external environment. In this regard, transforming the Russian higher education system is becoming one of the key tasks, since it is in the higher education system where the nation's intellectual capital is formed and the basic conditions for the production of knowledge and innovations are created, which in their turn are the main factor of competitive development in the global economic competition context. It should be noted that the reason for the increased interest in the issues of competitiveness of the Russian education lies not only in the objective factors of the educational space globalization, which makes it possible to compare the effectiveness of different systems at the international and interregional levels, but also in the practical sphere, from the point of view of ensuring the quality of Russian education in accordance with the population's changing demands and perspective tasks - the development of Russia's society and economy and efficiency improvement of the national youth policy for the benefit of the country's innovative and socially oriented development [2].

## 2. Materials and Methods

The authors used functional analysis, as well as statistical methods for studying production and economic processes. The studies were carried out on the basis of factual materials and information provided by the Polar Branch of Russian Federal Research Institute of Fisheries and Oceanography (PINRO).

## 3. Results

The national educational policy has the task of increasing the contribution of vocational education to the country's and region's socio-economic and cultural modernization, as well as to raising the global competitiveness of human capital assets, which are the key factors in the formation of a knowledge-driven economy and transition to an innovative and socially oriented type of economic development, according to the strategic objectives enshrined in the concept of long-term socio-economic development of Russia [3].

It is important to emphasize that the priority direction of the state policy in the higher education system is formation of a differentiated network of professional educational

organizations that takes into account specific features of the regions, in particular by creating university centers for innovative, technological and social development of the regions [3].

Such feature of the Arctic regions, including the Murmansk region, is the formation of Arctic competencies, which are on the one hand a specific (although legally unsecured) condition for training specialists to work in the extreme climatic environment of the Arctic. On the other hand, this is a unique competitive advantage characterizing the quality of professional education, which allows both individual educational organizations and the regional vocational education system as a whole (in this case, the regional higher education system of the Murmansk region) to be attractive and relevant for the target group of applicants (graduates of 11th forms from the Murmansk region and other regions of Russia, as well as from the neighboring countries), who connect their future career with the High North and the Arctic.

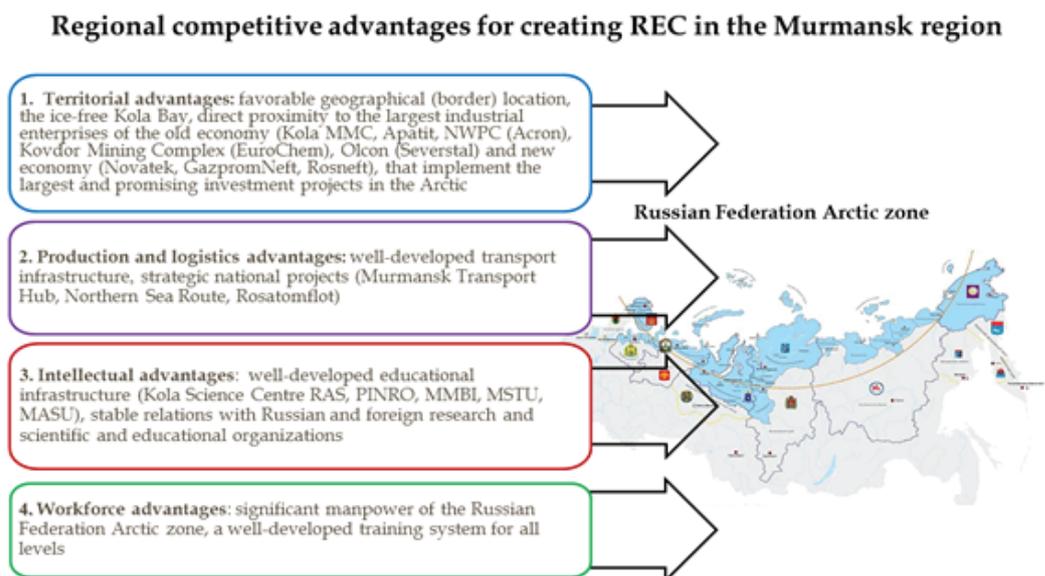
Innovative type of economic development requires the formation of an effective higher education system, including such elements as the formation of an innovative ecosystem based on the cooperation of science, education and the real sector, which can ensure a flexible response to requests from the economy. It is no coincidence that the President of Russia Vladimir Putin, speaking at the Arctic Forum in St. Petersburg, highlighted the need to create a powerful scientific and technological base in the Russian Arctic that will provide the integrated development of the Arctic macro-region, including the solution of unique and non-standard problems. For this reason, a world-class Scientific and Educational Center (REC) will be created in one of the Arctic regions in the framework of the national project Science [6, 10]. It should provide training for highly qualified personnel and solve applied scientific and practical problems of innovative development of Arctic spaces and resources.

Murmansk oblast has the full range of competitive advantages for creating such a world-class REC in the region (Figure 1).

The goal of creating a REC is to unite the potentials of leading scientific and educational organizations of higher education with the real economy sector, with the aim of training personnel for solving major scientific and technological problems in the priority areas of scientific and technological development of the Russian Federation [6, 10] and conducting world-class research and development, which should result in obtaining new competitive technologies and products, as well as their commercializing. At the same time, the destination model for creating such REC should take into account the main challenges of the innovative development of the Russian Arctic in the face of increasing global competition, accompanied by increased geopolitical rivalry, including

the control over raw materials, energy, water, food and human resources (Figure 2). The growing role of human capital as the main factor in the innovative model of economic development exacerbates rivalry and the struggle for highly qualified personnel ("head hunting"), which also actualizes the task of quality improvement of the personnel training for the Russian Arctic economy.

REC is a powerful organizational and economic tool for implementing the strategy of scientific and technological development of the Russian Federation; such educational center is capable of accelerating transformation of the Murmansk region into a leading innovation and technology center of the Arctic competencies through training qualified personnel to solve major scientific and technological challenges. It can also contribute to the creation of advanced innovative and globally recognized developments in the field of products, equipment and technologies for the reclamation of Arctic spaces and resources.



**Figure 1:** Competitive advantages for creating a world-class REC in the Murmansk region for the benefit of innovative socially oriented economic development of the Russian Arctic.

## 4. Discussion

In the Murmansk region, preservation and development of an integrated system of multilevel maritime education with a specialization in all types of maritime activities is of paramount national importance. This system should become the basic priority of the regional state policy in the field of vocational education, both in terms of ensuring sustainable socio-economic development of the Murmansk region itself and ensuring



**Figure 2:** Main challenges of the transition to an innovative socially-oriented development model of the Russian Arctic in the face of increasing global competition.

state interests in strengthening the personnel potential of maritime activities in the Arctic regional direction of the Russian Federation.

The priority task of Murmansk State Technical University is to systematically improve the quality of marine education with an emphasis on Arctic competencies. This implies improvement of the university continuing education system as a whole based on modernization of teaching technologies and educational programs content, which allow building flexible (modular) educational paths. Professional standards and specific needs of employers should also be taken into account to ensure their compliance with the modern economy requirements. At the same time, the task of creating a world-class REC in the region actualizes the need to build competencies in the field of research activities, which is included in the list of the main tasks of the graduates' professional activities, enshrined as mandatory in the Federal State Educational Standards of Higher Education (FSES HE) for engineering training areas (specialization fields). In this sense and in the context of the task to create a world-class REC in the region (Murmansk oblast), marine bioprospecting in the Arctic as a new and promising area may be of great interest. It is a forward-looking, but a very promising area of scientific and industrial activity (as the author believes), which contributes to the development of innovative technologies based on the use of unique genetic properties of Arctic organisms.

As is commonly known, the seas of the Russian part of the Arctic shelf (the northern part of the Barents Sea, the Kara Sea, the Laptev Sea, the East Siberian and Chukchi Seas) and the Arctic Ocean, as well as freshwater fishery reservoirs located in the

Arctic regions of the Russian Federation, have unique geophysical and hydrological conditions determining the extreme properties of the environment. Aquatic biological resources living under such conditions have developed genetically fixed adaptations, whose functioning is determined by unique chemical compounds. The main goals of bioprospecting are: identification of chemical agents of biological origin having properties useful for humans, decoding their molecular structure, and further laboratory and industrial synthesis. Bioprospecting study objects can be microorganisms (e. g., viruses, bacteria, molds, yeast, microalgae and protozoa) and larger organisms such as macrophytes, invertebrates, mollusks, and fish. The most important research area in the field of bioprospecting is the study of marine and bottom-dwelling microorganisms.

It should be noted that at present considerable global interest in biotechnological potential of the Arctic biodiversity can be seen, therefore this area ("Bioprospecting in the Arctic") is actively developing. The unique properties of Arctic organisms find effective use in the development of such classes of substances as enzymes, antifreeze proteins, biological treatment substances, bioflocculants, pharmaceutical, cosmetic and medical preparations, antimicrobial, antitumor and vitamin preparations, natural dyes and feed additives. Unfortunately, the absence of a planned research program in this area, as well as commercialization problems of scientific developments, lead to the fact that the use of biotechnological potential of aquatic biological resources in the Russian Arctic still has the level which does not meet modern requirements, and is generally fragmented.

One of the ways for the development of Arctic bioprospecting should be cooperation between the educational and scientific institutions, especially those located in the Murmansk region. In that respect it seems to be most promising and efficient to combine the efforts of the Murmansk State Technical University (MSTU) and PINRO (Polar Research Institute of Marine Fisheries and Oceanography) with the support of the regional fisheries complex enterprises. Such cooperation can ensure a logical combination of scientific and technical potentials of fisheries science and education, which would allow for constant replenishment of qualified scientific personnel for the development of the "Bioprospecting" and "Biotechnology" areas. Cooperation of this type fully complies with the tasks of creating a REC [6, 10], including for the purpose of conducting world-class research and development that should result in new competitive technologies and products, and their commercialization. As part of the Arctic bioprospecting development, it seems advisable to create the Russian National Collection "Arctic Aquatic Bioresources" based on samples of Arctic aquatic organisms collected during PINRO resource studies, independent sampling by MSTU employees,

and samples collected during other environmental projects in the Arctic. Implementation of this project will be instrumental in solving an important national task of ensuring global competitiveness in the field of innovative technologies based on the use of unique genetic properties of Arctic organisms.

All of the above makes it relevant to introduce the appropriate educational modules, which would allow students in marine professional fields to build competencies in "Arctic Bioprospecting" study area (within the variable part of the educational program individually shaped by the participants of educational relations). For example, it seems appropriate to use this approach in the following training fields: 04.06.01 Biology (Microbiology and Biochemistry), 04.19.03 Food Products of Animal Origin (Technology of Products from Water Raw Materials), 04.35.07 Aquatic Bioresources and Aquaculture (Marine Bioresources and Mariculture), 04.26.01 Water Transport Management and Hydrographic Support of Navigation (Master's degree level). In all the above mentioned training fields, the list of the graduates' professional activities specified in the Federal State Educational Standard [7] includes research activities directly related to oceanography, the study of the sea and seabed. The requirements to the structure of the Master's degree program in this area, approved by the Standard [7] include the obligatory (basic) part and the variable part formed by the participants of educational relations, which provides the possibility of flexible implementation of Master's degree programs within the same training field, but having different training orientation, including research and development (which is fully related to the variable part of the program).

## 5. Conclusion

Rational development of Arctic resources is an urgent task throughout the entire Russian economy. The formation of research competencies in the field of Arctic bioprospecting, including the creation of the Russian National Collection "Arctic Aquatic Bioresources" and the development of advanced research in biotechnology will not only be a significant contribution to the study and development of Arctic resources, but can also help Murmansk region to take the leading position and become the global competence center in this field, including the training of highly qualified personnel. Research of biotechnological potential of Arctic water biological resources may become one of the high-tech "growth points" for science, industry, and the country's economy in general.

## Funding

This work was supported by Murmansk State Technical University.

## Acknowledgement

The authors would like to thank their colleague for their contribution and support to the research. They are also thankful to all the reviewers who gave their valuable inputs to the manuscript and helped in completing the paper.

## Conflict of Interest

The authors have no conflict of interest to declare.

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