Development of human capital in the Arctic regions of Russia

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Abstract. This article considers the human capital development in the Russian Arctic regions as a basis for economic, social and demographic development. The article highlights main human capital theories and changes of its concept undergone over the past years. Human capital components were analysed using demographic resources capital (natural increase, migration growth), health capital (life expectancy, morbidity, mortality), education capital (level and structure of education, level of employment). In the last decade of the 20th century, the Russian Arctic regions lost their attractiveness as a labor market and experienced the negative migration. After the 2010s, the increased state's interest changed migration trends and natural population growth there. The demographic capital is more prosperous in the Russian Arctic zone than in other Russian regions. It is not typical for other countries and shows little impact of living conditions in Russia (harsh climate, underdeveloped infrastructure) on population growth. The employment structure shows that workers with higher and secondary professional education replace less educated workers. High mortality and morbidity of the population demonstrate low health indicators and problems with health care system in the Arctic regions. In conclusion, summary and recommendations are made to improve the human capital quality in the Russian Arctic regions.

1. Introduction
This article considers the development of human capital in the Russian Arctic regions as a fundamental basis for economic, social and demographic development. It has a direct and indirect impact on all spheres of life through its connection with science, health, education, employment, and cultural values. Human capital is an important factor in economic and social prosperity, strengthening, improving and developing of production, and increasing the income of the population. The purpose of this article is to examine the main theories of human capital and to trace the changes it has undergone over the years.

2. Relevance
The problem of human capital accumulation in the Arctic regions of Russia is relevant for three main fundamental reasons. First, the Arctic zone of Russia is considered as one of the strategically important territories of the Russian Federation [1]. Secondly, the Arctic territories are developing very unevenly, and in the near future the risks of unevenness may increase significantly [2]. Third, the quality of human capital in the new economy is the basis for sustainable development [3], [4].

As we know, Russian oil and gas exports do not provide sufficient development of the social sector [5]. In addition, in the context of growing demand for oil and gas, Russia was too late to join the structure of a modern "digital" economy [6], a "green economy" that would allow to modernize
workplaces in the Arctic regions, thereby increasing the attractiveness of jobs for high-quality human capital.

In this paper, we try to answer the question of how this problem manifests itself, and how human capital can be developed in these unfavorable for life territories. In addition, we show that there are critical issues that need to be addressed.

The measurement of human capital is usually based on three main approaches: "cost", "beneficial", and "educational". The integrated approach consisting of the above three elements is used oftentimes [7]. The term "human capital" became popular in Economics after the publication of an article by J. Mincer in 1958 [8]. G. Becker contributed to the theory by showing that workers can be assets having capital of skills and knowledge that have economic value [9]. Since then, the classic definition of human capital is knowledge, information, ideas, skills, and health of individuals capitalized through factors of production. Human capital is considered inseparable from its owner, but the level of capital aggregation is based on the authors' ideas about the need for its use. The "human capital" (hereafter HC) aggregation commonly consists of macro, meso, and micro level. The earliest works are devoted to the study of HC for national economies, and usually relied on the "cost" and "beneficial" concepts.

The work of R. Solow and the research of his followers during most of the 20th century demonstrated that the accumulation of physical capital does not explain much of the economic growth in national economies [10]. Hypotheses that explain the creation of knowledge and the increase in labor intensity through education and training related to an increase in HC have emerged. HC was understood as a set of investments in a person increasing their ability to work through education and professional skills. Later work of J. Mincer assessed the impact of education and training on wage growth [11]. The results were repeatedly scaled by researchers, but there were convincing critics showing too much influence of other, unaccounted factors. G. Becker in his later works on the basis of empirical calculations could not find convincing evidence for the original hypotheses, which also led him to understand the need to expand the concept [12]. J. Barney showed that HC is the main source of obtaining and maintaining a competitive advantage [13]. The new viewpoint implies the inclusion of behavioral aspects, motivation of economic activity. However, the main concept is still based on investment in HC through training [14].

The analysis of the influence of the main factors on the competitiveness of the economy showed that the human development index, along with GDP per capita, industrial production and export volume are among the most influential factors [15]. The modern view shows that HC in the modern "digital" economy is becoming the most important strategic resource that ensures competitiveness.

It is important to note the involvement of HC resources in the analysis. HC can be accumulated, exchanged, and invested in through its resources [16]. The study of HC resources is based on the allocation of social, intellectual [17], strategic [18], relational and other levels of formation [19]. HC is the most important competitive advantage not only for a firm, but also for regions and countries [20]. Thus, the characteristics that can be considered as HC are divided into two extremes. At one end there are stable or difficult to change characteristics, such as intelligence, personality, and physical attributes, and at the other end there are flexible characteristics that are easy to change, such as affect or irrational behavior [21], [22], [23], [24], [25]. Intermediate characteristics include knowledge and skills that may change, but remain fairly stable after acquirement [26].

Nowadays HC includes family spending on food, clothing, housing, education, health, culture, and government spending for these purposes [24].

Simultaneously with the development of the mainstream, the awareness of methodological dead ends, which inevitably rest on attempts to calculate the accumulated reserves of intangible wealth, changed the angle of research. There has been a shift from direct measurement of the amount of accumulated wealth in monetary units to identifying trends and ratios, and extending the analysis to narrower objects: regions, organizations, and personal qualities [25]. But the most fundamental definition of HC includes knowledge, skills, abilities, and other attributes of a person (knowledge, skills, abilities and others - KSAO), moreover it is a primary consideration of HC at the individual level. At macro levels, HC was viewed through linear aggregation of individual KSAOs at the level of
divisions, teams, sub-organizations, or firms. These traditional approaches were overshadowed by errors at various levels due to the generalization of results obtained at the micro level for the macro level. We should note the important direction of the concept evolution through the strategic development of human resources, which helps to more effectively manage existing and future crisis situations [26, 27].

Consideration of HC at the division level allowed us to show how the synergy of skills complementarity within the division is ensured [28]. Z. Channar and co-authors provided detailed evidence based on structural statistical equations of how HC variables (i.e. the acquirement of knowledge, skills and experience of employees) affect employee satisfaction, and therefore the effectiveness of organizations [29]. M. Tavakoli, H. Shirouyehzad, and R. Dabestani also developed a model for managing HC resources [30]. The study of HC reserves at the level of national initiatives and various types of labor market disparities that lead to the employees’ stress was carried out, for example, in J. Komlos’ work [31]. The structural relationships of HC reserves at the national and regional levels allowed R. M. Boarini, Mira d'ercole and G. Liu to explain how HC is produced and what are the links between education and its non-monetary results [32].

On the basis of numerous in-depth studies conducted in the field of HC and investment in it, it has been proved that investment in a person from the education point of view and enrichment of one’s knowledge is the key to the formation of a qualified and capable person who contributes to economic growth. In this study, an attempt was made to show in practice of how the Arctic regions of Russia are developing within the framework of the concept of HC.

3. Data and methods

The list of Russian Arctic regions includes, according to the national classification, the Arkhangelsk region (without Autonomous districts), Nenets Autonomous Okrug (hereafter NAO), Murmansk region, Yamalo-Nenets Autonomous Okrug (hereinafter Yamalo-Nenet AO), Krasnoyarsk region, Sakha republic (Yakutia), Chukotka Autonomous Okrug (hereafter Chukotka AO). These regions will be considered in this article.

The study involves data from official statistics of Russia. Analysis of HC development components is carried out according to the classical setting – using demographic resources capital (natural increase, migration growth), health capital (life expectancy, morbidity and mortality), education capital (level and structure of education, level of employment, both in general and in terms of education levels). The indexes were calculated based on the corresponding indicators. If the corresponding index is higher than 100%, the region has reached a level higher than the national average in this area.

4. Results

Like other European countries, Russia has experienced an economic crisis in recent years, which has led to the need of developing a strategy at the national and regional levels in order to reduce intraregional imbalances. In this regard, one of the specific tasks for 2014-2020 aimed at the regions of the Russian Arctic zone is to develop the Arctic regions. The tasks of the state program are defined: improvement of the life quality and protection of the population in the Arctic zone; creating conditions for the development of the Northern sea route; developing science, technology and improving the efficiency of using the resource base of the Arctic zone and the continental shelf of the Russian Federation in the Arctic; improving the efficiency of state management of socio-economic development in the Arctic zone. We should note that all these programs cannot be implemented without the main goal - the development of HC that provides competitive advantages to the region. The Russian Arctic regions are significantly lagging behind even the average Russian indicators in terms of modernisation [33]. Models of the Russian Arctic regions development based on systems of econometric equations have shown that the national banking [34], innovative, and technological systems have not provided the proper pace of development in the Arctic regions, despite the many programs adopted by the state [35].
In the last decade of the 20th century, the Russian Arctic regions lost their attractiveness as a labor market, and the negative migration accelerated. After 2010, the increase in the state's interest in the Arctic regions led to a change in demographic reproduction trends, see Figure 1.

![Figure 1. Demographic indicators of the population in the regions which territories are partially or completely included in the Russian Federation Arctic zone, 2018.](image1)

Demographic processes taking place in the Arctic regions of the Russian Federation have received a strong positive impulse. Stable negative values of the coefficient are observed only in the Arkhangelsk and Murmansk regions, figure 1. During the period from 2000 to 2018, the situation with natural population growth in the Arctic regions of the Russian Federation was characterized by positive dynamics, indicators in most regions of the Arctic zone were higher than the average Russian level. This can be explained by the younger population structure and relatively high income levels in the Sakha Republic and in the Nenets, Chukotka and Yamalo-Nenets Autonomous Okrugs. However, people continued to leave the Arctic regions.

However, people continued to leave the Arctic regions. A negative migration balance was typical for almost all Arctic regions in 2000-2018. Favorable conditions for population inflow were created only in the Krasnoyarsk region and the Nenets Autonomous Okrug in the middle of the study period. In 2018, the Chukotka Autonomous Okrug was marked by a positive migration increase of the population.

The regions of the Arctic zone are significantly lagging behind the national indicators in terms of life expectancy and the dynamics remain negative. The decline can be explained not only by differences in the development and quality of health care and other public goods but also by severe climatic conditions, see Figure 2. The current situation is critically different from the general trends of European countries that have territories in the Arctic zone. For example, in Norway and Finland, there is a steady increase in life expectancy over the same period of time. In 2018 it was 82.8 and 81.8 years, respectively, what is significantly higher than the Russian level.

![Figure 2. Indicators of life expectancy in the Russian Arctic regions.](image2)
The demand for HC in the labor market characterizes the level of employment of the population. In the Arctic regions, this indicator exceeds the national level and shows a positive trend. The highest level of employment is in the Chukotka AO (75.4%) and Yamalo-Nenets AO (74.5%), as well as in the Murmansk region (63.2%). The lowest level of employment is in the Arkhangelsk region (56.1%) as of 2018. An important aspect of studying the demand of the population of regions in the labor market is the structure of employment by level of education. Thus, in 2000 workers with secondary general education and secondary professional education level were the most popular in the labor market in all the considered regions. The structure of the employed population in 2018 is completely different - the largest share of the labor market is occupied by workers with secondary professional education (45%) and higher education (34.2%). On the contrary, workers with secondary general education (29.4%) and secondary professional education (39.4%) dominate among the unemployed. The most educated workers live in Yamalo-Nenets AO (45.8% of the employed and 25.9% of the unemployed), which belongs to the regions of new industrial development and is relatively more attractive for people to live in. The share of unemployment that exceeds the share of employment is typical for the Arctic regions population who has a lower level of education (basic general education and secondary general education), as well as no education. Thus, workers with a low level of education are replaced by workers with higher and secondary professional education.

Extending life expectancy is impossible without improving the quality and accessibility of medical care for the population. The main causes of death in the Russian Federation are diseases of the circulatory system and neoplasms. The morbidity rate per 1000 people in the Arctic regions is significantly higher than the average for the Russian Federation for the entire study period. The Nenets, (1369,9) Chukotka (1278,4), and Yamalo-Nenets (1272,1) Autonomous Okrugs stand out especially by general background of morbidity. The lowest indicator is in the Murmansk region (831,9) but even there it is higher than the national average (782,1) per 1000 people. The morbidity rate per 1000 population for neoplasms in the Arctic regions is higher than the national level and shows a steady growth. During the study period, this indicator has increased by 2-3 times. For example, in the Arkhangelsk region in 2000, this indicator was 8,1 and in 2018 it was 13,9. In the Krasnoyarsk region, the indicator was 7,2 and rose to 21,1. In the NAO, this indicator was 8,5 in 2000 and became 23 in 2018, respectively. The circulatory system morbidity per 1000 people tends to decrease, and in 2018 it was below the national average. The trend of increasing morbidity may be explained by increased attention to the prevention of mortality, since it is accompanied by a reduction in the mortality rate of the working age population. But the death rate in the working-age population in 2018 exceeds the national average. The highest mortality rate in the working age population is in the Chukotka Autonomous Okrug (954,6 per 100000 people of working age), and the lowest is in the Yamalo-Nenets Autonomous Okrug (359,9). Conducting clinical and screening examinations on the basis of outpatient clinics helps to identify diseases at the early stages of disease development, what increases the effectiveness of treatment and the likelihood of full recovery and maintaining a remission of diseases.

5. Methodology for assessing the dynamics of HC development in the context of entire Russia

In order to assess how the Arctic regions are developing in the context of entire Russia, we applied the methodology of rationing by the average Russian indicators. To do this, the percentage of the above indicator from the national average was calculated for each of the above indicators, if the target indicator should be increased. For example, in the Arkhangelsk region, life expectancy in 2000 was 62,77 years, and average life expectancy for Russia was 65,3, as a result, the corresponding index was calculated as I=(62,77/65,3)*100=96,1 (Table 1). If the target indicator should be lowered (for example, mortality, morbidity, unemployment), the index is considered as the share of the Russian level in the data for a specific region. For example, in the Arkhangelsk region, the infant mortality rate in 2000 was 14,4, while in Russia it averaged 15,3. Then the corresponding index is calculated as I=(15,3/14,4)*100=106,3 (Table 1). The data clearly show us how HC is attracted and developed in the regions relative to the average Russian level. It can be seen that entire Russia has developed HC at
a much higher level over the past 20 years than the Arctic regions. For example, in the Arkhangelsk region, the life expectancy index was 96.1% in 2000, and in 2018 it dropped to 74.1% of the national average. The infant mortality index in 2000 in the Chukotka Autonomous Okrug was 65.4% of the national average in 2000, and 40.2% in 2018%.

These indexes demonstrate the level of competitiveness of the region. If the index is higher than 100%, the region has reached the level of development in this area higher than entire Russia (Table 1).

Table 1. Indexes of achievement of average Russian human capital development indicators, % (*corresponds to the reverse order of the index)

|                | Demographic capital | Education capital | Health capital |
|----------------|---------------------|-------------------|----------------|
|                | Life expectancy at birth (years) | Percent of working age residents | Level of employment | Percent of employees with higher education among the employed | Percent of employees with higher education among the employed | Morbidity per 1000 people* | Mortality per 1000 people by neoplasm * | Mortality per 1000 people by diseases of the circulatory system * | Mortality of the population in working age * | The index of infant mortality * |
| 2000           | 98.1                | 102.8             | 104.8          | 75.6            | 40.0            | 70.8                      | 104.9                  | 103.6                      | 73.3                      | 106.3                      |
| Arkhangelsk region | 95.3                | 104.5             | 106.2          | 45.0            | 9.0             | 50.0                      | 105.0                  | 105.0                      | 92.6                      | 103.7                      |
| Murmansk region | 97.8                | 112.8             | 108.3          | 47.8            | 27.0            | 34.0                      | 134.4                  | 97.2                      | 122.4                      |
| Yamal-Nenets AO | 102.2              | 116.1             | 115.5          | 60.9            | 100.0           | 60.5                      | 149.1                  | 105.3                      |
| Krasnoyarsk region | 93.6                | 103.5             | 103.9          | 91.1            | 107.0           | 95.4                      | 118.1                  | 126.5                      | 85.3                      | 100.5                      |
| Sakha Republic (Yakutia) | 97.5              | 104.0             | 108.8          | 62.0            | 39.0            | 94.4                      | 173.5                  | 138.7                      | 107.0                      | 86.9                       |
| Chukotka AO     | 92.1                | 117.4             | 123.2          | 74.8            | 42.0            | 70.2                      | 236.1                  | 145.8                      | 86.4                      | 105.4                      |
| 2018           | 97.1                | 101.1             | 101.2          | 80.1            | 54.1            | 77.8                      | 83.5                   | 81.9                       | 84.5                      | 104.1                      |
| Arkhangelsk region | 96.4                | 105.8             | 105.7          | 93.0            | 104.3           | 106.4                     | 60.7                   | 55.2                       | 84.0                      | 90.1                       |
| Murmansk region | 87.2                | 114.8             | 124.6          | 133.9           | 125.1           | 162.7                     | 71.2                   | 94.5                       | 134.0                      | 91.1                       |
| Krasnoyarsk region | 77.8                | 102.3             | 101.5          | 86.0            | 75.8            | 115.0                     | 55.0                   | 134.7                      | 82.7                      | 89.5                       |
| Sakha Republic (Yakutia) | 79.0              | 104.0             | 103.9          | 94.4            | 66.2            | 129.8                     | 122.1                  | 78.3                       | 102.9                      | 102.0                      |
| Chukotka AO     | 84.6                | 111.4             | 126.1          | 110.5           | 18.9            | 162.5                     | 69.0                   | 78.5                       | 50.5                      | 40.2                       |

The final data can be averaged for each of the evaluation areas, see Table 2. According to Table 2, we can conclude that only one Arctic Russian region has developed its HC faster than the average parameter for Russia, this is the Yamal-Nenets Autonomous Okrug. This is a region where the main oil and gas resources are concentrated, that is why there are higher rates of development. But even in this region, the most prosperous of the reviewed ones, the education capital amounted to 44.5% of the national average in 2018, see Table 2. The lowest level of education capital in the Murmansk region, it was 31.4% of the national average. It is noteworthy that in 2000, the level of education capital in the Murmansk region was 46.4% of the national average. In other words, the already low percentage of employees with higher education has decreased in relation to the national average over the past 18 years.

Table 2. Average estimates of human capital development potential in the Arctic regions of Russia
6. Discussion
In this study, we took into consideration only those indicators that are available in Russian statistics. In the future, we plan to include data on employee competencies in the model.

The higher the level of education of individuals in the regions, the higher the level of employment. We can say that more educated people have a higher level of employment and are much less likely to become unemployed. At the same time, a low level of education or lack of it reduces the chances of finding a legal job. Usually these people are subject to a certain degree of discrimination, depriving them of equal protection of their interests in the form of contractual relations and protection of their rights.

The level of demographic and health capital development in the Russian Arctic regions is declining both in general and in comparison with other Russian regions. This has provided a reduction in life expectancy in almost all regions of the Russian Arctic zone over the past 20 years. The development of the Arctic regions residents' health capital has been insufficient even for simple reproduction of the population.

All of Russia has developed human capital at a much higher level than the Arctic regions over the past 20 years. Only one Arctic Russian region developed its human capital faster than the Russian average, the Yamal-Nenets Autonomous Okrug. This growth is driven by exports of oil and gas resources and higher incomes that attract young workers. This growth did not affect the educational status of employees and their health, and cannot serve as a basis for the conclusion about the competitiveness of the region.

7. Conclusion
Currently, human capital is considered as a key factor of competitiveness not only at the company level, but also at the national and international levels. We need more and more educated and prepared people to meet the challenges of a dynamic and uncertain future with serious social problems. It should also be taken into account that the problem of population aging, which is particularly acute for Russia, may eventually lead to a deficit in the labor market and thus self-limiting the competitiveness of the economy. The decline in life expectancy and the increase in morbidity do not correspond to global trends, and indicate critical problems in the development of human capital.

Our country's efforts for the economic and social development of the Arctic zone must be adapted to new trends and processes of global development, to growing competition, and to achieving full seamless integration into the world economy. All this is necessary, since the development and demand for the Northern sea route meets the resistance of alternative sea or land routes [1]. Ensuring these areas of development is impossible without developed human capital as the main resource of competitiveness in the new conditions [34]. We live in an era of innovation and new technologies where investing resources and efforts in education and the development of human capital is a necessary prerequisite for the success of society.

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References

[1] The State Program of the Russian Federation Socioeconomic Development of the Arctic Zone of the Russian Federation (17.12.2014 № 1393, 31.08.2017 № 1064, 29.03.2019 № 371, 05.06.2019 № 719) Available from: http://government.ru/en/docs/29164 [Accessed 2 March 2020]

[2] Efremova I, Didenko N, Rudenko D and Skripnuk D 2017 Disparities in rural development of the Russian arctic zone regions Research for Rural Development 2 189-194

[3] 2019 Social status and living standards of the population of Russia (Moscow: Rosstat) p 708 Available from: https://gks.ru/folder/210/document/13212 [Accessed 2 March 2020]

[4] 2019 Economic and social indicators of the Far North and equivalent areas in 2000-2018 (Moscow: Rosstat) p 187 Available from: https://gks.ru/compendium/document/13279 [Accessed 2nd March 2020] (In Russ.)

[5] Didenko N, Kunze K, Skripnuk D 2015 Russian export strategy and social sector: Consequences of resource-oriented exports on population of Russia Mediterranean J. of Social Sci. 6(5S2) p 473-481

[6] Dyatlov S A, Didenko N I, Lobanov O S and Kulik S V 2019 Digital transformation and convergence effect as factors of achieving sustainable development IOP Conference Series: Earth and Environmental Science 302(1) 012102

[7] Manole C, Alpopi C and Florescu M 2018 The need to develop human capital for sustainable development of Romania J. Economics, Management, and Financial Markets 13(3) 139-147

[8] Mincer J 1958 Investment in Human Capital and Personal Income Distribution J. of Polit. Econ. 66(4) 281-302

[9] Becker G 1962 Investment in human capital: a theoretical analysis NBER Spec. Conf. 15 supplement to J. of Polit. Econ. 70(5) 2 9-49

[10] Solow R 1957 Technical change and the aggregate production function Rev. Econ. Statist. 39 312-320

[11] Mincer J 1993 Studies in human capital 1 (Cheltenham: Edward Elgar Publishing)

[12] Becker G S 2008 Human capital: A theoretical and empirical analysis with special reference to education (Chicago, IL: The University of Chicago Press)

[13] Barney J B 2011 Gaining and sustaining competitive advantage 4 ed (Boston, MA: Pearson)

[14] Hatch N W and Dyer J H 2004 Human capital and learning as a source of competitive advantage Strategic Management J. 25 1155-1178

[15] Didenko N, Kulik S, Skripnuk D and Samylovskaya E 2018 A country competitiveness analysis. Adl-model involved International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM 18(5.3) 3-10

[16] Hatch N W and Dyer J H 2004 Human capital and learning as a source of sustainable competitive advantage Strategic Management J. 25 1155-1178

[17] Farsani J J, Bidmeshgioupour M, Habibi M and Rashidi M M 2012 Intellectual capital and organizational learning capability in Iranian active companies of petrochemical industry J. Procedia - Social and Behavioral Sci. 62 1297-1302

[18] Wright P M, Coff R and Moliterno T P 2013 Strategic human capital crossing the great divide J. of Management: Spec. Issue: Strategic Human Capital 10 1-18

[19] Chen Y Y and Huang H L 2012 Knowledge management fit and its implications for business performance: A profile deviation analysis J. Knowledge-Based Systems 27 262-270

[20] Teixeira E de O and Werther W B 2013 Resilience: Continuous renewal of competitive advantages J. Business Horizons 56(3) 333-342

[21] Costa R 2012 Assessing intellectual capital efficiency and productivity: An application to the Italian yacht manufacturing sector J. Expert Systems with Applications 39(8) 7255-7261
[22] Goldman F 2010 A structured model of relationship dynamics between organizational knowledge management and organizational learning In Proceedings of the European Conference on Intellectual Capital 257-265

[23] Gowthorpe C 2009 Wider still and wider? A critical discussion of intellectual capital recognition, measurement and control in a boundary theoretical context J. Critical Perspectives on Accounting 20(7) 823-834

[24] World Bank World Development Report 2019: The Changing Nature of Work Available from: https://www.worldbank.org/en/publication/wdr2019 [Accessed 2nd March 2020]

[25] Obeidat B Y 2012 The relationship between human resource information system (HRIS) functions and human resource management (HRM) functionalities J. of Management Research 4(4) 192-212

[26] Wang K Chiang C and Tung C 2012 Integrating human resource management and knowledge management: From the viewpoint of core employees and organizational performance IJOI 5(1) 109-138

[27] Wang S and Noe R A 2010 Knowledge sharing: A review and directions for future research Human Resource Management Rev. 20(2) 115-131

[28] Ployhart R E and Moliterno T P 2011 Emergence of the human capital resource: A multilevel model Academy of Management Rev. 36(1) 127-150

[29] Channar Z A Talreja S and Bai M 2015 Impact of human capital variables on the effectiveness of the organizations PJCSS 9(1) 228-240

[30] Tavakoli M Shirouyehzad H and Dabestani R 2016 Proposing a hybrid method based on DEA and ANP for ranking organizational units and prioritizing human capital management drivers J. of Modelling in Management 11(1) 213-239

[31] Komlos J 2018 Despair at Full Employment: The Urgency of a Fairer Labor Market J. Challenge 61:5-6 363-386

[32] Boarini R M d'Ercole M. and Liu G 2012 Approaches to Measuring the Stock of Human Capital: A Review of Country Practices OECD Statistics Working Papers (OECD Publishing)

[33] Romashkina G F, Didenko N I and Skripnuk D F 2017 Socioeconomic modernization of Russia and its Arctic regions Studies on Russian Economic Development 28(1) 22-30

[34] Romashkina G, Romashkina E 2019 The effect of the banking systems of the Arctic Council countries on their economic development International J. of System Assurance Engineering and Management 10.1007/s13198-019-00831-8

[35] Didenko N I, Skripnuk D F and Miroyubova O V 2017 Urbanization and Greenhouse Gas Emissions from Industry IOP Conference Series: Earth and Environmental Science 72(1) 012014