Welfare of Resource-Extracting Cities in the Russian Arctic: Challenges and Prospects

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Abstract. The strategic value of the Russian Arctic is related to the concentration of hydrocarbon resources in the region that form a basis for the development of offshore oil and gas production, support the development of the national fuel and energy sector, as well as exploration of essential mineral resources, which exploration cycle involves the expansion of relevant regional infrastructure, including that of resource-producing cities that service industrial facilities. The article contains research results for the economic and social status of Arctic resource-extracting cities. It includes the evaluation of the scale of the resource-extracting cities and their place in the overall settlement system in the Russian Arctic, determines the characteristic features of the Arctic resource-extracting cities and identifies their welfare challenges. Unemployment in such cities in the Russian Arctic was demonstrated to be brought about by the functional specifics of local businesses and destructive processes attributable to the national and global recession. The negative factors that affect welfare in the Arctic resource-extracting cities in particular include the restructuring of major production facilities built under Arctic development projects and their amalgamation with vertically integrated companies. It was determined that a comprehensive social and economic policy in the resource-extracting cities in the Russian Arctic could be efficiently implemented by balancing the interests of the local community, local governments, backbone companies, as well as regional and federal authorities. The article is prepared by a grant from the Russian Science Foundation, the project №19-18-00025 "Socio-economic dynamics and forecast for the development of the Russian Arctic, taking into account geopolitical, macroeconomic, environmental, and mineral factors".

1. Introduction
The strategic goal of Russia's long-term social and economic development is to achieve the status of a leading world power in the forefront of global competition economically and with a reliable national security system. One of the benchmarks of this development is to improve welfare by implementing a comprehensive social and economic policy taking a local settlement system profile into account.

Firstly, this profile includes natural factors that are responsible for the isolation and structure of settlements. For instance, Arctic settlements are located in an extreme climatic zone with a relevant terrain, have unique mineral fields, low population density and poor transport accessibility, as well as vast territories with their significant part being basically undeveloped and hard-to-reach. All these factors taken together emphasize the need in a seasonal supply of products to remote Arctic settlements and increased cost of living.

Secondly, this also includes the functions of the settlements and relevant prevailing types of businesses. Thus, based on their function, the Arctic settlements can be divided into ports (Murmansk
and Magadan) and restricted regions (home ports of the Russian Navy, shift camps, etc. such as Vidyaevo, Vilyuchinsk, Skalisty, Zaozersk, Ostrovnoy, Polyarny, Severomorsk and Yamburg (a shift camp beyond the polar circle in the Yamalo-Nenets Autonomous District). Resource-extracting cities have a special place in the Arctic settlement system and are mainly home to mining companies and facilities (Table 1).

**Table 1. Resource-extracting cities in the Russian Arctic**

| City                                      | Population size in 2018, thousand people | Backbone companies                                      |
|-------------------------------------------|----------------------------------------|--------------------------------------------------------|
| Kirovsk, Murmansk Oblast                  | 26.2                                   | Kirovsk Branch of JSC Apatit, part of PJSC FosAgro      |
| Monchegorsk, Murmansk Oblast              | 41.4                                   | JSC Kola Mining and Metallurgical Company, part of PJSC MMC Norilsk Nickel |
| Olenegorsk, Murmansk Oblast               | 20.6                                   | JSC Olcon, PJSC Severstal                               |
| Gubkinskiy, Yamalo-Nenets Autonomous District | 28.5                                   | OOO RN-Purneftegaz, OOO SevKomNeftegaz, OOO Kynsko-Chaselskoyeneftegaz, OOO Khrampurneftegaz, Gubkinsky Gas Refining Plant and OOO Gazprom Dobycha Noyabrsk |
| Muravlenko, Yamalo-Nenets Autonomous District | 32.1                                   | Muravlenkovskneft (branch of JSC Gazpromneft – Noyabrskneftegaz) |
| Novy Urengoy, Yamalo-Nenets Autonomous District | 116.9                                  | OOO Gazprom Dobycha Urengoy and OOO Gazprom Dobycha Yamburg of PJSC Gazprom |
| Noyabrsk, Yamalo-Nenets Autonomous District | 106.1                                  | JSC Gazpromneft-Noyabrskneftegaz and OOO Gazprom Dobycha Noyabrsk of PJSC Gazpromneft |
| Vorkuta, Karelia Republic                 | 54.2                                   | JSC Vorkutaugol of PJSC Severstal                       |
| Norilsk, Krasnoyarsk Territory            | 181.6                                  | Polar Branch of PJSC MMC Norilsk Nickel                 |

Such Arctic settlements feature low business diversification as well as a monostructural economy so that the social and economic development of the Arctic resource-extracting cities depends on the functioning of their major industrial facilities [1]. In particular, the economic depression of the Arctic resource-extracting cities, which is demonstrated by unstable business of the backbone companies, including a single-profile city economy and dependence of the products of major production facilities on the global environment, significantly impacts the welfare of such settlements.
Russia's Arctic resource-extracting cities represent the most vulnerable community which is always at risk due to a one-sided and mainly weak economy. Such settlements are the first to topple over during a recession. In particular, the resource-extracting cities in the Russian Arctic face demographic issues (e.g., a negative migration balance, especially with regard to employable population) that correlate with the cycle-based operations of the backbone companies [2]. The cycle-based resource production breeds tension in local labour markets (unemployment) and affects the taxable base and investment appeal, as well as the social and economic development of such settlements and the regions they are part of. Current social and economic issues of the Arctic resource-extracting cities represent an immediate problem since they threaten national security, including the goal of improving public welfare.

2. Assessment of the scale of resource-extracting cities and their place in the general settlement system of the Russian Arctic

The resource-extracting cities that emerged during the large-scale development of Arctic natural resources between 1930s and 1980s have a special place in the general settlement system of the Russian Arctic.

Currently, the oil and gas industry leads in the Russian Arctic economy. The Yamalo-Nenets Autonomous District is a major hydrocarbon supplier for the domestic as well as Eastern and Western Europe markets. It is home to more than 80% of Russian gas produced, while the share of oil and gas condensate production is 8% [3]. Oil and gas is a predominant industry in the local economies of the autonomous district with major sites in Gubkinskiy, Muravlenko, Noyabrsk [4], and Novy Urengoy.

Major enterprises in Gubkinskiy (1986) include OOO RN-Purneftegaz, OJSC SiburTyumenGaz, CJSC Purgaz, Gubkinskiy Gas Refining Complex, and OJSC Purnefteotdacha. Oil and gas production and gas refining industries account for almost 100% of their industrial output. Hydrocarbon resources position the settlement as a structural unit of Russia's fuel and energy sectors with explored oil reserves exceeding 22 million tons and natural gas reserves exceeding 22 million cubic meters [5]. The geographic location and special climate of the settlement, on the contrary, significant challenge the prospects of developing sectors other than resource extraction.

The backbone company in Muravlenko (1990) is Muravlenkovskneft, a branch of OJSC Gazpromneft-Noyabrskneftegaz, which develops more than ten oil fields. Various degrees of depletion of such fields determine the degree of economic sustainability of the major enterprise and therefore the degree of balance in the social and economic development of the settlement.

OJSC Gazpromneft-Noyabrskneftegaz is the backbone company in Noyabrsk (1982). The functional characteristics of the city are also formed by OOO Gazprom Dobycha Noyabrsk and Vyngapurovskiy Gas Refinery (OJSC SiburTyumenGaz). The hydrocarbon fields operated by such companies are characterised by a significant degree of depletion which can also have a negative impact on the balance in the social and economic development of the settlement.

More than 50% of Russian gas is produced in Novy Urengoy (1975). The gas fields around the settlement are ranked among TOP5 global fields based on their reserves [5]. Novy Urengoy is home to OOO Gazprom Dobycha Yamburg, OOO Gazprom Dobycha Urengoy, OJSC Severneftegazprom, JSC Arctigas, CJSC Nortgas, JS Achimgaz, JSC Rospan International, and OOO NOVATEK-Yukharovneftegaz.

Mining facilities are ranked second in the Arctic economy. Almost entire output of Russian diamonds, more than 90% of nickel, cobalt, and platinum group metals, 60% of copper, gold, tin, tungsten, rare and other metals are produced in the Russian Arctic regions.

The Murmansk Oblast produces 100% of apatite, nephelinic and baddeleyite concentrates, nickel, iron-ore concentrate, and refined copper [6]. Kirovsk (1934) is home to the world's largest apatite and nepheline ore fields developed by the Kirovsk Branch of JSC Apatit, a backbone company. The main type of products is an apatite concentrate used for phosphate mineral fertilisers. The backbone company in Monchegorsk (1937) and the oldest one in the Murmansk Oblast is Severonickel Mill, a structural unit of JSC Kola Mining and Metallurgical Company, with nickel being its main product. JSC Kola...
Mining and Metallurgical Company also determine the functional specifics of Zapolyarny where each third resident is employed at its structural unit, Pechenganickel Mill [7]. The main industry in Olenegorsk (1957) is production and processing of iron ores and the major enterprise in the settlement is JSC Olcon (PJSC Severstal) with its assets including iron formation fields.

Vorkuta geological and industrial district in the Arctic zone of the Komi Republic holds the most significant hard coal reserves in Europe. The key business in Vorkuta (1943) is coal mining. The backbone enterprise of this Arctic city is JSC Vorkutaugol (PJSC Severstal), major coal facility in the industry, which includes five open-pit coal mines. The mineral and raw material reserves of the settlement form the largest source for the metallurgy, energy and coke-chemical industries in Russia.

Norilsk (1953) in the Krasnoyarsk Territory is one of the largest industrial centres of Russia which functional characteristics are determined by nonferrous-metals industry. The share of Norilsk in the Krasnoyarsk Territory's industrial potential approximates 30%. Almost 90% of industrial facilities in the city are owned by the Polar Branch of PJSC MMC Norilsk Nickel which produces non-ferrous metals.

Backbone companies play an important role in the welfare of the Arctic resource-extracting cities not only by supporting local employment or by forming a salary policy but also by being major tax payers for local and regional budgets. Their economic position also directly impacts social infrastructure development since social responsibility programs implemented by these backbone companies not only support their staff but also foster social development [8]. This way, lower economic stability of such companies results in lower welfare, including reduced internal (financial) opportunities of the Arctic resource-extracting cities, wear-and-tear of social infrastructure, growing unemployment, and migration outflow.

3. Welfare of Resource-Extracting Cities in the Russian Arctic

The functional specifics of the Arctic resource-extracting cities determines the power of local social and transport infrastructures, which play an important role in fostering the welfare of such settlements.

A typical problem for such cities is housing: temporary and prefabricated buildings were erected during the industrial exploration of the region with their service life limited to 20 or 25 years. Thus in Monchegorsk (Murmansk Oblast) [9] the wear-and-tear of water supply grid currently exceeds 80% and the average level of sewage dilapidation is almost 70%. The municipal power supply system is very unreliable with the actual service life of cable lines being twice above their rated one. Transformer stations built between 1930s and 1960s have to support electricity consumption twice the design level. The water lines at the industrial site of the backbone company have been used for a long time (more than 40 years) and are highly worn out.

With depleted resources, the risks of unstable social and economic development of Muravlenko (Yamalo-Nenets Autonomous District), including its welfare, are associated with insufficient diversification of the economy and fewer opportunities for small and medium business developed due to increased production costs, high cost of living and limited transport (no railways or airports). The situation is further worsened by a decreasing population size (Table 2) and the outflow of qualified staff against a fairly high level of latent unemployment (about 20% with two thirds of the unemployed being women).

| Table 2. Population description in Muravlenko (Yamalo-Nenets Autonomous District) 2008, 2018 |
|---|---|---|
| Population size, thousand people | 2008 | 2018 |
| Birth rate, ‰ | 13.1 | 11.2 |
| Death rate, ‰ | 3.7 | 4.3 |
| Rate of natural increase of population, ‰ | 9.4 | 6.9 |
Another example is Kirovsk in the Murmansk Oblast where a backbone enterprise provides jobs for its residents and people from the nearby city of Apatity. The migration patterns in both cities [10] were significantly impacted by the restructuring of the mining industry with the outsourcing of some functions between 2012 and 2016 which almost halved the company’s headcount. It should also be noted that in 1929, Apatit Trust, backbone company, which later expanded as the largest mining and chemicals facility of JSC Apatit (one of major taxpayers to the Murmansk Oblast budget) was reorganised in 2017 as a structural unit of the Kirovsk Branch of JSC Apatit within a vertically integrated FosAgro Group and registered in another region (Cherepovets, Vologda Oblast).

The distinctive characteristic of the Arctic resource-extracting cities is a high share of employment at background companies, gender-based isolation of basic economic activities and poor presence of intangible industries. Thus, the Polar Branch of OJSC MMC Norilsk Nickel accounts for about 70% of the gross municipal product in Norilsk (Krasnoyarsk Territory), while other companies work to support the main plant. About 56% of the average monthly headcount in Norilsk are the employees of its major company and more than 70% of them are men.

This situation shows that the social priorities of the development of the resource-extracting cities in the Russian Arctic are underestimated which causes social and economic disproportions not only in such settlements but also in the Arctic regions as a whole. This way, despite sufficient income of backbone companies (as part of their own sustainable development), new jobs are to be set up at facilities other than the backbone ones to implement corporate social responsibility initiatives and ensure sustainable development of the region. For instance, the functional specifics of Noyabrsk (Yamalo-Nenets Autonomous District), which is dependent on oil and gas production, lowers the impact of backbone enterprises on the tax base for the local budget (since it enjoys multiple subsidies) and employment (with weak interest of young people in local employment).

The functional specifics of businesses in the resource-extracting cities of the Russian Arctic and destructive processes driven by national and global recession breed such phenomenon as Arctic unemployment. High level of unemployment in the resource-extracting cities of the Russian Arctic is reported for Kirovsk and Monchegorsk (Murmansk Oblast), where the 2008 and 2014 recessions had a negative impact on local labour markets. The Arctic unemployment as a phenomenon is aggravated by structural territorial unbalance between workforce supply and demand (Table 3) in the local labour markets in the Arctic resource-extracting cities.

### Table 3. Indicators of the labour market in the resource-extracting cities in the Murmansk Oblast, 2013 to 2015

|          | Recorded unemployment level, % | Labour market strains, prs per vacant position |
|----------|-------------------------------|-----------------------------------------------|
|          | 2013  | 2014  | 2015  | 2013  | 2014  | 2015  |
| Kirovsk  | 2.4   | 3.1   | 4.1   | 1.9   | 2.5   | 4.6   |
| Monchegorsk | 2.1  | 2.2   | 2.4   | 1.4   | 1.4   | 1.8   |
| Olenegorsk | 1.7  | 1.6   | 1.8   | 1.4   | 2.1   | 2.2   |

The issue of unemployment among young people is in the forefront for the long-term social and economic development of the Arctic resource-extracting cities. Gubkinskiy (Yamalo-Nenets Autonomous District) has a fairly high level of workforce development with a positive trend of an increase in social labour productivity. However, there is a controversial situation observed in the local labour market. More than 30% of young people have the status of unemployed despite a low level of reported unemployment (0.29% in 2017) and low labour market strains (0.1 person per announced vacancy) and the employment level of young people is less than 60%.

Therefore, the main challenges for the labour markets in the Arctic resource-extracting cities include discrepancy between labour supply and demand both quantitatively and qualitatively (qualifications); low efficiency of vocational training; inadequate incentives to work and low salary;
significant weight of female unemployment (lack of experience and young children are among main reasons for lack of competitiveness in women); high percentage of unemployed young people; and identical additional jobs (cleaner, road sweeper, salesman, etc.).

Welfare of the Arctic resource-extracting cities implies measurements of the social mood of the cities' population [11, 12]. The results of such surveys demonstrate that people perceive unstable operation of backbone companies (which if suspended can trigger a social and economic crisis in the cities), employment issues for people above 40 years old and unequal working conditions for young people as the main challenges for the welfare of the resource-extracting cities in the Russian Arctic. The latter is the main cause for the outflow of the young population from the region: no jobs and low salaries make them plan their future life outside such "hopeless" cities.

The formation and implementation of a comprehensive social and economic sustainability policy for the resource-extracting cities in the Russian Arctic is dependent on the functional specifics of such settlements and resulting prevalent activities, as well as natural factors that precondition the isolation and structure of the Arctic territories.

High level of welfare is a priority in the social and economic development policy for the resource-extracting cities of the Russian Arctic. The efficiency of this policy can be secured only by balancing the interests of the local community, local governments, backbone companies, as well as regional and federal authorities.

The comprehensive social and economic policy for the Arctic resource-extracting cities with a prevailing single-industry structure must be implemented taking into account development plans for backbone companies since such situations as depleted resources or reduced demand for the major company's products can cause negative situations in the welfare sphere and primarily in the local labour markets. Therefore, it is relevant to take proactive efforts to support local employment by developing production practices, including those at backbone companies in the Arctic resource-extracting cities through the involvement of employers in production training and vocational education. This need is in particular relevant in view of prospective disengagement of labour resources after reaching the retirement age. Support of small and medium businesses is equally important and must cover the expansion of development opportunities for the market area including trade, consumer-focused and information services. Such efforts will be efficient provided that backbone companies, local government, universities and colleges, as well as employment agencies coordinate their actions.

Furthermore, the comprehensive social and economic policy in the resource-extracting cities of the Russian Arctic should be based on a balance between sustained development of a city and conservation of natural resources.

Generally, if the specific nature of the comprehensive social and economic policy for the Arctic resource-extracting cities is taken into account, it would be possible to escalate specific welfare improvement activities to the regional and federal level to have them included in relevant national and departmental special-purpose programs.

4. Conclusions
The comprehensive social and economic policy in the resource-extracting cities of the Russian Arctic aims at transforming such territorial and settlement complexes in integral comprehensive systems by securing their sustainable development. The challenges resource-extracting cities face can be solved through the interface of all institutional factors, such as federal policy for such settlements, relevant regional and municipal initiatives, corporate social responsibility of vertically integrated groups including backbone enterprises and primarily with regard to local labour market regulation. However, the comprehensive social and economic policy for the Arctic resource-extracting cities must be focused on the challenges of their future sustainable development.

References
[1] Kolesnikov R A and Suhova E A 2018 The current social and economic condition of the cities of the Yamalo-Nenets Autonomous Districts and their innovative development Arctic and North
26 117-125

[2] Suopajärvi L et al 2017 Social impacts of the “glocal” mining business: case studies from Northern Europe Mineral Economics 30(1) 31-39

[3] Korzhubaev A G and Eder L V 2012 The potential opportunities and forecast of the development of the economy and oil and gas complex of the Yamalo-Nenets autonomous district Problems of Economics and Management of the Oil and Gas Complex 6 9-14

[4] Larchenko L V and Kolesnikov R A 2016 Development of resource centers of the Yamalo-Nenets autonomous district, specialized on a booty hydrocarbons Innovations 1(207) 79-84

[5] Larchenko L V and Kolesnikov R A 2017 The Development of the Russian Oil and Gas Industry in Terms of Sanctions and Falling Oil Price International Journal of Energy Economics and Policy 7(2) 352-359

[6] Lukichev S V, Zhirova D V and Churkin O E 2019 Status and the development prospects of the mineral resource complex of the Murmansk region Gorny Zhurnal 6 19-24

[7] Korchak E A and Guschina I A 2012 Social well-being of single-industry settlements of the Murmansk region: factors and problems Theory and practice of social development 2 306-309

[8] Samarin V et al 2019 Factors generating social problems of the Russian arctics mono-towns Actual Economy: local solutions for global challenges +2019 392-397

[9] Zaicev D V 2018 Social problems of Arctic single-industry towns: Monchegorsk case study Bulletin of Kemerovo State University. Series: Political, Sociological and Economic sciences 3 28-34

[10] Bakhtina A G et al 2017 On the question of formation of labor resourcesin the mono-profile cities of the Arctic Zone (on the example of Kirovsk of the Murmansk region) Economics and management 1(135) 26-32

[11] Korchak E A and Guschina I A 2016 Migration of population in the processes of formation and use of labor potential of the Murmansk region Ekonomica i upravlenie: problemy, resheniy 10(2) 76-83

[12] Nedoseka E V and Zhgunova G V 2019 Features of local identity of single-industry town residents (the case of the Murmansk Oblast) Arctic and North 37 118-133

[13] Lytkina T S and Smirnov A V 2019 Expulsions in the Russian North: migration processes and neoliberal policy Arctic and North 37 94-117