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Beyond Statistics: a Qualitative Study of Primary Sector Transformation in the Post-Soviet Russian Arctic*

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Abstract. The Russian Arctic is at the epicentre of economic, environmental, and social changes. At the same time, the peripheral character of the territory, its strong orientation on primary sector makes the region extremely volatile to suchlike shifts. The study concerns primary sector transformation in the Post-Soviet period when after 1991 significant changes in the economy were observed. The main aim of the paper is to identify the specifics, features and development prospects of the recent primary sector transformation in the Russian Arctic. The statistical methods do not reflect the full picture of the transformation. Firstly, Russia has switched to UN national accounts system only in 1994. Secondly, the Arctic statistics after 2009 for regional level is unavailable. That is why the main method of the research is the expert survey method. The results of the study demonstrate the dominant role of the primary sector and the strong dependence of Russian Arctic regions on these activities. The study identifies the key factors and drivers of the transformation, a specific position of the oil and gas sector and the role of natural resources to be traditionally used in the primary sector. Despite the positive role of economic diversification in the long-term economic development, the corresponding effect for the Arctic regions is not fully expressed. The methodological novelty of the research is an unconventional research method of investigating primary sector transformation on the regional level in the Post-Soviet Russian Arctic, i.e. the expert survey. The method can be applied to other countries and industries.

Keywords: *primary sector, the Post-Soviet transformation, the Russian Arctic, Arctic economy, polar geography, qualitative approach.*

Introduction

The Arctic region is of current political and economic concern for its huge resources [1, Käpylä J., Mikkola H., pp. 3–4]. Therefore, the study of the recent transformation of the primary sector in the Russian Arctic is an important and relevant topic. In recent years, the change of the economic pattern, liberalization and shifts in national and international politics have affected developments in the Russian Arctic [2, Perez E.K., Yanevan Z., pp. 441–449]. The study discusses specific pathway of Arctic transformation, i.e. how Russian Arctic primary industries have changed in the last three decades. The *primary sector* is a sector of the economy involving direct use or exploitation of natural resources¹. Moreover, economic and political changes coincide with the cli-

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¹ Rozenberg M. The 5 Sectors of the Economy. Primary, Secondary, Tertiary, Quaternary and Quinary. Thought Co, 2017. URL: <https://www.thoughtco.com/sectors-of-the-economy-1435795> (accessed 05 September 2020).

mate change, which is drastically manifested in the region [3, Crate S., Nuttall M., pp. 85-96; 4, Koivurova T. *et al.*]. In some parts of the Arctic, the temperature has already risen by two or more degrees [5, Ljubicic G. J., pp. 102–104]. The permafrost thaws continuously in Russia and Canada [6, Zubrzycki S. *et al.*, p. 596]. The developments stated can open entirely new opportunities for economic prospects of the Arctic.

The paper focuses on the Russian Arctic economy. We treat the Russian Arctic as per Presidential Decree 296 (2014)², where a term “Arctic Zone of Russian Federation” (further — AZRF) is defined. The Decree lists regions and municipalities comprising this zone. The aim of this study is to identify the transformation specifics and the development prospects of the primary sector in the Russian Arctic. The main objective of this study is to gain insights on causes and implications of the primary sector transformations based on the expert assessment. We rely on expert assessment because the previous analysis of the available statistical data on the primary sector fails to provide us understanding of the implications and the drivers of its transformation in the Post-Soviet period.

The remainder of the article proceeds as follows. The next section offers an overview of state of the art literature addressing the key concepts in the study. A methodology and methods are then elaborated on, where we display the rationale for employing qualitative methodology while addressing our research question. The section afterwards presents the detailed account of the experts’ responses within the interviews. In the penultimate section, we reflect on the experts’ responses in more details and connect their view on Post-Soviet transformation of the Russian Arctic with the available statistical data. The final section presents the study's conclusions and proposals for future research.

Background and Rationale

The background for this study is rich and is therefore displayed in four sub-sections. First, we clarify what we mean by the Russian Arctic as there are plethora of definitions coming from different disciplines and constructed for various purposes. Then, in the next sub-section we review international research literature on primary sector and present one of its classifications. In the third sub-section we address the idea of Post-Soviet transformation, relying on international and Russian research literature. The fourth sub-section presents the regional dimension of primary sector distribution in the Russian Arctic and suggests the research problem we address further in the text, i.e. the rationale for the study.

1. The Russian Arctic

There is a need to define the research context, i.e. what is meant by the Russian Arctic. There are several approaches as to how to determine the inland borders of the Arctic [7, Lukin Y.,

² Ukaz Prezidenta Rossiyskoy Federatsii № 296, ot 02.05.2014 «O sukhoputnykh territoriyakh Arkticheskoy zony Rossiyskoy Federatsii». [Decree of the President of the Russian Federation No. 296, dated 05/02/2014 "On the land territories of the Arctic zone of the Russian Federation".] URL: <http://www.kremlin.ru/acts/bank/38377> (accessed 14 May 2019).

pp. 171–185; 8, Vakhtin N.B., pp. 5–13]. An approach of a legislative and administrative sense is being used [9, Klokov and Khrushchev, pp. 4–5], which defines the area of concern as “**Arctic Zone of the Russian Federation**” (further — **AZRF**) upon Presidential Decree 296. The Decree elaborates the state policy of Russia in the Arctic enabling the listed regions to claim adequate governmental subsidies. AZRF comprises eight regions — **Murmansk Oblast, Yamalo-Nenets Autonomous Okrug, Nenets Autonomous Okrug and Chukotka Autonomous Okrug, Arkhangelsk Oblast, Republic Sakha (Yakutia), Komi Republic, Krasnoyarsk Krai, Karelia Republic** along with offshore islands in the Arctic Ocean³. Four regions are entirely included in Arctic Zone: Murmansk Oblast, Yamalo-Nenets Autonomous Okrug, Nenets Autonomous Okrug and Chukotka Autonomous Okrug. As to the four remaining regions, they are partially included into the Zone with their northern municipalities. In particular, solely former territories of Taymyr Autonomous Okrug present Krasnoyarsk Krai in the Arctic Zone. Furthermore, Republic Sakha (Yakutia) has special administrative units (“uluses”) in the AZRF. The similar situations are for Karelia Republic and Komi Republic. To differentiate regions of Arctic Zone into two specified groups the research explores the following approach: **Group A** includes entire Arctic regions and **Group B** comprises partial Arctic regions (Fig. 1).



Fig. 1. Map of the regions comprising the Arctic Zone of the Russian Federation⁴.

³ Decree of the President of Russian Federation № 287, 13.05.2017. "O vnesenii izmeneniy v Ukaz Prezidenta Rossiyskoy Federatsii ot 2 maya 2014 g. N 296" O sukhoputnykh territorial'nykh territoriyakh Arkticheskoy zony Rossiyskoy Federatsii" (On Amendments to the Decree of the President of the Russian Federation of May 2, 2014 N 296" On the Land Territorial Territories of the Arctic Zone of the Russian Federation). <http://base.garant.ru/71705322> (accessed 14 May 2019).

⁴ Created by the authors according to the Decree 296, 2014 & Decree 287, 2017

We suppose that AZRF approach is the most relevant to the analysis of the primary sector as only regions of Arctic Zone are de-facto located in the Arctic receiving subsidies for their economic development from the Russian Federal government. All AZRF regions have relatively high disproportions in their Gross Regional Product (GRP) per capita. Specifically, GRP per capita in Nenets Autonomous Okrug is equal to \$223,000, Yamalo-Nenets Autonomous Okrug — \$156,500, while Arkhangelsk Oblast is only to \$16,300. Almost half of the Russian Arctic Gross Domestic Product is produced in AZRF with 2/3 of that amount being produced in Yamalo-Nenets Autonomous Okrug [10, Klovov K.B., Khrushchev S.A., pp. 2–10].

2. The Primary Sector

The **primary sector** is a key part of the Arctic economy. Firstly, we are to explain what “primary sector” means. There is a historical approach called a **three-sector model** suggested by A. Fisher and Colin Clark [11, Fisher A. G. B., pp. 24–38; 12, Clark C., pp. 25–26]. This model divides national economy into three main parts: extraction of raw materials (primary sector), manufacturing (secondary sector), and services (tertiary sector) [11, Fisher A. G. B.]. As we have mentioned, the primary sector is the sector of the economy that involves **direct use of resources**. It includes agriculture (grazing, farming), fishery, forestry, hunting and mining industry with no manufacturing. It proves that the primary sector is concerned with the extraction of raw materials [13, Kenessey Z., pp. 359–372; 14, Vagdevi H.S., Kiranbabu P., pp. 2–3]. Prevalence of the primary sector is typical for developing countries that do not have enough financial opportunities for manufacturing and services (secondary and tertiary sectors correspondingly). Also, it is very typical for traditional cultures. Primary sector used to dominate prior to active use of machinery.

French scientist Jean Fourastié uses the theory of three-sector model to explain the transition from the industrial to the post-industrial society [15, Hospers G. J., pp. 11–14]. Also, in recent years a new model has been formulated — quaternary sector including management, science and information technologies. Some research concerns the proportions of BRICS countries (Russia included) in the primary sector [16, Rastyannikova E. V.]. The specifics of such research is that the author separates mining from all other primary activities. We employ this approach due to significance of mining in the Russian Arctic in relation to other industries.

Actually, the primary sector is in a state of extinction on a global scale. This process becomes evident if we combine data in other sectors that permanently supersede the primary sector [13, Kenessey Z., pp. 359–372]. We can see this situation on the graph below.

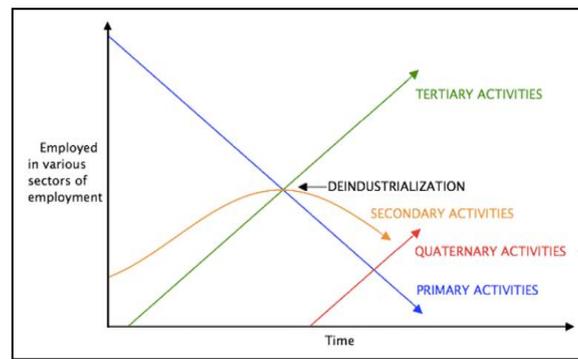


Fig. 2. Changes of employment in economic sectors in the world in historical context [14, Vagdevi H.S., Kiranbabu P.].

There are a lot of approaches to the inner division of the primary sector. In general, it is suggested to split primary activities into separate parts: agriculture, fishery, forestry, hunting and mining. Some researchers include hunting into forestry, reindeer husbandry into agriculture [17, Gorkin A.P., pp. 32–36]. We do not include subsistence into the primary sector. This classification reflects the authors' understanding of what primary sector means.

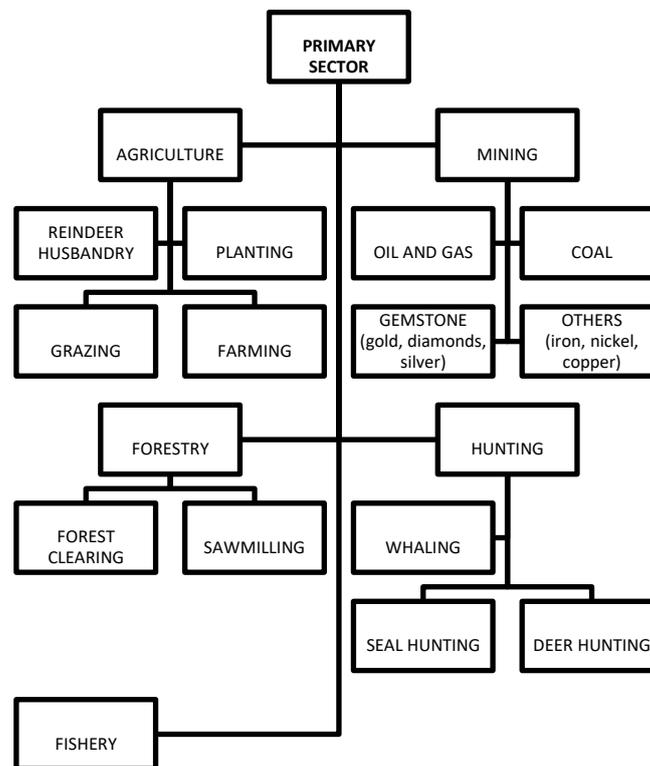


Fig. 3. Division of the primary sector ⁵.

3. The Post-Soviet Transformation

The problem of Arctic primary sector transformation in Post-Soviet period is a topic not thoroughly investigated in literature. Although there are substantial studies of Arctic primary sector transformation, there are still many aspects for further research. Existing works address economic analysis in general. Besides, some papers deal only with particular spheres of the economy like fish-

⁵ Created by the authors according to [12, Clark C.; 14, Vagdevi H.S., Kiranbabu P.; 17, Gorkin A.P.].

ery, mining or husbandry [2, Perez E.K., Yanevan Z.; 9, Klokov K.B., Khrushchev S.A.; 18, Scherbinin A. et al., pp. 3–7].

The Post-Soviet transformation is quite a specific phenomenon. Under this term we understand modernisation of old economic sectors — from industry to services, from industrial to post-industrial society. It also includes change of the political system. The main outcome of the USSR collapse in the Arctic is the uncertainty for further Arctic development. In spite of all this, a substantial scientific and technical reserve accumulated during the Soviet period continues to determine general strategies in the Russian Arctic [18, Scherbinin A. et al., pp. 3–7].

An important feature of the Russian Arctic economy is a broad range of economic activities for historical reasons. This territory is characterised by significant economic disproportions [19, Glomsrød S. et al., 2017]. Value added structure reflects strong reliance on oil and gas and other mining industries. According to the Russian Statistical Agency, these industries have 51.7% share of the gross value of the Russian Arctic ⁶.

Alexander Pelyasov focuses on the comparison between inner dynamics of primary activities [20, Pelyasov A.N.; 21, Pelyasov A.N. *et al.*, pp. 114–125]. Scott Stephenson and John Agnew investigate the Russian Arctic oil and gas sector. They emphasize strong state influence on the Arctic economy [22, Stephenson S.R., Agnew J.A., pp. 558–576]. Some papers are devoted to the environmental risks assessment for sustainable socio-economic development and environmental safety [23, Didenko N. et al., pp. 267–274]. Anthropogenic climate change may affect natural resources and human demand, creating a potential risk for human security [24, Scheffran J. et al., pp. 91–93].

4. The primary sector distribution in the Russian Arctic

The primary sector of the Russian Arctic has a complex regional distribution. Reindeer husbandry, fishing and hunting form the traditional types of economic activities for indigenous peoples [8, Vakhtin N.B., pp. 5-13; 25, Reinert E.S., pp. 522–540]. Forest industry is restricted in the Russian Arctic for climate reasons [4, Koivurova T. et al.]. In some small districts in AZRF tree cutting is allowed. They are so-called northern taiga zone (south of the Murmansk Oblast and Yamalo-Nenets Autonomous Okrug). These factors lead to poor prominence in agriculture and forestry in the Arctic economy [17, Gorkin A.P., pp. 32–36]. Fishery is an important activity for the Arctic. 35% of Russian fish is harvested in the Arctic regions (0,5 mln. tons), and 90% of this amount comes from Murmansk Oblast ⁷. Mining comprises extraction of hydrocarbons (oil and gas), coal, gemstones (gold, diamonds) and other minerals (iron, non-ferrous minerals such as nickel, cobalt, copper, apatite, bauxites). The entire primary sector is represented in different regions of the Russian Arctic (Table 1).

Yamalo-Nenets Autonomous Okrug is a leader in oil and gas industries. Nenets Autonomous Okrug and the Komi Republic are the key centres of the oil industry. However, the influence of Komi Republic is not as significant as it used to be in Soviet times, and oil provinces of this region are not

⁶ United States Geological Survey (USGS): Minerals Yearbook — Russia. URL: <https://minerals.usgs.gov/minerals/pubs/country/2012/myb3-2012-rs.pdf> (accessed 17.06.2019).

⁷ Russian Federal State Statistics Service (FSSS). URL: <http://www.gks.ru> (accessed 06 June 2019).

included in the Arctic Zone [26, Laverov N.P. et. Al., pp. 26–37]. Nenets Autonomous Okrug and Yamalo-Nenets Autonomous Okrug are key centres of oil industry. The Komi Republic is the main coal region while the Murmansk Oblast is a fishery centre [27, Vasilyev A.M., pp. 79–82].

Table 1

*Distribution of key primary activities in the Arctic Zone of the Russian Federation*⁸

Administrative Units	Reindeer Husbandry	Forestry	Fishery	Mining			
				Oil & Gas	Coal	Gemstones	Others
Komi Republic (city Vorkuta)	+				+		
Karelia Republic		+					+
Arkhangelsk Oblast	+	+	+			+	
Nenets Autonomous Okrug	+			+			
Murmansk Oblast	+	+	+				+
Yamalo-Nenets Autonomous Okrug	+	+		+			
Krasnoyarsk Kray (Taymyr Autonomous Okrug)	+		+			+	+
Republic Sakha (Yakutia)	+	+		+	+	+	
Chukotka Autonomous Okrug	+		+		+	+	

Theoretical framework of the paper relies on earlier observed statistical peculiarities of the Post-Soviet transformation reflected in data on oil, gas, coal and fishery dynamics and changes in primary industries Gross Value Added [28, Galustov, p. 15]. We encounter a serious problem of lack of statistics. Since 2009, the Russian Federal State Statistics Service has restricted key primary industries production data. The lack of statistical information creates obstacles for the adequate analysis of the primary sector. The only exception is fishery. Data on fish and aquatic biological resources extraction have reinstated since 2016. Main information available through statistical method is a prevalence of concrete primary activities in different regions. The map that follows is based on statistics.

⁸ Created by the authors based on FSSS & USGS data): Russian Federal State Statistics Service (FSSS). URL: <http://www.gks.ru> (accessed 21.11.2019). United States Geological Survey (USGS): Minerals Yearbook — Russia. URL: <https://minerals.usgs.gov/minerals/pubs/country/2012/myb3-2012-rs.pdf> (accessed 08 June 2020).

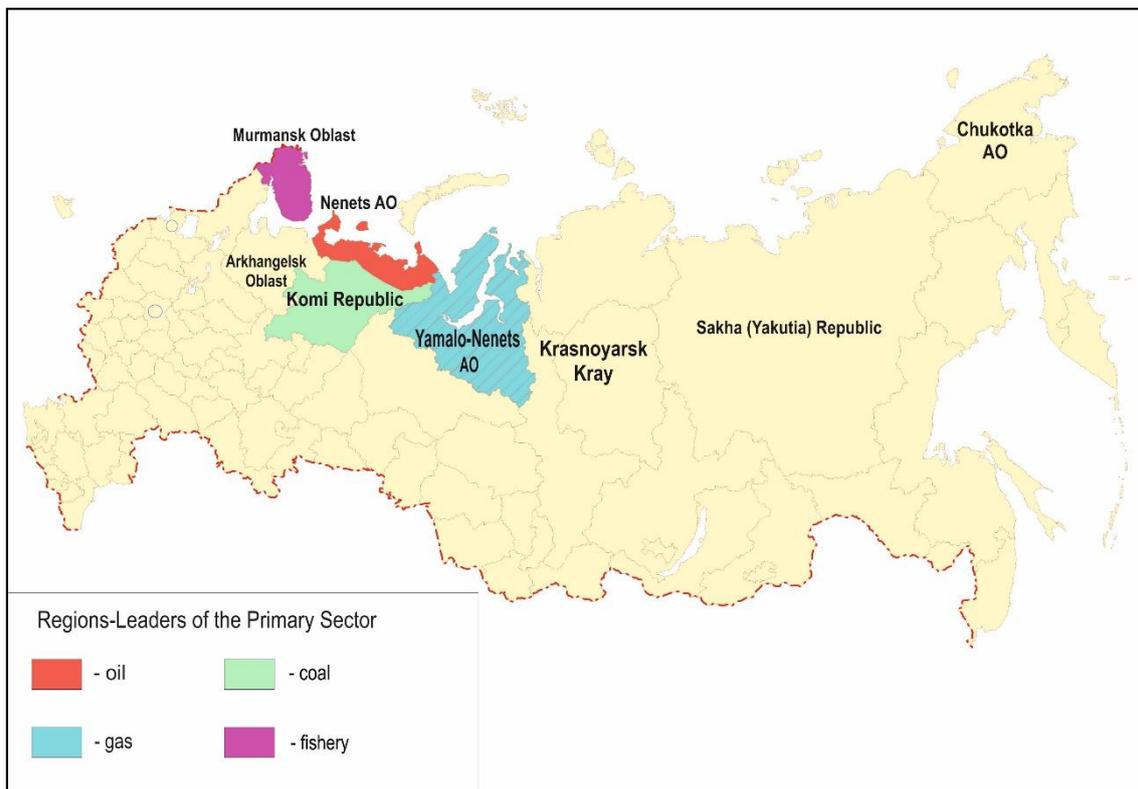


Fig. 4. Map of regions-leaders of the primary sector in AZRF [28, Galustov, p. 11].

We face the similar problem with relative statistical parameters. The Russian Federation has applied UN System of National Accounts since 1994. The first data on Gross Value Added by region was published in 2005. It turns out that it is not possible to evaluate the Post-Soviet transformation by relative data. However, absolute indicators are also complicated for deep analysis due to its restriction since 2010s [28, Galustov K.A., pp. 19–27].

In our study, therefore, we set the goal to test an alternative method that could clarify the nature and implications of the Russian primary sector Post-Soviet transformation. Hence, our first attempt is a qualitative analysis.

Methods

Qualitative method is a continuation of statistical investigation of the primary sector previously published [28, Galustov K.A., pp. 9–34]. Since 2009, the statistics for Federal Districts (Okrug) has substituted statistics for the Arctic regions. In this case, relying solely on statistics, it becomes complicated to identify any trends in the Arctic region. Normally Federal Districts occupy territories stretching far beyond the Arctic Zone. Therefore, by the completion of the expert survey we tend to compare qualitative results with quantitative parameters.

The method includes in-depth interviews with professional scientists involved in relevant research. Qualitative methods are essential to use for impossibility of complex transformation evaluation based on statistical information only. Qualitative research deals with words rather than numbers and constructs new knowledge based on holistic and substantial understanding of a phenomenon. Although qualitative methods are known to be less reliable when it comes to generali-

zation, we consider the use of expert evaluation as a good compromise when other data is unavailable.

The method employed in this study is suggested by Alan Bryman:

- It is an inductive approach to the relationship between theory and research;
- In contrast to natural scientific model in quantitative research, qualitative approach refers to understanding of the world through interpretation of this world by its dwellers;
- Social properties are the result of interaction between people, and cannot be separated from those who participate in its construction [29, Bryman A.].

These features are especially important in the context of this research, since the pattern and the dynamics of primary sector transformation are constructed based on people's vision and reflections. As competence of potential respondents remains unclear, we applied the principle of so-called "snowball sampling". It means that an informant having been interviewed introduces another informant, and further on. This technique is effective as an informant under interview both gives answers and provides details about further informant and it makes the analysis productive [30, Armstrong G., pp. 36–44; 31, Ozalpmann D., pp. 356–357].

We have started with the respondents somehow familiar with research under consideration. We have nominated seven experts in geography, economy, ecology, and ethnography. On the one hand, experts are expected to address the spatiotemporal dimension of the transformation, on the other, they are supposed to consider economic regularities of concern. This method has been applied in our previous investigations [32, Galustov K.A., pp. 163–176].

One co-author comes up with open questions. Respondents can speculate as long as they see it suitable for them. Such kind of speculation is known as semi-structured interview. It means that major part of questions is compulsory for the respondent to answer. However, some questions may be slightly changed depending on an expert's competence. The questions are classified into three groups (the complete interview guide may be found in the Appendix A.2):

- Questions on drivers and causes of the primary sector transformation;
- Questions on state of the art and further prospective transformation;
- Questions on practical results of the transformation for particular regions and industries.

Results

Qualitative evaluation is aimed to clarify transformation drivers, prospects, and subjective views on the progress of particular regions and industries. It also deals with regularities, commonalities and principal differences in expert's opinion.

All experts consider Yamalo-Nenets Autonomous Okrug as the main "region-winner". It means this region has more advantages of the transformation in comparison with others. This view is strongly based on hypertrophic development of oil and gas industry, which fully corresponds to previous observations [22, Stephenson S.R., Agnew J.A., pp. 558–576].

Prof. Habeck states, “old complains about the lack of processing industries in Russia is still true, and it strongly affects the Russian Arctic, which serves as a resource-extraction base but has barely any processing facilities”. Dr. Kaledin admits the fact, but does not call it a problem. According to Kaledin’s opinion, this economic trend is negative for the Russian Arctic, but positive for the whole of Russia as it increases the Russian role in the world economy and politics.

Prof. Habeck and Stanislav Kiselev state the special role of industrial development in the recent transformation processes. Especially it is related to fuel extraction, high demand for oil and gas. Prof. Krasovskaya and Prof. Evseev mark the revival of the economy in the last years. Contrary, Dr. Elsukov and Dr. Khrushchev mention that people deny the model of permanent living in the mining zone. A more popular model for them is so-called “vakhta” (shift): people live in the mining region during a limited time and return to their main residency when the shift is over.

Actually, the idea of Russian dependence on resources explains causes of the privileged position of the Yamalo-Nenets Autonomous Okrug. Nevertheless, we cannot talk about a long-term stability of the region. Demand on resources can change due to introduction of new ecological standards and prominence of new energetic sources. In this context, Yamalo-Nenets Autonomous Okrug does not have obvious sustainable development prospects with the dominance of two industries: oil and gas extraction. According to Stanislav Kiselev, reindeer herding in Yamalo-Nenets Autonomous Okrug is prospective as well. This is opposite for other regions due to the mining development [25, Reinert E.S., pp. 522-540; 33, Stern J.P., pp. 55–58].

Climatic issues have some specific implications. Northern Sea Route has been revived as a result of sea ice reduction. This can redirect Russian Arctic economy towards export and create opportunities for ocean shelf oil and gas extraction. Another aspect is permafrost thawing that has a negative impact on the development of transport communications and social infrastructure. It is a serious limitation for the sustainable development of the Arctic. Some primary activities such as reindeer herding and fishery are partly dependent on climate change, only noticeable in the long run [25, Reinert E.S., pp. 522–540; 34, Klovov K.B., Mikhailov V.V., pp. 28–42].

The economic factor mostly defines prospects of the transformation processes. Oil prices volatility, limited amount of resources and dependence on loans — all these factors do not contribute to the successful planning of the social and economic development of the Russian Arctic. Political factor exacerbates the geo-economic prospects of the region. Prof. Habeck assumes that this situation becomes more complicated due to social problems as gender-specific rural out-migration and state-induced programs for taking people back from the Arctic to the cities. Nevertheless, Dr. Kaledin thinks that it is compensated by the strategic role of the Arctic region for the Russian Federation, which implies military industrial development of the Arctic.

Most of the experts agree that all regions are in fact dependent on the transformation. For instance, Prof. Dr. Habeck states that “primary industries have been dependent on the transformation of the economic system, though in different ways. Agriculture, including reindeer herding and hunting, cattle breeding and other forms of animal husbandry, has suffered strongly in the

1990s and did not recover fully in the 2000s, with a few notable exceptions. The Soviet Union invested very much into the development of renewable resource use (animal husbandry) in the Far North, whereas Russia nowadays does not invest as much.”

Important point is that Chukotka Autonomous Okrug is defined as the most unstable and vulnerable region. Some areas such as Yamalo-Nenets Autonomous Okrug gas fields and other mature oil and gas provinces are not so dependent on the fast transformation changes. However, positive changes in mining can be accompanied by negative tendencies for reindeer herding and vice versa. Non-ferrous mining, agriculture, fishery, industries of traditional natural resources use are more affected by the transformation, because of low significance of these industries in the regional economy and strong dependence on social factors. Responses about regions and industries, where benefits of transformation outweigh losses, show curious regularities as shown below (Table 2).

Table 2

Regions and industries-“winners”⁹

EXPERTS	“Regions-winners”	“Industries-winners”
Prof. Dr. J.O. Habeck	Yamalo-Nenets Autonomous Okrug, Murmansk Oblast	Oil & gas mining, fishery
Dr. S. Khrushchev	Yamalo-Nenets Autonomous Okrug, Nenets Autonomous Okrug, Norilsk (Krasnoyarsk Krai)	Non-ferrous metallurgy
Dr. M. Elsukov	Murmansk Oblast, Arkhangelsk Oblast, Chukotka Autonomous Okrug	No, only transport
Dr. N. Kaledin	Yamalo-Nenets Autonomous Okrug	Oil & gas mining
Prof. T. Krasovskaya	Murmansk Oblast, Yamalo-Nenets Autonomous Okrug, Nenets Autonomous Okrug	Oil & gas mining
Prof. A. Evseev	Nenets Autonomous Okrug, Yamalo-Nenets Autonomous Okrug	Oil & gas mining, transport
S. Kiselev	Yamalo-Nenets Autonomous Okrug	Oil & gas mining, reindeer husbandry

Regions and industries with the biggest benefits from the transformation are reflected in the experts responses. As we have mentioned, there are similar opinions on these issues. The overwhelming majority of experts suppose that oil and gas mining is the “industry-winner” in the region. Reindeer husbandry, fishery and non-ferrous mining are also considered as industries with lots of benefits, but their benefits are less noticeable. From experts’ opinions, Yamalo-Nenets Autonomous Okrug is more often called as the most beneficial region in the Russian Arctic. Six experts mention Yamalo-Nenets Autonomous Okrug as a winner. Three responses referred to Murmansk Oblast and Nenets Autonomous Okrug.

As revealed in the context of the transformation impact regions of the Group A — Yamalo-Nenets Autonomous Okrug Murmansk Oblast, Nenets Autonomous Okrug and Chukotka Autonomous Okrug — are mentioned more often than other regions. These regions are directly associated with the Arctic being more sensitive to changes. Chukotka Autonomous Okrug is the most af-

⁹ Created by the authors based on informants.

affected region. Yamalo-Nenets, Nenets Autonomous Okrug and Murmansk Oblast have benefited mostly from the transformation (Table 1). This can be explained through their specialization in economy, close location to the ocean and distance to the main industrial centers.

Discussion

There are some common regularities in experts' responses. The answers are repeated more than once. Research results demonstrate features and regularities for each transformation aspect as follows:

1. **Drivers and Specifics of Transformation.** Ethnographers emphasize industrial development; ecologists pay attention to economic revival. Experts mention transitional features of the market economy invasion and Russian Arctic resource orientation.

2. **Factors of transformation.** All experts agree that economic and political factors are the main implications for the transformation.

3. **Role of Climatic Factor.** Responses to this question are strongly related to the professional background of the respondent. Economist (Elsukov) and economic geographer (Khrushchev) respond straightforward that climate factor is of no importance.

4. **Industries Affected by Transformation.** This reflects the consequences of transformation for particular industries. Responses vary. The most popular responses relate to non-ferrous industries (three experts), agriculture (three experts) and coal mining (two experts).

5. **Regions Affected by Transformation.** Experts think that all regions are affected. There is an opinion that the most affected regions are those with losses from transformation. Chukotka Autonomous Okrug is mentioned as the most affected region by five experts. In general, all regions are affected by the transformation. Few provinces and districts secure stability.

6. **Industries-“winners”.** Fuel industries such as oil and gas mining are mentioned by five experts, apart from Khrushchev and Elsukov. In some responses specific primary industries like reindeer husbandry, fishery and non-ferrous complex are specified.

7. **Regions-“winners”.** General expert opinion is that Yamalo-Nenets Autonomous Okrug is the main beneficiary. Murmansk Oblast and Nenets Autonomous Okrug are the second best (mentioned by three experts).

The study identifies features of the transformation, its factors, main industries and regions. Some responses can be compared irrespective of their difference.

The main conclusion deals with an observation of shifts in the primary sector in specific regions. Yamalo-Nenets Autonomous Okrug is an obvious leader in oil and gas industry, which is clearly reflected in experts' responses. There is a wide-spread opinion that the Russian budget is strictly dependent on the exploitation of hydrocarbons on the continent and in the shelf zone [26, Laverov N.P. et. al., pp. 26–37]. Yamalo-Nenets Autonomous Okrug accommodates significant Russian oil and gas reserves in AZRF. Nevertheless, economy of Yamalo-Nenets Autonomous Okrug is more diversified in comparison with Nenets Autonomous Okrug. Yamalo-Nenets Autonomous

Okrug boasts the most developed reindeer herding in AZRF [35, Klokov K.B., pp. 19–33]. These two regions belong to Group A. Its Arctic location and small population are reasons for their high economic growth per capita.

Most experts suppose that oil and gas has more advantages than all other industries in AZRF. Experts confirm that Group A regions, especially Yamalo-Nenets Autonomous Okrug, are “winners” of the transformation. Gas mining of Yamalo-Nenets Autonomous Okrug is the only industry that keeps and outperforms Soviet extraction volumes. Oil industry lost its position in the 1990s. However, Yamalo-Nenets and Nenets Autonomous Okrug have become leaders in oil industry superseding Komi Republic.

We compare how this expert assessment of oil and gas corresponds to available statistics. Matching expert responses to statistical data for 30 post-Soviet year period we can see that oil dynamics in AZRF becomes less noticeable in 21st century (Fig. 5). Since the Soviet era maximum value was achieved in 2005. For the whole period of observations Yamalo-Nenets Autonomous Okrug has remained to be a leader in the Arctic oil sector. Komi Republic hosts “Timano-Pechora energetic province” that used to be a key centre of oil industry in the USSR. Since early 1990s the role of Komi oil has drastically decreased. The similar tendency is observed for Yamalo-Nenets Autonomous Okrug. Other Arctic regions (like Nenets Autonomous Okrug) would have no oil mining on industrial scale.

Since 2000s role of Yamalo-Nenets Autonomous Okrug and Komi Republic has increased again. Nenets Autonomous Okrug demonstrates rapid growth of oil exploration. Yamalo-Nenets Autonomous Okrug reaches the peak in 2004 (50 mln tons), and then the extraction stabilises on 37-38 mln tons. Thus, we observe effective diversification of oil mining within Yamalo-Nenets Autonomous Okrug, Nenets Autonomous Okrug, Komi and prospective region of Sakha Republic (Yakutia).

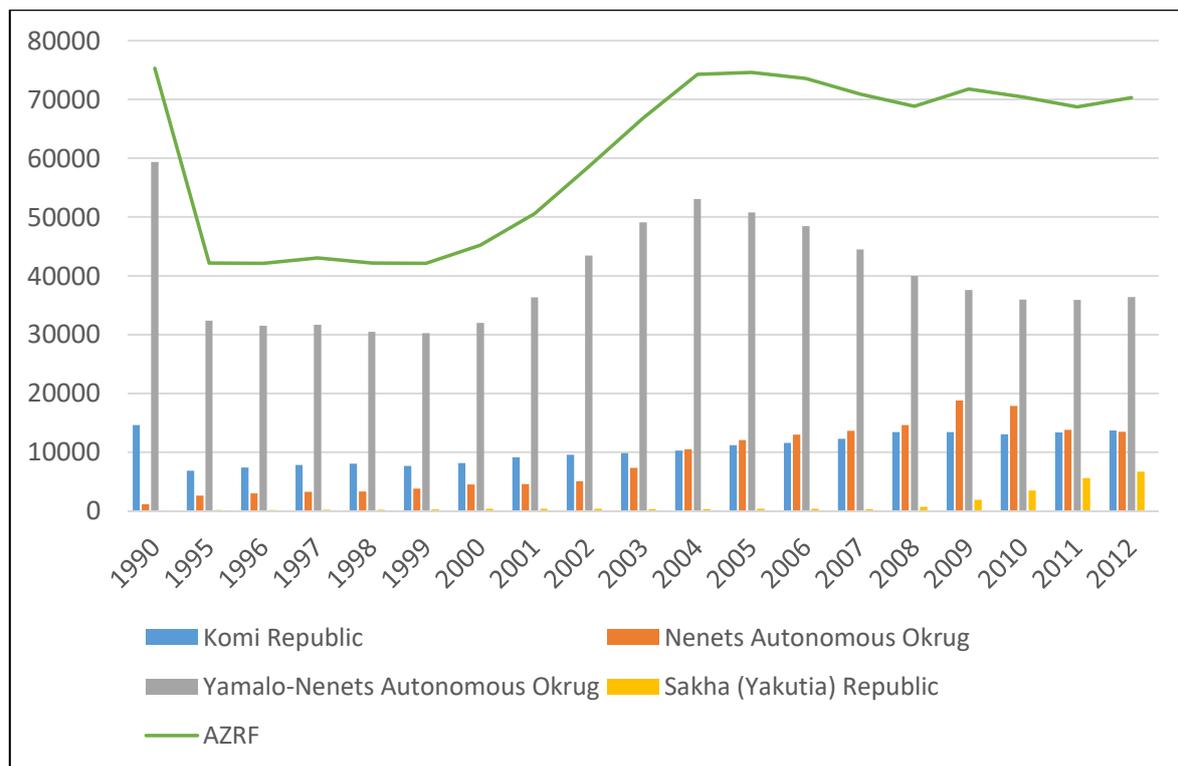


Fig. 5. Volume of the oil extraction in the AZRF regions, 1990–2012, tons¹⁰.

However, the curve for the Russian Federation (Fig. 6) demonstrates little significance of AZRF in national oil sector. Its dynamics corresponds to the volumes of Arctic extraction. Average amount of extraction is less than 100 mln tons.

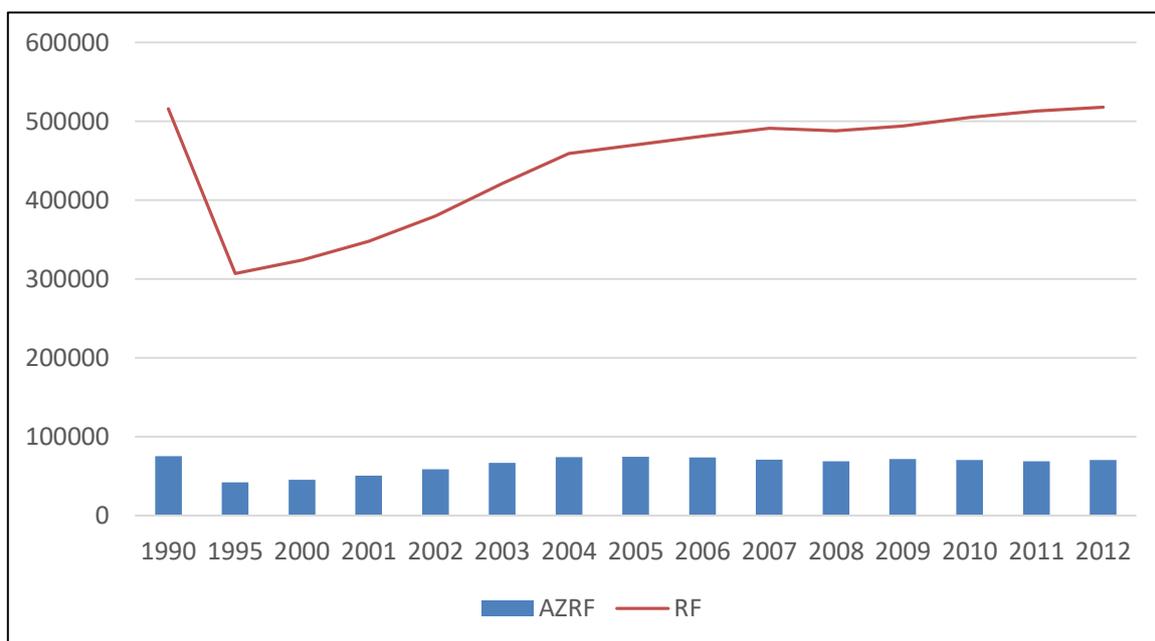


Fig. 6. Volume of oil extraction in the RF and AZRF, 1990–2012, K tons¹¹.

¹⁰ Created by the authors based on FSSS & PolitInform. Russian Federal State Statistics Service (FSSS), <http://www.gks.ru> (accessed 21 November 2019). Political Information Journal (PolitInform). URL: <http://www.politinform.ru/ekonomika-i-finansy/59822-nadolgo-li-nam-hvatit-poleznyh-iskopaemyh-trafik.html> (accessed 13 November 2019).

¹¹ Created by the authors based on FSSS & PolitInform.

Natural gas extraction has a quite different tendency in comparison with the oil industry. Statistical analysis also shows that Yamalo-Nenets Autonomous Okrug is an absolute leader in the gas sector not only in the Arctic, but also in the entire Russian Federation. That explains why the separate graphs for other regions trends are displayed (Fig. 7). The gas reserves in Yamalo-Nenets Autonomous Okrug comprise 90% of the total Russian volume (Fig. 8).

All other Arctic regions have underrepresented mining. Komi, Sakha, Nenets Autonomous Okrug and since 2006 Chukotka Autonomous Okrug have had a tiny volume of gas extraction. Komi is the second region in gas extraction. It is a traditionally oil, gas and coal mining orientated region. There is a large amount of combined oil-gas deposits in the region. For a strong crisis of gas extraction at the beginning of 1990 many deposits got conserved. Importantly, since the end of 2000s oil extraction has grown up. However, gas mining has contracted. This demonstrates the tendency of monopolising gas extraction in one region — Yamalo-Nenets Autonomous Okrug.

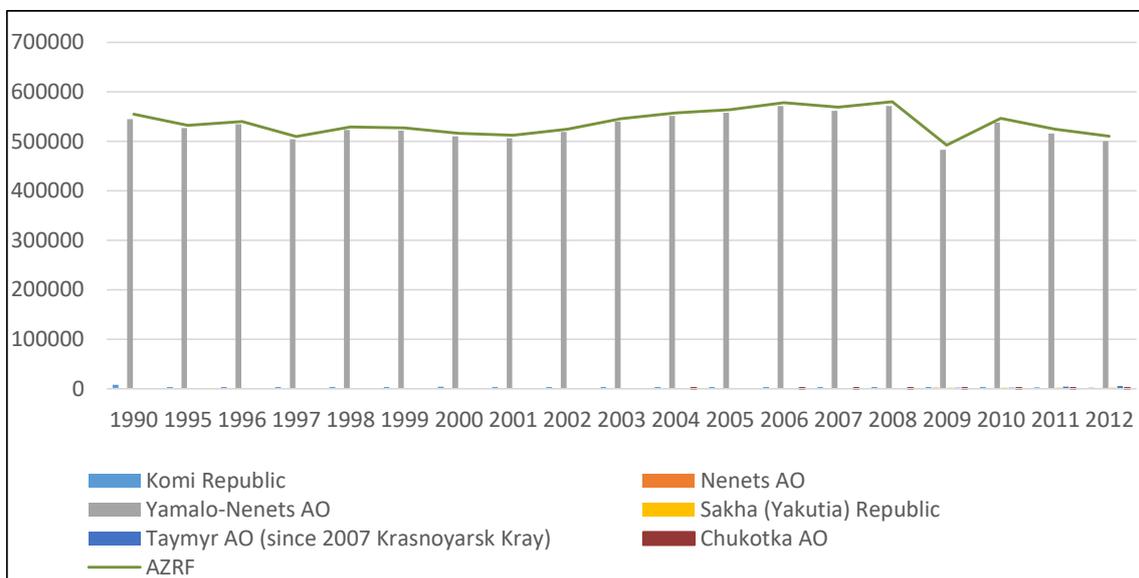


Fig. 7. Volume of gas extraction in AZRF regions, 1990-2012, K m³¹².

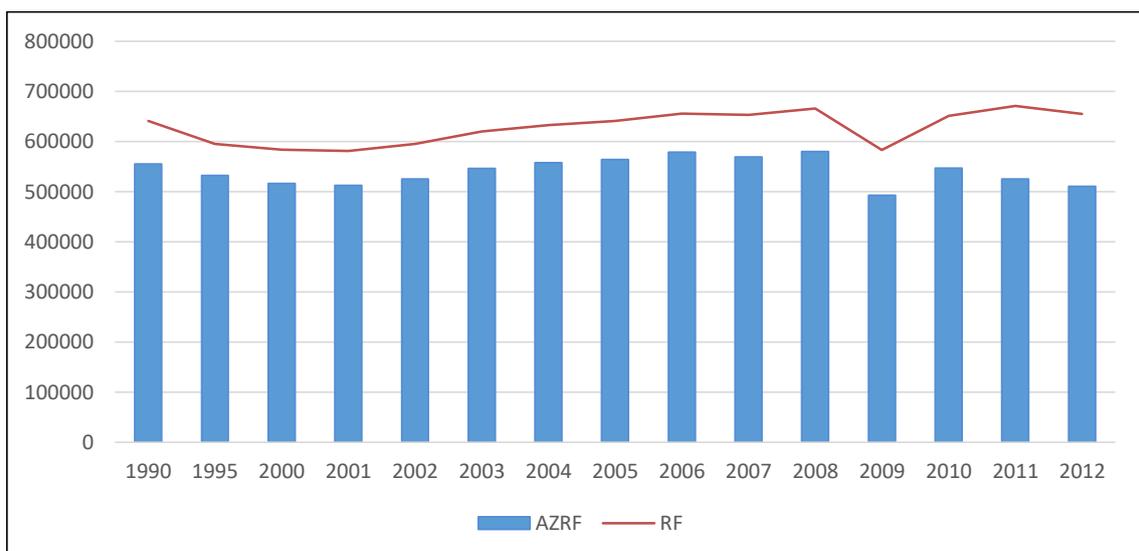


Fig. 8. Volume of gas extraction in the RF and AZRF, 1990-2012, K m³¹³.

¹² Created by the authors based on FSSS & PolitInform.

AZRF gas exploitation trend is diverged from that of oil exploitation. In 1990s the amount of gas extraction remained relatively stable with steady decline. In period 2002–2006, small increase was noticed, but there were practically no fluctuations. The only low dip happened in 2009 for the export crisis. This bottom dip is quite visible on the general Russian curve as well.

These statistical trends explain “Yamal-oriented” and “oil and gas-oriented” expert responses. Firstly, they emphasize the role of oil and gas sector in the Arctic economy. Secondly, they nominate Yamalo-Nenets Autonomous Okrug as the Arctic region of the most importance. Thirdly, the majority of experts recognize Chukotka Autonomous Okrug as the most transformation affected region while Republic Sakha (Yakutia) is recognised as of the most stability.

The primary industry concentration is a positive effect and is an example how the industry benefits from the transformation. Yamalo-Nenets and Nenets Autonomous Okrug effectively use their oil and gas exploration potential. In the case of Yamalo-Nenets Autonomous Okrug, the transformation has a positive impact on another primary industry — the reindeer husbandry. Murmansk Oblast benefits from the convenient geographical location for fishery development [36, Tortsev A.M., pp. 131–141]. The region has secured its potential in times of the economic crisis. Prof. Dr. Krasovskaya mentions, these developments can be linked to permanent intensification of the economic activity.

The analysis definitely shows that the regions of Group A are the most dependent on the transformation. Some of them like Nenets Autonomous Okrug, Yamalo-Nenets Autonomous Okrug and Murmansk Oblast benefit most from the transformation. Contrary, Chukotka Autonomous Okrug is strongly affected by the transformation. Yet, whether it is beneficial or not remains unclear. Specialisation has a local positive impact for the Arctic regions. Regions specialising on particular primary industries are more stable and their economic patterns are predictable.

Conclusion

The study examines a wide range of elements and features of the primary sector transformation in the Russian Arctic. The experts mention economic development as the main factor for the transformation that strongly depends on the industrial activities. Also, the study confirms the key role of oil and gas mining among other industries. The study also shows the outstanding of Yamalo-Nenets Autonomous Okrug, Nenets Autonomous Okrug and Murmansk Oblast among other Russian Arctic regions. Chukotka Autonomous Okrug is recognized as the most unstable region in AZRF. On the one hand, there is a clear positive effect from deep specialization for some regions. On the other hand, these advantages can vanish in the long run. Dependence on oil and gas industries might bring severe consequences for the regions in case of energy market revolution or simply a noticeable price drop of minerals. The policy of traditional natural resource use could improve the situation and create conditions for the regional independency on the economic volatility.

¹³ Created by the authors based on FSSS & PolitInform.

A lack of statistical information is an important limitation for research on the transformation. A large amount of statistical information is of restricted access and therefore, is unavailable for investigation. To make the transformation analysis efficient, it is preferable to liberalise the statistics availability. This will help to identify economic warnings earlier. Besides, the availability of statistical data will make primary industry analysis on the municipal level possible. If implemented, these suggestions may become a strong motivation for future research on primary industries transformation.

This study suggests a novel methodology of how to address primary sector transformation on a regional level along with or outside statistical investigation. Expert assessment gives us another view on transformation implications in the Arctic. The special value of the methodology is that the investigation for other economic sectors (secondary, tertiary) in different regions becomes available. Methodology used may also be expanded for other countries.

The limitations of the study are also rooted in the methodology. The conducted expert assessment cannot provide a solid fundament for quantitative modelling and forecasting. Therefore, while we suggest applying our framework for other countries, if better statistical infrastructure is available other methods to assess primary sector transformation should be considered first.

Further avenues for research are of great potential. Prospects of the study are connected with a search of the future of primary sector transformation. Modern global economy needs an enhanced ability to predict crises. That is why it is necessary to find out the ways to overcome the transformational consequences for the different countries and industries. Besides, the important prospect of the study is a joint assessment of economic and climatic factors on primary sector transformation. Thus, the suggested research framework may be relevant to other countries with large Arctic territories and poor statistical infrastructure to trace changes in primary sector.

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