

Actors of Science Diplomacy Within the Context of Self-Development of the Arctic Territories (on the Example of Murmansk Region)

Актеры научной дипломатии в контексте саморазвития арктических территорий (на примере Мурманской области)

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As revealed from the previous study of 2019 on specific aspects of self-development of the local communities of the Arctic Zone of the Russian Federation, one of the most active groups of regional actors involved in international collaborations are the scientific and educational entities (representing 40% value among the other groups of actors) [1]. This paper analyses the regional notion and institutional components of science diplomacy and takes a challenge to propose future actions to facilitate it. The study applies the qualitative research methods through the comparative and contextual analysis of the existing national and international legislation, acts, documents to summarize the practices, tools, actors, and stakeholders of science diplomacy at the regional level. As further discussed, science diplomacy in the Murmansk region takes different forms and can be shaped within the practices of national foreign policy and diplomacy as well as within the paradiplomatic activities of regional and municipal levels, including strong connections to science and education sectors. The new implementing concept of the Russian government for the foundation of the world-class research and educational centers may strengthen coherence of national actors of science diplomacy and facilitate cooperation within regions and between countries as discussed in this paper. The results of this research have the practical interest for the federal, regional and municipal governments to determine the future strategies and policies for international cooperation in the sphere of economic, scientific, and technical relations, as well as to enlarge the Russian program during the Chairmanship in the Arctic Council.

Keywords: *international cooperation, science diplomacy, regional self-development, local communities, socio-economic factors.*

Исследование 2019 года по изучению специфических аспектов саморазвития местных сообществ Арктической зоны Российской Федерации показало, что одной из наиболее активных групп региональных участников (акторов) международного сотрудничества являются научно-образовательные учреждения (представляющие 40 %-ную выборку среди других групп участников) [1]. В данной работе анализируется региональный контекст и институциональные компоненты научной дипломатии и ставится задача предложить дальнейшие действия для развития этого направления. В работе применяются методы качественного исследования посредством сравнительного и контекстуального анализа существующего национального и международного законодательства, регламентирующих актов, документов для обобщения практик, инструментов, акторов и заинтересованных сторон научной дипломатии на региональном уровне. В ходе исследования рассматривается, что научная дипломатия в Мурманской области принимает различные формы и может формироваться в рамках практик национальной внешней политики и дипломатии, а также в рамках парадипломатической деятельности на региональном и муниципальном уровнях, включая прочные связи с секторами науки и образования. Новая реализующаяся концепция правительства России по созданию научно-образовательных центров мирового уровня может усилить согласованность действий национальных акторов научной дипломатии и способствовать сотрудничеству внутри регионов и между странами, как обсуждается в работе. Результаты этих исследований представляют практический интерес для федеральных, региональных и муниципальных органов власти с точки зрения определения будущих стратегий и политики международного сотрудничества в сфере экономических, научно-технических отношений, а также расширения российской программы в период председательства в Арктическом совете.

Ключевые слова: *международное сотрудничество, научная дипломатия, саморазвитие регионов, местные сообщества, социально-экономические факторы.*

Introduction

At the time of rapidly changing economic and social realities at different levels of geographical projection “global-regional” as well as with the enhanced development, modification and implementation of variety of state official legislations and mechanisms for support of sustainable and territorial development of national Arctic microregion, it is vitally important to focus on specific aspects of development which produces the greater positive effect than currently considered.

Urbanized and populated territories of the Arctic always attracted the most attention from the research community and government officials to ensure the sustainable development of the area. The Arctic as a holistic region in the natural sense has different social and economic realities shaped within the national legislations and state borders. The transnational differences are obvious but the Russian Arctic by being the territory of many regions within the Russian Federation can be described as the territory of inter- and intraregional disparities. Russia comprises more than 40 % of the territory of the Arctic and involves 9 Arctic federal territorial subjects of different types (from oblast to autonomous districts, republics) with their own specific administrative, economic and social realities. Such specifics are reflected in the intra- and interregional disproportions of the Russian Northern economies largely discussed by experts [2–5]. *Zubarevich* explains that the regional development in Russia is mainly defined by the competitive advantages of the regions (resources, geographical location, agglomeration effect, human potential) rather than the regional policy of the state [2]. *Kolomak* notes that uneven spatial development in Russia remains a problem of great concern. In the last years, the government declared several approaches to the regional policy with different support mechanisms for underdeveloped regions which brought no success [6]. In this perspective, the dramatic trends of depopulation of the Russian Arctic depict the difficult trajectories of further development. This has been largely discussed in the recently published AACA report of the AMAP working group of the Arctic Council which concluded further population decline for the western part of the Russian Arctic of up to 15 percent, in the worst-case scenario, by 2031 [7]. Yamal-Nenets autonomous district is the only subject of the Russian Arctic which reveals the positive population trend in the past years [8]. Such a trend mostly speaks for the economic profile of the region based on the oil and gas industry, and opportunities for FIFO (Fly In Fly Out) employment. The other Arctic subjects of the Russian Federation experience considerable depopulation tendencies.

Murmansk region is the only Arctic subject of Russia which has the direct state borders to two other countries, Norway and Finland, and historic trade and cultural connections to the third geographically neighboring country with no direct land border — Sweden. All 4 countries comprise the Barents Euro-Arctic Region (BEAR) which has strong multilateral diplomatic, economic, scientific, cultural ties. The importance of maintaining international cooperation within Russian Arctic regions at different levels is underlined in the State Strategy for the Arctic where the Arctic Council and Barents Euro-Arctic Council are mentioned as the main platforms for such cooperation [9]. The BEAR coherence is largely discussed and covered by regional economists [10-11]. Such a transborder region with its international connections presents the case study of this paper.

As acknowledged earlier [1], the transborder region experiences considerable cross-impact between territories and municipalities of all three countries mostly based on population change tendencies. The active development of cross border transportation networks and routes will promote and accelerate the growth of geographical potential as well as mitigate the negative tendencies of depopulation within all countries involved in the transborder region.

As mentioned by *Skufina* [12], the general infrastructural and socially weak development of the Russian part of BEAR activates the demand for services, commodities, and products, and correspondingly promotes the supply from the neighboring countries of developed economies. Murmansk region due to its direct location to these countries has a lot of economic connections both to Finland and Norway especially in the light of infrastructural and logistic projects related to the Northern Sea Route [13].

Intensive international, transborder and paradiplomatic activities at the territory of Murmansk region in comparison with other Russian Arctic regions can be considered as such specifics that are directly connected to the territorial factor. The pronounced importance of multidimensional international cooperation in the region is usually reflected in the categories of scientific, business, and cultural communications and projects largely overarched by the active paradiplomatic level.

Even though the Murmansk region reflects depopulation tendencies of the Arctic territory of Russia described earlier, the population of municipalities in the Murmansk region still exceeds the population of neighboring territories of Norway and Finland, and the urbanization system is more concentrated. The Russian Arctic is still the region of big cities in comparison with Arctic regions of Europe and North America. This points

to the fact that the Soviet model of development of the Far North with extensive exploitation of natural resources and associated development of transport and social infrastructure has not yet been overcome. It is possible that the Russian North doesn't need such big cities and municipalities anymore, but the socioeconomic development of them should be diversified in the foreseen future when the industry, transport, and energy sectors accompanied by the development of science and education segment, and this requires the rethinking of Russian Arctic urbanization model. Nevertheless, the Russian government has undertaken such action and consider the development of World-class research and education centers across the Arctic regions of Russia and beyond. This might bring changes to the social and economic infrastructure of the local communities and induce greater development and facilitation of the (para) diplomatic and science and education activities especially in such transborder region as Murmansk.

This paper analyses and discusses the regional notion and institutional components of science diplomacy per se and takes a challenge to propose future actions to facilitate science diplomacy as one of the aspects for regional and self-development of local communities.

Theory and methodology

Science diplomacy is certainly not a new phenomenon but the one that becomes a particularly important instrument for the governments and states around the world to facilitate, normalize, and at times to détente the international connections. The concept itself has a long history and, for example, within Russia has its roots starting to shape in 1920-s. For that purpose, in 1925 the All-Union Society of Cultural Relations with Foreign Countries (VOKS) was established, whose activities were propagandistic. One of the sections of VOKS (along with sections of cinema, law, museum, ethnography, and pedagogy) was the scientific and technological section, in the work of which leading scientists were involved, that enabled them to communicate with foreign colleagues, participate in foreign trips, and obtain foreign literature [14].

Science diplomacy is an instrument of the state's "soft power" which presumes the convergence of science and foreign policy to facilitate and attain the common goals. Even though the concept is still vague, the Royal Society, UK [15] and American Association for the Advancement of Science¹ earlier in this century tried to frame the concept by discussing 3 main pillars of science diplomacy. They include "diplomacy for science" (facilitating international science cooperation); "science for diplomacy" (using science cooperation to improve international relations between countries) and "science in diplomacy" (informing foreign policy objectives with scientific advice). When discussing this concept, *Berkman et al* shares the larger geographical perspective to the background of science diplomacy by mentioning it as the bridge between national interests of nation-states and common interests within the international spaces (e.g. Antarctica, Outer Space) [16, 17]. Berkman describes science diplomacy as a holistic (international, interdisciplinary, and inclusive) process involving informed decision-making to balance national interests and common interests for the benefit of all on Earth across generations. This largely refers to and helps to bridge the dualistic approach to the Arctic as the region of national (within geopolitical and national borders) and common (scientifically holistic geographical) spaces and interests.

Science diplomacy however may be accepted as a larger or overarching concept which includes and/or may be referred to as a background to the other types of emerging diplomatic relations in different contexts, for example, *cultural diplomacy* [18], *educational diplomacy* [19], *environmental diplomacy* [20, 21, 22] in particular crucial these days *climate diplomacy* [23], *innovation and economic diplomacy* [24, 25], *public diplomacy* [26, 27], etc. which all are of high importance and relevance for the Arctic region per se. All these types of diplomatic relations make the definition and conceptualization of science diplomacy problematic on one hand but also give the contextual volume and added value to the phenomenon. All mentioned above diplomacies can be the elements of each other, present a high level of interconnection and convergence by being the integral components of a variety of international relations based on common and national interests.

When discussed within the concept of common and national interests, science diplomacy can be reviewed at different levels and utilized by different actors, stakeholders, and users through a variety of tools and mechanisms. For example, UN as a global organization (actor of science diplomacy) advocating for the common interests for sustainability and humankind by implementing global protocols as mechanisms and tools of science diplomacy — The Montreal Protocol [28], The Kyoto Protocol [29], etc. The mentioned above dualistic challenge of the Arctic when considered within the common space is a great example of the historic international

¹ Website of Centre for Science Diplomacy. Available at: <https://www.aaas.org/programs/center-science-diplomacy>. (Accessed 09.09.2020).

cooperation and, thus, the momentum of science diplomacy in action. The latest fourth International Polar Year 2007-2008 (in this context considered as the tool) was the collaborative, international science program to study Arctic and Antarctica which included 63 nations and a broad range of disciplines to reach the common goals and interests [30]¹.

It was launched and sponsored by the International Council for Science (ICSU, now known as the International Science Council, ISC) and the WMO (World Meteorological Organization, the specialized agency of the United Nations), thus considered as the actors of science diplomacy. The International Geosphere-Biosphere Programme in this context can be mentioned as the effective long-lasting tool (existed for 28 years from 1987 to 2015) of science diplomacy implemented by the International Council for Science (as the main actor) to study the global change (common interest)^{2 3} [20].

When considered at the geographically holistic regional projection, the Arctic Council can be exemplified as both — the main actor of science diplomacy and the tool of such by creating the dialogue platform for many countries, organizations, and stakeholders. It is the viable aspect for the Russian Federation at the moment as in 2021-2023 it will be chairing the Council by proclaiming national interests in the context of common goals for the region. The Arctic Science Agreement signed by the Arctic states including Russia in 2017 is one of the tools and mechanisms of science diplomacy at this level. The Arctic Council is the high-level intergovernmental forum that addresses issues faced by the Arctic governments and the indigenous people of the Arctic, it promotes cooperation, coordination, and interaction among Arctic stakeholders⁴. Structurally Arctic Council is comprised of the Working Groups which includes the scientists to provide scientific advice for the decision-making. The Arctic Council's Chairmanship is rotational and is passed by every two years from one Arctic state to another. This discourse leads to the other level of science diplomacy — the national interests.

Many national legislations and strategies include science, education, innovation, technology as core elements of national development. For example, the recently adopted and published "Strategy for Developing the Russian Arctic Zone and Ensuring National Security until 2035" ⁵. The Norwegian Ministry of Foreign Affairs included science diplomacy in different aspects of its international relations [32]. The Embassies and Consulates are the focal spots of science diplomacy in the role of active actors at the territory of other nations. Such diplomatic offices provide a number of different science diplomacy tools to ensure the declaration of national goals and interests and to facilitate the connections between nations on a bilateral basis (e.g. by appointing science advisors and attaches, developing science, innovation networks, etc.).

However, and as mentioned earlier, the Arctic territory in the national context is the regional area with a diversity of aspects and realities. The broad scope of science diplomacy at international and national levels takes the narrower direction and aims when considered regionally. Thus, the Murmansk region by being part of the transborder area is an excellent example and case study of how science diplomacy can influence the self-development of local communities in the Arctic dimension.

This paper applies the qualitative research methods through the comparative study and contextual analysis of the existing national and international legislation, acts, documents to summarize the practices, tools, actors, and stakeholders of science diplomacy at the regional level.

Results and discussion

Murmansk region is the vivid study area with the role of communicator and negotiator of the national interests within the foreign policy practices as part of the transborder area. Paradiplomacy is active and developed at both levels of regional and municipal governments. In July 2017 the Federal Law on the state-region delimitation of authority for transborder activities of regions and municipalities has been passed in the Russian Federation [33]. This law sets up the constructive mechanisms for paradiplomatic activities of the regions though doesn't proclaim their full independence and targets the regional and municipal governments to evaluate and monitor their efforts for transborder cooperation.

When discussing different geographical projections in the diplomatic and foreign policy discourses, the Arctic region in general is the area of common and national interests negotiated at the Arctic Council platform by the Arctic states. But when it comes to the narrower geographical projection and more specific actors, to the regionalization discourse, the Barents Euro-Arctic Region acts like this area. BEAR was launched in 1993 (27

¹ IPY website. Available at: <https://ipy.arcticportal.org/> (Accessed 09.09.2020).

² IGBP website. Available at: <http://www.igbp.net/> (Accessed: 11.09.2020).

³ ISC (International Science Council, previously ICSU). Available at: <https://council.science/> (Accessed 11.09.2020).

⁴ Arctic Council website. Available at: <https://arctic-council.org/en/> (Accessed 11.09.2020).

years by 2020) by the will of Kirkenes Declaration discussed by the national governments but is managed by the regional body — The Barents Regional Council (BRC)¹. BRC represents 14 counties within 4 countries and includes 3 groups of indigenous people. The Russian part of BRC includes 5 Russian Arctic regions including the Murmansk region.

As mentioned earlier in this paper, the Murmansk region has direct land borders with Finland and Norway comprising the transborder region with over 550000 border crossings between Russia-Norway and Russia-Finland (entry&exit, person per year); strong extractive industries and mining profiles: Scandinavian Mining Cluster and Kola Mining Complex; scientific and educational buffers: Oulu, Rovaniemi, Apatity, Murmansk, Tromsø, etc.

The cooperation practices within BEAR regulated by the Kirkenes Declaration are complemented by the bilateral national and regional agreements and treaties. By now the regional government of Murmansk has established longstanding agreements with 6 large northernmost regions of Finland, Sweden and Norway proclaiming peaceful, neighborly, and mutually beneficial directions of cooperation. Such activities have obvious economic added value within the transborder region and might in the short term become related to more intense transborder economic paradiplomacy with the concrete trade and investment practices. In this context science diplomacy is implemented through the paradiplomatic activities of regional and municipal governments. International activities of the Murmansk region within the transborder area takes different forms. During the previous study [1] they were schematically categorized into several top-down levels from regional to individual. While the organizational and individual levels are shaped independently any official state formalities, the regional and municipal levels have the procedure-oriented basis usually executed by the countersigning of official documents between subnational governments (some bilateral agreements signed in 1988 with the renewal in 2011-2015, counting to the 32 years of existence), and from 2017 are under new state legislative regulations [33]. Such active development of international contacts is considered by regional and municipal authorities not only as an efficient instrument for problem-solving but also for building sustainable development strategies [34] at paradiplomatic level. As the analysis shows, even at the geographically narrower, compact regional level the actors, ways, mechanisms, and tools of science diplomacy are diverse, the established connections are long-lasting, exist for 20-30 years, and impressively effective (*Table 1*).

Table 1

**Examples of regional actors and mechanisms of science diplomacy
in the Murmansk region in the context of transborder region**

Actors	Mechanisms
1	2
Regional level	
Regional government (administration, ministries and governmental services), regional consulates and foreign offices (Murmansk office of the Consulate General of Finland, Norwegian Consulate General in Murmansk)	Within the framework of regional agreements and memoranda with Northern territories of border (Norway, Finland) and neighboring (Sweden) countries Within the framework of existing intergovernmental regional bodies such as Barents Euro-Arctic Region — Barents Regional Council
Municipal level	
Municipal government (administration and local services, departments)	Within the twin town and sister cities concepts Within the Council of Border Municipalities in the North Within the cross-border cooperation programs (e.g. Kolarctic CBC, Nordic cooperation programmes)
Organizational level	
Higher education institutions (HEIs) — Colleges, Universities, Institutions Research centres (Kola Science Centre, Russian Academy of Sciences) Non-governmental organizations Cultural organisations Small and medium-sized business	Cross-border cooperation programs (e.g. Kolarctic CBC, Nordregion) Within the regional non-governmental organizations such as Northern Chamber of Commerce and Industry of Murmansk region and Union of Industrialists and Entrepreneurs of Murmansk region, etc. Programmes for business and innovation support Within scientific, educational and cultural organizations, networks and links

¹ Website of BRC. Available at: <https://www.barentscooperation.org/en/Barents-Regional-Council>. (Accessed 11.09.2020).

End of the Table 1

1	2
Individual level	
Individual migrations within the local seasonal and temporary push-pull migrations, education and labor linkages, episodic business, scientific and touristic shiftings as well as purchasing activities of local population	Joint trade regulations and programs, bilateral cross-border migration regulations (e.g. local cross-border visa-free regime Norway-Russia within 30 km area from the border; special Pomor visa with the easy application procedure)

Note: The Table is based on and supplements the table from a previous study [1] which describes the levels of international cooperation in the Murmansk region

As seen from *Table 1*, all strategies of science diplomacy (S4D — Science for Diplomacy; D4S — Diplomacy for Science; SinD — Science in Diplomacy) are presented in different ways and values at all levels of cooperation within the region by implementing different mechanisms of cooperation facilitation (e.g. governmental representation in different bodies, joint mobility projects and regulations, common scientific and innovation interests, etc.). The individual level is covered by the multiply educational, cultural, and scientific people to people (P2P) connections which are intensively developed in the region. In this sense, the role of the "science diplomat" is considered as a multilateral actor at all levels of international cooperation, especially in the framework of close friendly and often family relations, individual ties within a transborder region. In the case of the latter, it is more appropriate to talk about the "users" of science diplomacy results.

Science diplomacy is a transboundary field sitting across 1) national borders, entailing bilateral or multilateral relationships; 2) policy frameworks, combining the policy realms of science, technology, innovation, and foreign affairs — each with clear-cut definitions of competencies, actors and levels — and establishing complex and fluid interactions with joint jurisdictions; 3) stakeholders of all natures, involving government actors as well as international organizations, scientific institutions, non-governmental organizations (NGOs), the private sector and so forth; and 4) professional backgrounds because it bridges two cultures with different world views: the scientist and the diplomat [35].

One of the main factors for international cooperation and science diplomacy facilitation especially in the transborder regional projection is the human capital. As revealed from a statistical overview of population changes, in the backyard of successful regional diplomatic practices, the Murmansk region experiences dramatic depopulation in comparison with its neighbors. Depopulation of Murmansk region with the decrease of 12,7% in total for 2007/2019 (the period from the previous study) shows extremely negative influence on dynamics of geographical potential which is very important for the urbanization and agglomeration trends (*Figure 1*). Norway's Arctic experiences population growth, and the local smaller communities in Finland tend to decrease from surrounding areas towards the bigger municipalities with a diversity of services.

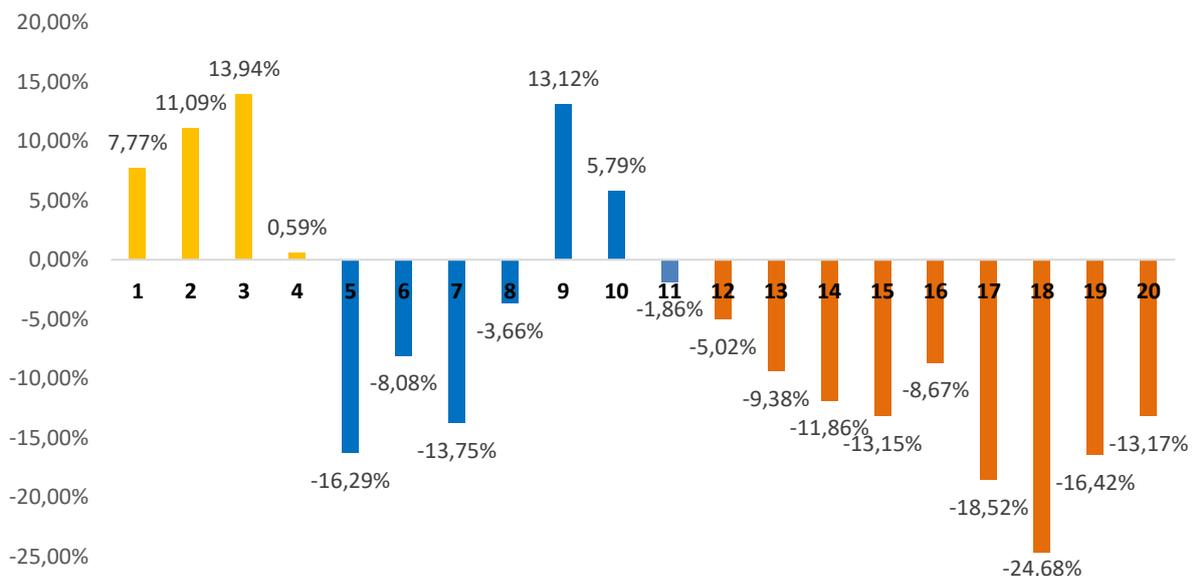


Fig. 1. Population change 2007/2019 (%) of selected administrative units within the transborder area.

Norway: 1 — Sor-Varanger, 2 — Alta, 3 — Tromso, 4 — Vadso; Finland: 5 — Salla, 6 — Kuusamo, 7 — Kemijarvi, 8 — Sodankyla, 9 — Oulu, 10 — Rovaniemi, 11 — Inari; Murmansk region, Russia: 12 — Murmansk, 13 — Apatity, 14 — Kirovsk, 15 — Kovdor, 16 — Olenegorsk, 17 — Revda, 18 — Nikel, 19 — Zapolyarny, 20 — Monchegorsk.

Note: Selected municipalities in the territories of Finland and Norway are the most popular destinations among citizens of the Murmansk region (as revealed from sociomonitoring). The administrative center of Sør-Varanger commune is the town of Kirkenes which is counted in national statistics only within the general municipality. Population statistics obtained from Statistics Norway. Available at: <https://www.ssb.no/> (Accessed 14.11.2020); Official Statistics of Finland (OSF). Available at: <http://www.stat.fi/> (Accessed 14.11.2020); Murmanskstat. Available at: <http://murmanskstat.gks.ru/> (Accessed 14.11.2020).

Decomposition trends of geographical potential and agglomeration influence by countries speak for different national relationships within center-periphery models even at the regional levels. In all cases, these models have centripetal character when the population of small municipalities intensively decreases. But when in Norway and Finland population increases in big cities, for example in Oulu and Rovaniemi (Finland), in Tromso (Norway), in Murmansk region depopulation covers all municipalities. This is the result of one of the main trends in the dynamics of the population within the whole territory of Russia, when in fact at the territory of such a large country there are only two central spatial cores — Moscow and Moscow region, and Saint-Petersburg and Leningrad region. As cores of the second level, we can consider all municipalities with a population of over 1 million (Ekaterinburg, Novosibirsk, etc.), but not all of them demonstrate stable socioeconomic growth.

Presented population trends for Oulu, Rovaniemi (Finland), and Tromso (Norway) are connected to the science, innovation, business, education, and culture services strongly developed and provided at these locations. By being so-called Arctic Innovation Hubs, these municipalities are the platforms for knowledge-based business development, innovation testing, collaborative research [36, 37]. Here, the Higher Education Institutions and Research Units and Centres, play an important role as institutional actors in science diplomacy, and following intercultural exchange, and scholarships.

Murmansk region has the fully developed research and education infrastructure to facilitate the similar kind of the Arctic research and innovation hubs by building strong interregional and intraregional connections within Russia and active international connections based on existing science diplomacy practices and actors which has been analyzed in this paper. International collaborations help institutional development and promote the exchange of new and modern knowledge. Such kinds of efforts have been undertaken just recently by the Russian government with the adoption in July 2019 of the «Clause of the Council for the world-class scientific and educational centers».

To develop such kind of centers, it is necessary to involve the participants of research and educational centers (REC) in global innovation structures based on international scientific cooperation and the concept of open innovation: network structures, technology platforms, innovation clusters [38, 39]¹. Murmansk region is currently developing the Arctic world-class scientific and educational center which is comprised of the leading scientific and educational entities of the region and beyond. This gives a floor for further facilitation of science diplomacy as one of the core elements for regional sustainable development.

Conclusion

This study aimed to analyze and discuss the regional notion and institutional components of science diplomacy per se and to propose future actions to facilitate science diplomacy as one of the aspects for regional and self-development of local communities. As seen from the discussion, science diplomacy in the Murmansk region takes different forms and can be shaped within the practices of national foreign policy and diplomacy as well as within the paradiplomatic activities of regional and municipal levels. Science diplomacy has greater development potential within existing financial programs (as drivers of cross-border cooperation) and active science connections across borders even at individual P2P level by promoting the role of “science diplomat” [1]. The transborder regions in their international collaborations and by retrieving glocalization processes in practice provide the strong local context for the global science diplomacy at both bilateral and multilateral connections. Global science diplomacy as mentioned earlier by the existing examples (IGBP, UN, IPY, etc.) is

¹ Website “World-class research and educational centers”. Available at: <https://xn--m1acy.xn--p1ai/> (Accessed 11.09.2020). (In Russian).

usually based on large-scale and long-lasting cooperation. The regional scale of science diplomacy may be based on short-term actions but is also fundamentally dependent and rely on long-term international relations. In the Arctic context, science diplomacy helps to overcome the dualistic vision of the area (national vs common spaces) and maintain the Arctic context balancing between national and common interests (especially in the sphere of climate diplomacy, environmental diplomacy, etc.). Considering the strong role of paradiplomatic actors in building the science diplomacy and general cooperation mechanisms, the national support should be enlarged. By being promoted at the international level, the world-class scientific and educational centers can proclaim and use the existing science diplomacy practices to facilitate their own development. The current study should further be looking into the indicators to monitor science diplomacy values. This will help to evaluate the important, gaps, challenges, and opportunities for the science diplomacy mechanisms.

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