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Abstract

The present study aims to examine the main directions of economic cooperation between Russia and China in the Arctic following the outbreak of the full-scale war in Ukraine. The significance of the Arctic region for Russia is indisputable, particularly in the context of climate change and the prevailing geopolitical shifts. Russia possesses the largest Arctic territories in the world, controls the Northern Sea Route and has a centuries-long history of Arctic exploration and development. In contrast, China's involvement in Arctic affairs is a recent phenomenon, though it aims to augment its influence in the region and exploit Arctic resources. The history of Sino-Russian collaboration in the Arctic is considerably brief, yet it has undergone significant expansion over the past two decades. The outbreak of war in Ukraine and the subsequent significant restriction of Arctic interaction between Western nations and Russia have presented China with a valuable opportunity, accompanied by some difficulties and uncertainties. The economic collaboration between China and Russia has become imperative for the latter, resulting in a state of reliance. China stands to benefit from the diversification of energy supplies, the development of alternative transport routes, and the favourable terms in trade with Russia. The threat of secondary sanctions from Western countries has the effect of limiting China's activity in its relations with Russia. This has several consequences, including the complication of financial settlements and the slowing down of the implementation of major investment projects in the Arctic. However, since the start of the full-scale war in Ukraine, trade between the two countries has accelerated dramatically, particularly in energy resources produced in the Russian Arctic. There has also been an increase in contacts between Russian and Chinese scientists in the field of Arctic research, and plans have emerged for new projects to develop transport infrastructure linking the Russian Arctic and China. Approaches of Russia and China to cooperation with each other in the Arctic are currently undergoing significant changes, which reflect global political trends. Given the importance of the Arctic in a changing climate and shifting global balance of power, the dynamics of Russia-China relations in the Arctic are a subject worthy of close study.

Key words: Russia, China, economic cooperation in Arctic, war in Ukraine.

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1. Introduction

The Arctic has recently become a subject of increased interest, particularly in the context of evolving climatic conditions and a complex geopolitical landscape. The region's strategic importance is defined by its position as the shortest air and sea route between Europe and the Americas, Russia and the United States, and East Asia and Europe. The Arctic Ocean is bordered by five countries (Canada, Denmark, Norway, Russia and USA), and three countries (Iceland, Finland and Sweden) possess substantial Arctic territories. These eight countries are members of the Arctic Council, and supranational entities such as the EU and NATO have also expressed significant interest in the region. Russia is the largest Arctic country, encompassing approximately one-third of the total world's Arctic area. In Russia itself, Arctic territories cover an area of 48 million square kilometres or 28% of the country's total territory. Russia's engagement in the Arctic extends back a considerable period of time, marked by a history of exploration and resource exploitation.

The geographic boundaries of Russia's Arctic region underwent refinement on two occasions in the 20th century (in 1926 and 1979), and in 2020 a federal law was passed that provided the contemporary definition of the Russian Arctic zone (Russian government, 2020). According to this description, the Arctic zone of the Russian Federation is located on the shores of the six seas of the Arctic Ocean and includes the territories of several subjects of the Russian Federation, but only four of them are located in Russian Arctic zone in their entirety, the Murmansk Oblast and three autonomous districts, the Nenets, the Yamal-Nenets and Chukotka.

The strategic, military and economic importance of this region is gaining weight not only for the Arctic states, but also for countries not previously actively involved in Arctic affairs, who are attracted by the region's rich natural resources and logistical opportunities. India and Japan, for example, have recently shown increased interest in Arctic issues. Nevertheless, China has been the most proactive in this regard, identifying the Arctic as a key region for the expansion of its influence and the realisation of its geopolitical ambitions. Following 2022, this activity has only intensified, although it is limited by China's fears of being subject to secondary sanctions against Russia.

The relationship between Russia and China in the Arctic is characterised by a multifaceted collaboration including various energy and infrastructure projects. It is influenced by the divergent geopolitical strategies and interests of both nations, as well as various environmental aspects, primarily related to climate change. The nature of this relationship is dynamic, experiencing periods of fluctuation, yet it remains generally beneficial for both countries.

Even so, significant contradictions remain between Russia's and China's approaches to the Arctic and its problems, particularly with regard to the implementation of a strategy for the management of Arctic territories, including the exploitation of various types of resources, the freedom of navigation in the Arctic seas, and certain issues on the environmental agenda, not to mention the military significance of the Arctic, which is of extreme importance to Russia. In particular, Russia adheres to the principle that Arctic states have sovereign rights over certain maritime regions, particularly over Exclusive Economic Zones (EEZ) and continental shelves (UNCLOS, the United Nations Convention on the Law of the Sea, 1982) (UN, 2024), while China argues that the Arctic and its resources are the 'common heritage of all humankind' (Bartenstein, 2015). These aspects have so far been neglected in Sino-Russian relations, and there has been no mention of bilateral cooperation on legal regulation or management of the Arctic (Strelnikova *et al.*, 2024).

Following the outbreak of the full-scale war in Ukraine, there has been an increased focus among researchers on the strengthening of political, military and economic ties between Russia and China, including in the Arctic. The study of this phenomenon is complicated by the fact that in 2022 Russia closed access to statistical data on most indicators of its foreign economic activity. Consequently, the primary source of data on economic collaboration between Russia and China following the onset of the full-scale war in Ukraine is currently the Chinese Customs Service (Chinese customs, 2024a), which is processed and analysed by various analytical centres, for example Bruegel 'Russian foreign trade tracker' (Darvas *et al.*, 2024). However, it is important to acknowledge that these data do not fully capture the comprehensive scope of economic cooperation between Russia and China, particularly in regard to trade, because since the onset of the full-scale war in Ukraine both countries have employed various circumvention schemes with the objective of evading Western economic sanctions.

The history of China's Arctic policy is relatively recent, although it formally dates back to 1920, with accession to the Svalbard Treaty, originally the Spitsbergen Treaty (Arctic Portal Library, 2016) and its subsequent ratification in 1925. In China, accession to the Svalbard Treaty marks a historic point for China's Arctic engagement (Liu, 2021; Østhagen, 2024). Nevertheless, it was not until the early 1980s that China's interest in polar affairs occurred in the context of the Chinese economic reform, also known domestically as the reform and opening-up (China's State Council, 2018b).

The genesis of this activity was in the research sphere, with a primary focus on Antarctica, at a time when the State Polar Committee of China was established in 1981. A mere 15 years later, the scope of the Committee's activity expanded to encompass the Arctic region, leading to the renaming of the Committee as the Chinese Arctic and Antarctic Administration (CAA). To improve the level of polar research the Polar Research Institute of China (PRIC) was founded in 1989. In 1996, by joining the International Arctic Science Committee (IASC), China took a decisive step to the next level of involvement in Arctic affairs. The same year a winter training base in Yabuli, Heilongjiang Province in Northeast China (CAA, 2024) was established to train scientists for polar expeditions in northern China. Since then, China's interest in the Arctic has grown slowly but steadily, supported by the country's government.

The institutional basis for China's Arctic strategy was established in the 21st century, coinciding with the active phase of realisation of China's foreign policy doctrine. This doctrine was predicated on the concept of the 'Community of the Common Destiny of Mankind', a notion initially articulated in 2004 and formally enshrined in China's 2004 Constitution (China's State Council, 2019a). In 2012, at the 18th Congress of the Communist Party of China, an ambitious goal of building China into a 'maritime great power' was declared for the first time (Mallory *et al.*, 2022).

Fulfilling the selected strategic objectives, China has become more actively involved in the Arctic region's affairs, utilising all possible and available formats of Arctic cooperation due to its 'non-Arctic' status and developing a wide variety of polar competences (Jones, 2020). The main areas of China's international cooperation in the Arctic have been scientific activities, biodiversity conservation, combating global climate change, building transport and logistics infrastructure, and oil and gas exploration (Smith *et al.*, 2019). The Arctic Council, a key platform for international cooperation in the region, has granted China observer status since 2013 (Keck, 2013).

It is imperative for China to ensure reliable transport links with the primary consumers of its goods. As the majority of Chinese goods are transported to Europe via the Suez Canal, China is confronted with the challenge of diversifying international transport channels and identifying alternatives to traditional sea routes. This is primarily due to the necessity of meeting the external trade transport requirements of the country's extensive inland regions. It is important to note, though, that unlike transport and logistics, expanding access to Arctic resources is not an existential need for China; rather, it is a profitable trade avenue of increasing importance in modern conditions.

The Belt and Road Initiative (BRI), initiated in China in 2013 (Baidu, 2024c), placed significant emphasis on the establishment of global transportation and investment infrastructure. By 2017, the BRI had integrated two pre-existing initiatives: the Silk Road Economic Belt (Belt and Road portal, 2023a) and the 21st Century Maritime Silk Road (Baidu, 2024a). Simultaneously the 21st Century Maritime Silk Road was complemented by the Vision for Maritime Cooperation under the Belt and Road Initiative (China's State Council, 2017), which envisages China's active participation in the development of the Arctic and utilisation of its resources. The financing of the Silk Road Economic Belt projects was addressed by the establishment of the Silk Road Fund in 2014 (The People's Bank of China, 2015).

In addition to the aforementioned initiatives, China has modified its official discourse on its interests in the Arctic, emphasising the evolution of multi-level and mutually beneficial economic cooperation with circumpolar states and proposing that the rights of all non-Arctic states to participate in exploration on the high seas and international seabed areas in the Arctic must be legally recognised (Zhang, 2024). As the interest of non-Arctic states in the Arctic has enhanced, the notion of sub-Arctic or near-Arctic states, as promoted by China, has gained ground in this discourse. The purpose of this discourse is to justify the increased attention to the region (Medvedev *et al.*, 2024).

The formulation of China's Arctic strategy was concluded in 2018, when the State Council of the People's Republic of China published the China's Arctic Policy, 'The White Paper' (China's State Council, 2018a). The emergence of China's specialised Arctic strategy proved to be a landmark event for regional politics and

was an official recognition of China's Arctic ambitions. This seminal document solidified China's position as a near-Arctic state, delineating China's primary objectives in the Arctic region. These objectives entailed ensuring access to Arctic governance and the requisite Arctic resources for the Chinese economy, in addition to conducting commercial maritime activities in Arctic waters.

Formally, China's Arctic strategy defines areas of development such as science and research, environmental issues, energy exploration and exploitation and transport and logistics improvements. In a broader sense, China aspires to internationalise the Arctic, to maintain an open regime governed by international law, not limited by the exclusive rights of the Arctic states. The realization of these objectives is planned to be achieved by recognizing that the Arctic region is generally accessible to non-Arctic countries and by integrating the Northern Sea Route (the NSR) into the Belt and Road Initiative.

In this regard, a natural extension of the Belt and Road Initiative to the Arctic until recently appeared in the form of the Polar Silk Road project (Baidu, 2024b), which implied the use of the NSR and cooperation with Arctic states, including Russia. The commitment of China to advance its national interests in the Arctic is further substantiated by the 2019 publication of China's National Defence in the New Era, which delineates the objective of developing weapons systems capable of functioning at the lowest possible temperatures (China's State Council, 2019b).

The primary strategic objective of China's collaboration with Arctic nations is the establishment of a novel trade route between Asia and Europe. During the 2010s, China selected the NSR as an Arctic transport corridor, deviating from its initial plans for a shipping route through the central Arctic and North Pole (Military-Political Analytics, 2018). According to optimistic calculations made before the global pandemic of the COVID-19 and the outbreak of the full-scale war in Ukraine, China expected that by 2020 the NSR would carry up to 15% of China's foreign trade traffic, mostly in the form of containerised cargo, corresponding to about USD 800 billion (Zhuravel, 2018). Yet these plans were never realised and it is unlikely that they ever will be.

In 2021, China's 14th Five-Year Plan for national, economic and social development and the long-term goals up to 2035 (China's State Council, 2021) emphasised practical cooperation in the Arctic, especially with Russia, and the implementation of the Polar Silk Road project, which includes the goals of creating a system for building heavy icebreakers, ice-strengthened liquefied natural gas (LNG) ships, polar floating oil and gas drilling platforms, polar monitoring based on satellite navigation (Eiterjord, 2023a).

A key challenge to achieving cooperation in the Arctic between Russia and China has always been the difference in understanding of the legal status of the provision of navigation. Considering the NSR as a promising transport route, China's approach to navigation in the Arctic Sea lanes is guided by the principle that 'freedom of navigation and the right of all countries to use them should be ensured' and that 'non-Arctic states have the right to search for and exploit resources in the international seabed area'. Such proclamation of the principle of Arctic internationalisation has the potential to give rise to contradictions with Russia. Yet China currently recognises Russia's right to appeal to Article 234 of the UN Convention on the Law of the Sea and respects Russia's rights to adopt non-discriminatory rules and regulations in ice-covered waters (Strelnikova *et al.*, 2024). China officially takes a neutral position on territorial disputes in the Arctic.

The position adopted by China with regard to Arctic exploration and cooperation with Russia in this area is also determined by its understanding of climate issues. China has positioned itself as a country interested in combating climate change, with its Arctic Policy having integrated environmental issues into the state's national strategy. But its domestic policy is mainly focused on decrease CO2 emissions under the Paris Agreement (Yamineva, 2020; Hurri and Kopra, 2023).

In this context, China has identified natural gas from the Russian Arctic as a key source of clean energy. The country aims to achieve what it terms 'the world's steepest reduction' in carbon emissions and has set a target of achieving carbon neutrality 'in the shortest possible time' (Daniel, 2022). Russian gas is viewed as a temporary measure to facilitate the achievement of this objective. Furthermore, China does not perceive climate change in the Arctic region exclusively as a negative factor. The anticipated rise in sea levels and the consequent flooding of coastal areas, a phenomenon that would be concurrent with the opening up of the NSR to year-round navigation, are viewed as beneficial to China's interests.

China's scientific engagement in the Arctic is congruent with its geopolitical interests, with the skilful utilisation of science diplomacy enabling the country to fortify its presence in the Arctic region and

progressively augment its participation in Arctic governance affairs (Sørensen and Klimenko, 2017). This has, however, evoked apprehension from other Arctic states, including Russia (Koivurova *et al.*, 2020). This commitment is evidenced by China's involvement in the International Arctic Science Committee since 1996, and the establishment of the Yellow River Research Station in Svalbard in 2003. The China-Nordic Research Centre (CNARC), established in 2013, serves as a pivotal organisation in coordinating joint scientific research initiatives between China and the Nordic countries in the Arctic. The primary objectives of the Centre encompass the study of climate change, the economic implications of regional activity, and the growth of shipping infrastructure. China is also a member of the Asian Polar Science Forum.

Over the past thirty years, China has been increasingly active in scientific research on the Arctic, as evidenced by the growing number of Chinese scientific publications on the subject (Lasserre and Alexeeva, 2019). The promotion of international scientific dialogue has been identified as a key objective in China's Arctic Policy and its 14th Five-Year Plan for Economic and Social Development (China's State Council, 2021; Eiterjord, 2023b). The implementation of these policies entails the active involvement of Chinese scientists in global discussions on Arctic matters. Additionally, China is allocating substantial resources to Arctic scientific research and simultaneously increasing the number of researchers specialising in Arctic-related issues (Kolzina and Mindubaeva, 2020).

For the Russian Federation, the Arctic represents a national priority that is receiving increasing attention and is being linked to the future of the country's economic development. The vast Arctic territories along the Arctic Ocean, the industrial base inherited from the USSR in the Arctic regions (mining, oil and gas, nuclear), and the transport infrastructure, civil and military, are of particular significance to Russia. The NSR, which connects Europe and Asia, is of particular importance due to its potential to significantly reduce the time of cargo transport, especially in the conditions of global warming. Nevertheless, the primary significance of the Arctic for Russia lies in the vast mineral and energy resources it contains, which are crucial for the nation's current and future economic growth.

The history of Russian exploration and expansion in the Arctic region dates back to the Middle Ages and was further intensified in the early 20th century with the establishment of the city of Murmansk in 1916. It continued during the Soviet era with the special attention being paid to the development of the NSR, a shipping route in the Russian Arctic that traverses the Arctic Ocean (the Kara, Laptev, East Siberian, Chukchi and Bering Seas) and connects over 50 European and Far Eastern Russian ports as well as the mouths of navigable Siberian rivers into a single transport system.

The establishment of the Institute for the Study of the North (1925) and the Main Directorate of the NSR (1932) represented significant milestones in Russia's achievements of the Arctic region. The foundation of the Arctic and Antarctic Research Institute in 1958 further catalysed research and development in the Arctic. The progression of arctic research and the construction of seaports along the NSR coincided with the discovery of substantial oil and gas reserves in the Arctic regions of Western Siberia. The largest oil and gas fields on the Russian Arctic shelf were discovered in the late 1980s.

Following the collapse of the Soviet Union in 1991, funding for the Arctic regions was significantly reduced, resulting in the abandonment of numerous infrastructure facilities and a nearly 33% decrease in the number of settlements. Consequently, annual transport volumes along the NSR fell fourfold, from 6.6 million tonnes in 1987 to 1.65 million tonnes in 1996 (Tass, 2019a). It was only after the year 2000 that Russia's Arctic potential began to recover, and a number of major infrastructure facilities were rehabilitated and completed, including the Yamal railway, the Varandey oil terminal, and the Yamal-Europe gas pipeline.

At the same time, Russia began to build new military bases in the Arctic and modernise old ones, conducting exercises aimed at ensuring control and security over the NSR. These actions were undertaken, in part, as a response to the intensification of China's Arctic aspirations, which were regarded as being in direct contravention of Russia's national interests at the time (Mikhaylichenko, 2019).

The utilisation of the economic potential inherent within the Arctic region poses numerous challenges for the Russian Federation. Firstly, the majority of mineral and energy deposits remain undiscovered and are located in geographically remote areas with harsh climatic conditions, necessitating substantial investments in their extraction and transportation, which Russia can only obtain from abroad. Secondly, Russia is in dire need of foreign technologies for the development of Arctic deposits. And thirdly, the NSR

is a challenging route with severe climatic conditions, including shoals and strong ocean currents (Li *et al.*, 2024). Most ports along the NSR do not have passenger terminals, and the infrastructure is outdated and overused (Zaostrovskih, 2018).

In order to realise its stated objectives in the Arctic, which are to strengthen its sovereignty over the region, primarily in the areas of Arctic navigation and resource management, Russia must attract large amounts of investment and gain access to the most advanced technologies. Until recently, the main focus has been on investment and technology from Western countries.

Until 2010, the progress of the Russian Arctic was hindered by a significant institutional obstacle in the form of inadequate domestic legislation that regulated navigation along the NSR. This legislative lacuna served as a deterrent to investment. By the early 2010s, the Russian authorities recognised the imperative to enhance the administrative and regulatory framework for Arctic shipping with a view to attracting international transport companies.

This task began to be addressed at an accelerated pace. In 2010, the federal law regulating Russia's internal waters and territorial zones was amended (Russian government, 2010), the NSR was defined as Russia's historically established national transport communication, and the Code of Merchant Shipping (Russian government, 1999) enshrined the concept of its water area and defined its boundaries. In 2012, the Law on the NSR (Russian government, 2012) was adopted, which clearly defines its water area and establishes and delimits authorities in its zone. In 2013, a single management body for the NSR, the Northern Sea Route Administration was established (Ministry of Transport of the Russian Federation, 2013), and in 2015, the 'State Commission for Arctic Development' was founded as well (Russian government, 2015b).

A key document in this respect is the 'Strategy for the Development of the Arctic Zone of the Russian Federation and National Security until 2020' (Russian government, 2013). The document in question formally specified Rosatom as the designated body responsible for the organisation of maritime navigation along the NSR. In addition, it proclaimed the intention to facilitate year-round navigation along the Russian Arctic coast and to construct the necessary infrastructure. In 2015, the 'Comprehensive Project for the Development of the Northern Sea Route' (for 15 years) was approved (Russian government, 2015a). In 2018 the 'Comprehensive Plan for the Modernisation and Expansion of the Mainline Infrastructure until 2024' (Russian government, 2018a) along with the federal project 'Development of the Northern Sea Route' (Russian government, 2018b) were endorsed, which, in addition to the rebuilding of the NSR infrastructure and the modernisation of the icebreaker fleet, also provided for the improvement of the Europe-Western China transport route.

In 2018, a federal law was adopted giving Rosatom responsibility for the advancement of NSR infrastructure (Russian government, 2018c), and in 2019 the 'Northern Sea Route Infrastructure Development Plan for the period until 2035' (Russian government, 2019) was implemented. Finally, in 2020, the 'Strategy for the Development of the Arctic Zone of Russia until 2035' (President of Russia, 2020a) and the 'Fundamentals of the State Policy of the Russian Federation in the Arctic for the Period until 2035' (President of Russia, 2020b) were approved, thus establishing the legislative basis for transit shipping in the Russian Arctic.

The basis of economic cooperation between Russia and China is constituted by political agreements, primarily the 1992 Joint Declaration on the Foundations of Relations (President of Russia, 2024b) and the 2001 Treaty on Good Neighbourliness, Friendship and Cooperation (President of Russia, 2024c). In terms of foreign policy, political cooperation is conducted within the framework of the UN and other established international organisations, as well as within the framework of the Shanghai Cooperation Organisation, BRICS and other similar entities. Prior to the full-scale war in Ukraine, despite the sanctions imposed after 2014, there were numerous high-level meetings between Russian and Chinese leaders within the framework of the G-20, APEC, SCO, BRICS, etc. (Mitko and Sidorov, 2024).

The discussion of plans for cooperation with China to exploit energy resources in the Arctic has been ongoing since the late 20th century, with the subject being a primary focus in Russian-Chinese negotiations to expand and elevate the strategic partnership based on energy and natural resources to a new level. Initially, China played an active role in promoting the development of cooperation, while Russia adopted a cautious stance towards the concept (Koivurova *et al.*, 2020). In 2007, Russia even opposed China's gaining observer status in the Arctic Council, although later, in 2013, it supported China's membership in the organisation (Gosnell and Bastian, 2023). Within the Arctic Council, Russia and China have engaged in the elaboration of norms of international environmental law, as well as participated in working groups

addressing various environmental aspects (Rottem, 2019; Fu, 2023), including the abatement of Arctic pollution (ACAP); the protection of the Arctic marine environment (PAME); sustainable development in the Arctic (SDWG); the prevention, preparedness and response to emergencies (EPPR).

The mutual benefits of economic collaboration between Russia and China in the Arctic nowadays are evident. These include the joint exploitation of Arctic resources and the NSR, as well as the potential for connecting the Russian Arctic to the Belt and Road Initiative. For Russia, this means the opportunity to modernise infrastructure and build new seaports along the NSR. For China, it represents an additional resource base beyond the south-eastern region and an opportunity to influence the situation in the Arctic, from infrastructure transformation to the growth of Arctic tourism.

The problems of economic cooperation between Russia and China in the Arctic are mainly related to differences in approaches and prioritisation. In addition to strategic and military risks associated with the growing Chinese presence in the Arctic, there are significant differences in the interpretation of Arctic law and governance between Russia and China. China's concerns include the underinvestment in outdated infrastructure in the Arctic, delays in the implementation of Arctic projects, and the sporadic decision-making process (Rehman, 2022). The harsh conditions of the Russian Arctic and the limitations of Russian national policy are also well recognised in China (Yang and Guo, 2022). Despite repeated joint statements about the importance of the Arctic for resource development and logistics, Chinese researchers argue that the region is not a priority for China and is commercially unpredictable (Zhilin, 2024). Conversely, Russia acknowledges the systemic challenges posed by antiquated infrastructure, particularly in Russian seaports along the NSR (Majorov, 2021), while concurrently expressing apprehension regarding China's growing influence in the Arctic, due to concerns that this may diminish Russia's own authority in the region.

Energy trade currently forms the basis of economic cooperation between Russia and China. Notably, the major energy projects that have become pivotal to this cooperation between the two countries commenced in the aftermath of the global economic crisis of 2008. Subsequent to this period, a shift in attitude became observable, with the signing of contracts and the initiation of several significant projects, including the construction of the East Siberia-Pacific Ocean oil pipeline and the Power of Siberia gas pipeline (Lasserre and Alexeeva, 2019).

In 2009, a series of significant developments occurred, including the signing of an agreement on cooperation in the oil sector, memoranda of understanding on cooperation in natural gas and in the coal sector, the establishment of a joint energy commission, and the formation of the Russia-China Energy Dialogue, which was renamed in 2012 as the Intergovernmental Commission on Energy Cooperation. Furthermore, at the G20 summit in St. Petersburg in 2009, China's CNPC purchased a 20% stake in the Yamal LNG project, thereby marking the inception of large-scale energy cooperation between Russia and China in the Arctic (Zaikov *et al.*, 2024). Investments by China in the Russian oil and gas industry were primarily concentrated between 2000 and 2010, with notable examples including Yamal LNG and Arctic LNG 2 and several others.

Following the imposition of Western sanctions in 2014, when Russia's Arctic projects were among the first to be subject to restrictions by the US and European Union, including bans on the transfer of technology and equipment to Russia for drilling below 150-152 metres, as well as the exploration of shale oil reserves on the Arctic shelf (Rehman, 2022), Russia was compelled to seek alternative sources of capital and to initiate a reorientation of its energy supplies towards the East, thereby reinforcing energy cooperation with China.

As a consequence, contracts were concluded for the supply of natural gas to China via the Power of Siberia gas pipeline, with a volume of 38 billion m3 over 30 years at a favourable price for China (Albuquerque *et al.*, 2024). These were accompanied by a memorandum on natural gas transit under the Power of Siberia-2 project, as well as framework agreements between Gazprom and Chinese national oil and marine corporations. Furthermore, an expansion of energy cooperation was agreed, with the aim of establishing a near-geopolitical alliance, the EAEU and the Belt and Road Initiative, including joint development of the NSR (Tass, 2014). In addition, China's share in the Yamal LNG project rose to 29.9% when an additional 9.9% stake was acquired through The Silk Road Fund in 2015 (Rehman, 2022). However, during the same period, there was a sharp temporary decline in trade between Russia and China due to insufficient demand on the international market and lower prices for crude oil and other commodities (Lin, 2024).

In 2016, the Russian government initiated the construction of the Primorye-1 and Primorye-2 international transport corridors (Russian government, 2016) with the objective of strengthening its position in the Asia-Pacific region and increasing trade with China and other countries. In 2017, China proposed the utilisation of these corridors for the expansion of the Polar Silk Road (Li and Wu, 2024). In 2019 economic cooperation between Russia and China reached an unprecedented level, as evidenced by the signing of a Joint Statement on Further Deepening the Relationship of Comprehensive Partnership and Strategic Cooperation (President of Russia, 2019). This statement introduced a novel initiative to foster collaboration in scientific expeditions, polar tourism, and environmental protection. A total of three joint statements were made between 2017 and 2019 to support cooperation in the Arctic in the fields of science, tourism and the environment (Yang and Guo, 2022).

In 2020, trade between the two countries declined due to the worldwide isolation caused by the COVD-19 pandemic, including the suspension of several projects under the Belt and Road Initiative, which affected their implementation (Lee and Song, 2024). By the close of 2020, the trade turnover between Russia and China had decreased by 2.9% in annual terms to USD 107.76 billion (Lin, 2024). By 2021, according to the latest available Russian statistics, the main export groups from Russia to China were energy resources and mineral raw materials, accounting for 74.37% of total exports, and wood, pulp and paper products accounting for 7.62%, food products and agricultural raw materials - 4.98%, metals and metal products - 5.74%, machinery, equipment and vehicles - 3.44%, and chemical industry products - 3.69%. As of 2021, the main groups of China's exports to Russia were machinery, equipment and vehicles - 60.77% of the total. This was followed by textiles and footwear at 9.19%, chemical industry products at 11.03%, metals and metal products at 7.44%, and food products and agricultural raw materials at 1.99% (Russian Foreign Trade, 2022).

Table 1. Structure of Russian fuel and basic materials exports to China in 2021 (USD billion and share in Russian export)

Total	**68.0**	**14%**
Coal	4.6	25%
Crude oil	35.4	32%
Petroleum products	3.9	6%
Natural gas	2.8	4%
Iron ores and consentrates	1.2	32%
Chemicals	4.0	5%
Wood, pulp and paper	4.5	42%
Metals	2.5	8%

Source: Russian Customs Service, 2022.

At that time, China was already attempting to diversify its import sources. Despite becoming the world's largest importer of liquefied natural gas (LNG) by 2021, Russian contracts accounted for only 10% (Wachtmeister, 2023). While Yamal LNG and Arctic LNG 2 remain China's largest energy investments in the Arctic, the diversification of hydrocarbon supplies is a cornerstone of China's energy security strategy. It is noteworthy that more than half of China's natural gas is produced domestically, and the 14th Five-Year Plan, published in 2021, identifies a further increase in domestic production (China's State Council, 2021).

In the year prior to the outbreak of the full-scale war in Ukraine, Russia-China cooperation was further strengthened at the political level, as evidenced by a 'Joint Statement on the Twentieth Anniversary of the Treaty of Good Neighbourliness, Friendship and Cooperation' in 2021 (President of Russia, 2021) and a 'Joint Statement on International Relations Entering a New Era and Friendship without Borders and No Prohibited Zones of Cooperation' in early February 2022, just before the outbreak of the full-scale war in Ukraine (President of Russia, 2022a).

The primary economic cooperation projects between Russia and China in the Arctic include Yamal LNG, Arctic LNG 2, Power of Siberia, and the NSR development project, also known as the Polar Silk Road in Chinese tradition. By the beginning of 2022, Chinese companies had become the largest owners of foreign ownership of Russian oil and gas resources.

Yamal LNG represents the most substantial LNG project in the Arctic region and the first Arctic energy project under the Belt and Road Initiative, with an investment amounting to USD 27 billion. It possesses the capacity to produce, liquefy and ship 17.4 million tonnes of natural gas on an annual basis (Korppoo and Wang, 2024). Arctic LNG 2 constitutes the second liquefaction project on the Yamal Peninsula, with China holding a 20% stake in it. The project has encountered significant challenges due to the imposition of sanctions. The Power of Siberia pipeline, spanning over 3,000 kilometres and valued at USD 55 billion, was inaugurated in 2019. This pipeline facilitates the export of over 10 billion cubic metres of gas annually by Russia (Interfax, 2024c). Right before the full-scale war in Ukraine in February 2022, Russia and China signed an agreement to supply an additional 10 billion cubic metres of gas per year through this pipeline.

Until early 2022, China continued to support plans for substantial investment in the development of the NSR and the merger of this Russian project with its own project, the Polar Silk Road, which had initiated the operation of Yamal LNG and the supply of LNG to China.

The NSR is a pivotal component of the economic collaboration between Russia and China, encompassing not only Arctic exploration but also serving as a strategic direction for the future. Presently, year-round navigation is only feasible in the western segment of the NSR, while the eastern part of the route (east of the Gulf of Ob) is characterised by more challenging ice conditions, necessitating the use of icebreakers and high-ice class vessels to navigate these conditions (Chizhevskij, 2024).

Russia and China have divergent perspectives on the significance of the NSR. For Russia, the route constitutes an integral component of its historical legacy, having been utilised for regular shipping for nearly a century. Russia asserts its exclusive rights to the NSR and regards its importance for the development of the Russian Arctic as paramount. The involvement of foreign partners and investors, notably China, is regarded as a means to modernise the infrastructure and stimulate commercial traffic along this route. In contrast, China perceives the NSR as a conduit for expanding the Belt and Road Initiative to a pivotal region for its economy, with a strategic emphasis on diversifying China's maritime trade routes and leveraging the competitive advantages offered by this route (Lasserre and Alexeeva, 2019).

Prior to the full-scale war in Ukraine, between 2013 and 2021, China's COSCO Shipping Specialised Carriers organised 42 voyages along the NSR on 33 vessels, 14 of which were icebreaker-guided (Moe *et al.*, 2023). For China, whose exports to Europe are predominantly industrial products and electronics, the primary objective is to organise container transport, a challenging endeavour due to natural and technical constraints (Erohin, 2022). This issue is already being addressed by China, which has persistently advocated for a revision of Russia's tariff policy and a reduction in the rates for icebreaker wires along the NSR (Medvedev *et al.*, 2024).

Despite the presence of significant joint endeavours, the extent of China's investment in Russia remains constrained. Historically, China's direct investment in Russia has been modest in comparison to other investment flows. For instance, Kazakhstan received twice the amount of investment as Russia between 2016 and 2023 (Von Essen, 2024). As of 2021, the total value of Chinese direct investment in the Russian economy was estimated at approximately USD 1 billion, with accumulated investment reaching USD 3.3 billion, representing approximately 6.3% of the total direct investment in Russia (Bank of Russia, 2022). As of early 2022, approximately one-third of direct investment from China to Russia was allocated to real estate, one-third to mining, and one-third to banking and manufacturing (Litova, 2024).

It is challenging to accurately appraise the scale of investment cooperation between Russia and China due to the multifaceted and heterogeneous structure of such endeavours. It is reasonable to hypothesise that the aggregate value of Chinese investments in Russia and Russian investments in China exceeds official data. This is primarily due to the preference of Chinese entrepreneurs to utilise offshore financial vehicles, resulting in the maintenance of distinct statistics for mainland China and Hong Kong. Additionally, Russia and China employ divergent methodologies for investment valuation. The Central Bank of Russia, for instance, has been observed to underestimate the volume of direct and accumulated Chinese investment, while disregarding small business investment through offshore and cross-border cooperation (Gemueva, 2021).

An important aspect of the cooperation between Russia and China is the cooperation in the scientific field, which has exhibited consistent growth, especially in the domain of Arctic research. The basis for this cooperation is the Agreement on Scientific and Technical Cooperation, signed between Russia and China in 1992 (Russian Government, 1992). Currently, cooperation is being developed through interstate agreements in the multilateral format within the BRICS, SCO, APEC, and within the framework of bilateral agreements and mechanisms. The primary body responsible for the coordination of scientific cooperation between Russia and China is the 'Sub-Commission on Scientific and Technical Cooperation' of the 'Commission for the Preparation of Regular Meetings of the Heads of Government of Russia and China'. This commission also includes a 'Russian-Chinese Working Group on High Technologies and Innovations' (China.org.cn, 2003).

Large joint scientific projects are grouped into the MegaScience class of projects that receive state funding under the Russian national project 'Science'. In 2019, a USD 1 billion 'Russian-Chinese Science and Technology Innovation Fund' was established to support joint projects (Rex, 2019), and Chinese scientists were invited to participate in the work of 15 large scientific centres planned to be established in Russia (Tass, 2019c). The most prevalent form of scientific cooperation is the establishment of joint Russian-Chinese universities and associations for scientific and technological cooperation, which as of 2023 included 42 Russian and 197 Chinese universities (Russian Academy of Sciences, 2019a), in addition to research centres and laboratories, such as the joint Russian-Chinese laboratory for high-power lasers, which opened in Shanghai in 2019 (Russian Academy of Sciences, 2019b).

Support for joint R&D projects is provided at the state level. Since 2021, joint Russian-Chinese R&D projects have been the focus of competitions organised with the support of the Russian Science Foundation (RSF) and the State Natural Science Foundation of China (NSFC) (Russian Science Foundation, 2024). In the same year, the 'Russian-Chinese Research Centre for Digital Economy' was inaugurated within the framework of the 'BRICS Forum on Partnership in the New Industrial Revolution"(Russian-Chinese Centre, 2021), and in 2022 – the 'Russian-Chinese Innovation Centre for Marine Science and Technology' (Russian government, 2022c).

The scientific collaboration between Russia and China in the Arctic has undergone a consistent progression since the 2000s, with China intensifying its appraisal of the commercial and military-strategic prospects of the Arctic, thereby fostering the enhancement of scientific interactions in these areas of research. Notably, the symbolic act of planting the Russian flag at the North Pole by a scientific expedition in 2007 had a significant impact on China (Filippova, 2019). The formats of scientific cooperation have been very diverse. For instance, between 2012 and 2016, annual Russian-Chinese seminars on Arctic cooperation were initiated, the Russian-Chinese 'Polar Engineering Centre' and the 'Inter-University Centre for Arctic Studies' were established (Tass, 2016), numerous joint scientific expeditions in the East Siberian and Chukchi Seas and landings at the North Pole were organised, and joint research on oil and gas deposits in the Barents and Pechora Seas for their industrial development began.

In 2015 the topic of Arctic science was included in the BRICS agenda, and the field of marine and polar sciences was identified as one of the 19 priority areas of cooperation between the BRICS countries (BRICS, 2019). Other notable achievements include the 'High Technology Forum' (2015), the 'Memorandum of Understanding on Innovation Cooperation' (2016), the first 'Joint Innovation Dialogue '(2017), the 'Silk Road Innovation High Technology Park' (2018), the 'Joint Innovation Investment Fund' (2019), and the Year of Sino-Russian Science, Technology and Innovation Cooperation (2020-2021) (Yang and Guo, 2022).

In 2017 a significant progress in the field of Arctic research cooperation was marked by the signing of an 'Agreement on enhancing Arctic scientific cooperation', facilitating access to research infrastructure and facilities in the Arctic for scientists from BRICS countries, including China (IASC, 2017). Concurrently, the establishment of the 'Joint Sino-Russian Ocean and Climate Research Centre' in Vladivostok and the 'Special Arctic Research Centre' was initiated, with plans for at least five joint expeditions over the subsequent five years (Interfax, 2024b). In 2018, the Chinese Academy of Sciences and the Russian Academy of Sciences signed a cooperation agreement (Tass, 2018) and a joint research agreement on the Siberian Arctic shelf in the Laptev Sea and the Barents Sea (Fu, 2023). In 2019, the Institute of Oceanology of the Russian Academy of Sciences and the National Laboratory for Marine Science and Technology in Qingdao, China, agreed to establish a Sino-Russian Arctic research centre (Tass, 2019b).

In 2020, the 'Roadmap for Russian-Chinese Cooperation in Science, Technology and Innovation for 2020-2025' was adopted, which identified digital technologies, artificial intelligence, informatics and

telecommunications as priority areas of cooperation, joint research in energy and much more in order to reduce dependence on unfriendly foreign markets (MES of Russia, 2020). At the same year a roadmap for cooperation in satellite navigation for 2021-2025 was endorsed, facilitating the observation of climate change in the Arctic (Fu, 2023).

Consequently, scientific collaboration between Russia and China on Arctic matters had been steadily progressing prior to the onset the full-scale war in Ukraine, though it was still engaged in a competitive dynamic with scientific cooperation between Russia and Western nations in this domain.

Another developing area of cooperation between Russia and China is tourism. In the 1990s, tourist exchanges between Russia and China were insignificant and mainly occurred at the regional level. The tourism industry was boosted after the signing of an agreement on visa-free group travel in 2000 (Russian government, 2000). Following the signing of an agreement on visa-free group tourist travel, the number of Chinese tourists in Russia expanded rapidly, reaching over two million by 2008. Notwithstanding the aforementioned figure, the Russian destination has never been a significant destination for Chinese tourism, accounting for only approximately 1% of all Chinese tourists travelling abroad (Efremova *et al.*, 2017). The global financial crisis of 2008-09 led to a decline in the number of tourists, but by 2019, the number had once again reached close to two million (Bu, 2022). In China's Arctic Strategy, Arctic tourism was identified as a key area for development: 'Arctic tourism is an emerging industry, and China is a source of tourists to the Arctic' (China's State Council, 2018a, article 4.3.4).

Significant efforts have been made to expand cooperation in tourism between Russia and China, including the organisation of various public events such as years of culture and tourism, youth exchanges, tourism forums, exhibitions, and so on. Regional tourism through border crossing points has also been actively promoted. The progression of cooperative endeavours in the sphere of tourism between Russia and China was not without challenges. These challenges included infrastructural deficiencies, cultural divergences, and a paucity of Chinese-language interpreters. The pandemic of COVID-19 interrupted this development, which began to resume after the outbreak of the full-scale war in Ukraine.

In order to stimulate the growth of polar tourism, the 'Strategy for the Development of the Arctic Zone of Russia' was amended and incentives for this type of economic activity were provided. In the western part of the Russian Arctic, in the Murmansk region, polar tourism grew most actively, and by 2019 this region became the leader in terms of the flow of tourists in the Russian Arctic (Interfax, 2020). In the Arkhangelsk region, the Russian Arctic National Park has been particularly successful in attracting Chinese tourists, accounting for approximately one third of all visitors (News29ru, 2018). This trend, before the emergence of the global pandemic, saw a steady increase in the number of reciprocal tourist visits between Russia and China, with Russian tourists consistently outnumbering their Chinese counterparts, reaching 2.3 million in 2019 (Yang and Guo, 2022).

The dynamic development of cooperation between Russia and China in the Arctic prior to the full-scale war in Ukraine was influenced by various global political and economic factors, including those related to Western sanctions imposed after Russia's annexation of Crimea in 2014. While energy projects constituted the primary focus, other areas such as scientific and tourism cooperation also witnessed advancement. This cooperation was conducted within the framework of existing international formats and organisations integrated with Western countries.

2. Sino-Russian economic cooperation after the beginning of the full-scale war in Ukraine

Understanding the changes that have occurred in Russia's and China's economic cooperation in the Arctic is only possible in the context of the overall changes in the two states' approaches to economic cooperation with each other since the outbreak of a full-scale war in Ukraine in 2022 and in the context of ongoing geopolitical turmoil.

The war represented a significant shock for China, particularly in light of the joint declarations of 'friendship without borders and without prohibited areas of cooperation' made by the two leaders in early February 2022 (President of Russia, 2022a), shortly before the war. Since then, China has been attempting to balance its support for Russia in its opposition to the West with the need to maintain economic ties with its Western trading partners. The impact of war and its aftermath on security, the sustainability of economic development, and the relationship between economic sanctions and energy security have become topics of close scrutiny in China.

For a period of approximately six months following the war's onset, China adopted a notably cautious economic policy towards Russia. Economic collaboration was suspended, particularly in the energy sector, which is of the utmost sensitivity for China. Immediately following the outbreak of the full-scale war in Ukraine, the Chinese Foreign Ministry issued a directive to the three leading Chinese energy companies (Sinopec, China National Petroleum and China National Offshore Oil) advising caution regarding any further investment in Russia, with Sinopec proceeding to suspend several of its major energy projects in Russia (Aizhu *et al.*, 2022).

In 2022, China refrained from signing new investment contracts for energy imports and did not invest in Russia's upstream sector since the beginning of the war, even as Western companies withdrew (Von Essen, 2023). Furthermore, Russia was one of fourteen countries with which China almost completely ceased cooperation under the Belt and Road Initiative (Roskongress, 2023). It is important to note that at that time, bilateral economic ties between Russia and China were still affected by various factors, including restrictions due to the fight against the COVD-19 pandemic, price fluctuations in global commodity and raw materials markets, including energy, and sanctions pressure from Western companies (Russian-China Trade, 2022).

Following an initial downturn in Russia's economic cooperation with China, a rapid process of recovery and growth has begun, reaching historic highs in some areas. China has strengthened its economic foothold in Russia, especially increasing its exports of engineering products, vehicles, electronics, chemicals, plastics, and rubber, while Russia has substantially augmented its energy exports to China. The role of the Chinese yuan currency has expanded in Russia, both in banking and trade.

This increased engagement was further solidified at the Shanghai Cooperation Organisation summit in Uzbekistan in September 2022, where the new reality of political-economic cooperation between Russia and China was formally documented. Notably, energy cooperation was identified as the cornerstone of practical cooperation between China and Russia (Tass, 2022; Hurri and Kopra, 2023). In October 2022, the 20th Congress of the Communist Party of China outlined new goals and objectives for China's development under the conditions of 'great change', including those involving China's active participation in reforming and building a system of global governance (China's State Council, 2022).

In the context of mounting global challenges, China's current approach to international cooperation is characterised by a strategic balancing act, aimed at optimising the distribution of power and opportunities to achieve its political and economic objectives. Russia, which is currently facing challenges, presents China with significant opportunities to advance its interests, but with a note of caution. By extending assistance to Russia, and leveraging its position to its advantage, China meticulously avoids assuming long-term obligations. Yet an analysis of expert opinions reveals that the fundamental principles of the strategic partnership between Russia and China remain unaltered (Sagild and Hsiung, 2024).

Following China's decision in late 2022 to proceed with the development of relations with Russia within the established framework, the year 2023 was characterised by a deepening of cooperation between Russia and China in both political and economic domains. This was evidenced by several high-level meetings that took place during the year, which served to consolidate the new realities of cooperation. A notable evolution was the joint statement on strategic partnership issued during the Chinese leader's visit to Russia in March 2023 (President of Russia, 2023a), which outlined a plan to expand economic cooperation until 2030, with a particular emphasis on the advancement of the NSR, as well as in the areas of technology and innovation, promotion of investment and financial cooperation, improvement of an interconnected logistics system, as well as a plan to expand economic cooperation between the two countries.

Still, new energy contracts were not signed, with priority instead being given to the development of land transport infrastructure, rail and road links. Transport and logistics crossings between Russia and China not only resumed operations after a long pandemic break, but also expanded considerably, in particular, trial freight traffic on Asian Highway 4 began (Belt and Road portal, 2023b; Podberezkina and Sazonov, 2023). The negotiation of a new version of the bilateral investment cooperation plan and the investment promotion and protection agreement (Cyplakov, 2024) proved unsuccessful by the close of 2023.

After the Russian President's visit to China in May 2023, a joint statement between Russia and China on deepening the relations of comprehensive partnership and strategic interaction entering a new era was adopted (President of Russia, 2024a), but again no substantial economic agreements were concluded.

In a business forum held in China in late 2023 Russia, represented by Prime Minister Mishustin, made a further effort to strengthen cooperation with China in the fuel and energy sector, and to gain access to Chinese technologies in oil refining. The aim was to attract investment from China (Russian government, 2023a). During the course of the meeting, an announcement was made pertaining to the existence of 80 joint investment projects with China, with total investments exceeding USD 165 billion. Nevertheless, this meeting did not have a serious impact on the level of China's investment in Russia.

In 2024, Russia persisted in urging China to boost funding for collaborative endeavours. In August 2024, a communiqué following a meeting between Chinese Premier Li Qian and Russian Prime Minister Mikhail Mishustin in Moscow observed that Russian-Chinese trade and economic cooperation had attained a substantial level and was progressing steadily across all areas (Russian government, 2023b). But despite the optimistic statements, it has not been possible to achieve a large-scale attraction of Chinese investment in the Russian economy.

Russia recognises that the development of cooperation with China must be prioritised in its foreign economic strategy, and it relies on China's pragmatic approaches to the strengthening of political and economic ties with Russia. The full-scale war in Ukraine has exposed and intensified the limitations in Russia-China relations and the existence of long-term and complex problems. Consequently, Russia perceives the enhancement of political and economic relations with China as a medium-term objective, given the ongoing discord between China and the West and Russia's reluctance to align itself with China's interests. The long-term economic interdependence between Russia and China is still regarded as a potential threat to Russian sovereignty (Melnikova and Nechaeva, 2024).

Given the challenges currently faced by Russia in establishing long-term arrangements, the focus has shifted towards the creation of new models of economic integration with Asian countries, including China, through individual declarations, memoranda, and agreements (Kheyfets, 2023). In order to enhance economic cooperation with China, Russia must explore novel mechanisms and categories of goods, such as increasing agricultural exports or facilitating the exchange of sensitive technologies. Furthermore, Russia has the potential to align itself with China's initiative for an energy transition by positioning itself as a nation with substantial reserves of 'green resources', such as oil and gas. It is evident that Russia has not yet formulated a comprehensive programme to foster economic ties with China. The qualitative composition of Russian exports to China may necessitate the establishment of joint consortia with Chinese companies and the restructuring of the Russian economy, a process that appears challenging in the present circumstances (Lukonin, 2023).

Since 2014, Western sanctions have had a damaging effect on economic cooperation between Russia and China. After 2022, Chinese companies have been paying even closer attention to these sanctions due to the risk of losing access to Western markets. In response, China has been adjusting the structure of its trade relations in line with its policy of diversifying its foreign trade portfolio and so-called friend-shoring, which minimises potential economic risks in the event of a deterioration of relations at the political level (Aiyar *et al.*, 2023). The sanctions have had an uncertain impact on the activities of several large Chinese companies doing business in Russia. Those companies that have at least partially reduced their operations in Russia tend to have close ties in the West, such as Huawei, ZTE, Honor, Lenovo, Sinopec and AliExpress.

Sanctions have led to a sharp increase in the share of settlements in trade between Russia and China in Chinese yuan. At the close of 2022, Russia doubled the maximum allowable CNY share in the country's Sovereign Wealth Fund (SWF) from 30 to 60% (Grinkevich, 2022). In early 2023, the CNY's share of trading in the Russian stock market raised tenfold and surpassed the dollar in terms of trading volume. In 2024, the share of CNY settlement in trade between China and Russia reached nearly 92% (Cyplakov, 2024). Financial logistics in economic cooperation between Russia and China have become increasingly complex since the outbreak of the full-scale war in Ukraine.

This issue became particularly evident in 2024, following the imposition of the 14th set of sanctions and the US sanctions against Gazprombank, which, according to Chinese experts, 'represent the most important settlement channel' for Russian banking and financial institutions involved in Sino-Russian economic and trade cooperation (Biang, 2024). In an effort to bypass the sanctions, Russia is collaborating with China to explore the potential of digital currencies, such as Central Bank digital currencies (CBDCs), for international payments (RBK, 2024b). At the same time the Bank of Russia acknowledges the challenges associated with these settlements and the escalating risks of secondary sanctions, which are likely to impede financial transactions (Litova, 2024).

Following the imposition of new sanctions on Russian banks by the US at the end of 2024, Chinese banks initiated the cessation of services to Russian financial institutions that were included in the aforementioned sanctions list, including Gazprombank, through which payments for Russian energy exports were facilitated (Business Petersburg, 2024).

It is imperative to acknowledge that secondary sanctions and enforcement measures alone are insufficient to obstruct the progression of Sino-Russian trade relations in the prevailing circumstances. For instance, export controls in other countries, such as the U.S., do not apply to Chinese products developed domestically. Furthermore, U.S. financial sanctions will not affect CNY-denominated transactions of Russian and Chinese companies outside the U.S. financial system.

Table 2. Russia's imports of selected categories from China that include goods subject to export bans (USD billion)

	2019	2020	2021	2022	2023	2024 (1-7)
Office and automatic data-processing machines	1.33129	1.45590	2.10226	2.41579	3.61462	2.04684
Telecommunications and sound recording equipment	1.46329	1.65818	2.16883	2.08490	2.66737	1.32871
Electric machinery and parts (including semiconductors)	2.97891	3.36076	4.59182	4.80651	6.79075	3.68896
Instruments and apparates (including lasers)	0.59230	0.71879	0.89549	0.80827	1.11302	0.64090
Transport equipment (other than road vehicles)	0.42714	0.47892	0.62301	0.76886	0.56278	0.40139

Source: Darvas *et al.*, 2024.

Russian import data indicates that China continues to increase its supply of goods to Russia, replacing those in the sanctions categories, thereby helping Russia to circumvent Western sanctions. In comparison with China's major trading partners, the size of Russia's economy is not as large, and demand for Chinese goods in Russia is negligible. The impact of Western sanctions has reduced consumer demand in Russia, and the imposition of further sanctions could severely limit it in the long run. Conversely, the range of Russian products of interest to China, regardless of efforts to expand it, remains relatively limited. These factors have only intensified since the outbreak of the full-scale war in Ukraine (Lukonin, 2023). Considering these circumstances, China is selectively complying with Western sanctions in its own interests. Large Chinese companies, including banking companies, continue to operate in Russia as usual, while smaller Chinese companies, especially regional companies, are adapting to the new business environment (Von Essen, 2023).

The analysis of economic indicators of Russia-China cooperation after the beginning of the full-scale war in Ukraine is challenging due to the unavailability of Russian statistics on foreign economic activity since spring 2022. Access to data is limited to individual indicators, as well as data mentioned in reports on Russian government decisions or in individual publications on specific aspects of foreign economic activity.

Presently, the primary source of data concerning the economic indicators of the collaboration between Russia and China is the statistics provided by the Chinese customs authorities (Chinese customs, 2024a). But even these statistics may be considered incomplete for a number of reasons. For instance, since the end of 2021, China has ceased to provide data on pipeline gas import volumes by country yet continues to offer total volumes and value data on a country-by-country basis. Indicators and interpretations of economic cooperation with Russia since 2015 are also available on the Chinese information resource The Belt and Road Initiative (Belt and Road portal, 2024a).

Following the outbreak of the full-scale war in Ukraine, trade turnover between Russia and China began to increase rapidly, which had not been observed since the mid-2000s. At that time, this occurred against the background of an active process of economic globalisation and high growth rates of foreign trade between Russia and China. In the contemporary geopolitical climate, characterised by heightened international tensions and the volatility of economic indicators, particularly with regard to Russia, the dynamics of trade have become increasingly unstable and unpredictable.

In 2022, the total value of trade between Russia and China amounted to USD 190.27 billion, marking a significant raise of 29.3%. A detailed breakdown of the figures reveals that Russian exports accounted for the majority of this increase, with a 42.4% share, while Chinese exports expanded by a comparatively modest 12.8% (Chinaru, 2023). In comparison, China's trade with its three largest trading partners (ASEAN, EU and US) grew by only 15%, 5.6% and 3.7% respectively (Liu, 2023). The substantial acceleration in Russian exports can be attributed to a confluence of factors, including the favourable global prices for energy and industrial goods, as well as a gain in the physical volumes of supplies.

The growth in trade turnover was primarily driven by Russian gas and oil exports to China.In comparison with 2021, there was a 43.9% climb in LNG exports to China in terms of volume, and an 8.3% rise in oil exports to China. In terms of value, LNG exports multiplied by 2.4 times (reaching USD 6.7 billion), while oil exports rose by 44% (reaching USD 58.4 billion) (Milkin and Savenkova, 2023). Metals trade also exhibited observable growth, with Russia exporting gold, platinum, copper and steel, and China significantly increasing its exports of alumina to Russia as a strategic raw material for aluminium production (Von Essen, 2023). Despite the quantitative growth in the total volume of Russia-China trade, its qualitative composition remained virtually unchanged.

In 2023, the boost in trade turnover was almost equivalent to that of 2022, with trade volumes rising to USD 240.11 billion, according to Ministry of commerce of China. In contrast to 2022, the 2023 trade increment was driven by stronger growth in China's exports compared to Russia (67% vs. 25%). In 2023, Russia emerged as China's sixth-largest trading partner, surpassing the United States, Japan, South Korea, Hong Kong, and Taiwan. This represents a significant shift from 2022, when Russia ranked only tenth among China's trading partners (Schepin, 2023). For China, the Russian market proved to be one of the few destinations where shipments exhibited growth, while exports to the United States and Europe experienced a decline of more than 10% during the same period (Edovina, 2024a). Consequently, the share of trade volume with Russia in China's total foreign trade heightened to 4% in 2023 (in 2022 it was 3.3%) (Chuneng of week, 2024).

The volume of bilateral trade continued to increase, primarily due to the active substitution of Chinese products for those commodity niches previously occupied in the Russian market by Western companies (cars, various types of machinery and equipment, household electrical appliances), and the reorientation of Russian exports, primarily energy carriers, towards China. Positive trade dynamics were achieved due to the outstripping growth in the physical volumes of goods supplied. In this context, Russia announced its intention to enlarge trade turnover with China to USD 330 billion by 2030 (Tass, 2024a). On the other hand, China is seeking to diversify its trade growth with Russia by increasing, albeit slightly, trade with other non-Western countries, in particular India and Brazil (Melnikova and Nechaeva, 2024).

In 2024, economic relations between Russia and China encountered challenges, yet overall positive dynamics were sustained. An analysis of data spanning the initial 11 months of the year reveals a decline in the growth rate of trade turnover when compared to the preceding year: in the initial quarter, growth stood at 5.2%; in the first half of the year, growth reached 1.8% (Tablogix, 2024; Reuters, 2024a); and for the 11-month period, growth stood at 2.1%. In terms of value, bilateral trade volumes reached USD 222.78 billion by November 2024 (Chinese customs, 2024b). Given that Russia's trade with China totalled USD 240.11 billion in 2023, and the trade volume in November 2024 was USD 20.5 billion, it is likely that the 2023 figures will be surpassed only marginally in 2024. China's overall foreign trade growth rate of 3.6% is already notably higher than the growth rate of trade with Russia, suggesting a potential decline in China's trade activity with Russia (PortNews, 2024a).

In November 2024, there was a significant decrease in trade turnover between China and Russia within a single month. In terms of volume, there was a 10.5% decline in exports and a 7.4% decline in imports. When assessed in terms of value, China's exports to Russia decreased by 2.5%, while imports experienced a 6.5% decline when compared to the previous year. The total value of bilateral trade this month amounted to approximately USD 20.5 billion, marking a decline of around 5% compared to the previous year and

representing the first decrease in four months. This decline can be attributed to a confluence of factors, including the tightening of banking sanctions imposed on Russia, a contraction in the purchasing power of the Russian market, and China's ongoing strategy of diversifying its supply sources. Furthermore, the issue of mutual settlements has been a point of concern for Russian President Vladimir Putin, who, in December 2024, stated that the central banks of Russia and China were developing a solution to this problem (Voice of America Chinese, 2024). Chinese buyers and banks have been reluctant to make direct currency settlements with Russia to circumvent Western sanctions due to US sanctions. According to Chinese analysts, the short-term decline in trade should not affect strategic cooperation between Russia and China (SOHU news, 2024b).

Table 3. China's import and export statistics with Russia 2023-2024

	Imports/exports (USD billion)		Exports (USD billion)		Imports (USD billion)	
	Total value of imports and exports	Year to year (%)	Total value of exports	Year to year (%)	Total value of imports	Year to year (%)
January, 2023	17.391	14.9	8.085	10.1	9.305	19.5
February, 2023	33.686	25.9	15.037	19.8	18.649	31.3
March, 2023	53.846	38.7	24.074	47.1	29.772	32.6
April, 2023	73.148	41.3	33.686	67.2	39.462	24.8
May, 2023	93.806	40.7	42.947	75.6	50.859	20.4
June, 2023	114.547	40.6	52.284	78.1	62.263	19.4
July, 2023	134.104	36.5	62.545	73.4	71.559	15.1
August, 2023	155.102	32	71.806	63.2	83.297	13.3
September, 2023	176.416	29.5	81.428	56.9	94.988	12.7
October, 2023	196.482	27.7	90.077	52.2	106.405	12.4
November, 2023	218.177	26.7	100.336	50.2	117.84	11.8
December, 2023	240.112	26.3	110.972	46.9	129.139	12.7
January, 2024	19.688	12.5	9.223	15	10.465	10.4
February, 2024	37.01	9.3	16.808	12.5	20.202	6.7
March, 2024	56.682	5.2	24.428	2.6	32.254	7.3
April, 2024	76.581	4.7	32.734	-1.9	43.847	10.2
May, 2024	96.509	2.9	41.789	-1.8	54.72	6.9
June, 2024	116.875	1.8	51.661	-0.8	65.214	3.9
July, 2024	136.674	1.6	61.643	-1.1	75.03	3.9
August, 2024	158.47	1.9	71.911	0.4	86.559	3.2
September, 2024	180.357	2	83.148	2.4	97.209	1.7
October, 2024	202.212	2.8	94.142	4.7	108.069	1.1
November, 2024	222.774	2.1	104.196	4	118.579	0.4
December, 2024	244.82	1.9	115.499	4.1	129.32	0

Source: Ministry of commerce of China, 2024.

Following 2022, Chinese exports to Russia demonstrated an uneven upward trend. A decline in volume and value was evident in the initial months of 2022, coinciding with China's export policy aligning with the sanctions imposed by Western nations, leading to a substantial reduction in their exports to Russia (DiPippo, 2022); Chorzempa, 2022). Starting from the second half of 2022, China initiated a distinguished escalation in its exports to Russia, achieving a 12.8% growth rate by the year's conclusion. This enabled China to attain a record 10.5% overall export growth compared to 2021, with trade with Russia accounting

for 3% of China's total international trade in 2022.The primary commodities of China's exports to Russia in 2022 were industrial products, automobiles and spare parts, and household appliances.

Table 4. China's exports to Russia in terms of goods (USD billion)

	2019	2020	2021	2022	2023	2024 (1-7)
Total	49.45	50.61	67.59	76.27	111.44	61.71
Mineral fuels	0.37	0.12	0.14	0.26	0.27	0.15
Goods other than mineral fuels	49.07	50.5	67.46	75.98	111.16	61.57

Source: Darvas *et al.*, 2024.

It is important to note that China has significantly intensified its exports to Russia of certain dual-use goods, including integrated circuits that have potential military applications (David et al., 2023). Definite types of strategically significant chips have been prohibited from export to Russia (Kornev, 2022). In total imports from China increased by approximately USD 9 billion, which is approximately five times less than the decline in EU exports to Russia. Overall, imports of machinery and equipment to Russia, even including exports from China, were 40% below the 2021 level (Bashmakov, 2023).

In 2023, Chinese exports to Russia grew by 46.9% to over USD 110 billion (Tass, 2024a). The primary contributors to this growth were machinery, equipment and vehicles, which constituted over 60% of Chinese imports to Russia. In sectors where Western companies exited, Chinese manufacturers rapidly secured the vacated product niches. As these niches were filled, the monthly growth rates of Chinese exports to Russia began to decline, partially due to the weakening of the rouble.

Notably, exports of automobiles and transport equipment exhibited an accelerated growth trajectory in 2023, maintaining their position as the primary catalyst for the expansion of Chinese exports to Russia. This trend was further underscored by the substantial growth recorded in exports of non-ferrous metals, which surged by 41% compared to the previous year (Von Essen, 2023). By mid-2023, Chinese goods shipments to Russia had stabilised at slightly above 3% of total Chinese exports (Knobel and Firanchuk, 2023), highlighting a steady and sustained presence of Chinese trade in the Russian market. For Russia, the importation of Chinese technical products has become a non-alternative. Given the sharp growth of Chinese exports to the EAEU countries and Central Asia, from where they were apparently re-exported to Russia, the real share of Chinese exports in the Russian market was even higher.

In 2024, the dynamics of Chinese exports to Russia exhibited uneven development. During the initial quarter, there was a 2.6% addition in exports compared to the same period in 2023, indicating a slowdown. There were periods of growth, with raises of 15% and even 20%. Nevertheless, challenges related to bank transfers and payments exerted a negative influence. Consequently, over the span of 11 months, the growth rate was recorded at a mere 4%, reaching a total of USD 104.19 billion. In November 2024, Chinese exports experienced a significant decline, as previously referenced, due to a variety of factors, including the tightening of sanctions. The ability of Russia and China to overcome these challenges and maintain an expansion in exports to Russia remains uncertain. It is evident that exports of goods from China are growing unevenly and are not sufficient to address the entire demand deficit that has arisen due to the cessation of equipment and component supplies from Western countries. While Russia's total imports have nearly returned to pre-crisis levels, exports from China and other Russia-friendly countries have almost compensated for the reduction in other import flows (Edovina, 2024b).

In 2024, there was some supplement in the categories of Chinese exports to Russia. Noteworthy examples include Russia's first import of a substantial shipment of diamonds from China, valued at over USD 12 million (Chinaru, 2024b), and a significant increase in Chinese beer exports to Russia, reaching almost double the volume compared to the previous year (Vihareva, 2024). Additionally, China is witnessing a notable expansion in its exports of fruits and vegetables to Russia's Far East (Chinaru, 2024a).

Russian exports to China have demonstrated a consistent upward trajectory since the onset of the full-scale war in Ukraine, though this trajectory is characterised by multidirectional fluctuations in specific commodity categories.

	2019	2020	2021	2022	2023	2024 (1-7)
Total	60.25	57.10	78.37	112.22	127.65	74.40
Mineral fuels	41.86	33.28	52.68	83.45	93.18	55.51
Goods other than mineral fuels	18.43	23.81	25.66	28.76	34.44	18.88

Source: Darvas *et al.*, 2024.

In 2022, the value of Russian exports to China exhibited a substantial increase of 43.4%, amounting to approximately USD 100 billion. This growth can be attributed to augmented revenues from oil and gas exports, along with an escalation in the physical volume of shipments. Beyond energy carriers, the export growth was influenced by supplemented supplies of agricultural products, including seafood, to China. Exports of metals to China exhibited a substantial raise, with aluminium exports rising by 56% (Burns, 2023), primarily due to the accumulated supply of Chinese alumina, which experienced a thousand-fold plus in exports to Russia (Von Essen, 2023). Russian gold exports to China surged by 67%, reaching USD 387 million, followed by platinum metals and copper (Tan, 2022).

In 2023, the growth rate of Russian exports to China was not so high comparing to the previous year. In terms of value, it increased by 12.7% only to almost USD 139 billion, the main reason being a decline in global energy commodity prices. The Russia's balance of trade with China remained positive, although it was roughly halved compared to 2022 (Edovina, 2024a). The analysis indicates that China accounted for approximately 45.7% of Russia's total oil exports, 48% of coal, 23% of pipeline gas, and over 24% of LNG. Concurrently, the Russian share in China's total fuel imports pumped up to nearly 20% (Knobel and Firanchuk, 2023). Also, China's purchases of Russian agricultural goods exhibited a substantial and sustained growth. The value of these exports strengthened from 34% to 44%, reaching approximately USD 11 billion (Cyplakov, 2024; Interfax. 2024a). The supply of basic metals exhibited multidirectional dynamics. Exports of ferrous metals from Russia to China decreased by more than 50%, while shipments of copper and nickel intensified, reaching the pre-sanctions period, and aluminium shipments increased sharply, 2.6 times by the same period in 2022 and 3.4 times by 2021 (Knobel and Firanchuk, 2023).

In 2024, the growth of Russian exports to China almost ceased, increasing in value over 11 months by a mere 0.4% to USD 118.6 billion, falling short of the record figures for 2023. The trend of multidirectional Russian exports to China persisted, yet the growth in export volumes of certain categories (timber and chemical products, plywood, paper and cardboard, uranium shipments, metals and metal products) proved insufficient to counteract the decline in export volumes and values of other categories, such as LNG, sawn timber, steel and nickel (Dangwal, 2023; Chinaru, 2024c; Oil and Capital, 2024). Despite these efforts, identifying new export destinations for Russian goods to China has proven to be a challenge. For instance, in late 2024, plans were unveiled to establish trade centres in China for Russian goods, with a particular emphasis on Russian food products (Russian-Chinese Centre, 2021), but this initiative requires investment from Russia, which is constrained in the context of ongoing warfare.

Energy exports to China since the onset of the full-scale war in Ukraine have been a pivotal source of state revenue for Russia.

In 2022, there was a record overall increase in Russian oil, oil products and gas exports by 43%, and in terms of total value, these exports reached an absolute record for 27 years, totalling USD 383.7 billion (Novosti, 2024). Energy exports from Russia to China exhibited a substantial surge in both volume and value, in defiance of the presence of significant discounts (averaging 11% in 2022). This phenomenon can be attributed to the impact of sanctions, embargoes, and price ceilings, which led to a substantial boost in the value of energy exports. The value of Russian oil, coal, LNG, and pipeline gas exports to China surged by 56%, with trade volumes up to nearly USD 70 billion (Von Essen, 2023). The share of Russian oil in China's total imports reached 17%, an illustrious development that was influenced by the lower oil demand experienced in China during the previous year due to the impact of the pandemic. In 2022, Russia emerged as the second-largest oil supplier to China, after Saudi Arabia. In addition, China pursued a policy of oil import diversification, with an supplementary oil and energy agreement with Saudi Arabia in December 2022 (Ministry of foreign affairs of China, 2023), further expanding its oil import portfolio.

In late 2022, a combination of an embargo and price cap on Russian oil was implemented, resulting in a 1.8-fold decline in the average Urals price to USD 49.5 per barrel. By late 2023, oil exports to China had surged by 24% to 107 million tonnes, while the value raised by a mere 3.5% to USD 60.6 billion

(Zagvozkina, 2024). Consequently, China emerged as Russia's foremost energy consumer, increasing its share of Russian exports from 15% to 30% in terms of value. China persisted in procuring Russian oil and oil products at an undervalued price, albeit indirectly, through domestic independent companies, evading the utilisation of its primary state-owned tanker fleet and abstaining from providing alternative shipping insurance. It is evident that various sanctions circumvention schemes are widely employed, with Russian oil being sold under alternative names or blended with other sources (Wachtmeister, 2023).

Pipeline gas supplies through the Power of Siberia pipeline have been steadily increasing since 2022. In 2022, pipeline gas exports to China through the Power of Siberia pipeline increased by 50% in volume to 15.4 billion cubic metres and by 160% in value to USD 3.98 billion, and Russia became the second largest pipeline gas supplier to China, with the share of Russian gas in China's pipeline imports up to 25% at the end of the year (Downs and Mitrova, 2024). In 2023, Russian pipeline gas exports to China surged by 50% to 22.73 billion cubic metres, surpassing Gazprom's contractual obligations to Chinese buyers by 700 million cubic metres (Tass, 2024d). Projections indicate that exports through the Power of Siberia pipeline will expand by a further 40% in 2024. By the close of the year, the pipeline had attained its design capacity and even exceeded it, reaching 38 billion cubic metres. In 2025, it is highly likely that Gazprom will become the leading supplier of pipeline gas to China, surpassing Turkmenistan by a significant margin (Interfax, 2024c).

Russian LNG exports to China is a dynamic area of energy cooperation between the two nations. In 2022, there was a 43.9% increase in LNG exports from Russia to China (to 6.5 million tonnes), a 140% gain in value to USD 6.75 billion, and the share of Russian LNG in total LNG exports to China averaged 11% (Wachtmeister, 2023). At the conclusion of 2022, Russia's position as the fourth-largest LNG supplier to China was superseded only by Australia, Qatar, and Malaysia. Nevertheless, China has endeavoured to diversify its LNG imports, augmenting supplies not only from Russia but also from Qatar (Moe *et al.*, 2023). In 2023, China's LNG exports from Russia to China surged by 23%, achieving 8 million tonnes, yet their value experienced a substantial decline of nearly 30% (Zagvozkina, 2024).

With regard to alternative energy sources, coal exports to China expanded by 20% to 67 million tonnes in 2022 (about USD 7.2 billion in value), and Russia became the second largest coal supplier to China accounting for 23% of China's coal imports (Interax, 2023). In 2023, Russian coal exports to China surged further, recording an increase of 52% up to 102 million tonnes, reaching a new high (Tass, 2024e). In 2024, China made the strategic decision to develop its own coal production, imposing import duties. By the end of the first seven months of 2024, Russian coal exports to China had decreased in volume by 10%, to 54.4 million tonnes, and in value by 1.7 times, to USD 5.5 billion (Lenta.ru, 2024). This decline in the value of Russian coal imports can be attributed to a combination of factors, including lower global prices and a substantial jump in logistics costs. From January to November 2024, China's purchases of Russian coal decreased by 21% year-on-year, from USD 13.3 billion to USD 10.5 billion (Cole, 2024).

Electricity exports to China climbed to 4.6 billion kWh in 2022 (Rambler, 2024d), decreased to 3.1 billion kWh in 2023, and further decreased to 1 billion kWh in 2024 (NovaNews, 2024). This decline is attributable to the electricity deficit in the Russian Far East, precipitated by elevated energy consumption, reduced water availability, and a high rate of failure of generating equipment. Therefore, the export prospects of Russian regions in the foreign electricity market are diminishing. Russia aspires to cultivate hydrogen production as a novel domain of collaboration with China; however, these aspirations remain largely unaccompanied by practical actions (MRC.ru, 2024).

It should also be noted that Russia has raised its exports of enriched uranium to China. In the initial 10 months of 2024, China's imports of enriched uranium from Russia amounted to USD 849 million, marking a 3.2-fold increase compared to the same period the previous year (Russia's pivot to Asia, 2024).

The trade balance between Russia and China underwent significant fluctuations following the onset of the full-scale war in Ukraine. Still, a general trend of approximately twofold growth in energy supplies to China and a near-doubling of Chinese imports of Russian products has been observed over the three-year period. The trade balance between Russia and China reached its peak in 2022, after which there was a decline in almost pre-war indicators. There is a trend of constant growth in mineral fuels, and for goods other than mineral fuels, there is a growing negative balance, i.e. imports of goods from China are increasing.

Table 6. Russia's trade balance with China (USD billion)

	2019	2020	2021	2022	2023	2024 (1-7)
Total	10.79	6.49	10.76	35.96	16.19	12.67
Mineral fuels	41.48	33.18	52.56	83.17	92.91	55.36
Goods other than mineral fuels	-30.67	-26.69	-41.8	-47.23	-76.74	-42.68

	2022			2023			2024		
Month	Total	Mineral fuels	Goods other than mineral fuels	Total	Mineral fuels	Goods other than mineral fuels	Total	Mineral fuels	Goods other than mineral fuels
January	0.19	5.50	-5,31	1.22	7.21	-5,99	1.24	7.53	-6.29
February	1.00	4.59	-3,59	2.39	6.95	-4,56	2.15	7.18	-5.03
March	4.02	5.96	-1,94	1.98	8.13	-6,16	4.32	8.91	-4.59
April	5.09	6.65	-1,56	-0.02	6.64	-6,65	3.13	8.56	-5.43
May	5.94	7.92	-1,98	2.04	8.42	-6,39	1.64	8.10	-6.46
June	4.75	7.15	-2,41	1.73	8.44	-6,71	0.48	7.94	-7.46
July	3.25	7.20	-3,95	-1.07	6.58	-7,66	-0.29	7.14	-7.42
August	3.22	8.29	-5,07	2.21	8.56	-6,35	-	-	-
September	2.66	7.61	-4,95	1.89	8.05	-6,16	-	-	-
October	2.82	7.81	-4,99	2.42	7.75	-5,33	-	-	-
November	2.83	8.02	-5,19	0.91	7.84	-6,93	-	-	-
December	0.19	6.47	-6,29	0.49	8.34	-7,85	-	-	-
TOTAL	35.96	83.17	-47,23	16.19	92.91	-76,74	12.67	55.36	-42.68

Source: Darvas *et al.*, 2024.

An analysis of China's participation in Russia's foreign trade in 2022 reveals a notable supplement in its share compared to the year 2021. Specifically, China's share in total exports increased from 17.9% to 28%, marking a substantial rise. Similarly, its share in total imports rose from 2.048% to 39%, indicating a significant growth in its involvement in Russian trade. In 2023, the foreign trade of China with Russia increased to 4.04% compared to 2021 (2.45%), in total exports to 3.28% (2.048%), and in total imports to 5.05% (2.96%) (Knobel and Firanchuk, 2023). Over the past three years, the significance of bilateral trade relations for both Russia and China has enlarged considerably. Despite the growth in quantitative parameters, the nature of these relations remains extensive, with no discernible qualitative changes in the commodity structure of mutual trade. Following the departure of numerous foreign brands in the wake of the full-scale war in Ukraine, they have been replaced by Chinese brands, predominantly in the automotive industry. The supply of Chinese cars to Russia has maximised substantially, and these vehicles are now being produced in the former factories of Western companies. A similar trend is evident in the production of household appliances. These processes are progressing slowly due to concerns regarding potential Western sanctions on Chinese companies and their difficulties in conducting business in Russia.

The ongoing and inevitable rise in Russia's technical lag, compounded by the inability to access advanced Western technologies, is set to impede the nation's progress. This is further compounded by the absence of a viable alternative to compensate for the loss of sophisticated equipment and components from Western sources. Consequently, there is a strong likelihood that this situation will result in a significant decline in utilisation and investment activity across a wide range of industries.

The investment exchange between Russia and China has historically been characterised by imbalance, with investment in Russia never occupying a prominent position in China's economic agenda, irrespective of the economic sector. This imbalance has been further aggravated by a decline in direct investment

since 2020, coinciding with the period of the global pandemic. The start of the Belt and Road Initiative did not translate into a significant escalation in Chinese investment in Russia, as concerns over the potential imposition of secondary Western sanctions led to a substantial halt in investment activities after 2022 (Von Essen, 2024). In 2022, China's total accumulated investment in Russia was recorded at USD 9.9 billion, representing a mere 0.3% of China's total foreign investment (Luzyanin, 2024). In 2023, following the withdrawal of Western companies from Russia, China's cumulative investment in Russia surged to nearly USD 60 billion, a development that propelled China to the position of the largest holder of foreign resources in Russia (Wachtmeister, 2023).

Most of the Chinese investment is derived from intergovernmental agreements, with a significant portion allocated to the acquisition of raw materials and the construction of new infrastructure to support the escalating levels of cargo traffic. However, it should be noted that Chinese direct investment, including offshore investments facilitated by Hong Kong, accounts for less than 2.5% of all foreign direct investment in Russia. In comparison, Russia's direct investment in China stands at less than 0.1% of China's foreign investment (Pivnenko, 2024). In 2024, there were more than 8,000 companies with Chinese capital operating in Russia, representing a figure three times the number of German companies and 10 times the number of American companies. The portfolio of the Russia-China Intergovernmental Commission on Investment Cooperation now includes more than 80 projects worth more than USD 200 billion, although not all of them are put into practice (Litova, 2024).

The complexity of Russia's administrative and taxation mechanisms poses challenges for Chinese investment, particularly in the long term. Within the context of the Belt and Road initiative, Russia's role as a partner rather than a recipient of investment is emphasised, as outlined in bilateral agreements. This dynamic affects investment opportunities and requires Russia to align its transport and infrastructure projects, including the NSR, with China's strategic interests under the Belt and Road project (Luzyanin, 2024). Russian investment in China is constrained by intense competition and, with the exception of specific areas such as nuclear research and nuclear icebreaker construction, is not a significant interest for China.

Regional economic cooperation between Russia and China plays a pivotal role in bilateral relations. Following the outbreak of the full-scale war in Ukraine and China's post-pandemic economic reopening, this cooperation has accelerated. Opportunities for Russia and China to develop regional cooperation are based on both bilateral ties and Shanghai Cooperation Organization (SCO) membership.

Over the past decade, trade turnover between Russia's Far Eastern regions and China's northeastern provinces has increased substantially, reaching USD 22 billion in 2022 and USD 27 billion in 2023 (Tass, 2024c). The most significant province in terms of regional cooperation is China's Heilongjiang province, which shares a border of nearly 3,000 kilometres with Russia. It boasts a lot of ports, well-developed railway and road networks, and is playing an instrumental role in the construction of the 'China-Mongolia-Russia Economic Corridor'. The cross-border transport sector witnessed a significant surge in activity following the inauguration of the road and railway bridges on the Amur River in 2022. By September 2024, the aggregate volume of imported and exported goods had accounted for 1.224 million tonnes (Belt and Road portal, 2024c).

The substantial augmentation in cross-border container transport by rail and the escalation in road transit between Russia and China are constrained by the capacity of Russia's transport infrastructure in the Far East, which has reached its limits. To address this predicament, a direct freight link between Beijing and Moscow was inaugurated in 2023, and plans for a second railway bridge across the Amur River have been endorsed. The China Railway Corporation (CRCC) is undertaking initiatives to enhance rail transport infrastructure between Russia and China, with the objective of establishing a logistics corridor that facilitates the transportation of goods between Russia, China, and other European countries. Mongolia has recently consented to a list of 33 projects for a potential economic corridor from Russia to China through its territory (EurAsiaDaily, 2024).

In 2024, the first logistics train, the 'Arctic Express 1', was launched, combining sea and railway modes of transport from Moscow via Arkhangelsk to Chinese ports along the Arctic waterway (Expert online, 2024). A total of 10 trips in both directions were organised, with record-breaking delivery times of only 22-25 days. Notably, in September 2024, a shipment from China to Belarus was successfully delivered via this route, marking the first use of the NSR. The 2025 navigation season is currently being planned, with a particular emphasis on increasing export volumes (Region29, 2024). The China Railway Corporation (CRCC) is playing an active role in this project.

In 2024, there was a significant focus on developing cross-border cooperation between Russia and China, with various support institutions, primarily the Russian Export Centre, being utilised to enhance it. For instance, Kazan hosted the second ROSTKI Forum, a new annual platform for providing economic cooperation between Russian regions and Chinese provinces (BigAsia, 2024). In addition, the 7th China International Import Expo (CIIE) was held in Shanghai, with Russian companies having a significant presence (PR Newswire, 2024). Beginning in 2024, an index identifying and forecasting the most promising regions for Chinese investors has been published (Eurasian Business Association, 2024).

It is evident that Russian regions adjacent to China do not attract significant investment, with a mere USD 13 billion in 2023. The primary inflow of investment from China is facilitated through intergovernmental agreements and is predominantly associated with the raw materials sector and the construction of infrastructure necessary to service it (Pivnenko, 2024). A recent evaluation of the productivity of interaction between Russian regions and China, encompassing the period from 2022, has identified Primorsky Krai, Amur Region, Tula Region, Jewish Autonomous Region and Tatarstan as the leading regions. This evaluation is used to assess major investment projects, including those in the planning stage, as well as the level of trade. The most significant regional projects include the Amur gas processing plant, the Russia Forest Products timber factory, the Haval car factory in the Tula region, the Haier home appliances factory, and the joint Kamaz and JAC Motors truck manufacturing project (Litova, 2024).

Scientific cooperation between Russia and China has undergone rapid development since the onset of the full-scale war in Ukraine. The 'Roadmap for Russian-Chinese cooperation in science, technology and innovation for the period 2020-2025' (Ministry of Education and Science of Russia, 2020) continues to serve as the foundational document for this collaboration, while initiatives are also being undertaken at the regional level, as well as by individual research institutes and universities. Their international ties with Western scientific structures have been practically severed, and they have had to seek new partners to replace them. Chinese scientific structures appear to be the most preferable of these and in line with the general line of the Russian leadership.

In addition to the roadmap, scientific cooperation is mentioned in the Joint Statement 'On the Plan for the Development of Key Areas of Russia-China Economic Cooperation until 2030' signed in March 2023 (item 6 'Expansion of Cooperation in the Spheres of Technology and Innovation') (President of Russia, 2023d) and the protocol on strengthening cooperation in basic scientific research between Russia and China in the field of nuclear research (Ministry of Education and Science of Russia, 2023a). Currently, 20 Chinese institutes of this profile are engaged in joint nuclear research (Huzhina, 2024). In 2023, agreements were signed to expand joint programmes, academic exchanges and inter-university cooperation, and to acknowledge the importance of the draft 'Russia-China Roadmap for Humanitarian Cooperation until 2030', which is under development (Ulyanova and Babonov, 2023). Furthermore, in the same year, a Memorandum of Co-operation on Quality Assessment and Accreditation of Higher Education Institutions was signed (NCPA.ru, 2024). In 2023, the number of Chinese students studying in Russian universities exceeded 44,000, while the number of Russian students studying in Chinese universities reached more than 12,000 (Babaev *et al.*, 2024).

The Working group on high technology and innovation of the Sub-Commission on science and technology cooperation of the Russian-Chinese Commission for the preparation of regular meetings of heads of government continues to meet and work. In late 2023, the Working Group outlined prospects for cooperation in the advancement of research infrastructure, joint Arctic and climate initiatives, and cooperation in higher education. In 2024, further meetings were convened in Yekaterinburg and Beijing, with priority areas identified as mathematics and theoretical physics, space, atmospheric and astronomical research, geology, climate change, biodiversity, microbiology and neurobiology, and numerous others. A total of 11 joint Russian-Chinese R&D projects were approved in 2024 with an implementation period of 2023-2025, including topics such new materials, information and communication technologies, medicine and biotechnology (Technopark Druzhba, 2024). In 2024, an agreement between Russia and China on the establishment of an international scientific lunar station was ratified, although it looks more like a statement of intent (Russian government, 2024a)

The promotion of tourism cooperation has been a matter of significant concern for both China and Russia.

In 2022, China's COVID-19 restrictions had not yet ended, so tourist exchanges with Russia were statistically insignificant. In 2023, Russia and China began to expand bilateral cooperation in tourism, and the industry began to recover quickly from the pandemic. Based on the 2000 agreement (Russian

government, 2000), visa-free travel for group tours between China and Russia was resumed (Gazeta.ru, 2023) and an e-visa system was launched (RBK, 2023). Consequently, 997,900 Russian tourists visited China, and 477,000 Chinese tourists visited Russia in 2023. Of latter, approximately 130,000 travelled to Russia's Primorsky Krai and 200,000 to Moscow (People's Daily newspaper, 2024). The tourism flow from China became the largest for the Russian tourism market after the tourist flow from the CIS countries, and the number of Russian tourists' trips to China also increased two and a half times compared to the 2019 level (Babaev *et al.*, 2024).

In the first half of 2024, 406 thousand Russian citizens travelled to China for tourism purposes, which is 13 times more than in the first half of 2023. The tourist flow from Russia to China has exhibited a pronounced upward trend. During the same period, the number of Chinese tourists visiting Russia surpassed that of the entire previous year. In the initial eight months of 2024, the mutual visa-free tourist flow reached 789 thousand people, of which nearly 340 thousand were Russian tourists visiting China, and over 449 thousand were Chinese tourists arriving in Russia (CSR, 2024).

In response to this surge in tourism, China has initiated a series of measures aimed at restoring its pre-pandemic tourism levels. A state report, titled 'China Tour: Let the World Recognise a More Authentic China' (Belt and Road portal, 2024b), published in December 2024, outlines a strategic plan to enhance the country's attractiveness to foreign tourists. The report identifies the expansion of the list of visa-free countries, the facilitation of financial transactions, and the improvement of tourist accommodation as key objectives.

In Russia, the number of foreign tourists has increased by more than threefold compared to pre-pandemic levels, but tourists from China now spend more money, as many of them now come to Russia not as part of visa-free groups, but by applying for individual visas (Profi.Travel, 2024). Russia is also making certain efforts to develop regional tourism links. For instance, direct flights from the Chinese city of Changchun to Vladivostok are scheduled to commence in autumn 2024 (Worldinform.ru, 2024).

The establishment of the Sino-Russian Association of Tourism and Hospitality Universities at the end of 2024, comprising 14 Chinese and 6 Russian universities, was a pivotal development in the implementation of the action plan of the Roadmap for Expanding Russian-Chinese Humanitarian Cooperation until 2030 (Ministry of Education and Science of Russia, 2024b; Russian Union of Travel Industry, 2024). This initiative is intended to foster scientific and educational cooperation in the field of tourism between Russian and Chinese universities.

Despite the ongoing contradictions and China's cautious approach, driven by fears of secondary sanctions, there has been an expansion in economic cooperation between Russia and China after 2022. In certain sectors, initially robust growth has been superseded by a slowdown and even a contraction, attributable to both the natural limits of production and infrastructural constraints. Overall, Russia has not yet regained the export volumes to China that were lost due to the severing of ties with the West. In contrast, China is determined to diversify its foreign economic policy, without becoming excessively dependent on Russia.

Regardless of these challenges and concerns about potential dependency, Russia's economic cooperation with China appears to be inevitable. For instance, at the end of 2024, during a forum on attracting investment in Russia, President Putin stated that irrespective of global developments, Russia would continue to strengthen its relationship with China, a long-term and significant economic and trading partner (Belt and Road portal, 2024e).

The two countries have enhanced existing bilateral economic cooperation mechanisms and established new ones, in response to the mounting sanctions imposed on Russia by Western nations. Notwithstanding, the rapidly evolving bilateral economic cooperation between Russia and China has encountered several challenges, resulting in a slowdown in growth. These challenges include China's inability to fully substitute for the West in trade with Russia, both in terms of import-export volumes and technology exchange, and the increasing difficulties in financial settlements caused by sanctions. Taking into account these difficulties, China remains committed to further economic cooperation with Russia, as this would create new opportunities for both countries. Deepening cooperation with China appears to be a non-alternative, although concerns about dependency still remain.

3. Sino-Russian cooperation in the Arctic region after the beginning of the full-scale war in Ukraine

In the aftermath of the full-scale war in Ukraine, the Arctic region has assumed a heightened significance for Russia and China, with regard to both opportunities and challenges. Over the past three years, it has been possible to draw some conclusions about the changes and approaches to Arctic issues on the part of both countries.

China's Arctic policy has remained largely unchanged since the outbreak of the full-scale war in Ukraine. In recent years, China has pursued a multi-vector policy to expand its influence in the Arctic, positioning itself as a near-Arctic power, even though it has no vital interests in this region. The challenge for China remains to become an integral part of the international system in the Arctic, regardless of systemic constraints, such as a limited the role of an observer in the Arctic Council and U.S. opposition to Chinese presence in the Arctic region. Four key areas of China's Arctic policy, including engagement in the energy sector and infrastructure development, scientific cooperation, and tourism, remained unchanged after February 2022.

At the same time, the Arctic governance system is undergoing a significant shift, according to Chinese researchers, from a cooperative to a competitive model (Zhao *et al.*, 2023). In this new paradigm, China will adopt a comprehensive approach, engaging both politically and economically, while leveraging scientific and technological cooperation. The likelihood of an increased military presence in the Arctic is also considered probable (Puranen and Kopra, 2023).

In the immediate period following the outbreak of the full-scale war in Ukraine, China took a period of reflection on the consequences of the events and adjusted its policies in the Arctic, including its economic direction. An analysis was conducted on the changes in the two basic documents on Russia's state policy in the Arctic region since 2022, and it was concluded that China had more opportunities to expand Arctic cooperation with Russia in the Arctic because Russia would not necessarily act solely in its economic interests (Yunying, 2024). Russia's status as an Arctic state with extensive territories and resources in the Arctic has rendered it a significant target for China in the emerging geopolitical landscape.

China resumed its ambitious plans in the Arctic region, capitalising on Russia's isolation and leveraging its desire to enhance cooperation in the Arctic to gain an advantage. At the same time, it is crucial for China to exercise caution in its approach to ensure that its deepening cooperation with Russia in the Arctic does not adversely impact its relations with other Arctic countries.

In the long-term, China's future Arctic development is inextricably linked to the Arctic Council, and the active promotion of the smooth operation of the Arctic Council is of paramount importance for China (Chen, 2023). Furthermore, it is imperative for China to ensure Russia's continued involvement in the Arctic Council, a stance it publicly expressed in October 2022 by stating its unwillingness to recognise the Arctic Council without Russia (Jonassen, 2022). It is evident that China aspires to enhance its influence within the Arctic Council, particularly in the event of Russia's possible return to active participation the Arctic Council in the future. Presently, China and India, who hold the status of observers, remain the sole states in the Arctic Council structures that maintain a friendly stance towards Russia.

Energy trade, Arctic shipping and scientific cooperation, and tourism are identified as the primary areas of developing closer ties between China and Russia in the Arctic post-2022.

Arctic shipping and the commercial exploitation of the NSR are identified as top priorities for China in the Arctic, with the objective of ensuring diversified and secure trade with Europe, including through the Arctic, in the face of a complicated geopolitical environment. The ramifications of the full-scale war in Ukraine have led to a reassessment of the legal framework for ensuring maritime safety in the Arctic, with sanctions on shipping insurance rendering the situation stagnant (Yunying, 2024). Furthermore, China has advocated for the establishment of a regional fisheries management organisation for the Arctic Ocean and has ratified an international agreement banning commercial fishing in these waters until at least 2037 (Rambler, 2024b).

In addition, China has consistently pursued a policy of combating climate change, as evidenced by the country's attention to environmental issues, including climate change, which has been reaffirmed in a late 2024 report summarising the country's leadership strategy for environmental protection (Belt and Road portal, 2024d).

Since the outbreak of the full-scale war in Ukraine, Russia's Arctic policy has undergone significant changes due to a combination of factors, including the confrontation with the West, the regime of isolation and sanctions, and the severing of most ties of international cooperation in the Arctic region. Presently, the Russian Federation is confronted with the pressing imperative of ensuring the extraction and transportation of energy resources from the Arctic deposits. The solution to this task involves the rapid progress of the NSR and related maritime and land transport infrastructure, with the anticipation of trade with Asian countries and preferably at the expense of their investments. China's role in this initiative is pivotal, and Russia swiftly recognised the critical importance of significantly accelerating its cooperation with China starting 2022.

Related legislation concerning the development of Russia's Arctic territories began to be amended. In February 2023, amendments were made to the 'Fundamentals of Russia's State Policy in the Arctic until 2035' (President of Russia, 2023c). In opposite to previous focusing on collaboration with the Arctic Council countries, Russia now aims to enhance cooperation with 'foreign countries within the framework of relevant multilateral organisations and mechanisms'. This shift is interpreted by China as a demonstration of Russia's openness to fostering bilateral cooperation in the Arctic with member countries of various international organisations and institutions. This turn in approach was followed Russia's withdrawal from the Barents/Euro-Arctic Council in September 2023 (Chernenko, 2023), while maintaining its formal membership of the Arctic Council (Tass, 2024b).

In March 2023, a new version of Russia's Foreign Policy Concept was issued (President of Russia, 2023b), in which the priorities in the Arctic declared the 'special responsibility' of the Arctic states under the United Nations Convention on the Law of the Sea (UNCLOS, 1982). The document outlines several objectives, including the regulation of relations in the Arctic Ocean, the neutralisation of the course of unfriendly countries to militarise the region and contain Russia, the assurance of the invariability of the 'historically established international legal regime of internal sea waters', the establishment of cooperation with non-Arctic countries, and the protection of Russia's interests in the Arctic.

In pursuit of these objectives, Russia has implemented stringent shipping regulations within its Arctic Ocean internal waters, revised its inland sea boundaries, and obtained approval for its application to extend its continental shelf (Zhilin, 2024). These measures stand in contrast to China's approach of facilitating international access to the Arctic. At the conclusion of 2024, Russia asserts that the strategic documents governing the nation's activities in the Arctic, which were adopted following the outbreak of the full-scale war in Ukraine, should undergo a review in light of the imposition of new sanctions, challenges encountered in shipbuilding, and the necessity for enhanced import substitution (Vmeste.rf, 2024).

Russia's federal budget for 2025 and for the planning period of 2026 and 2027 provides for state financing of the programme 'Socio-economic Development of the Arctic Zone of the Russian Federation' in 2025-2027 in the amount of approximately USD 250 million. The federal project entitled 'Development of international economic cooperation in the Arctic zone of the Russian Federation' is to receive an allocation of USD 1.2 million in 2025, USD 480 thousand in 2026 and a further USD 1.2 million in 2027. The allocation of funds for the implementation of the federal project 'State support for the implementation of investment projects in the Arctic zone of the Russian Federation' is set to receive USD 85 million in 2025, USD 90 million in 2026, and USD 32 million in 2027 (Russian government, 2024b).

In December 2024, at a meeting of the Presidential Council for Strategic Development and National Projects, Vladimir Putin instructed to pay special attention to the Arctic issues and their progression. The meeting discussed the results of the first stage of the Strategy for the Development of the Arctic Zone of the Russian Federation, implemented from 2020, as well as making adjustments to this document (NIA Federaciya, 2024).

The future of Russian-Chinese collaboration in the Arctic post-2022 has been uncertain for some time, due to a variety of factors. The accords established between Russia and China in preceding years, including the declarations of amity and the absence of any proscription on collaborative endeavours on 4 February 2022, had the potential to significantly enhance energy trade and the improving of transport infrastructure, particularly the NSR, i.e. the Chinese initiative, the Polar Silk Road. The outbreak of the full-scale war in Ukraine has led to a marked shift in the nature of Russian-Chinese collaboration in the Arctic, with cooperation becoming more stable but less active.

The development and exploration of the Arctic region is a key national priority for Russia, and the successful achievement of this objective is contingent on the attraction of foreign investors and the establishment of a market for the region's natural resources. At present, China is the only country that can meet Russia's needs in this area.

The topic of the Arctic has been a recurrent subject in the agendas of bilateral meetings between the two nations, with the Commission for the Preparation of Regular Meetings of the Heads of Government of Russia and China maintaining continuous operations (China.org.cn, 2003). Annual consultations on the Arctic, held in September, have served to augment the focus on this particular field of cooperation (Zhilin, 2024). There is an active exchange of official delegations at the federal level between the two countries to discuss economic issues, including those related to the projects in the Russian Arctic.

In 2023, the joint statement on deepening the strategic partnership between Russia and China emphasised the importance of preserving the Arctic as a 'region of peace, stability and constructive cooperation' and highlighted the development of the NSR as a strategic priority (President of Russia, 2023a). In this regard, China conveyed its readiness to collaborate with Russia to enhance the transit capacity of the route, culminating in the establishment of a joint working group (sub-commission) to facilitate the advancement of the NSR. The task assigned to this sub-commission was as follows: 'to promote the use of the NSR for international maritime transport, increase the capacity to provide icebreaking services, and encourage enterprises of the two countries to actively develop cooperation, taking into account market principles' (Russian government, 2023b).

The first meeting of the sub-commission on the NSR was convened at the conclusion of 2024. Chaired by the Director General of Rosatom State Corporation on the Russian side, and by the Chinese Minister of Transport on the Chinese side, this meeting served to underscore the elevated status of this working body (Shchetinina, 2024). In regard to Arctic matters, Russia and China have committed to the enhancement of collaboration in the domains of shipping, navigational safety, technology, and the construction of polar vessels. This area of cooperation is instrumental in facilitating China's emergence as a dominant maritime power, as well as the implementation of its ambitious programme to build its own icebreaker fleet and ice-class vessels (Leksyutina and Vyahireva, 2024).

It is also noteworthy that in 2023, a memorandum of understanding on the strengthening of maritime law enforcement cooperation between Russia and China was concluded (Biang, 2023). On the basis of this agreement, the Chinese maritime police participated in the Arctic Patrol 2023 exercise in the Barents Sea and also took part in naval exercises off the coast of Alaska (Østhagen, 2024).

In the absence of engagement by Western countries with Russia in the Arctic Council, the prospect of cooperation with China in the Arctic has become a virtually unchallenged for Russia. Consequently, China has initiated the establishment of bilateral ties with Russia within the Arctic Council, particularly as China emerges from its post-pandemic isolation in 2022-2023. Initial concerns that Russia might be perceived as a more favourable partner for Arctic research than existing Arctic Council members, and that alternative ad hoc forums might emerge (Dyck, 2024), were not substantiated. Instead, the prevailing sentiment is that Russia and China's collaboration within the Arctic Council remains consistent with the established principles of the organisation. In 2024, ongoing discussions between Russia and China continue to explore prospects for enhanced interaction within the Arctic Council. In 2024, Russia stated that 'bilateral cooperation on these and other topical issues on the Arctic agenda will be further strengthened' (Marine News of Russia, 2024a).

BRICS has become an additional platform for Russia and China to discuss topical issues related to the Arctic, with Russia being the only Arctic state in this forum. The other BRICS members are countries with rapidly developing economies that need to constantly increase their energy imports. The BRICS countries have practically replaced the members of the Arctic Council in the projects conducted by Russia under its rotating chairmanship in 2021-2023 (Strelnikova *et al.*, 2024). In this way, the Russian Federation plays the role of a kind of 'guide' for the BRICS countries in their endeavours to take a more active role in addressing sustainable development issues in the Arctic region.

As for the Polar Silk Road project, it has been relegated to the periphery of Russian-Chinese relations, while the development of Arctic cooperation along the NSR continues, but in the form of separate, formally unrelated projects. It is imperative to recognise that even prior to the invasion to Ukraine, the project was in a state of uncertainty due to the repercussions of the pandemic. In 2022, China was still

experiencing significant restrictions, including the movement of its citizens, especially abroad, and almost all spheres of life inside the country were not fully functioning. The Polar Silk Road project, a significant undertaking, saw only limited progress during this period, except the establishment of the China-Russia Joint Laboratory on Polar Technology and Equipment 'Belt and Road' (SMTU, 2022). The Polar Silk Road project's mention in official documents concerning Russia-China cooperation was infrequent. The importance of Arctic transit for Russia and China has not diminished over this time, but the refusal to use clear terminology seems to be related to China's reluctance to make strategic commitments in uncertain geopolitical circumstances. In October 2023, Beijing hosted the Belt and Road International Forum and Summit, organised to celebrate the initiative's tenth anniversary. This event marked the third iteration of the forum (following those in 2017 and 2019) and the first since the outbreak of the full-scale war in Ukraine. Notably, the term 'The Polar Silk Road' was not utilised (Budris, 2023).

The significance of climate issues in the Arctic for the ongoing cooperation between Russia and China is evident. For instance, at the United Nations Climate Change Conference (COP29) in November 2024, China engaged in discussions with Russia concerning the subjects of BRICS cooperation on climate and environmental protection in the Arctic (CCEIS, 2024). The Arctic Pavilion, which was organised as part of the aforementioned conference, included meetings between Russia and China (Northern Forum News, 2024). China views Arctic LNG projects as a means of achieving its ambitious carbon dioxide emission reduction goals, perceiving them as a 'clean alternative' to more 'dirty' fossil fuels such as coal (Devyatkin, 2023).

In energy cooperation between Russia and China big projects continue to play a leading role after 2022, mainly in the form of pipeline natural gas and LNG. In 2024, China's LNG imports from Russia accounted for 22% of Russian LNG exports, placing it second after the EU, which accounted for 49% of Russian LNG exports (ERR, 2024).

A total of 360 oil and gas fields have been discovered in the Russian Arctic, including 334 onshore and 26 offshore. It is estimated that the Russian Arctic shelf has oil and gas reserves with the potential to contribute 20-30% of country's oil production by 2050 (Arctic Russia, 2024). The Russian Arctic zone is home to five major projects: the Power of Siberia and Power of Siberia-2 pipelines, as well as two LNG projects, Yamal LNG and Arctic LNG 2, which are at different stages of readiness. In Russia's long-term LNG development programme, adopted in 2021, there were plans for other LNG projects in the Russian Arctic, such as Murmansk LNG and Ob LNG (Garant.ru, 2021). In the face of tightening Western sanctions, NOVATEK made a final decision in late 2024 to suspend their promotion, focusing on the Arctic LNG 2 project (Maritime News of Russia, 2024b).

In 2024, the EU adopted new sanctions packages targeting the production of the Russian JV, and from March 2025, it will ban the transit of Russian LNG through its territorial waters and the financing of new Russian LNG projects, placing 27 vessels on the sanctions list (Budris, 2024).

Notwithstanding the prevailing contradictions, energy cooperation in the Arctic remains a priority and a non-alternative for both China and Russia. For China, the advantages of energy cooperation in the Arctic include the acquisition of energy resources at a favourable price, the attainment of knowledge and experience of working in Arctic conditions, and the manufacturing of appropriate equipment for energy resource extraction in the Arctic. Chinese companies are entering other energy projects in the region, thereby helping to expand China's presence in the Arctic. For Russia, collaboration with China remains a non-alternative, despite apprehensions of economic and political reliance in a region of strategic importance and the imposition of Western sanctions.

The issue of technological reliance on the export of critical technologies for the development of Arctic energy deposits became evident in Russia after 2014, following the initial sanctions, when the share of imports in the supply of critical oil and gas equipment was 80%, and for some items there were no Russian analogues (CDU TEK, 2024).

After 2014, federal programmes on state support for import substitution and a number of federal laws were adopted. For example, a Roadmap for localisation of LNG equipment production was developed (President of Russia, 2017), and programmes for localisation of equipment for LNG projects in Russia until 2030 (National oil and gas service association, 2021) and for the development of LNG production with indication of LNG equipment (Russian government, 2021). The objectives set out in these programmes were to increase the share of Russian-made equipment in LNG projects to at least 40% by 2024 and

80% by 2030. While some progress has been witnessed in the small-capacity fleet, medium- and large-capacity LNG production in Russia remains heavily reliant on imported equipment (Bashmakov, 2023).

In this context, China, despite its technological lag in comparison to the leading Western companies in the production of Arctic energy extraction equipment, stands as Russia's sole prospect for the continuation of ongoing projects.

The Yamal LNG project, in which China (state-owned CNPC and The Silk Road Fund) holds a 30% stake and whose design capacity was expanded to 19 million tonnes of LNG per year in 2021, is the main supplier of LNG to Europe. Notwithstanding the initial sectoral restrictions imposed in 2014, which included a prohibition on technology transfer for hydrocarbon exploration in the Arctic, along with subsequent sanctions, the project's completion in 2019 remained unobstructed (Zaikov *et al.*, 2024). Even in the face of mounting sanctions on Arctic LNG 2, Yamal LNG has hitherto evaded significant impact. In 2023, Novatek petitioned the Russian government to introduce incentives for Chinese investors in Yamal LNG and to abolish the dividend tax for them (Zlobin, 2023).

Nevertheless, the risk of future sanctions on Russian LNG persists, with the potential for logistical challenges, unstable revenue streams and diminished competitiveness. By the conclusion of 2024, seven LNG tankers, among them one of 15 Arctic-class gas carriers engaged in the Yamal LNG project, which supplies LNG to China, were targeted by EU sanctions (LNG.Expert, 2024).

The Arctic LNG 2 project, in which China holds a 20% stake, was considered one of the most promising projects in the world in 2021 and was expected to become the largest LNG project in Russia (Garant.ru, 2021). The investment decision on this project was made in 2019, and the design capacity was to be, as for the Yamal LNG project, almost 20 million tonnes of LNG per year. The project's realisation has been hindered by the imposition of unprecedented sanctions pressure. Novatek is utilising the profits from its successful Yamal LNG project to provide ongoing financing for Arctic LNG 2, establishing an internal financing mechanism that serves to safeguard the project from external financial constraints. Despite these measures, only one of the project's three production lines was commissioned in 2024 (Larina, 2024).

This has the potential to reduce China's inclination to future investment in the Russian Arctic. Still, Russian LNG from Arctic LNG 2, akin to Yamal LNG, remains among the most economical in the global market, a factor that is favourable for China. In 2024, the Chinese company Harbin Guanghan manufactured and delivered three gas turbines for the Arctic LNG 2 power plant, which were much needed (Tek-All.ru, 2024; Humpert, 2024).

The Arctic LNG 2 project is facing mounting sanctions pressure, with the United States including companies from the United Arab Emirates and Singapore associated with the it in the sanctions list by the end of 2024 (U.S. Department of State, 2024). It was revealed that liquefaction at Arctic LNG 2 had been suspended due to challenges in LNG marketing, with eight LNG shipments since August failing to reach their intended buyers. Indeed, no shipments have yet been delivered from the new production facility, which commenced operations in late 2023 (Beller, 2024). At the conclusion of 2024, Novatek is collaborating with lobbyists to attempt the removal of the Arctic LNG 2 project from the extant sanctions list (Hirtenstein and Rashad, 2024), as the sanctions have impeded the LNG module production plant in Murmansk (Alimpieva, 2024). LNG modules were also produced for Russia by the Chinese company Wison New Energies, but in 2024, due to sanctions, the company's management announced that it was suspending operations in Russia (Maritime News of Russia, 2024c), meaning further difficulties with the project.

The Power of Siberia project, whose pipeline gas supplies to China are steadily increasing after 2022, is not experiencing any difficulties and continues to be the main channel for gas supplies to China. In 2022, the Kovykta field, located in the Irkutsk region, was connected to the pipeline. By the end of 2024, a new record for daily pipeline gas supplies to China had been established (Interfax, 2024d). Gas imports through the Power of Siberia pipeline are handled by PetroChina, China's largest oil and gas company, which is part of the China National Petroleum Corporation (CNPC).

A second branch of the pipeline, the Power of Siberia-2 to China via Mongolia, has not yet been agreed upon. This is because China is keen to purchase Russian gas at a lower cost and to avoid investing in infrastructure construction costs (Mordyushenko and Dyatel, 2024; Liu, 2024). Russia had initially planned to commence construction in 2024, with an expected completion date of 2029. The intended annual gas supply to China was estimated at 50 billion cubic metres of gas per year by 2030, a two-thirds increase

in liquefied natural gas (LNG) capacity and with the objective of compensating for the loss of European markets and reorienting the gas industry towards the East.

The prevailing circumstances have led to a reluctance on the part of China to make decisions that entail irreversible consequences, including the potential of Russia becoming a significant energy supplier. This is due to the fact that the combined capacity of the two Power of Siberia pipelines would nearly equal the total amount of natural gas that China currently imports from other countries (Nugert, 2023). Additionally, difficulties have emerged in the Mongolian segment of the pipeline, as that nation depends on branches for its own gasification (Kruglej, 2024). In 2024, the Power of Siberia-2 project remained without a signed contract or confirmed financing, despite Russia's persistent attempts to persuade its Chinese partner to sign the deal, the main reason being China's fear of secondary sanctions from the West (Korppoo and Wang, 2024; RBK, 2024a).

The development of Russian Arctic oil exports to China is characterised by uneven progression. Russia possesses substantial proven oil reserves within the Arctic shelf, with Rosneft holding exclusive licences for 28 licences areas across six seas in the Arctic Ocean (Rosneft, 2021). The company has expressed its intention to initiate related projects in the near future. Since 2013, Gazprom Neft has been engaged in oil production in the Arctic, specifically at the Prirazlomnoye offshore platform, which is Russia's sole Arctic offshore platform to date, with reserves estimated at approximately 70 million tonnes. The exploitation of the Shtokman field was abandoned due to the imposition of sanctions. It is anticipated that production from the Kamennomysskoye-Sea field (Nprom.online, 2024) will commence in 2025, and the remaining oil production projects on the Russian Arctic shelf remain at a conceptual stage, with precise figures yet to be determined.

In 2020, Gazprom Neft, a subsidiary of the Russian state-owned gas and petroleum corporation Gazprom, produced its 13 millionth tonne of oil from the Prirazlomnoye field and began shipping Arctic oil to China (Finam, 2020). Currently, transshipment of oil cargo in the Arctic zone is carried out from ports out of five ports, from Murmansk to Dudinka. In 2022, a single tanker traversed the NSR *en route* to China; the following year, Russia build up its oil exports to China via this route (in total, Russia exported 10.4 million barrels of oil to China in 2023 on 13 vessels from Arctic and Baltic ports), yet the average transit time due to inclement weather conditions remained comparable to the traditional route via the Suez Canal (MediaPaluba, 2024b).

In the initial 11 months of 2024, Russia augmented its oil exports to China by 1.65% in comparison with the previous year, reaching a total of 99 million tonnes. The value of crude supplies amounted to USD 57.4 billion, which represents a raise of 4.7% in comparison with the previous year. Russia continues to be the foremost oil supplier to China (Tass, 2024f). Sinopec Corporation, a major player in China's oil and petrochemical industry, plays a pivotal role in the importation of Russian crude oil, which is then refined and sold into the Chinese market.

The challenges associated with exporting Arctic Russian crude to China are primarily attributable to the fact that production and navigation in northern waters do not permit the shipment of Arctic grades by large vessels. Consequently, companies are compelled to utilise floating storage facilities for ship-to-ship trans-shipment at the port of Murmansk (The Moscow Times, 2024). The complexity of the logistics process results in an increase in the cost of Arctic oil, thereby rendering it uncompetitive in comparison to the conventional route of oil deliveries to Asia via the Suez Canal.

It is also noteworthy that economic collaboration between Russia and China is expanding beyond oil and gas to encompass other resources. For instance, in 2023, a Chinese company initiated a project to build a titanium mine in Russia's Arctic zone in the Komi Republic (BNK news agency, 2023).

Since the outbreak of the full-scale war in Ukraine, there has been progress in Russian-Chinese cooperation on the development of the NSR, although this is still far from the targets set earlier, according to which transit traffic to China should reach 50 million tonnes in 2030 (Rosatom, 2024). The volume of cargo turnover along the NSR remains insignificant comparing to the one of the Suez Canal, primarily due to the underdeveloped Arctic transport infrastructure and the necessity to expand the cargo and icebreaker fleet.

China's approach to cooperation with Russia in this area remains largely unchanged, with China continuing to regard the NSR as supplemental route and a means of diversifying the sources of imported resources, primarily energy resources. The challenge for China is to balance the economic benefits of participating

in the joint exploitation of the NSR with the risk of being drawn into the geopolitical rivalry between Russia and the West (Nong, 2024). The NSR is no longer regarded by China as an integral part of the Polar Silk Road, for instance, the 'Fourteenth Five-Year Plan for the National Economic and Social Development of the People's Republic of China and the General Plan of Long-Term Goals to 2035' published in early 2021 mentions the Polar Silk Road project only briefly, and it is not mentioned at all in the 'Report to the Twentieth National Congress of the Communist Party of China' published in October 2022 (Zhang, 2024).

The China's COSCO Shipping Specialised Carriers which operates the largest Chinese fleet capable of operating on Arctic Ocean routes, ceded the NSR shipments to other Chinese companies due to the threat of sanctions. As a result, in 2023 was established a Hainan Yangpu NewNew Shipping Co, which launched a new container route connecting St Petersburg and China via the NSR (Moe et al., 2023). Thus, China is willing to cooperate with Russia in the development of the NSR, but at a lower level of business ties and only on the condition of joint efforts to develop port and fleet infrastructure. China's interest in the commercial use of the Northern Sea Route has not diminished, as evidenced by recent statements by Chinese officials (Rambler, 2024c) and, for example, by the fact that in 2024 the Chinese city of Tianjin, where one of the country's northern seaports is located, will begin broadcasting sea ice analyses and forecasts and weather information for the NSR (Reuters, 2024b).

For Russia, following the shift in geopolitical dynamics after 2022, the development of the NSR has assumed paramount importance, as the redirection of exports from the West to the East has emerged as a pivotal transport priority. The NSR is poised to alleviate pressure on Far Eastern railways and showcase the merits of the most direct sea route between Europe and East Asia.

In the immediate aftermath of the Russian invasion of Ukraine, a government meeting on the development of Russia's Arctic zone (President of Russia, 2022b) resolved in April 2022 to adjust the previously adopted plans for the Arctic (Russian government, 2015a; Russian government, 2018a) and combine the activities envisaged by them. In August of the same year, amendments were made to the 'Northern Sea Route Infrastructure Development Plan until 2035' (Russian government, 2022a). The majority of the activities of the initial plan were scheduled for completion by 2024, a target that proved unattainable in the context of the subsequent alterations.

The revised version of the plan mentions 155 measures, with the objective of developing the cargo base, fleet, transport infrastructure and security infrastructure. In comparison with the previous version, the plan has become more detailed, with significantly higher levels of investment and financing from a range of sources. As in the initial version, the primary objectives remain the annual increasing of cargo turnover and the advancement of infrastructure (ports, roads, and railways), in addition to the construction of cargo ships and icebreakers. Russia's policy towards the NSR is becoming more diversified and, concomitantly, oriented towards the domestic market. Projections indicate that annual cargo traffic along the NSR will reach 150 million tonnes in 2030 and 220 million tonnes by 2035 (Goroshilova, 2023). The total estimated cost of this initiative from 2022 to 2035 is projected to be around USD 30 billion, with approximately 60% of this amount expected to be spent by 2025.

Russia's federal budget for 2025 allocates financial resources to the organisation of regular transportation along the NSR as part of the federal project entitled 'Development of the Great Northern Sea Route' (from Kaliningrad and St. Petersburg to Vladivostok) for the period from 2025 to 2027. This project is aimed at the improvement of seaport infrastructure, navigation and hydrographic support of navigation, and organisation of regular transportation (Russian government, 2024b) with the support of friendly countries, primarily China (Maritime News of Russia, 2024c). While the organisational and economic workings of the NSR are still being comprehended under the new conditions, the most likely prediction is that this route will become increasingly important for oil and LNG exports to China and India in the near future.

It should also be noted that under the new conditions Russia has initiated changes in the management of navigation on the NSR, designed to streamline its system and allocate areas of responsibility for certain aspects of the project's progression. For China, one of the obstacles to investment in the NSR was the absence of organisational structure and legal certainty; for instance, the functions of icebreaker escort are still not regulated by law (Mikhailova and Tabata, 2024).

In order to address the aforementioned challenges, the Russian Federation continues to improve the NSR regulations. In 2022 a set of regulations pertaining to the navigation of internal sea waters by foreign-

flagged vessels was adopted (Russian government, 2022b). At the same year the Russian Maritime Doctrine was updated (Ministry of foreign affairs of Russia, 2022). A notable distinction of the new Maritime Doctrine of Russia, in comparison to its predecessor (2015), is the identification of the Arctic as a regional priority. In addition, a single body has been established to oversee the organisation of icebreaker escort services for ships traversing the waters of the NSR, in addition to the issuance of navigation permits. This body, designated as the 'Main Directorate of the Northern Sea Route' (Glavsevmorput), is a constituent element of Rosatom (Russian government, 2022d).

In order to ensure the effective functioning of navigation along the Northern Sea Route, Russia is planning to create its own satellite constellation to collect data on the location of ships and ice conditions in the Arctic and Pacific Oceans. Satellite navigation is critical for increasing the throughput capacity of the NSR (Rosatom, 2024), especially as the construction of liquefied natural gas terminals continues, such as the Utrenny export terminal on the Gydan Peninsula for the Arctic LNG-2 project (Alifirova, 2023).

The processes of institutionalisation of Russian-Chinese cooperation in NSR development are undergoing rapid advancement. President Putin's visit to China in May 2024 elevated the Arctic agenda to a next level. The establishment of a special body to coordinate cooperation on NSR development was agreed, namely a joint sub-commission within the Russian-Chinese commission for the preparation of regular meetings of heads of government (Leksyutina and Vyahireva, 2024; Kimani, 2024). In addition, three joint working groups were established: on the improvements of navigation, security and Arctic shipbuilding (Rosatom, 2024). In November 2024, the first meeting of the sub-commission was convened under the patronage of the Russian and Chinese transport ministers, signifying the significance of this collaborative field. The working groups presented comprehensive reports on shipping development, navigation safety and polar vessel technology, delineating a comprehensive roadmap of tasks to be accomplished by 2025 (Pal, 2024). The objective is to boost the annual transit of goods to China via the NSR to 50 million tonnes by 2030, with Russia aiming to transport 100 million tonnes of cargo annually by the same time (Zhilin, 2024).

While Russia is enhancing its collaboration with China in this area, it is concurrently endeavouring to diversify the risks associated with becoming dependent on a single partner. In 2023, Rosatom, the operator of the NSR, and DP World of the UAE established a joint venture to develop transit container traffic on the NSR (Atom media, 2023). Furthermore, Russia took the initiative to establish a permanent commission on transport logistics within BRICS and invited interested countries to participate in the NSR advancement (The Russian State Commission for Arctic Development, 2023b). By the conclusion of 2024, a Russian-Indian working group on the matter of cooperation within the NSR had been constituted, and the meeting addressed a draft intergovernmental memorandum of understanding on the advancement of cooperation on maritime transport in the NSR (Interfax, 2024f).

In an effort to promote the utilisation of the NSR, the Russian government has initiated a series of measures aimed at providing support for navigation in the region. A programme has been implemented since 2022, offering subsidies for short sea shipping operations between ports in the Northwest and Far East regions. The Russian government has allocated a substantial budget, amounting to more than USD 70 million (PortNews, 2024c), to support shipping activities until the year 2035, in accordance with the stipulated the NSR plan. As previously referenced, in 2024, there was a noteworthy escalation in the discourse surrounding the implementation of the project entitled 'Development of the Great Northern Sea Route' (NIA Federaciya, 2024). The development of the NSR on such a scale will require the creation of a domestic carrier with a fleet of bulk carriers and container ships based on Rosatom's existing large logistics companies (Sudostroenie.info, 2024), as well as the construction of new gas carriers and infrastructure for LNG carriage via the NSR (Interfax, 2024g). In 2024, there was even information about a project to build a nuclear-powered submarine gas carrier with a cargo capacity of 170-180 thousand cubic metres, which would be able to transport LNG through the NSR in 12 days instead of 20 (Atomic Energy 2.0, 2024).

Arc7 ice class vessels are required to ensure secure passage of the NSR. Vessels of lower ice class or without designated ice class have only sporadically traversed the eastern section of the NSR. The nuclear icebreaker fleet of Russia currently comprises seven nuclear-powered vessels operated by Rosatom and four non-nuclear icebreakers. Plans are in place to complete one additional nuclear-powered icebreaker by 2029. By 2030, the icebreaker fleet on the NSR is planned to be increased by 2035 to 18 units, but the sources of financing their construction are still unclear, as a large-scale attraction of investors is required.

The Russian company Atomflot has expressed the opinion that year-round cargo transportation along the NSR can be ensured if there are at least 12 modern nuclear-powered icebreakers (Chizhevskij, 2024). Yet this number may not be sufficient during certain seasons in the Eastern Arctic, where ice thicker than 4 metres requires icebreakers with a capacity of 120 MW of the Leader class, of which there are likely to be 2-4. Presently, Russia has only one such icebreaker under construction (The Russian State Commission for Arctic Development, 2024).

In total, Russia may require up to 160 high-ice class vessels (PortNews, 2024e) by 2030 to ensure the export of Arctic project products (LNG and oil), and this is impossible without attracting Chinese investments. These plans have not yet materialised, and at the end of 2024, Rosatom proposed the introduction of an Arctic investment levy from 2028, in the form of a surcharge on the payment for icebreaking through the eastern sector of the NSR. The funds collected are intended to be used for the construction of new icebreakers for tanker escort. There are concerns among Russian shippers that this could potentially diminish the appeal of shipping through the NSR (Chizhevskij, 2024). Russia is also working to raise the number of icebreakers by ordering them from friendly countries. For example, in 2024, Russia signed an agreement with India to build four non-nuclear icebreakers for the Arctic (Maritime News of Russia, 2024d).

The challenges associated with the development of the NSR extend beyond the necessity to expand the icebreaker fleet. For instance, following the withdrawal of European dredging companies from the Russian market in 2022, their services were assumed by Chinese entities. This transition resulted in a threefold augment in costs. Consequently, Rosatom has initiated plans to construct its own dredging fleet comprising 16 vessels (Rosatom, 2024).

With respect to the dynamics of NSR traffic, in 2021 it accounted for a mere 5.8% of total maritime traffic of Russia (Mikhailova and Tabata, 2024). In 2022, the NSR cargo traffic decreased by 2.3% to 34 million tonnes, 80% of which were LNG and oil. In 2023, transport volumes heightened to 36 million tonnes and in 2024 to around 37.6 million tonnes (B-port, 2024). These figures are far from the 80 million tonnes planned for 2024. The workload levels along the NSR have remained consistent, with no observed addition. The level is not decreasing due to the diversion of cargoes by Russian companies, while Russia's foreign partners show no escalation of interest in using the NSR. This diversion of oil shipments via the NSR have exhibited a 30% surge in 2024, with projections indicating a total exceeding 2 million tonnes by the year's conclusion (Antonov, 2024; PortNews, 2024d). These figures remain comparatively modest when benchmarked against shipments to Asia via the Suez Canal (The Moscow Times, 2024). As a result, the total cargo traffic along the NSR is not growing at the same rate as it was in 2022, when the route development plan was approved.

In 2021, Chinese companies made 14 shipments along this route, but none in 2022 (Moe *et al*., 2023). However, by 2023, Russia and China had successfully prepared and launched regular transportations along the NSR, which significantly reduced the distance and time of cargo transport from Russia's northern ports to China. In 2023, a total of 80 voyages of cargo ships, cruise liners and oil tankers arrived at Chinese ports sequentially via the Arctic waterway (Li and Wu, 2024). The first regular container route along the NSR between Russian ports (Arkhangelsk, St. Petersburg, Murmansk) and Chinese ports (Shanghai, Qingdao, etc.) was initiated. And yet, the Chinese Hainan Yangpu NewNew Shipping company has transported only 100 thousand tonnes of cargo, with a total cargo turnover along the NSR of 36 million tonnes. This is explained by the lack of large vessels and container ships of high ice class, which only enable transportation in the short summer-autumn period.

China plans to increase the volume of container traffic along the Northern Sea Route. A notable example is the Chinese container ship Flying Fish 1, a Panamax vessel measuring 294 metres in length, which transported approximately 5,000 containers along the NSR within a span of three weeks in 2024. This represents a significant deduction of 15 days compared to the transit time through the Suez Canal, and a substantial cost reduction of approximately USD 150 thousand (Makarov, 2024). Furthermore, the NSR has emerged as a key route for the transportation of goods from China to Belarus, marking a remarkable expansion in international trade opportunities. In August 2024, a new multimodal route 'Arctic Express No. 1' was launched, establishing a direct connection between the primary Chinese ports (Shanghai and Ningbo) and Arkhangelsk via the NSR. Subsequently, cargoes are transported by rail from Arkhangelsk to Moscow and St. Petersburg. It is estimated that within a year of its inception, the route facilitated 13 voyages to China via the NSR, with a total of 10,000+ containers transported, marking a substantial raise

of 62% and 30% compared to the previous year's figures, respectively (Rambler, 2024c). It is anticipated that by 2027, container shipping along the NSR will be operational on a year-round basis. To this end, a joint Russian-Chinese enterprise is being established to design and construct ice-class container ships, ensuring uninterrupted navigation and the effective management of the container line (Leksyutina and Vyahireva, 2024).

Following 2022, there has been a observable advancement in investment cooperation between Russia and China in the Arctic, though at a reduced level in comparison to previous megaprojects.

Investments in Arctic development have historically been a priority for Russia, with the nation establishing itself as a global leader in this domain. The majority of these investments have been directed towards gas production projects in the Yamalo-Nenets District over the past 25 years. But even prior to 2022, there was a notable shift in the focus of Arctic investment towards Chukotka. This strategic realignment was primarily driven by long-term plans to enhance transport volumes along the NSR (Mineev *et al.*, 2024).

Post-2022, Russia faced the challenge of identifying a replacement for Western investors, who had declined to participate in joint projects. Significant Arctic projects, particularly in the energy and transport sectors, which are of strategic economic importance to Russia (accounting for almost 60% of investments in the Russian Arctic), are at risk. The primary investment sectors in the region include the NSR, oil and gas fields, LNG production, metal mining, research and development, and tourism.

In response to this challenge, the Russian government has intensified internal and external public and private investment in the Arctic zone, with a substantial surge in investment announced over the past two years (Belt and Road portal, 2023c). As of the end of 2023, the Arctic region of Russia had attracted investments totalling USD 19 billion. The mining sector attracted the largest amount of investment (approximately USD 9.3 billion), followed by the oil and gas and chemical industry (approximately USD 2.2 billion) (Rambler, 2024a).

By the close of 2024, it had been declared that investments in Russian Arctic development projects had surpassed USD 7 billion. Within Russia's designated Arctic zone, where investors are beneficiaries of preferential tax and administrative arrangements, there are 950 investment projects with investments amounting to just over USD 20 billion (PortNews, 2024b). The data concerning investment in the Russian Arctic shows significant variation, seemingly contingent on the methodology employed in the calculation process. For instance, alternative sources have been cited with figures as high as 3,600 investment projects totalling USD 90 billion (Olejnik, 2024).

Until the 2010s, Chinese investment in the Arctic was primarily directed towards Western countries such as the United States, Canada, and Greenland via Denmark. But during the 2010s, there was a discernible shift in the nature of these investments. This was primarily due to a perception in the West that China posed a security threat, which resulted in the blocking or failure of several Chinese Arctic projects, a memorable example being the bankruptcy of a Chinese zinc mine in the Yukon, Canada (Halliday, 2013).

The commencement of substantial Chinese investment in the Russian Arctic is evidenced by the acquisition of a 20% stake in the Yamal LNG project in 2013, followed by an extra acquisition of a 20% stake in the Arctic LNG 2 project in 2019. These investments, in conjunction with the Power of Siberia project, serve as notable exemplifications of Chinese enterprises' investment activities in the Russian Arctic. It should be noted that China's investment activity in the Russian Arctic is not limited to large-scale projects. Since 2022, there has been an increase in investment by medium-sized enterprises and infrastructure facilities in the Arctic. For instance, in 2023, an agreement was reached on Chinese investment in titanium mining in the Arctic zone (Komi Republic) (BNK news agency, 2023), and Chinese investors were expected to participate in the construction of the Sosnogorsk-Indiga railway (Stider, 2024). After all, the railway project was put on pause at the end of 2024 (Interfax, 2024e).

The motivation behind Russia's pursuit of Chinese investments is twofold: firstly, to facilitate the development of its energy and mining sectors in the Arctic zone, and secondly, to enhance its position as a major player in the global energy market. In this regard, Russia is undertaking substantial measures to attract foreign investments, with a particular emphasis on China in the present context. The plan entails the attraction of Chinese investments to LNG production in Yakutia and Primorsky Krai, with the objective of constructing plants with a collective capacity in excess of seven million tonnes per annum. These plants are intended for subsequent transportation to China (Jiaxing, 2024).

The potential for Chinese investment in various projects within the Russian Arctic is a subject under discussion in consultations between the Russian and Chinese foreign ministries (Maritime News of Russia, 2024a). The introduction of new deposits may be eligible for a tax deduction of up to 50% of the mineral extraction tax until 2032 (Far East and Arctic Development Corporation of Russia, 2023). In early 2024, the Arctic zone of Russia was expanded to encompass two districts of the Khanty-Mansi Autonomous Okrug, with the aim of attracting investment (Far East and Arctic Development Corporation of Russia, 2024). Furthermore, regional companies in China have expressed interest in investing in the Russian Arctic (Pitukhina and Belykh, 2024).

Scientific cooperation between Russia and China in the Arctic has developed at an accelerated pace since the outbreak of the full-scale war in Ukraine and in the context of the overall intensification of scientific ties between the two countries. Along with nuclear research, the Arctic area is now one of the leading areas of scientific relationship between the two countries.

In 2023, Russia held a meeting of the State Commission on Arctic Development, which resulted in the creation of a special body, the Scientific and Expert Council. The primary objectives of this council are to inventory current scientific research on Arctic topics, identify the most relevant topics, and intensify international scientific cooperation with 'friendly countries' (The Russian State Commission for Arctic Development, 2023a). The organisation of competitions for joint Russian-Chinese research projects has also continued, with 52 such projects receiving support in 2024, including those related to the Arctic (Russian Science Foundation, 2024).

At present, scientific cooperation between Russia and China on Arctic issues is carried out in various forms, with inter-university cooperation developing most actively. The Sino-Russian Arctic Forum (St Petersburg University, 2024), the 'Arctic Scientific Dialogue' scientific and educational forum with the participation of Chinese scientists on the monitoring of climate change in the Arctic, the development of the Arctic shelf and the intensification of navigation along the NSR continues to be held on a regular basis (Russian Centre for Scientific Information, 2024). The Russian-Chinese meetings, dubbed 'Arctic cooperation in new conditions', are a noteworthy point of discussion, with the prospects for the NSR, the activities of the Arctic Council in new conditions, and the creation of a Russian-Chinese exchange of Arctic products being particular points of interest (St Petersburg University, 2023). In 2022, the Russian-Asian Arctic Research Consortium was established in Yakutsk. The consortium has grown to include 18 participants, notably prominent Chinese entities (NEFU, 2024). Russian universities in the Far East demonstrate the highest level of engagement in this collaborative effort.

Starting 2023, Harbin Engineering University and the Moscow Institute of Physics and Technology collaborates on a project, contributing to a joint scientific and educational programme at the International Arctic Station 'Snowflake'. The station is planned be operational on a year-round basis on the Yamal Peninsula, which serves as the centre of gas production in Russia. The scope of the project encompasses collaboration in the areas of clean energy, robotics, telecommunications, new materials, and artificial intelligence. Additionally, it will encompass activities aimed at safeguarding the ecological environment of the Arctic region. The genesis of this project can be traced back to its initial development within the framework of the Arctic Council (Huzhina, 2024).

Some initiatives of scientific cooperation in the field of Arctic research between Russia and China have not been implemented, despite the joint decisions taken. This applies, for example, to the China-Russia Joint Laboratory on Polar Technology and Equipment, established at the end of 2022 as part of The Belt and Road Initiative China-Russia project, which was to provide scientific and technical support for the implementation of the China-Russia consensus on the construction of The Polar Silk Road in the field of polar technology and equipment (SMTU, 2022). The idea of a joint scientific centre for Arctic marine research put forward in 2023 has not been put into practice either (Ulyanova and Babonov, 2023).

In 2024, new plans were set to expand Russian and Chinese scientific cooperation in the Arctic, involving the leading polar research institutes of both countries (namely, Russia's Arctic and Antarctic Research Institute, China's Arctic and Antarctic Administration, and the Polar Research Institute). Joint Russian-Chinese expeditions to the Northwest Pacific Ocean, the Bering Sea and the Eastern Arctic (the continental slope of the Eastern Arctic seas and the south of the Lomonosov Ridge) are planned for 2025-2026 (Interfax, 2024b). Russia extended an invitation to China to participate in the Russian scientific Arctic expedition on the Svalbard archipelago and the North Pole drifting expeditions, which are to be organised with the support of a unique scientific vessel, the ice-resistant platform 'North Pole'. In return,

China invited Russian scientists to participate in expeditions on the Chinese research icebreaker vessel Xuelong 2 (Arctic and Antarctic research institute, 2024). It is anticipated that this cooperation will be permanent, with regular consultation meetings to take place.

The commitment of Russia and China to develop scientific cooperation is further underscored by the official visit of the Chinese Deputy Minister of Science and Technology to the Arctic and Antarctic Research Institute of the AARI in October 2024. During this visit, the two nations discussed promising areas for the development of mutually beneficial cooperation in polar research, as well as options for joint expeditions in polar regions and internship programmes for young scientists (MediaPaluba, 2024a).

As for the cooperation in the field of Chinese tourism in the Russian Arctic, prior to the emergence of the pandemic, there had been considerable progress. For instance, in 2018 alone, 354,000 tourists from China visited the region, while the total number of tourists from the United States, Switzerland and Germany was 423,000 (Papirosova and Barbo, 2023). In 2019, the potential for cooperation between Russia and China in the field of Arctic tourism was recognised. Before the pandemic, external tourism in China was experiencing significant growth, encompassing non-standard destinations such as icebreaker excursions to the Northern Polis and cruise tourism along the NSR (Mikhaylichenko, 2019). Furthermore, Chinese tourists were also visiting the western sector of the Russian Arctic, with the Murmansk and Arkhangelsk regions demonstrating notable dynamism in this regard. In 2019, Murmansk region welcomed over 16,000 Chinese tourists, while the Russian Arctic National Park in the Arkhangelsk region, situated in the northern part of the Novaya Zemlya archipelago and the Franz Josef Land archipelago, also anticipated a significant influx of Chinese tourists (Xiao, 2022).

From 2019 to 2022, the total number of inbound tourists to Russia fell almost threefold (Bondarenko *et al.*, 2023). Arctic tourism has suffered even more than other destinations. After the outbreak of the full-scale war in Ukraine, Russia was subjected to Western sanctions, and the number of tourists from Europe and the United States on its territory dropped drastically. Still, China has emerged as a pivotal factor in the potential revitalisation of the global tourism industry, particularly in light of the removal of outbound restrictions in 2023. China places significant emphasis on outbound tourism, recognising it as a strategic priority in the process of redefining its national identity in the 21st century (Gillen, 2024), and continues to demonstrate robust demand for tourism to Russia.

Following the year 2022, the Russian Federation initiated measures to encourage the tourism in the Arctic zone. For instance, it introduced amendments to the legislation entitled 'On State Support of Entrepreneurial Activity in the Arctic Zone of the Russian Federation' (Russian government, 2020; Russian government, 2024c), as well as in the 'Strategy for the Development of the Arctic Zone of Russia', which included measures to stimulate this type of economic activity (President of Russia, 2023c). Nevertheless, even the recommencement of visa-free group tourist trips between Russia and China in 2023 (Gazeta.ru, 2024) did not result in a favourable outcome with regard to the Arctic tourism.

The challenges hindering the development of Arctic tourism in Russia, regardless of the expressed interest from Chinese tour operators, can be attributed to the following factors: the limited tourist season, which extends over only a few months each year; the absence of modern tourist accommodation outside the Arctic mainland; and the availability of only two icebreakers suitable for transporting tourists – the nuclear-powered icebreakers '50 Years of Victory' and 'Yamal'. In Russia, the organisation of trips to the polar regions is the responsibility of a single entity, the company 'Polar Travel Club' (Polar Travelling Club, 2024), which is a member of the Association of Arctic Expedition Cruise Operators, AECO.

Despite the fact that as of 2023, there were 127 projects under implementation in the Russian Arctic tourism sector (Belt and Road portal, 2023d), an analysis of statistical indicators of tourism in the Arctic zone of Russia has shown that out of nine subjects, tourism is successfully developing in only four: Krasnoyarsky Krai, the Republic of Karelia, the Murmansk and Arkhangelsk regions demonstrate an average level and pace of progress in this respect, while the Komi Republic and Sakha (Yakutia) show average performance or are in the early stages. Yamalo-Nenets, Nenets and Chukotka autonomous districts show minimal development in tourism (Bondarenko *et al.*, 2023).

China is unable to provide significant support to the Arctic tourism due to a lack of technical expertise. At the same time, China's interest in cooperation in this area lies in gaining the necessary experience. In turn, Russia is faced with the task of improving a system to support Arctic tourism and ensure its safety, primarily rescue, protection and insurance (Xiao, 2022).

The present study explores the ongoing collaboration between China and Russia in the tourism sector, with a particular focus on the state of support at both the governmental and corporate levels. In December 2024, during the 14th International Forum 'Arctic: Present and Future', the Chinese Ambassador to Russia highlighted tourism as a pivotal domain for humanitarian cooperation between the two nations (Association of Polar Explorers, 2024). The launch of the first Arctic cruise line is planned for May 2025 by 66 Degrees Expeditions, a joint venture of Guangdong Port and Shipping Group and Guangdong Travel Holding Group. Polar cruises to Antarctica and the Arctic are currently considered to be one of the fastest growing sectors of the cruise industry (Marine Insight, 2024). The ship, which has an ice classification of '1A Super,' is designed to accommodate 130 passengers and will feature a bilingual crew (Jing Daily, 2024).

4. Conclusions

Economic cooperation between Russia and China in the Arctic has been influenced by global factors and general trends in the development of relations between the two countries since the outbreak of the full-scale war in Ukraine. For Russia economic cooperation with China in the context of the ongoing aggression in Ukraine is a non-alternative despite the fact that it cannot compensate for the loss of cooperation with Western countries in terms of volume, income, or access to advanced technologies. Russia has had to accept the risk of becoming dependent on China, although before the full-scale war in Ukraine, this risk was viewed as existential.

Although there was a decline in the initial period, from mid-2022 this cooperation began to develop at an accelerated pace. By the end of 2024, the growth rate of economic indicators of Russia-China cooperation began to slow down, apparently reaching its peak. A similar trend is evident in the context of Russia and China's collaboration in the Arctic region. While China does not consider economic cooperation with Russia in the Arctic to be of vital importance, it does present new prospects and opportunities to strengthen its position in this strategically significant region. Secondary Western sanctions do not have a significant impact on Russia's Arctic cooperation with China, merely increasing the cost to Russia.

The foundation of Sino-Russian collaboration in the Arctic is the trade of energy resources extracted in the Russian Arctic zone. Since the onset of the full-scale war in Ukraine, Russia has reoriented its plans for new energy and infrastructure megaprojects, the main among which being the development of the Northern Sea Route transport route, towards China. This reorientation is driven by the expectation of investment inflows and technological support. In response to these developments, Russia is making significant efforts to clean up the legal system governing the Northern Sea Route and to build the necessary infrastructure. Conversely, China has shifted its discourse away from the 'Polar Silk Road' initiative, instead emphasising pragmatic measures to develop the Arctic transport route. This is driven by the objective of diversifying its European trade routes.

To facilitate the import of energy resources from the Russian Arctic, China utilises both the existing Power of Siberia gas pipeline and oil tankers operated by private enterprises. However, it is notable that China has refrained from active participation in additional energy projects of importance to Russia, such as Power of Siberia-2 and Arctic LNG 2, while continuing to receive additional revenues from increased supplies via existing routes.

Over the past three years, Russia and China have also attempted to expand economic cooperation in the Arctic to new areas, including Arctic tourism (in which China has expressed interest) and the extraction of certain types of minerals, such as titanium. However, these new areas are, so far, insignificant and do not have a significant impact on the total volume of cooperation between the two countries. Scientific cooperation between China and Russia on Arctic issues is actively developing. China is keen to benefit from Russia's extensive experience in Arctic research, including in the field of nuclear shipbuilding.

The future of economic collaboration between Russia and China is uncertain and contingent on the outcome and timing of the full-scale war in Ukraine. However, the long-term interests of both countries in the Arctic remain steadfast.

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