

Perspective from China's International Cooperation in the Framework of the Polar Silk Road

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Adaptation to the challenges emerging from the changing Arctic is an important component of future Arctic governance. Evidence of the impacts of climate change abounds in the Arctic—and rebounds around the world. This includes observations about the relationship between ice melting in the Arctic and extreme weather events at lower latitudes, as well as how changes in the duration and extent of Arctic sea ice cover are transforming global trading patterns. Given the global impacts reverberating from climate change, collective actions and a synergy of adaptation strategies are needed. As one of the world's major economies and as an investor in the Arctic infrastructure network, what impact will China's engagement in the Arctic impose on the balance of economic activities and environmental protections in the Arctic, and on efforts to build resilience at both the Arctic regional level as well as at the global level? This question will be important both to Chinese policy makers and to the international community, now and in the years to come.

In January 2018, the Chinese government issued “China's Arctic Policy White Paper” (White Paper) as an attempt to explain China's policies and positions regarding Arctic affairs to the outside world, and to build trust between China and other partners.¹ In particular, the term, “Polar Silk Road” (PSR) used in the White Paper has attracted wide attention.² The PSR refers to a series of cooperative international ventures among Russia, the Nordic countries, and certain East Asian countries. There is a synergy between China's Arctic policy and policies from other parties, related to sustainable development in the Arctic region as well as adaptive strategies to climate change in a global context. China hopes to strengthen such cooperation under the Belt and Road Initiative (BRI), following principles of extensive consultations, joint contributions, and shared benefits—while emphasizing policy coordination, infrastructure connectivity, unimpeded trade, financial integration, and closer people-to-people ties.³

Now the PSR is ready to launch. Exactly how the concrete projects outlined in the framework of the PSR should be carried out, and what

objectives should be realized through these joint efforts, will be questions that should guide the work of researchers, policy makers and practitioners.

The PSR is not only a part of China's BRI initiatives, but also represents a contribution to joint efforts by Arctic nations, international organizations, and other stakeholders in Arctic governance, as well as in the coordination of Arctic policies for developing and protecting the Arctic. As part of China's Arctic policy, the PSR's launch underscores that China has the willingness to jointly build up the infrastructure in the Russian Arctic region for peaceful utilization of new sea routes that are currently developing—and are likely to expand in the future. Recent investment commitments to Russia have signaled that China will support Russia to jointly enhance the Northern Sea Route (NSR) and other sea routes in the Arctic, based on the concepts of “win-win” and globally accepted sustainability principles. This project also echoes the Arctic Corridor railway project by Finland, Norway, and the European Union (EU), and will encourage contributions from Japan and Korea to jointly strengthen international utilization of the NSR.

In the White Paper, China expresses its intention to work jointly with all parties concerned to build the PSR by developing Arctic shipping routes. It encourages its enterprises to participate in infrastructure construction for the routes where China COSCO Shipping has conducted commercial trial voyages since 2013, in order to pave the way for these routes' commercial and routine operation. By advancing international cooperation on Arctic affairs, the PSR will focus on three concrete cooperation projects: (1) joint efforts to build a “blue” economic passage linking China and Europe via the Arctic Ocean,⁴ (2) enhancing Arctic digital connectivity, (3) building a global infrastructure network in the Arctic region, and (4) enhancing adaptive capability and green technology innovation through international cooperation.

How Does the Concept of a Polar Silk Road Form Through Interactions Between Russia and China?

At the 2011 conference, *The Arctic: Territory of Dialogue*,⁵ Russian President Vladimir Putin said, “We see its [NSR's] future as an international transport artery capable of competing with traditional sea routes in cost of services, safety and quality.” Although Russia's Minister of Emergency Management Sergey Shoygu put forward the concept of the PSR (originally introduced as the “Silk Road on Ice”) for the first time during this 2011

conference, the concept was not immediately met with resounding echoes of support from other parties.⁶ However, in September 2013, Chinese President Xi Jinping introduced the BRI for the first time during an official visit to Kazakhstan.⁷ Earlier that year, China COSCO Shipping undertook its first commercial trial voyage from a Chinese port to Rotterdam via the NSR with the *MV Yong Sheng*. The commercial ship followed in the steps of China's icebreaker *RV Xuelong's* maiden transit through an Arctic sea route of a Chinese-flagged vessel from China to Iceland in 2012.⁸ China furthermore was granted formal Observer status to the Arctic Council with other Asian countries in 2013.⁹ Since then, there has been incremental growth in Arctic commitments by Chinese stakeholders, with a steep surge since mid-2017 through effective steps to enhance Arctic cooperation between China and its international partners, including in the realms of Arctic policy and economy.

China's Foreign Minister Wang Yi stated that China would support Russia's initiative to jointly build a "Silk Road on Ice" during a meeting with his Russian counterpart, Foreign Minister Sergei Lavrov, in May 2017.¹⁰ In June 2017, a policy document was co-released by China's National Development and Reform Commission (NDRC) and its State Oceanic Administration (SOA), which provided new insights about how international cooperation in the Arctic (as with the proposed blue economic passage linking China and Europe) might be more closely tied to international trade and the BRI.¹¹ In November 2017, Xi Jinping and Russian Prime Minister Dmitry Medvedev agreed that China and Russia should jointly develop and cooperate on the use of the NSR and building the PSR. In January 2018, the first ever White Paper published on China's Arctic policy supported the efforts to jointly build the PSR and facilitate connectivity and the sustainable economic and social development of the Arctic. The White Paper says that China hopes to work with all parties to build the PSR by developing Arctic shipping routes. In effect, China calls for stronger international cooperation on infrastructure construction and operation of these Arctic routes.¹²

China attaches great importance to navigation security in Arctic shipping routes. It has actively conducted studies on these routes and continuously strengthened hydrographic surveys with the aim to improve the navigation, security, and logistical capacities in the Arctic region. China abides by the Polar Code, and supports the IMO in playing an active role in formulating navigational rules for Arctic shipping. China also advocates

the protection and rational use of the region, and encourages its enterprises to engage in international cooperation regarding the exploration for and utilization of Arctic resources by making the best use of their advantages in capital, technology, and its large domestic market.¹³

Polar Silk Road Projects and Possible Future Projects

Energy Projects

The most important commercial Arctic project to date is Yamal LNG. The project, which became operational at the end of 2017, is seen as vital in utilizing Russia's Arctic resources and in addressing China's energy needs. Yamal LNG is an integrated project encompassing natural gas production, liquefaction, and shipping. The project consists of the construction of a liquefied natural gas (LNG) plant with an output capacity of around 16.5 million tons per year (by 2019), using the South Tambey Field as a resource base. The field's proven and probable reserves are estimated at 926 billion cubic meters, making it one of the largest Arctic producers of LNG.¹⁴

Beijing's winter haze has become an air pollution problem in China over the past decade, and is well known around the world. Air pollutants not only increase the incidence of lung and bronchial diseases among Chinese residents, but also increase the atmospheric particulate matter concentrations around East Asia. The Chinese government has been instituting pollution control measures since 2013, including shutting down some of the most polluting companies and forcing some winter heating enterprises to use natural gas, a relatively clean energy alternative to coal to provide heat. For this reason, China's demand for natural gas has greatly increased in the winter, and China's natural gas imports from Central Asia, Russia, and the United States have all increased by a large margin. During President Trump's visit to China in 2017, natural gas from Alaska accounted for an important part of the deal signed between China and the United States.

Extensive transportation infrastructure is being built with a similar scope as the Yamal LNG project, including a seaport (began in 2013) and the Sabetta Airport. The \$3.22 billion Belkomur railway project connecting the Sabetta Port to the Eurasian railway network was awarded Russia's infrastructure project of the year 2016. To date, this project has employed

as many as 30,000 Russian workers from its central and southern regions. Now that the Yamal project is operational, Russia aims to gain a larger share of the global market in liquefied natural gas. This seems like a highly realistic goal, as the Yamal-Nenets Autonomous Region is the world's largest natural gas producing area, accounting for approximately 80 percent of Russia's natural gas production and approximately 15 percent of the world's gas production.¹⁵ Even under current sea conditions, Yamal is projected to double Russia's share of the growing global LNG market by the time it reaches full capacity in 2020.¹⁶

In November 2017, Novatek, one of the largest independent natural gas producers in Russia, signed a Strategic Cooperation Agreement with the Chinese National Petroleum Company (CNPC), which already owns 20 percent of Yamal LNG (also known as Arctic LNG-1), a \$27 billion production project. The strategic cooperation agreement confirms the parties' intentions to cooperate in implementing the Arctic LNG-2 project, as well as collaborating in different segments of the LNG and natural gas markets, including LNG trading and gas infrastructure development.¹⁷ Novatek also signed an agreement with China Development Bank for cooperation as part of this project.¹⁸ France's Total oil corporation also has a 20 percent stake in the Yamal LNG project (LNG-1) and would like to participate in the upcoming Arctic LNG-2 (as would other possible international investors), which has a potential producing capacity of approximately 19.8 million tons per year. The Arctic LNG-2 project could unlock more than seven billion barrels of oil equivalent of hydrocarbon resources in the onshore Utrenneye gas and condensate field. The first of three phases is planned for markets in 2023, partly utilizing the NSR to connect the produced natural resources to global energy trading supply chains.¹⁹

China's involvement has been vital to this important project, especially in light of the economic sanctions imposed by the United States and other Western countries against Russia. China's Silk Road Fund owns 9.9 percent of the equity in Yamal LNG-1.²⁰ The Russian natural gas producer Novatek, which holds the remaining 50.1 percent stake, has subsequently concluded an agreement for \$12 billion in loans, payable over 15 years, with the China Development Bank and China Export-Import (EXIM) Bank, dominated in euros and Chinese yuan.²¹ Yamal LNG, which ships to East Asian markets (China, Japan and Korea) in summer, could be piped to Europe in winter. Through Sino-Russian cooperation in LNG projects, Chinese energy and infrastructure construction companies have

accumulated extensive experience in the Arctic environment, and Chinese enterprises have both the technological capabilities and financial resources to be at the forefront with regards to future resource development in the Arctic region.

The China-Iceland cooperative relationship is also a successful example of Arctic cooperation. In 2012, China signed framework agreements with Iceland to support greater cooperation on geothermal energy, along with marine and polar science.²² Developing geothermal energy is part of China's comprehensive energy-transforming strategy. It is also one of the adaptations that China has made to address the challenge of climate change. By April 2018 Sinopec in China and Iceland's Arctic Green Energy Corporation (AGEC) have developed geothermal projects in 40 cities in China.²³ In 2013, the two countries signed a free trade agreement, and have engaged in a series of bilateral initiatives, including the Joint China-Iceland Aurora Observatory.²⁴ A special session on the BRI was held by the Arctic Circle Assembly in 2017, and the Arctic Circle Assembly will discuss the Polar Silk Road again in 2018.²⁵ Geothermal and Arctic cooperation remain among the top priorities for cooperation between China and Iceland, as was evident during the visit of Iceland's Foreign Minister Gudlaugur Thor Thordarson to China in early September 2018.²⁶ New agreements were signed on geothermal cooperation and trade-related topics such as e-commerce and the import of food products, including mutton meat and seafood products.²⁷

Arctic Shipping and Commercialization of the NSR

In October 2017, the oil and gas shipping unit of China's COSCO Shipping approved a plan to acquire a 50 percent stake in the Mitsui OSK (MOL) subsidiary that owns four conventional LNG carrier newbuildings booked to deliver cargo from Yamal LNG, expanding the two firms' joint fleet to 17 LNG carriers, with a total investment of \$877 million. The deal is the fourth joint LNG project between MOL and China COSCO Shipping. The two firms jointly own four ships delivered in 2015-2016 for charter to ExxonMobil, six vessels due for delivery in 2016-2018 for charter to Sinopec, and three of the 15 icebreaking LNG carriers that will load Yamal LNG cargo at the Port of Sabetta in the Russian Arctic.²⁸

China COSCO Shipping has become the most significant large-scale international shipping operator in the Arctic region and the first to

include the NSR into its transportation network as a regular route. In 2013, COSCO's *Yongsheng* transited the NSR for the first time, and in 2015 COSCO completed two-way transit shipping. By the end of 2017, China COSCO Shipping had sent a total of 10 vessels on 14 trips through the NSR, successfully carrying cargo that included building materials, machine parts, and other equipment. These achievements mark that regular shipping activities along the NSR carried by Chinese shipping companies have already begun to take shape.²⁹ In 2018 COSCO completed eight NSR voyages, including China's first cargo ship specially designed for sailing in polar waters, the *MV Tian En*.³⁰ The goods carried through the NSR by China COSCO's specialized carriers include paper pulp from Finland to China and offshore windmills made in China to Europe.

In September 2017, numerous Chinese companies stated that they are keen to invest in a new project near Arkhangelsk, a historic Russian port city, which would include the Belkomur railway project and the development of a deep-water port in the northern Dvina River. A new port will be built near Mudyug Island in the Dvina River Delta close to the existing port facilities for larger vessels. China EXIM bank has committed to provide loans for the project while COSCO has said it would like to participate, as would Chimbusco, a Chinese bunker company, Poly Group, and the China Marine Fuel Service Corporation.³¹ The new port is estimated to reach 30 million tons of cargo by 2030 and act as a central Arctic hub for Russian exports and imports in trade with Europe, the Asia-Pacific region and North America.³²

In an op-ed in the *China Daily*, Iceland's Foreign Minister Thordarson furthermore underscored that his "government follows carefully and with interest the Belt and Road Initiative, including the "Silk Road on Ice," which is focused on opening up new shipping routes through the Arctic."³³ Iceland has the potential to become a shipping hub in the Atlantic Arctic, especially for traffic through the central Arctic shipping route that China has been at the forefront of exploring,³⁴ and will be further equipped to do so with the launch of its first domestically built icebreaker the *RV Xuelong 2*.³⁵ There are planned port projects in the northeast of Iceland, at Finnafjörður and Dysnes,³⁶ which have been linked to potential Chinese investors and users.³⁷

The Arctic Corridor Project: Possible Cooperation under the PSR Framework

One of proposed projects in the Nordic Arctic is the “Arctic Corridor,”³⁸ a railway project that would connect the city of Rovaniemi in northern Finland with the Norwegian port of Kirkenes. Under the plan, ships could dock at Kirkenes, where cargo would be offloaded to the railway and sent southward through rail connections in Scandinavia to Helsinki and on through the proposed Helsinki-Tallinn undersea railway tunnel that would connect to Central Europe. The projects will include the rebuilding of the Kirkenes deep-water port, railway, and logistic hub in Rovaniemi, an air logistic hub in Helsinki, and linking to the Baltic Tunnel. The Arctic Corridor Project could be well suited for cooperation under the PSR framework, for several reasons. First, the Arctic Corridor and related projects are infrastructure projects with high relevance to the NSR that will facilitate the connectivity of East Asian and Arctic economies to the Baltic region and Central European market in a more comprehensive way than at present. Second, the Arctic Corridor is a huge ensemble of costly projects, and some parties concerned have come to China to discuss the possibility of cooperating with Chinese companies; the project even has a brochure in Chinese.³⁹ Hence, the project has the potential to make the Eurasian market more integrated and holds additional added value for connectivity between East Asian and EU markets through the NSR.

The Arctic Corridor Project involves two Nordic countries, Norway and Finland, and the EU. The Chinese and Norwegian Governments are seeking to revive stalled free trade negotiations,⁴⁰ and Norway’s shipping groups are especially interested in greater engagement with China. Norway is actively considering the possibility of greater involvement by Chinese Arctic shipping stakeholders.⁴¹ Kirkenes is the northernmost ice-free port located by the Barents Sea and is the closest Western port to East Asia via the NSR. Under this plan, ships could move goods from China as well as oil and gas from Arctic fields in Russia westward along this northern route to Kirkenes. Cargo would be offloaded to the railway and sent southward through rail connections.

Kirkenes is a free trade, logistics and industrial port in use for supplies and services to the Russian Barents, Pechaora and Kara Seas, Yamal, and other northern Russian onshore and offshore sites.⁴² Kirkenes has an ultra-deep, large fjord port that enjoys a dry and calm inland climate and is

sheltered from harsh coastal weather. It is open, accessible, and operational for conventional, non ice-class vessels at all times. In addition, Kirkenes has unlimited port and industrial site expansion potential for the Arctic Corridor's future development. The mayor of Sør-Varanger municipality (which includes Kirkenes), Rune Gjertin Rafaelsen, visited Shanghai as a member of a delegation lead by Norwegian Minister of Research and High Education Iselin Nybø, in April 2018. The mayor said that Kirkenes is well prepared for the Arctic Corridor and the opening of the NSR.⁴³ The Norwegian National Rail Administration, the Norwegian National Coastal Administration, and the National Road Administration have all made recommendations to the Ministry of Transport and Communication in support of the Arctic Railway. If it could be built, the line would be integral to the flow of freight transport along the NSR, connecting Finland and the Baltic region to Kirkenes, the vast oil and gas production areas, and the western part of NSR. Such a vision has been a long time coming, and in September 2010, the Bulk carrier *MV Nordic Barents* successfully became the first non-Russian flagged commercial vessel to transit the NSR, sailing directly from Kirkenes through the NSR and Bering Strait to Lianyungang in China with a cargo of iron ore.⁴⁴

China and Finland agreed to establish a future-oriented strategic partnership and cooperation in the Arctic, with technology innovation as one of the key components. Helsinki serves as a key air hub in the Nordic region. It serves seven airport destinations in greater China with 38 weekly flights, which is more than to any single European country.⁴⁵ As the Arctic capital of Finland, Rovaniemi is known globally for issues of Arctic interest. It has a number of areas of planned expansion/shared interest with China, including energy, mining, tourism, ICT, and clean-tech. A maritime cable project linking Europe and Asia via the NSR is planned to pass through Rovaniemi.⁴⁶ An increasing number of tourists choose to go to the Finnish Lapland area in the winter.

In February 2018, the *Helsinki-Tallinn Transport Link Feasibility Study—Final report* was released. The Fin-Est study indicated technical details for the proposed \$15-23 billion (€13-20 billion), 103km-long rail tunnel connecting Finland to Estonia under the Gulf of Finland, including two huge artificial islands and a tunnel 250m below the sea's surface.⁴⁷ Once constructed, it would be the world's longest undersea tunnel. In Helsinki, the line would run in parallel with the planned airport rail line providing connections to the rest of Finland, Sweden, and northern Russia.

On the Tallinn side, the link would connect directly to the airport, which is already connected to the rest of the rail network and Rail Baltica—the new pan-Baltic rail project due to start construction in 2019. Rail gauges differ between Finland and Estonia, so the line will need to be built to the European, 1435mm standard gauge to allow it to connect directly into Rail Baltica.⁴⁸

Technology Cooperation for Science, Monitoring, and Search-and-Rescue

Promoting Arctic digital connectivity and jointly building an international infrastructure network are also important indicators for developing the PSR. In addition to international cooperation in digital technology on the ground, China's international cooperation with Arctic nations and other stakeholders on space technology and submarine cable projects are also on the PSR's agenda. The Ministry of Industry and Information Technology of China and China Telecom (one of the biggest telecom operators in China) are cooperating with Finnish counterparts on a planned trans-Arctic submarine cable project, a 10,500-kilometer fiber-optic maritime cable link across the Arctic Circle. The trans-Arctic submarine cable project is a joint one, led by Chinese and Finnish initiators and joined by Russian, Japanese and Norwegian partners.⁴⁹ According to the joint communiqué of the 20th regular meeting of the Prime Ministers of China and Russia in 2015, "China and Russia have made it clear that they should further strengthen practical cooperation in satellite navigation between the Russian GLONASS system in China's Beidou system through improving the compatibility and inter-operation, enhancing the system functions, building station network for applications, and exchanging the data of monitoring and evaluation."⁵⁰

The particularity of the environment along the PSR has forced all parties concerned to think about ways to develop a green economy. The development of sustainable energy systems—including wind power, ocean tidal energy, geothermal energy, and hydropower—is a pivotal path for green development. In addition, ecotourism and low-carbon emission food and aquaculture products are also promising areas. China's White Paper on its Arctic policy specifically mentions clean energy and low-carbon polar tourism. China has pledged to strengthen clean energy cooperation with Arctic countries, exploring the supply and utilization of clean energy and

achieving low-carbon development.⁵¹

Cooperation in the Arctic Will Enhance the Adaptive Capability of China and Its Enterprises

China's contribution to adaptation efforts addressing the changing socio-ecological system on a planetary scale should include: (1) playing an active role in devising and implementing institutional management for collective adaptation, (2) taking effective measures to meet its commitments to the global environmental and climate regimes, (3) building resilience in local Chinese communities, and (4) enhancing its adaptive capability while China and its enterprises join activities in other regions, especially in the Arctic.

A Stricter Environmental Protection Legal System

The Arctic is rich in natural resources, but these abundant resources are stored in an environment with a fragile ecology and harsh production conditions. Therefore, the exploration and exploitation of Arctic natural resources requires sufficient assessments focused on environmental impacts, ecological sensitivity, and production safety. It is necessary for Arctic governance to solve the contradictions between the exploration and exploitation of Arctic natural resources and the protection of this fragile environment, with a more complete understanding of how human activities create barriers for the migration and reproduction of Arctic birds and animals, and how environmental pollution such as oil spills affect fragile ecosystems. Climate change is causing significant impacts and threats to the Arctic ecosystem, including the disruption of food chains upon which many species in the Arctic depend. Increasing the availability of such knowledge and instituting effective responses are essential for the sustainable utilization of resources in the Arctic region.

While many projects for Arctic development have yet to be built, and while no one can accurately predict the pace of sea ice melting and technological advances, a number of projects are making progress across many of these countries—and real momentum for Arctic partnerships has been developed. Many of the long-held economic goals of many Arctic countries are likely to be realized over the next 20-30 years, and much closer links may be formed among China, Russia, and northern Europe

as a result of all of this planning and the combined efforts of the relevant governments, businesses, and other stakeholders.

The Chinese Government has committed to regulate and supervise the activities of Chinese citizens, legal persons, and other organizations in the Arctic in accordance with the emerging legal framework, in order to ensure that their activities accord with international law and respect the relevant national laws on environmental protection, resource conservation and sustainable development. Chinese enterprises need to be mindful of the fact that their partners along the PSR are developed economies, and environment protection is a precondition for economic activities in the Arctic. These elements are both challenges and opportunities for the Chinese government and Chinese companies to gain new experiences. The institutional systems of these countries will impose institutional restrictions on China's activities in these areas. Enterprises participating in the PSR must have high environmental protection capabilities, high legal awareness, and strong responsibilities to the local communities where they are operating.

A New Experience in Cooperation with Developed Economies

In other regions of the Belt and Road cooperation such as Central Asia and Africa, most countries lag behind China in terms of technology, the business environment, education, and labor training, etc. With regard to cooperation along the PSR, the majority of Arctic countries are highly developed economies. These countries are more developed than China in terms of GDP per capita, their level of productivity, and their degree of affluence. They are also among the leading countries in technological innovation worldwide. In the global innovation index rankings, Arctic countries hold high positions. With the exception of Russia, the 2017 innovation indexes of the Arctic countries were all higher than that of China, while China overtook Iceland, Canada and Norway in the 2018 rankings.⁵² Other countries along the Belt and Road, such as countries in Central Asia and North Africa, have a strong sense of urgency for development. They focus on achieving economic growth that coincides with China's high speed of building infrastructure. The social development goals of the more developed Arctic economies are more diversified and comprehensive, including social justice, ecological balance, economic development, inter-generational equity, enterprise ethics, and climate

response, among other values. The decision-making procedure for social resource allocation is more complicated in the Arctic countries.

In terms of the institutional environment for business operations, Arctic countries have sound market systems, developed industrial structures, sophisticated economic operation mechanisms, and systematic market legal norms. In addition, these countries have high standards and protection norms for labor rights and environmental protection. The degree of economic correlation of the Arctic countries with the rest of the world shows that these countries have a high degree of economic internationalization, a large contribution of foreign trade to economic development, open financial markets, and a mature development of transnational corporations. Russia's economy is, by comparison, relatively weak, but it is also an economy with comprehensive educational and industrial systems, with a rich history of achievements in heavy industries. Despite the sharp pain of the collapse of the Soviet Union, Russia still has the economic potential for strategic development as a great power.

Compared with cooperation in other regions, the cooperation along the PSR represents a higher level of technology—and the flow of technology, capital, and information runs in both directions. The Arctic countries have high expectations for China's infrastructure capacity, technology and investment, but they also have rigid criteria for foreign investment. Such high standards will help China's outbound investments become increasingly realized in the future. The development of the PSR can expect to encounter many contradictions and challenges. The ecological and environmental crisis caused by melting ice will trigger even higher environmental standards for economic activities in the Arctic, which will raise the costs of investments. Moreover, commercial benefits will also be affected by the speed of sea ice melting, the improvement of navigation conditions on traditional routes, the status of the world economy, fluctuations of international crude oil prices, and innovations in renewable energy. Therefore, the return of investment along the PSR often needs to be considered within a medium- and long-term perspective. While Chinese stakeholders engage in the ongoing bankable projects in the Arctic, they should take all the above-mentioned factors into account, gain experience, and work with local partners to ensure that the projects (including infrastructure, energy, shipping, etc.) are consistent with this adaptation process.

Notes

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