

BREAKING THE ICE



NEW TRADE VIA THE
NORTHERN SEA ROUTE



EUROPE OF SOVEREIGN
NATIONS

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ABOUT THIS STUDY



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attractive. Particularly in view of the ongoing crises in the Middle East and the Horn of Africa, the Northern Sea Route is increasingly coming into focus. China confidently describes itself as an 'indirect Arctic neighbour'. This is not about geographical or political correctness – it is about claims to power, securing raw materials and, not least, new trade routes.



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Europe risks falling further behind the major powers. The Northern Sea Route could help bring trade, prosperity, industry and jobs to the coasts of Northern and Central Europe. This study aims to explore the opportunities for this.

I hope all interested readers find this a rewarding read.

Volker Schnurrbusch

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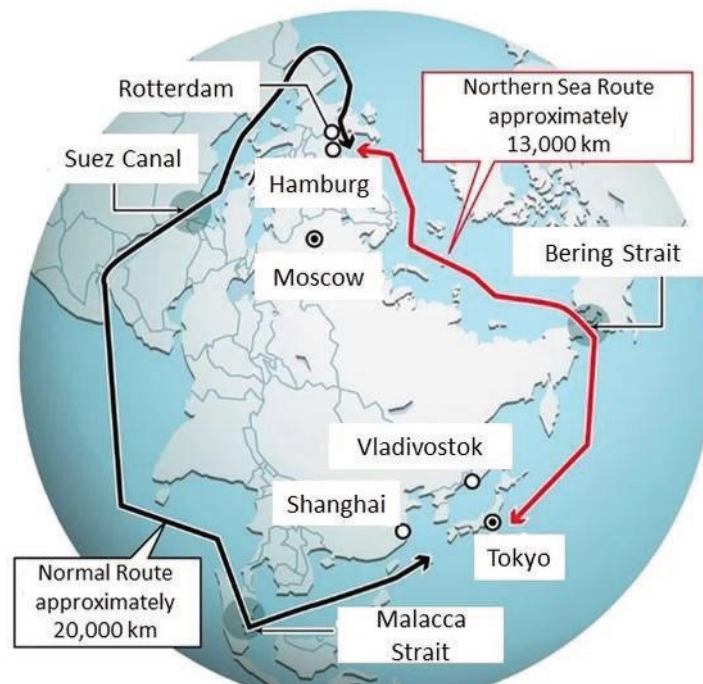
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1 INTRODUCTION

1.1 THE NORTHERN SEA ROUTE

The Northern Sea Route (NSR) is a shipping route that runs along Russia's northern borders in the Arctic Ocean waters, the Barents, Kara, Laptev, East Siberian, Chukchi and Bering seas. The NSR links Russia's European and Far Eastern ports and estuaries of navigable rivers in Siberia into a single national transport system in the Arctic. The length of the NSR between the straits in the Novaya Zemlya archipelago and the Provideniya Port is about 5610 km.¹

The NSR is open to vessels sailing under foreign flags, subject to compliance with Russian laws and established rules. The main reason for foreign ship operators' interest in the NSR has been its potential to shorten to almost half the length of other sea routes from Europe to the Far East. The distance between Hamburg and Shanghai via the Northern Sea Route is 13,580 km, whereas it is 20,000km via the Suez Canal Route (SCR).²



Picture: Northern Sea Route (NSR) and Suez Canal Route (SCR)³

¹ Russian International Affairs Council. "Northern Sea Route". Available at: <https://russiancouncil.ru/en/northernsearoute/> accessed on April 1, 2026.

² Ibid.

³ Picture: Lepic, B. "Milestones Reached along the Increasingly Busy Northern Sea Route," Splash247 (September 18, 2023). Available at: <https://splash247.com/milestones-reached-along-the-increasingly-busy-northern-sea-route/> accessed on April 16, 2026.



Russian diplomat Dmitry Gerasimov was the first person to propose the possibility of using the Northeast Passage (as the NSR was called until the early 20th century) and transforming the northern territories into the Northern Sea Route in 1525. Russian polymath, scientist and writer Mikhail Lomonosov provided a theoretical justification for the feasibility of developing the transport route. Empress Anna instructed in 1732 Vitus Bering to travel to Kamchatka.⁴ Finnish-born explorer Adolf Erik Nordenskiöld was the first person to complete the entire Northeast passage from the Atlantic to the Pacific along the northern coast of Eurasia in 1878-1879.⁵

NSR became a fully realized project only during the Soviet period. The Soviet Union used vast resources, including forced labour from the Gulag system, to construct Arctic ports, build fleets of icebreakers, and establish settlements to support Arctic operations. The NSR revived in the 2000s thanks to global warming, melting ice cover and massive energy projects such as Yamal LNG on the Yamal Peninsula and Arctic LNG 2 on the neighbouring Gydan Peninsula.⁶

Western sanctions disrupted Russia's energy exports from the Arctic to European markets. Russia lost its access to western technology and financing. The new situation forced Russia to seek new partners.⁷ Chinese operators have replaced western ones in operating on the NSR in the 2020s⁸. China has launched a Polar Silk Road (PSR) project in 2018⁹ and has added the NSR as part of the Belt and Road Initiative (BRI) in 2017.¹⁰

⁴ Ibid.

⁵ Niemi, Seija A. "Nordenskiöld, an Early Pioneer of Nordic Conservation." Environment & Society Portal, *Arcadia* (2012), no. 12. Rachel Carson Center for Environment and Society. <https://doi.org/10.5282/rcc/3891>

⁶ Weisko, Paul, "The Istanbul Bridge's Important Journey: A New Chapter for the Northern Sea Route", INSS – The Institute for National Security Studies, INSS Insight No. 2091, January 26, 2026. Available at: <https://www.inss.org.il/publication/northern-sea-route/> accessed on March 28, 2026.

⁷ Ibid.

⁸ India Shipping News. (2026, January 12). *China sets new record on a sea route abandoned by the West: 14 container voyages on the Northern Sea Route in 2025*. <https://indiashippingnews.com/china-sets-new-record-on-a-sea-route-abandoned-by-the-west-14-container-voyages-on-the-northern-sea-route-in-2025/>

⁹ Sun Y. (2018), The Northern Sea Route The Myth of Sino-Russian Cooperation, Stimson Centre.

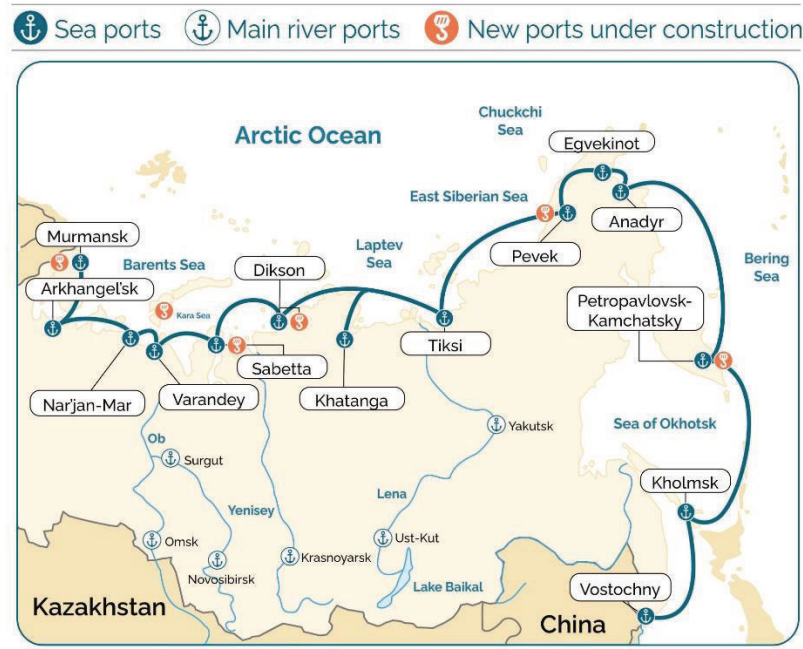
¹⁰ Song (2018), "Analysis of China's Arctic Route Development associated with the Belt and Road initiative", *Journal of Digital Convergence*, 16 (2018), pp. 103-115.

1.2 STRUCTURE OF THE STUDY

The aim of this study is to find out the current and future feasibility of the Northern Sea Route for maritime transportation between the ports of Hamburg, Germany, and Shanghai, China. Shanghai and Hamburg, which are among the five main gateway ports of both North-Western Europe and China.

The study combines analysis of currently existing research literature about the NSR to interviews of top-class professionals, who possess topical information and outlook to the NSR. The experts chosen to be interviewed in the study represent different professional positions, but also different geographical locations. This ensures diversity of perspectives and avoids excessive bias.

The Northern Sea Route (NSR)



Source:
Ministry of Transport of the Russian Federation

ISPI

Picture: Northern Sea Route's sea ports¹¹

¹¹ Aliyev, R. (2024). *Moscow's Arctic Projects Amidst the War: Sanctions, LNG projects, Icebreakers and the Northern Sea Route*. ISPI. Available at: <https://www.ispionline.it/en/publication/moscows-arctic-projects-amidst-the-war-sanctions-lng-projects-icebreakers-and-the-northern-sea-route-178452> accessed on: April 16, 2026.



The study provides answers to questions concerning the strengths and weaknesses of the shipping on the NSR from the points view of climate, economy, logistics, and geopolitics. The study will also highlight main factors, which affect the future of the NSR and its usefulness for European countries from the point of view of trade links to Asian markets through the NSR, as well as energy connections in the Russian Arctic.

The study provides concrete and practical information for policy-makers concerning the competitiveness and profitability of the shipping on the NSR. The study avoids drawing direct conclusions to the political and economic questions. Instead, the study provides policy-makers with necessary information and gives them leeway to determine their own position with a dichotomy of choices concerning the major questions of the NSR.

The main added value to the currently existing research material concerning the future feasibility of use of the Northern Sea Route will be as follows:

Chapters 2-6 of the study present the realities of the NSR from the point of views of climate, economy, logistics, geopolitics, and sanctions.

Chapter 7 processes data gathered from the literature review and combines it with data gathered from expert interviews. The outcome is a balanced analysis of the current realities in the NSR.

Chapter 8 concludes the study by revealing the current strengths and weaknesses of the NSR shipping. The chapter also draws guidelines for policy-makers by highlighting the most important choices concerning the future of the development of the NSR from the European point of view.



2 NSR AND CLIMATE

2.1 ESTIMATES 2001-2010

Arctic maritime routes attract a growing amount of attention due to the unprecedented warming of the region and diminishing ice coverage. Arctic temperature increase is greater than the global mean due to the Arctic amplification phenomena. Melted ice permits the warming of the Arctic waters, which in turn enables further ice melt.

The Arctic, generally defined as the region north of the Arctic Circle at approximately 66° 34 min North, encompasses approximately six percent of the Earth's surface, with an area of more than 20 million square kilometres. The Arctic Ocean itself is approximately 14 million square kilometres.

A shorter itinerary of transport via Arctic routes, among others via the Northern Sea Route, started to increase in the early 1990s. This also led to a growing amount in research of the maritime routes. Several studies^{12 13 14 15} found that melting of the earth's polar ice sheets had led to great reductions in the covered area in summer. At the time, predictions of a year-round ice-free Arctic route varied hugely, ranging between as early as 2020 and as late as 2200.

Estimates about the navigability of the Northern Sea Route varied largely during the first decade of the 2000s. Shepherd¹⁶ noted that during the 1990s and the first decade of the 2000s, the earth's polar ice sheets have been melting undeniably. His observations were that between 1992 and 2011 the Antarctic and Greenland lost about 4050 ± 1940 Gt of ice mass. Shepherd et al. estimate that this has resulted in an approximated sea level rise of $1.12 \text{ cm} \pm 0.38 \text{ cm}$ in that same period.

¹² Pruyn, J. F. J. (2016). Will the Northern Sea Route ever be a viable alternative? *Maritime Policy & Management*, 43(6), 661–675. <https://doi.org/10.1080/03088839.2015.1131864>

¹³ Ho, J. (2010). "The Implications of Arctic Sea Ice Decline on Shipping." *Marine Policy* 34 (3): 713–715. doi:10.1016/j.marpol.2009.10.009

¹⁴ Dalsøren, S. B., Ø. Endresen, I. S. A. Isaksen, G. Gravir, and E. Sørgeard. 2007. "Environmental Impacts of the Expected Increase in Sea Transportation, with a Particular Focus on Oil and Gas Scenarios for Norway and Northwest Russia." *Journal of Geophysical Research: Atmosphere* 112 (D2): 30. doi:10.1029/2005JD006927

¹⁵ PAME. 2009. Arctic Marine Shipping Assessment 2009 Report. In AMSA.

¹⁶ Shepherd, A., E. R. Ivins, A. Geruo, V. R. Barletta, M. J. Bentley, S. Bettadpur, K. H. Briggs, et al. 2012. "A Reconciled Estimate of Ice-Sheet Mass Balance." *Science* 338 (6111): 1183–1189. doi:10.1126/science.1228102.



Khon et al.¹⁷ argued that the Arctic Ocean would be open for commercial shipping on a regular basis during the summer season (from April to October) after 2020, based on changes in the ice cover of the Arctic region. According to the same study, the use of the Arctic Ocean for commercial shipping year-round may be feasible starting by 2050.

2.2 ESTIMATES 2011-2020

Decrease in the thickness of ice coverage in the Arctic started to be increasingly visible in the 2010s. The National Snow and Ice Data Center found that the average annual ice extent had decreased in the last 20 years by 1.25 million km², or 8 per cent¹⁸. During the 2010s, the estimate about the operational period of the Northern Sea Route was from 3 to 6 months¹⁹. According to the predictions made during the second decade of the 2000s, further decrease in the ice thickness in the Arctic Ocean would allow a year-round commercial shipping along the NSR throughout the year in the near future.

Barnhart et al.²⁰ acknowledged that the Arctic was undergoing vast changes and at an unprecedented speed. The studies predicted that the Arctic Ocean would be to the greatest extent open water over half a year by the end of the 21st century.

Cariou and Faury²¹ highlighted that navigation in the late 1990s throughout the Arctic region was only possible during the summer months due to icy and harsh weather conditions. However, there was already a clear change in view. Many areas were losing their ice cover, remaining free from ice for an extended period, and becoming feasible for shipping. According to the scholars, the yearly navigable number of days was estimated to rise from 70 days then up to 125 days in 2050 and further on to 160 days in 2100.

¹⁷ Khon, V.C., Mokhov, I.I., Latif, M., Semenov, V.A., Park, W. (2010) Perspectives of Northern Sea Route and Northwest Passage in the Twenty-First Century. *Climatic Change* 100(3/4): 757-769.

¹⁸ Beitler, J. (2015) May in decline. National Snow and Ice Data Centre, June 2015 mentioned in Benedyk, I. V., & Peeta, S. (2018). A binary probit model to analyze freight transportation decision-maker perspectives for container shipping on the Northern Sea Route. *Maritime Economics & Logistics*, 20(3), 358-374. <https://doi.org/10.1057/s41278-016-0046-4>

¹⁹ Northern Sea Route Administration. (2016) Northern Sea Route Information Office: mentioned in Benedyk and Peeta see footnote 18 above.

²⁰ Barnhart KR, Miller CR, Overeem I, Kay JE (2015) Mapping the future expansion of Arctic open water. *NatClim Chang* 6:280–285. <https://doi.org/10.1038/nclimate2848> mentioned in Dalaklis, Dimitrios & Drewniak, Megan & Schröder-Hinrichs, Jens-Uwe. (2018). Shipping operations support in the “High North”: examining availability of icebreakers along the Northern Sea Route. *WMU Journal of Maritime Affairs*. Dalaklis, D., Drewniak, M.L. & Schröder-Hinrichs, JU. *WMU J Marit Affairs* (2018) 17: 129. <https://doi.org/10.1007/s13437-018-0142-7>. [10.1007/s13437-018-0142-7](https://doi.org/10.1007/s13437-018-0142-7)

²¹ Cariou P, Faury O (2015) Relevance of the Northern Sea Route (NSR) for bulk shipping. *Transp Res A* 78: 337–346.



Estimations made during the second decade of the 2000s were relatively moderate. According to the studies, decreasing ice extent and increasing presence of thinner first-year ice suggest that seasonally ice-free Arctic Sea could be a reality within this century^{22 23}. Lei et al.²⁴ noted that the accessibility period, during which ice concentration of the Arctic Ocean is less than 50 per cent and ships are navigable along the NSR, facilitated by icebreakers, had increased from 84 days in the 1980s to 114 days in the first decade of the 2000, reaching 146 days in 2012.

Studies of the era highlighted extraordinary environmental changes that continued to occur throughout the Arctic landscape. Richter-Menge et al.²⁵ found that “Arctic air temperatures continued to rise, and the average annual surface air temperature anomaly (+ 2.0 °C relative to the 1981–2010 baselines) over land north of 60° N between October 2015 and September 2016 was by far the highest in the observational record beginning in 1900”. Furthermore, the pace of the Arctic sea ice retreat started to be visible, at the time at 13.3% per decade compared to the averages of 1981–2010²⁶. The data about sea ice retreat in 2017 indicated that Arctic’s sea ice extent for January 2017 averaged 13.38 million square kilometers, the lowest January extent in the 38-year satellite record²⁷. It had become evident that the Arctic Ocean had become more accessible for ships due to retreat of ice.

The navigational season during the 2010s started in July and ended in late November²⁸. The exact beginning and ending of the season were subject to year-by-year conditions. A small part of studies started to be overwhelmingly optimistic about the future prospects regarding the navigability of the NSR. According to some estimates among the shipping industry stakeholders, “ships might sail the NSR over four seasons by the year 2030”. According to the 2018 National Oceanic and Atmospheric Administration (NOAA) Arctic Report Card, compiled with input from more than 80 scientists in twelve countries, surface air temperatures in the Arctic are warming at twice the rate of the rest of the globe.

²² Stroeve J.C, Serreze, M.C., Holland, M.M., Kay, J.E., Maslanik, J. and Barrett, A.P. (2012) The Arctic’s rapidly shrinking sea ice cover: A research synthesis. *Climate Change* 110(3): 1005–1027 mentioned in Kiiski, T., Solakivi, T., Töyli, J. *et al.* Long-term dynamics of shipping and icebreaker capacity along the Northern Sea Route. *Marit Econ Logist* **20**, 375–399 (2018). <https://doi.org/10.1057/s41278-016-0049-1>

²³ Overland, J. and Wang, M. (2013) When will the summer Arctic be nearly sea ice free? *Geophysical Research Letters* 40(10): 2097–2101.

²⁴ Lei, R., Xie, H. Wang, J. Leppäranta, M. Jónsdóttir, I. and Zhang, Z. (2015) Changes in sea ice conditions along the Northeast Passage from 1979 to 2012. *Cold Regions Science and Technology* 119: 132–144.

²⁵ Richter-Menge J, Overland JE and Mathis JT (2016): Arctic Report Card 2016 mentioned in Dalaklis et al (2018) see footnote 20 above.

²⁶ Climate NASA (2016) Climate trends continue to break records, available online: [2016 Climate Trends Continue to Break Records - NASA](#) accessed on March 26, 2026; mentioned in Dalaklis et al. (2018) see footnote 20 above.

²⁷ NSIDC, National Snow and Ice Data Center (2017) Low sea ice extent continues in both poles. January 5, 2017; mentioned in Dalaklis et al. (2018) see footnote 20 above.

²⁸ NSRIO – Northern Sea Route Information Office (2016) Transit statistics; mentioned in Kiiski et al. (2018) see footnote 22 above.



The 2019 NOAA Arctic Report Card²⁹ revealed the average annual land surface air temperature in the Arctic from October 2018-August 2019 was the second warmest since 1900.

The potential for rising sea levels and dilution of salinity due to fresh water ice melt will impact coastal communities and fisheries worldwide. Arctic sea ice is becoming younger, thinner, and covers less area—an ongoing trend for the last twelve years. Maximum sea ice extent in 2018 was the second-lowest measured for the last 39 years, second only to 2017. Old ice constituted less than one percent of the 2018 ice pack, marking a decline of more than 95% in the last 33 years.² Arctic sea ice extent at the end of the summer in 2019 tied 2007 and 2016 as the second lowest recorded since satellite observations commenced in 1979³⁰. The loss of older, thicker ice results in a more unpredictable ice pack that is vulnerable to summer melt. Young ice is more apt to melt more quickly—or to break free and disrupt shipping lanes.

2.3 ESTIMATES 2021-

The 2020s emerged with an ever-clearer idea about the increasingly good future prospects regarding the navigability of the Northern Sea Route. During the 2020s, calculation of ice load has become a special subject, and evolved a lot³¹. Studies of the 2020s point out that climate change has caused a rapid and dramatic decline in Arctic sea ice. During the latest decades, the extent of sea ice in the Arctic Ocean has been steadily decreasing, with the 12 lowest ice extents recorded since 2007. The diminishing ice cover during the summer months has extended the navigation season along the Arctic Sea Route, making it more accessible to shipping activities. The extent of Arctic Sea ice is decreasing simultaneously that the ice is also thinning. The studies point out that reduction in sea ice is opening up new and previously uncharted routes in the Arctic.

Zhao Pengjun, Li Yunlin, and Zhang Yu³² showed in their study that the Northern Sea Route could be navigable year-round by the year 2100. In the study, researchers looked at low- to medium-emission levels and analysed the navigability of the NSR between 2023 to 2100. According to them, the impacts of climate change on Arctic maritime transport will bring new opportunities to

²⁹ National Oceanic and Atmospheric Administration. (2019, December). Arctic report card. Nevel, D. E., & Weeks, W. F. (1970). The voyage of the S.S. 'Manhattan'. The Military Engineer, 62(406), 80–82. JSTOR, www.jstor.org/stable/44552504; mentioned in Gosnell, Rachael: The Potential of Polar Routes: The Opening of a New Ocean, 195 in Weber, J. (Ed.). (2020). Handbook on Geopolitics and Security in the Arctic: The High North Between Cooperation and Confrontation. Springer International Publishing.

³⁰ National Oceanic and Atmospheric Administration (2019) see footnote 29 above.

³¹ Sharapov D (2023) Evolution of ice load prediction tools for hydrotechnical construction. E3S Web of Conf 402:05023. DOI: <https://doi.org/10.1051/e3sconf/202340205023>.

³² Zhao, P., Li, Y. & Zhang, Y. Ships are projected to navigate whole year-round along the North Sea route by 2100. *Commun Earth Environ* 5, 407 (2024). <https://doi.org/10.1038/s43247-024-01557-7>



China's "Polar Silk Road" framework i.e. to the NSR. Firstly, they found that all ice-going vessels would only be able to navigate the NSR throughout the year except for the spring by 2065. Secondly, they found that the NSR would be navigable year-round by 2100. Zhao and his colleagues considered their scenarios for Polar Class 7 (PC7) vessels, which are described as being the "least capable, limited to vessels operating in summer/autumn in thin first year ice". Zhao et al. project that an ice-free Arctic in September is foreseeable under all scenarios considered, which makes possible the opening of the NSR.

Pastusiak³³ found in his study that the NSR's navigability dates are inside the period from 16 June to 26 March. Under the current climate warming conditions, ships cannot navigate on the NSR from 27 March to 15 June. Hence, the non-navigable period of the NSR lasts 92 days i.e. 3 months. The change in the amount of ship voyages is also an indicator of the future prospects of the navigability of the NSR. In 2025, Chinese operators completed 14 container ship voyages between Asia and Europe via the NSR. The number of voyages has grown year by year, as it was 11 voyages in 2024 and 7 in 2023. China's attitude towards the NSR has also changed. Before, China only tested the Arctic corridor, nowadays it uses it seasonally, which has made the NSR a small but strategic asset for China.³⁴

Chinese operators have replaced western ones in operating on the NSR. Mid-sized Chinese operators, NewNew Shipping Line and Sea Legend, have become de facto pioneers on the NSR, whereas Maersk and MSC have stepped back. These Chinese operators started their 2025 Arctic navigation window on 16 July. NewNew Polar Bear departed then from Shanghai to Arkhangelsk, Russia. Chinese Xin Xin Tian 2 ended the season on 30 October by completing a transit from Shanghai to Kaliningrad.³⁵

Certain estimates about the future prospects for the use and navigability of the NSR look particularly positive. The Head of the Russian State Hydrometeorology University Valery Mikheyev estimates that the NSR could eventually become navigable throughout the year by 2030 due the climate change. Thickness of the arctic summer sea ice is approximately half the extent that it was in the 1970s and half the volume, while the region's strongest sea ice has broken up twice this year, for the first time on record.³⁶

Centre for High North Logistics found, however, that ice conditions along the NSR during the summer–autumn navigation period in 2025 were unfavourable. According to the study, the open-water period lasted no more than two weeks, from the end of September until the beginning of October. The eastern section of the route remained the most challenging, particularly the East Siberian Sea,

³³ Pastusiak, Tadeusz. (2024). Length of Navigation Season in Current Conditions of Climate Change on the Northern Sea Route. *TransNav, the International Journal on Marine Navigation and Safety of Sea Transportation*. 18. 493-502. 10.12716/1001.18.03.02.

³⁴ India Shipping News. (2026) see footnote 8 above.

³⁵ Ibid.

³⁶ Ibid.



where ice persisted for most of the navigation season. An earlier and more intense onset of ice formation was observed in autumn 2025.³⁷

3 NSR AND ECONOMIC VIABILITY

3.1 DISTANCE-BASED SAVINGS

Shipping has been a backbone of global trade's growth during more than a century³⁸. According to UNCTAD,³⁹ “[m]aritime transport is the backbone of global trade, moving over 80% of goods traded worldwide by volume”. What has been characteristics for the seaborne trade is that it has mostly concentrated on few maritime routes, e.g. the Suez Canal, which has accounted for about 8 per cent of the maritime trade flows in the world⁴⁰.

Maritime routes between Asia and Europe have for long been the most important for container transport⁴¹. UNCTAD⁴² statistics indicate that a share of vessel port calls between Asia and Europe was 80 per cent of all vessel port calls in the world in 2025. Northern China's role has become essential in maritime transport as seven Chinese ports belong to the top 10 of the world's container terminals.⁴³

NSR connects the Atlantic Ocean and the Pacific Ocean and Europe and East Asia to each other along the Arctic Ocean on the Siberian coast in Russia. The NSR creates a connection e.g. between European ports and East Asian ports such as Busan, Shanghai, Kaohsiung, and Yokohama. The Asia-Europe route is the world's most significant container shipping corridor: “In 2024, container

³⁷ Centre for High North Logistics. Main Results of NSR Transit Navigation in 2025. Available at: [Main Results of NSR Transit Navigation in 2025 - Centre for High North Logistics](#) accessed on March 27, 2026.

³⁸ Hoffmann, J. and Kumar, S. (2010) Globalization: the Maritime Nexus. In: C.T. Grammenos (ed.) *The Handbook of Maritime Economics and Business*. 2nd edn. London: Informa, Lloyds List Press, pp. 35–64.

³⁹ UNCTAD – United Nations Conference on Trade and Development (2025): Shipping data: UNCTAD releases new seaborne trade statistics. Available at: <https://unctad.org/news/shipping-data-unctad-releases-new-seaborne-trade-statistics> accessed on March 27, 2026.

⁴⁰ Suez Canal Authority (2015) Suez Canal Traffic Statistics; mentioned in Kiiski et al. (2018) see footnote 22 above.

⁴¹ Verny, J. and Grigentin, C. (2009), “Container shipping on the northern sea route”, *International Journal of Production Economics*, Vol. 122 No. 1, pp. 109.

⁴² UNCTAD – United Nations Conference on Trade and Development (2025): 2025 Review of maritime transport. Staying the course in turbulent waters. Available at: https://unctad.org/system/files/official-document/rmt2025_en.pdf accessed on March 27, 2026.

⁴³ Verny and Grigentin (2009) see footnote 41 above.



traffic on the Asia-Europe route reached 24.2 million TEU, accounting for 11.4% of global container trade.”⁴⁴

Irina V. Benedyk and Srinivas Peeta⁴⁵ studied reasons for the growing interest for the use of the NSR for transportation of freight as an alternative to the Suez Canal. According to them, main reasons are as follows:

1. “the NSR provides distance reduction (up to 30 per cent), and thus can decrease transit time and fuel consumption depending on ice conditions;
2. the NSR avoids regions with high piracy risks;
3. the NSR avoids the Suez Canal fee, as well as possible congestion in the canal;
4. the NSR could provide an alternative route between East Asian ports and Europe in the event of political instability in the Middle East; and
5. the Arctic Ocean has high potential for gas resources. Hence, vessels using the NSR can potentially have ready access to the cheaper LNG fuel along their route without additional transportation costs.”

Arctic maritime routes are attracting more interest because of the need to diversify maritime transportation lines, especially from the Suez Canal. The potential of Arctic commercial shipping is increasing due to climate change and decrease in thickness of ice in the Arctic Ocean ^{46 47}.

The most important explaining factor for the diversion of maritime container cargo from the Suez Canal Route (SCR) to the Northern Sea Route (NSR) is shorter transport time. The NSR transport time is, according to estimates, 19.3 days, which decreases the NSR transport time by 35.4 percent compared to the estimated transport time of the SCR i.e. 30.4 days. This is a significant advantage for the NSR against the SCR shipping especially for the high-value cargoes.⁴⁸

⁴⁴ “The World's Largest Trade Volume Shipping Route: The Core Position of the Asia-Europe Line”, Waytron, July 1, 2025. Available at: [The World's Largest Trade Volume Shipping Route: The Core Position of the Asia-Europe Line - Waytron logistics limited](#) accessed on March 30, 2026.

⁴⁵ Benedyk and Peeta (2015) see footnote 18 above.

⁴⁶ Arctic Council (2009) Arctic Marine Shipping Assessment 2009 Report. Tromsø, Norway: Arctic Council; mentioned in Kiiski et al. (2018) see footnote 22 above.

⁴⁷ Dinwoodie, J., Tuck, S. and Rigot-Müller, P. (2013) Maritime oil freight flows to 2050: Delphi perceptions of maritime specialists. Energy Policy 63: 553–561; mentioned in Kiiski et al. (2018) see footnote 22 above.

⁴⁸ Furuichi, Masahiko & Otsuka, Natsuhiko. (2014). Proposing a common platform of shipping cost analysis of the Northern Sea Route and the Suez Canal Route. Maritime Economics & Logistics..



According to many estimates, the consequent savings in fuel⁴⁹ and time⁵⁰ can render the NSR twice as energy efficient⁵¹ and a remarkable economic opportunity for many countries⁵². Reduction in sailing distance and time also means that the connection through the NSR can “bring potential benefits in production, logistics, warehouse and distribution costs for shippers and consignees”.

However, the NSR also has many downsides. They include “sea ice and higher hazard levels higher risk of a reduced service, greater navigational need, higher unit costs per distance travelled, given the need for ice strengthening and ice breaker support, higher ship building costs.⁵³ Moreover, “[c]rew training, protection of the cargo, the maintenance of both hulls and ship equipment are also extra concerns”.⁵⁵

Venta Maersk sailed through the NSR in 2018 on an experimental voyage. According to India Shipping News, the mission worked technically, but not commercially. Since then, large European and US container lines have kept their distance.⁵⁶ After the western operators disappeared from the NSR, mid-sized Chinese operators NewNew Shipping Line and Sea Legend have become pioneers on the arctic shipping lane. They are interested in the shorter distance through the NSR to European ports. The SCR route between Shanghai and Antwerp is about 19,550 km, whereas the alternative offered by the NSR shortens that to close to 14,900 km, which is about 24 percent reduction in distance.⁵⁷

The Centre for High North Logistics recorded 103 transit voyages along the NSR in 2025, compared to 97 in 2024. These vessels carried about 3.2 million tons of cargo.⁵⁸ However, traffic along the NSR is minuscule compared to that on the SCR: “The Asia–Europe corridor via Suez alone handles over 13,000 ships annually. The NSR, by contrast, had only 100 transits of all types in 2025 and container voyages account for a fraction of those. Arctic containers account only for below 0.1 percent of global container flows. Mega-hubs like Shanghai,

⁴⁹ Ibid.

⁵⁰ Schøyen, H., and S. Bråthen. 2011. “The Northern Sea Route versus the Suez Canal: Cases from Bulk Shipping.” *Journal of Transport Geography* 19 (4): 977–983. doi:10.1016/j.jtrangeo.2011.03.003.

⁵¹ Schøyen and Bråthen (2011) see footnote 50 above.

⁵² Bennett, M.M. (2014), “The maritime tiger: exploring South Korea’s interests and role in the arctic”, *Strategic Analysis*, Vol. 38 No. 6, pp. 886-903.

⁵³ Liu, M. and Kronbak, J. (2010), “The potential economic viability of using the Northern sea route (NSR) as an alternative route between Asia and Europe”, *Journal of Transport Geography*, Vol. 18 No.3, pp. 434-444.

⁵⁴ Hong, N. (2012), “The melting Arctic and its impact on China’s maritime transport”, *Research in Transportation Economics*, vol. 35, (2012), pp. 50-57..

⁵⁵ Lee, T. and Kim, H.J. (2015), “Barriers of voyaging on the Northern sea route: a perspective from shipping companies”, *Marine Policy*, Vol. 62, pp. 264-270.

⁵⁶ India Shipping News (2025) see footnote 8 above.

⁵⁷ Vinyl One 2025: China Sets New Record On A Route The West Has Abandoned: 14 Arctic Container Voyages On The Northern Sea Route In 2025.

⁵⁸ Centre for High North Logistics (2025) see footnote 26 above.



Singapore, Rotterdam or Antwerp each handle tens of millions of containers a year; the NSR's 400,000 tons of boxes barely register beside that."⁵⁹

One more advantage of the NSR would be, when combining it with other routes, that it could increase yearly shipping capacity⁶⁰. This is remarkable because the Suez Canal has faced with restrictions concerning its capacity⁶¹ and security due to Houthi attacks in the Red Sea and the US-Israeli war on Iran.

Several studies concerning the commercial feasibility of the NSR have been conducted. Different studies have found that the NSR can be commercially feasible. An empirical analysis⁶² revealed that NSR/SCR-combined shipping of container cargo between East Asia and Northwest Europe can be commercially feasible. Before that, studies concerning the same topic gave mixed results. Verny and Grigentin⁶³ found that the NSR was the cheapest choice after having compared the NSR and the SCR, Trans-Siberian railway, air transportation, and a combination of maritime and air transportation.

An extended length of the NSR operating period explains why NSR shipping, as well as NSR/SCR-combined shipping, have been evaluated as feasible under various scenarios. E.g. Omre⁶⁴ evaluated that NSR/SCR-combined shipping was feasible in all scenarios. Similarly, the competitiveness of the NSR against the SCR depends on the length of the NSR's service period. According to Furuichi and Otsuka found that when it reaches 225 days, NSR/SCR-combined shipping (\$984/TEU) appears nearly competitive against SCR shipping (\$944/TEU) even when an ordinary ultra-large container ship of 15000 TEU is deployed. This also implies that NSR/SCR combined shipping of container transport by the 4000 TEU ice-class container ship can be regarded as economically feasible to a certain extent, even though SCR shipping deploys large (between 6000 and 8000 TEU) and/or ultra-large container ships (15 000 TEU).

Masahiko Furuichia and Natsuhiko Otsuka⁶⁵ found that the increase in the number of annual voyages makes shipping through the NSR financially more attractive, and that the reduced transport time is a significant advantage against SCR shipping especially for high-value cargoes. However, they concluded that the NSR will only be a good alternative when all the north pole ice is gone so that even the largest vessels can trade on it, without paying any fee like they do for the use of the Suez Canal. This is due to the fact that container ships operated via the SCR between East Asia and Northwest Europe have been rapidly shifting to large (6000–8000 TEU) and/or ultra-large (15 000 TEU) ships,

⁵⁹ Ibid.

⁶⁰ Furuichi and Otsuka (2014) see footnote 48 above.

⁶¹ Verny and Grigentin (2009), 109 see footnote 41 above.

⁶² Furuichi and Otsuka (2014) see footnote 48 above.

⁶³ Verny and Grigentin (2009) see footnote 41 above.

⁶⁴ Omre, A. (2012) An economic transport system of the next generation integrating the northern and southern passage, Master Thesis, Norwegian University of Science and Technology, Trondheim, Norway.

⁶⁵ Furuichi and Otsuka (2014) see footnote 48 above.



which significantly affect the competitive advantages of NSR/SCR-combined shipping by the 4000 TEU ice-class ship.

Nevertheless, there are contrary conclusions about the profitability of the NSR too. Liu and Kronbak⁶⁶ concluded negatively about the profitability of freight carriers along the NSR because of “cost and operational uncertainties, such as vessel and cargo damage, uncertain insurance costs, icebreaker and pilot ship cost uncertainty, and weather uncertainty”.

As far as NSR’s feasibility was concerned the literature often focused on events and possibilities, such as an 85 per cent reduction in ice-breaker fees improving feasibility⁶⁷, or that 13 of 26 studies concluded NSR was profitable.⁶⁸ Similarly, the results show that a critical mass of 30 to 50 MT is needed for the NSR shipping and ice-breaking system to function on market-based principles. The finding is in line with the Arctic Council⁶⁹ estimate that the NSR needs around 40 MT of cargo in order to be financially attractive.

3.2 COMPETITIVENESS OF DIFFERENT CARGO AND VOYAGE TYPES

Over the past decade, several studies have focused on the economic viability of the NSR, encompassing a wide array of shipping sectors: containers⁷⁰; LNG⁷¹, car trade⁷², and dry bulk⁷³.

NSR has traditionally been popular for transport of liquid and dry bulk cargo⁷⁴. There has been a firmly established view that “the NSR is more viable for bulk shipping than for containers due to prerequisites for liner shipping such as schedule regularity and the availability of feeder ports”⁷⁵. The preference for bulk transport can also be explained by the abundant supply of natural resources, notably oil and gas, in the Arctic region (Gautier et al, 2009). Consequently, for long, NSR’s increased transit volumes consisted mostly of

⁶⁶ Liu, M. and Kronbak, J. (2010) see footnote 50 above.

⁶⁷ Ibid.

⁶⁸ Lasserre, F. (2014) Case studies of shipping along Arctic routes. Analysis and profitability perspectives for the container sector. *Transportation Research Part A* 66: 144–161.

⁶⁹ Arctic Council (2009) Arctic Marine Shipping Assessment 2009 Report. Tromsø, Norway: Arctic Council, 117.

⁷⁰ Liu and Kronbak (2010) see footnote 50 above.

⁷¹ Raza, Z. and Schøyen, H. (2014) The commercial potential for LNG shipping between Europe and Asia via the Northern Sea Route. *Journal of Maritime Research* 11(2): 67–79.

⁷² Furuichi and Otsuka (2014) see footnote 48 above; mentioned in Kiiski et al. (2018) see footnote 22 above.

⁷³ Cariou, P. and Faury, O. (2015) see footnote 21 above; mentioned in Kiiski et al. (2018) see footnote 22 above.

⁷⁴ Kuptsov, N. (2014) Northern Sea Route: Perspectives for Bulk Carriers and Liquid Tankers. *Applied Mechanics and Materials* 587-589: 1986-1992; mentioned in Benedyk and Peeta see footnote 18 above.

⁷⁵ Schøyen and Bråthen (2011) see footnote 50 above.



bulk cargoes. Lasserre and Pelletier⁷⁶ also showed that cargo carriers of bulk, liquid, and general cargo had a higher interest in the NSR than container carriers.

The volume of cargo transported on the NSR has increased since 2010.⁷⁷ The Northern Sea Route's trade volumes increased by 755% between 2014 and 2022.⁷⁸ The cargo volumes along the NSR have been steadily increasing since 2013, with a recent surge of 9 million tons in 2017, 31.5 million tons in 2019, and 34.85 million tons in 2021. In 2018, the world's largest container ship, the ice-class container vessel *Venta Maersk* (Arc4, 3,600 TEU) of Danish company Maersk, successfully completed the world's first pilot operation on the NSR. The vessel carried a total cargo volume of 1,550 TEUs, including frozen fish from Kamchatka, transshipment containers from Busan New Port, and Korean batteries and home appliances, and unloaded the cargo at ports in Germany and Russia via the NSR. Although it was a one-time pilot operation, it raised expectations for the possibility of container vessels operating via the NSR in the future.⁷⁹

Freight traffic along the NSR decreased by 2.3% i.e. by 870,000 tons in 2025 due to declines in bulk cargo, LNG, and oil. Growth was seen in the transportation of petroleum products, ore concentrate, gas condensate, and containerized cargo by weight. Analysts do not foresee any compelling growth potential for freight traffic along the route in 2026.⁸⁰

Schøyen and Bråthen⁸¹ argued that bulk shipping is the most competitive cargo type in the Arctic because of the operational restrictions. Lasserre⁸² agreed with them by further estimating that the NSR would become a maritime route first and foremost for natural resources.

There is a lot of demand for LNG in Asia. The International Gas Union's (IGU) 2025 World LNG Report⁸³ reads that in 2024, the world's top five LNG importers were all Asian, accounting for nearly 59 percent of all global LNG imports. In 2024, China was the largest importer of LNG with 78.6mt imported LNG (20% of global imports), followed by Japan (67.7 mt), South Korea (47.1 mt), India (26.1 mt) and Taiwan (21.8 mt). In 2025, Russia became the third largest LNG supplier for China after Australia and Qatar, after Russia increased liquefied

⁷⁶ Lasserre, F., and S. Pelletier. 2011. "Polar Super Seaways? Maritime Transport in the Arctic: An Analysis of Shipowners' Intentions." *Journal of Transport Geography* 19 (6): 1465–1473. doi:10.1016/j.jtrangeo.2011.08.006; mentioned in Pruyn (2016) see footnote 12 above.

⁷⁷ Hong, SW, "Operation of the Northern Sea Route and Response Strategy", *Cello Square*, May 10, 2023. Available at: <https://www.cello-square.com/en/blog/view-730.do> accessed on March 28, 2026.

⁷⁸ "How viable is Arctic shipping?", *The Economist*, June 28th 2024. Available at: <https://www.economist.com/the-economist-explains/2024/01/18/how-viable-is-arctic-shipping> accessed on March 28, 2026.

⁷⁹ Hong (2023) see footnote 77 above.

⁸⁰ "Арктика не держит нагрузку", *Коммерсантъ*, February 2, 2026. Available at: <https://www.kommersant.ru/doc/8419017> accessed on March 28, 2026.

⁸¹ Ibid.

⁸² Lasserre (2014) see footnote 68 above.

⁸³ IGU – International Gas Union, "2025 World LNG Report". Available at: [1763396210-1747916410-igu-world-lng-report-2025.pdf](https://www.igu-world-lng-report-2025.pdf) accessed on March 30, 2026.



natural gas (LNG) sales to China by 18.2%, to 9.79 million tons.⁸⁴ Western sanctions have not prevented Russia from exporting LNG from Arctic LNG 2 project to China.⁸⁵

Several studies show that the NSR is the cheapest maritime lane for transportation of Russian and Norwegian LNG and not only to East Asia, but also to “South Asia from Russia; to Southeast Asia from Russia and Norway; and to some East Asian countries, especially Japan, from some European ports located along the Atlantic coast, at least in some scenarios”. In general, the NSR is the cheapest maritime route in most cases between Russia and Norway and Northeast Asia, e.g. China, Japan, and South Korea^{86 87}, as well as under certain conditions to Northeast Asia^{88 89 90 91}. Furthermore, Shibasaki et al.⁹² showed with their study that the NSR is the cheapest maritime route even between destinations of the southern Atlantic coast of Europe e.g. France and Spain, and Japan, and between destinations between Russia or Norway and Southeast or South Asia.

Yamal and Gydan Peninsulas have been the most active LNG production areas in the Russian Arctic. Gazprom Neft and Novatek, have developed the Bovanenkovo, Yamal LNG, and Arctic LNG projects. Initially, the \$27 billion Yamal LNG project was a joint venture, with an ownership structure of 50.1% by Novatek, 20% by Total, 20% by China National Petroleum Company, and 9.9% by the Chinese Silk Road Fund.⁹³ Aker Arctic Technology, Yamal LNG, and Daewoo Shipbuilding and Marine Engineering (DSME) developed a specially designed class of ice-breaking LNG carriers, which deliver production of the Arctic LNG projects to international markets.⁹⁴

⁸⁴ “China increased Russian LNG imports by 18.2% in 2025”, TASS, January 20, 2026. Available at: <https://tass.com/economy/2073441> accessed on March 30, 2026.

⁸⁵ Paraskova, Tsvetana, “Russia’s Arctic LNG Defies Sanctions as China Keeps the Gas Flowing”, OilPrice.com, January 26, 2026. Available at: <https://oilprice.com/Latest-Energy-News/World-News/Russias-Arctic-LNG-Defies-Sanctions-as-China-Keeps-the-Gas-Flowing.html> accessed on March 30, 2026.

⁸⁶ Raza and Schøyen (2014) see footnote 71 above.

⁸⁷ Zhang, Y., Q. Meng, and S. H. Ng. 2016. “Shipping Efficiency Comparison between Northern Sea Route and the Conventional Asia-Europe Shipping Route via Suez Canal.” *Journal of Transport Geography* 57: 241–249. doi:10.1016/j.jtrangeo.2016.09.008; mentioned in Shibasaki, R., Usami, T., Furuichi, M., Teranishi, H., & Kato, H. (2018). How do the new shipping routes affect Asian liquefied natural gas markets and economy? Case of the Northern Sea Route and Panama Canal expansion. *Maritime Policy & Management*, 45(4), 543-566..

⁸⁸ Liu and Kronbak (2010) see footnote 50 above.

⁸⁹ Lasserre (2014) see footnote 68 above.

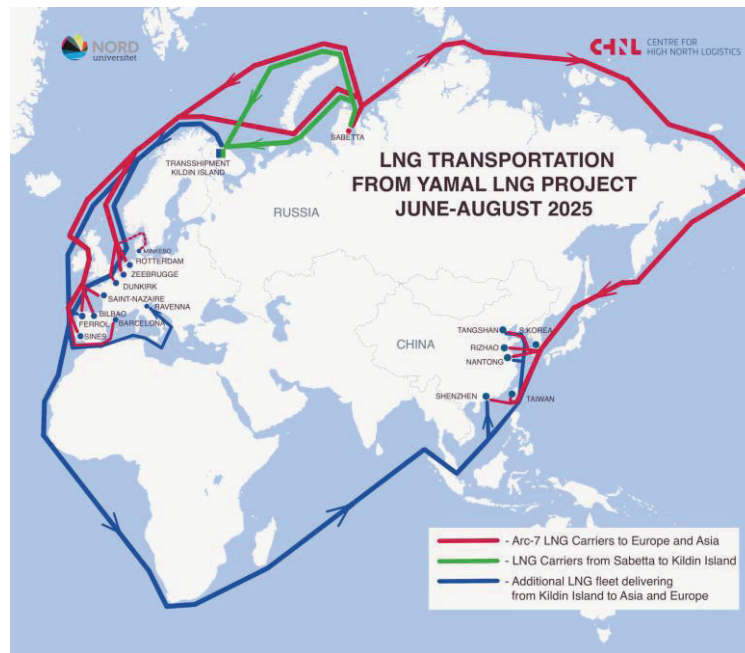
⁹⁰ Furuichi, M. and Otsuka N. (2014) see footnote 48 above.

⁹¹ Cariou and Fauray (2016) see footnote 21 above.

⁹² Shibasaki et al. (2018) see footnote 84 above.

⁹³ Gazprom. “Yamal Megaproject.”; Total. “Yamal LNG: The Gas that came in from the cold.”; mentioned in Gosnell (2020) see footnote 29 above.

⁹⁴ Gosnell (2020) see footnote 29 above, 199-200.



Picture: LNG Transportation from Yamal LNG Project June-August 2025⁹⁵

Transportation choice between bulk and containers on the NSR is simultaneously a choice between destination and transit voyages. As Björn Gunnarsson has written, “there has been strong growth in destination shipping between the Arctic and ports outside the region, but transit shipping between the Pacific and the Atlantic has not experienced the growth many had anticipated”. The difference between transit and destination voyages on the NSR:

- “Transit voyage on the NSR: when a vessel passes through both the western and eastern boundaries of the NSR without calling at ports en route.
- Destination voyage on the NSR: Shipping between a Russian port and a non-Russian port.”⁹⁶

Rachael Gosnell has written that “[w]hile destination shipping will see heightened activity—though numbers will still remain very low in comparison to overall global activity—transit shipping will be much slower to come to the Arctic. For the container shipping of goods, shipping companies rely on economies of scale and on-time delivery within a tight schedule; ever-increasing capacities of ships help to lower costs. Operating in the region can be vastly more expensive

⁹⁵ Centre for High North Logistics. (2025, September 16). *Update on LNG Export from the Yamal LNG Project for June – August 2025*. Available at: <https://chnl.no/news/update-on-lng-export-from-the-yamal-lng-project-for-june-august-2025/> accessed on April 16, 2026.

⁹⁶ Gunnarsson, Björn, and Arild Moe. "Ten Years of International Shipping on the Northern Sea Route: Trends and Challenges." *Arctic Review on Law and Politics* 12 (2021): 4-30. <https://doi.org/10.23865/arctic.v12.2614>



due to decreased transit speeds and the potential for significant weather delays.”⁹⁷

However, according to differing views, there are growing prospects for container shipping along the NSR, too. Chinese container ship Istanbul Bridge’s 20-day transit in 2025 through the NSR between Chinese Port of Ningbo and UK’s Felixstowe marked a significant milestone for the NSR and Arctic shipping as it carried nearly five thousand containers, including cargoes of new energy technologies such as batteries. According to certain estimates, [t]here is potential for the NSR to become part of global container shipping networks, linking Asian manufacturing centres to European markets via the Arctic”. Another reason for the voyage’s significance for the NSR’s container potential was that it was the first liner service to traverse the NSR.⁹⁸

3.3 INTEREST IN GERMANY TOWARDS THE NSR

The Northern Sea Route shortens the distance between Europe and Asia, which draws attention of Germany, too. Germany also backed opening new shipping routes from Europe to Asia. There was a good reason for that as 90% of German exports relies on sea transport, the marine sector being of crucial importance for the trading relations with the rest of the world. Germany ranks first in the world for container carriers, holding around 20% of the market share.⁹⁹

The shipbuilding industry is one of the strategic branches of German economy. Germany’s shipyards create a niche market requiring highly advanced technologies in order to provide icebreakers and vessels to ship liquefied gas in the Arctic conditions. Before the era of sanctions, German shipyards expected orders to increase as they provided drilling platforms, high-tech vessels used for gas and oil exploration as well as for installation and servicing offshore wind farms.¹⁰⁰

Norton¹⁰¹ argued already in 2009 that the Northern Sea Route may create new opportunities for German shipping thanks to shorter travel times, less fuel use and lower costs. In the last decade, German cargo ships used the routes to

⁹⁷ Ibid.

⁹⁸ Weisko (2026) see footnote 6 above.

⁹⁹ Grzela, J. (2015). Germany’s Arctic Policy – Between Economy and Ecology. *Athenaeum. Polskie Studia Politologiczne*, 48, 124. <https://doi.org/10.15804/athena.2015.48.09>

¹⁰⁰ Gerlach M, (2014), German Shipyards’ Orders up, Focus on High-Tech Vessels, Reuters, April 27, 2014. Available at: <https://www.reuters.com/article/business/germany-attracted-record-foreign-investment-in-2014-study-idUSKBN0NI0TR/> accessed on March 28, 2026; mentioned in Grzela (2015) see footnote 99 above.

¹⁰¹ Norton J. (2009), German Ships Successfully Make “Arctic Passage”, *Reuters*, September 12, 2009. Available at: <https://www.reuters.com/article/business/environment/german-ships-successfully-make-arctic-passage-idUSTRE58B01K/> accessed on March 28, 2026.



deliver goods to West Siberia. Navigation companies hoped to use the Northeast Passage to transport goods between Europe and East Asia.

German and Chinese ports have been connected to each other through the NSR in the past. First trial shipments of containerized freight and bulk cargo between China and Hamburg through Russia along the NSR were successful. The amount of transported goods was expected in 2019 to reach the level of 92.6 million tons by 2024. As an illustration of high expectations of future prospects for the NSR cooperation, Port of Hamburg Marketing (HHM) signed a cooperation agreement with Russia's Rosatom in 2018. The aim of the agreement was to strengthen and develop cooperation between the ports along the NSR and the ports in the Hamburg Metropolitan Region. The Port of Hamburg and Rosatom were interested in the development of the NSR's ports, exploitation of raw materials in Russia, as well Arctic LNG production.¹⁰² Carriers from Denmark, Germany, and the Netherlands are primarily involved in the transportation of resources from Russia.¹⁰³

European shipping lines have had an incentive to look for alternative trade routes due to crises in the Red Sea and more recently in the Persian Gulf. It has been a cause of wonder why European shipping companies continue to be reluctant to use the NSR, even though the NSR is "attractive because the route from Shanghai to Hamburg takes half the time [i.e. 24 percent shorter] of traveling through the Suez Canal". The NSR is over 70% shorter compared to the Cape of Good Hope route that operators are having to use at the moment.¹⁰⁴ According to an older study, passages between Rotterdam and other European ports nearby and further north and East Asia would be commercially "marginally interesting" between July and October.¹⁰⁵

Notwithstanding the NSR's benefits, 22 international shipping companies, accounting for 43 percent of the world's sea fleet, informed in 2022 after the start of the war in Ukraine that they are committed to avoid the NSR.¹⁰⁶ The reasons why a 40% reduction in distance between Hamburg and Yokohama does not mean an equal cost saving are related to "increased cost of building ice-classed ships, the unpredictability of open waters, slower speeds, navigation difficulties, the greater risk involved and the availability of ice-breaker services".¹⁰⁷

¹⁰² Northern sea route of interest for Port of Hamburg too, *Port of Hamburg*, April 18, 2019. Available at: <https://www.hafen-hamburg.de/en/press1/news/northern-sea-route-of-interest-for-port-of-hamburg-too-36275/> accessed on March 28, 2026.

¹⁰³ Hong (2023) see footnote 77 above.

¹⁰⁴ Trans.Info. (2024, August 5). *Northern sea route: why European carriers are still avoiding Suez Canal alternative*. Available at: <https://trans.info/en/northern-sea-route-393940> accessed on April 15, 2026.

¹⁰⁵ Drent, J. (1993). Commercial Shipping on the Northern Sea Route. *The Northern Mariner Le Marin Du Nord*, 3(2), 1–17. <https://doi.org/10.25071/2561-5467.770>

¹⁰⁶ Trans.Info (2024) see footnote 100 above.

¹⁰⁷ Nordregio. (2008). *Potentials for Trans-Arctic Shipping*. Journal of Nordregio, No. 3-2008. Available at: <https://archive.nordregio.se/en/Metameny/About-Nordregio/Journal-of-Nordregio/2008/Journal-of-Nordregio-no-3-2008/Potentials-for-Trans-Arctic-Shipping/index.html> accessed on April 15, 2026.



The most recent opportunity for German and other western European ports was the direct shipping line between Chinese and European ports. Chinese niche liner Sea Legend Shipping launched a direct container service between China and northern Europe via the NSR in August-September 2026. The 4,890 TEU *Istanbul Bridge*'s voyage between Chinese and European ports took 18 days. The Sea Legend Shipping planned to start a regular service during warmer months between Chinese ports such as Qingdao, Shanghai, and Ningbo, and European ports such as Hamburg, Rotterdam, Gdansk, and Felixstowe. The Sea Legend Shipping's business model has targeted premium cargo for its new Arctic service with high time sensitivity, such as electronics and fashion, and it aims to capitalise on faster delivery cycles and inventory efficiencies enabled by the shorter maritime route offered by the NSR.¹⁰⁸

However, the Sea Legend Shipping's experience was not encouraging. The company informed in November 2025 that it had ceased its China-Europe Arctic Express (CAX) service after only one single sailing.¹⁰⁹ Danish shipping and logistic company Maersk's experience resembled the one of the Sea Legend Shipping. The company conducted successfully a test voyage sending the first-ever container ship along the route in August 2018. The *Venta Maersk* delivered containerized cargo from Asia to Bremerhaven and Saint Petersburg. However, the company decided after the test that it would remain a one-off and it would not return to the route in the near future.¹¹⁰

MSC Mediterranean Shipping Company also informed in September 2025 that it continues to avoid the NSR because the NSR "remains underdeveloped for commercial shipping since safe navigation and transit are not assured".¹¹¹ Hapag-Lloyd, while acknowledging benefits of the NSR in offering significantly shorter voyage time and distance between Europe and Asia, informed in October 2019 that the company does not use the NSR for environmental reasons.¹¹²

¹⁰⁸ Chambers, S. (2025, September 22). China's Sea Legend launches Arctic express box service to Europe. *Splash247*. Available at: <https://splash247.com/chinas-sea-legend-launches-arctic-express-box-service-to-europe/> accessed on April 15, 2026.

¹⁰⁹ Container News. (2025, November 26). Sea Legend stops Arctic service after one voyage. Available at: <https://container-news.com/sea-legend-stops-arctic-service-after-one-voyage/> accessed on April 15, 2026.

¹¹⁰ M. Humpert, A New Dawn for Arctic Shipping – Winter Transits on the Northern Sea Route, High North News. Available at: www.highnorthnews.com/en/new-dwanarctic-shipping-winter-transits-northern-sea-route accessed on April 16, 2026.

¹¹¹ MSC Mediterranean Shipping Company. (2025, September 29). *Trade Asia to Europe – MSC Reaffirms Commitment to Avoid "Arctic" Northern Sea Route* [Customer Advisory]. Available at: <https://www.msc.com/en/newsroom/customer-advisories/2025/september/trade-asia-to-europe-%E2%80%93-msc-reaffirms-commitment-to-avoid-%E2%80%93-arctic-northern-sea-route> accessed on April 15, 2026.

¹¹² Hand, M. (2019, October 1). *Hapag-Lloyd will not use Arctic sea passages*. Seatrade Maritime. Available at: <https://www.seatrade-maritime.com/containers/hapag-lloyd-will-not-use-arctic-sea-passages> accessed on April 15, 2026.



3.4 INTEREST IN ASIA TOWARDS THE NSR

China has been strongly interested in the Arctic and especially in the NSR as a transit shipping route. Consequently, China has engaged in intensified bilateral cooperation with Russia in the Arctic. Chinese ships have also had trial sailings in the Arctic e.g. icebreaker Xue Long in 2012, and general cargo ship Yong Sheng in 2013 and 2015¹¹³¹¹⁴. The Chinese shipping company Cosco has actively investigated the viability of seasonal container shipping¹¹⁵.

At the beginning of 2010s, studies estimated bravely that as much as 5–15 per cent of Chinese foreign trade could use the NSR by year 2020¹¹⁶ or even more optimistic figure of 5.5 per cent of the World trade by 2030¹¹⁷. The reality has been more disappointing, though. The share of the NSR for all Chinese foreign trade has been minor, less than 1 per cent of its total.

A huge proportion of those shipping companies that use traditional shipping routes are Asian. They would potentially significantly benefit from the NSR's reduced shipping times and consequent savings on routes to Europe.¹¹⁸

China has shown interest in the Arctic since 2005¹¹⁹. China's interest became more official after it obtained an observer status at the Arctic Council in 2013.¹²⁰ China launched a Polar Silk Road (PSR) project in early 2018¹²¹ after having added the NSR to its Belt and Road Initiative (BRI) in June 2017.¹²² As part of the BRI, China aims to integrate the NSR and other Arctic shipping routes into global trade networks.¹²³

¹¹³ Røseth, T. (2014) Russia's China Policy in the Arctic. *Strategic Analysis* 38 (6): 841–859.

¹¹⁴ "China mulls routine navigation through Arctic to Europe", *China Daily Europe*, October 26, 2016. Available at : https://europe.chinadaily.com.cn/china/2015-10/26/content_22289246.htm accessed on March 28, 2026.

¹¹⁵ Paris, C. and Chiu, J. (2015), Chinese Shipping Group Cosco Planning Regular Trans-Arctic Sailings. *The Wall Street Journal*, October 29, 2015. Available at: <https://www.wsj.com/articles/chinese-shipper-cosco-to-schedule-regular-trans-arctic-sailings-1446133485> accessed on March 28, 2026.

¹¹⁶ Doyle, A. (2013) China plans first commercial trip through Arctic shortcut in 2013. *Reuters*, Oslo, March 12, 2013. Available: <https://www.reuters.com/article/shipping-china-idUSL6N0C4F9720130312/> accessed on March 28, 2026.

¹¹⁷ Bekkers, E., Francois, J.F. and Rojas-Romagosa, H. (2015) *Melting Ice Caps and the Economic Impact of Opening the Northern Sea Route*. Hague, The Netherlands: CPB Netherlands Bureau for Economic Policy Analysis. CPB Discussion Paper 307.

¹¹⁸ Tseng (2017) see footnote 37 above.

¹¹⁹ L. Huang, F. Lasserre, O. Alexeeva Is China's interest for the Arctic driven by Arctic shipping potential? *Asian Geographer*, 32 (2015), pp. 59-71.

¹²⁰ K. Hossain, Y. Xu, L. Lifan, "China's BRI expansion and great power ambition: The Silk Road on the ice connecting the Arctic". *Cambridge Journal of Eurasian Studies*, 3 (2019).

¹²¹ Sun (2018) see footnote 7 above.

¹²² Song (2018) see footnote 10 above, 103-115.

¹²³ Weisko (2026) see footnote 6 above.



Meersman et al.¹²⁴ studied the potential of the BRI's railway connection and compared it to the Suez Canal Route (SCR) in shipping. On the one hand, they found that there is potential for the BRI as a transport corridor especially for higher-value goods. On the other hand, the NSR's capacity is very limited, and there are risks concerning delays. However, the scholars argue that there might be light at the end of the tunnel, since the addition of the NSR to the BRI could at least partly solve the capacity problems.

Chinese COSCO Shipping Corporation started experimental voyages through the Arctic already in 2013. The early expeditions signalled China's long-term interest in the maritime route that it later started to call as the Polar Silk Road.¹²⁵ Chinese firms have been interested in the energy sector in the Russian Arctic. They became major investors in LNG projects in Russian Arctic in 2014. The cooperation deepened in 2022. Shipping activity on the NSR surged in 2024-2025, which can be explained by the surge in trade in hydrocarbons and manufactured goods between China and Russia.¹²⁶

3.5 ADDITIONAL COSTS

3.5.1 ICEBREAKING COSTS

Extreme weather conditions linked to building ice-reinforced vessels are the reason for increased costs on the NSR. That has discouraged investors' views about the NSR's viability.¹²⁷

Icebreaking costs on the maritime routes of the Arctic are additional costs that are unique compared to other shipping lanes. Russia imposes extra costs for the icebreaker escorts, which are often needed for commercial vessels that sail in the NSR's ice-covered passages. The icebreaking fees depend on the transiting vessel's tonnage as well as the required distance of the icebreaker escort. The NSR's transit fees typically rival those of the SCR.^{128 129}

Liu and Kronbak¹³⁰ argued that the NSR is not economically viable due to the icebreaking costs even though "logistics revenue through NSR is higher than the Suez Canal route due to relatively short sailing distance". However, the scholars saw that the NSR's net profit could surpass that of the SCR, when the icebreaking cost decrease to a certain level.

¹²⁴ Meersman H., Sutalo N., Van de Voorde E., van Hassel E., Vanelslander T. (2020). "Belt and road : more competition between sea and rail? A generalized cost approach." *Freight transport modeling in emerging countries*. Elsevier, 2020, p. 185-209.

¹²⁵ Weisko (2026) see footnote 6 above.

¹²⁶ Ibid.

¹²⁷ Dalaklis et al. (2018) see footnote 20 above.

¹²⁸ Furuichi and Otsuka (2014) see footnote 48 above, 7.

¹²⁹ Zhang et al. (2016) see footnote 75 above.

¹³⁰ Liu and Kronbak (2010) see footnote 50 above.



At least in the past, the NSR's pricing policy for icebreaker and pilotage has been unclear, which has made it difficult to estimate the economic efficiency of NSR's use¹³¹. Moreover, a new ice-class ship's cost is 10–30 per cent higher than the cost of an ordinary ship of the same size.^{132 133}

Vessels sailing on the NSR have an obligation to have aboard an ice pilot with “the minimum level of knowledge of navigation in the ice-covered waters and have experience in piloting ships under ice conditions along the NSR for not less than 15 days”, which brings additional costs to the operators.¹³⁴

High North News writes concerning Arctic escorting costs as follows:

“Fees for large oil tankers and LNG carriers can reach between \$300,000 – \$700,000 for a single escort, depending on the size of the vessel, the distance travelled and the time of year. In 2024 Atomflot provided escorts to 976 vessels. A standard delivery of supercooled gas from the existing Yamal LNG plant racks up icebreaker fees of around \$400,000. Out of a total of 287 shipments in 2024, at least 120 required icebreaker escorts between the months of December and May, likely generating in excess of \$50m for Atomflot.”¹³⁵

3.5.2 BUREAUCRACY

One of the well-known disadvantages of the NSR is bureaucracy, which “makes it difficult to estimate the economic efficiency of using the NSR”¹³⁶. The operation procedure of the NSR is complicated and time is needed beforehand to prepare it. An operator needs a permission from the Russian government to operate on the NSR. Once it is obtained, “the Russian government's operation regulations and infrastructure development policies on the NSR as well as geopolitical variables should be fully reviewed in advance”.¹³⁷

Consequently, the operators' operability depends on Russian authorities as well as on Russian legislation, which “applies to the whole maritime domain independently of the Exclusive Economic Zone (EEZ), territorial or Internal waters status”. Vessels have to “submit for authorization from the national

¹³¹ Ho, J. (2010) The Implications of Arctic Sea Ice Decline on Shipping. *Marine Policy* 34(3): 713 715.

¹³² Liu and Kronbak (2010) see footnote 50 above.

¹³³ Omre (2012) see footnote 64 above.

¹³⁴ Furuichi and Otsuka (2014) see footnote 48 above, 14.

¹³⁵ Humpert, Malte, “Russia to Earn \$160bn in Taxes From Northern Sea Route by 2035, Arctic Region Accounts for 7.5 Percent of GDP”, High North News, May 19, 2025. Available at: <https://en.highnorthnews.com/business/russia-to-earn-160bn-in-taxes-from-northern-sea-route-by-2035-arctic-region-accounts-for-75-percent-of-gdp/153741> accessed on March 28, 2026.

¹³⁶ Ho (2010) see footnote 13 above.

¹³⁷ Hong (2023) see footnote 77 above.



authorities at least fifteen working days prior to the date on which they intend to enter the NSR”.¹³⁸ Other requirements include:

“[T]he requirement to use the assistance of Russian icebreakers for additional fees. According to Moscow, these practices are aimed at preventing accidents and ensuring safe passage. Russia justifies these regulations on the “ice” Article 234 of the United Nations Convention on the Law of the Sea (UNCLOS), according to which coastal states have the right to enforce laws targeting the prevention, reduction and control of marine pollution from vessels in ice-covered areas within the EEZ.”¹³⁹

3.5.3 TOLLS

The operators have to pay a toll in order to be allowed to enter the NSR. The fee depends on the ice class of the vessel, ice condition, sea area and navigation season. Liu and Kronbak¹⁴⁰ have drawn scenarios concerning the NSR fee. According to them, “[s]cenario in which NSR fee is assumed to be \$5.0/GT, is compared with the scenario in which NSR fee is assumed to be \$979/TEU”. They concluded their analysis by stating that “the recent NSR fee transactions of \$5.0/GT for bulk cargo shipping can be understood as practically competitive against the Suez Canal fee”¹⁴¹.

3.5.4 INSURANCE COSTS

Another cost is the skilled crew required¹⁴²¹⁴³. A crew of 19 would cost US\$100,000 per month¹⁴⁴. Some suggest introducing an Arctic Certificate¹⁴⁵ as

¹³⁸ Schönfeldt, Kristina (2017): *The Arctic in International Law*, Oxford Hart Publishing; mentioned in Runhaar, A. (2025), “Arctic Shipping. The Royal Dutch Navy’s Strategic Dilemma on the Northern Sea Route”, *Marineblad*, May 6, 2025. Available at: https://www.marineblad.nl/artikel/royal-dutch-navy-arctic-shipping-routes-nsr#_edn13 accessed on March 28, 2026.

¹³⁹ United Nations, *United Nations Convention on the Law of the Sea*, 10 December 1982, Article 234. Available at: https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf accessed on March 28, 2026.

¹⁴⁰ Liu and Kronbak (2010) see footnote 50 above.

¹⁴¹ Falck, H. (2012) *Shipping in Arctic waters— The Northern Sea Route: Mariehamn, Finland*; mentioned in Furuichi and Otsuka (2014) see footnote 48 above.

¹⁴² Verny and Grigentin (2009), 109 see footnote 41 above.

¹⁴³ Ho (2010) see footnote 13 above.

¹⁴⁴ Verny and Grigentin (2009), 109 see footnote 41 above.

¹⁴⁵ Laulajainen, R. (2009), “The Arctic sea route”, *International Journal of Shipping and Transport Logistics*, Vol. 1 No. 1, pp. 55-73; mentioned in Tseng (2017) see footnote 37 above.



much technical support, know-how, navigation equipment, escort and experience is needed to take ships through NSR¹⁴⁶.

Nevertheless, these additional costs must be considered alongside the savings of NSR. Crews may be more expensive, but sailing time is much reduced, so the crew would not be needed for as long¹⁴⁷. Insurance may be higher, but the reduced risk of piracy¹⁴⁸ or kidnapping¹⁴⁹ is a positive and hull insurance is the same for ice-class and standard class ships¹⁵⁰. On balance, some argue NSR could “cut the cost of a single voyage by a large container ship billions of dollars a year”¹⁵¹.

Ocean-going ships need to purchase Hull and Machinery (H&M) and Protection and Indemnity (P&I) insurances. There are additional requirements for the NSR shipping’s insurance compared to other maritime routes due to “the uncertainties and risks involved in sailing in the ice waters”. However, the NSR’s advantage is that there is no piracy in the Arctic waters, compared to the SCR¹⁵².

The ships sailing on the NSR also need a mandatory extra insurance coverage because of a 15 times higher severe incident rate¹⁵³. The main reason for damage caused along the NSR are ice striking the ship, which usually causes cheap steel damage. If ice conditions get lighter, the extra costs drop for Hull & Machinery (H&M) further. A risk of a major accident or spill and a consequent expensive clean-up operation explains a pressure to increase the P&I insurance fee.¹⁵⁴

Pruyn¹⁵⁵ estimates that insurance costs are around 10 USD/GT per year, from which the share of H&M is about 75%–80%. The final outcome is that the NSR’s insurance costs are 9.5 USD/GT more compared to the SCR¹⁵⁶. Insurance costs of the NSR are higher than on the SCR due to “the reduced proximity to maritime infrastructure and rapidly changing weather conditions”, which increase the risks compared to operating in warmer waters. This may result to up to 40% of prices of some insurance companies’ basic premium.¹⁵⁷

¹⁴⁶ Verny and Grigentin (2009), 109 see footnote 41 above.

¹⁴⁷ Hong (2012) see footnote 54 above.

¹⁴⁸ Furuichi and Otsuka (2014) see footnote 48 above.

¹⁴⁹ Schøyen and Bråthen (2011) see footnote 50 above.

¹⁵⁰ Laulajainen (2009) see footnote 145 above.

¹⁵¹ Hong (2012) see footnote 54 above, 50.

¹⁵² MOL (2012) List of export charges for European line service; mentioned in Furuichi and Otsuka (2014) see footnote 48 above 17.

¹⁵³ Loughnane, D., B. Judson, and J. Reid. (2006). “Arctic Tanker Risk Analysis Project.” *Maritime Policy & Management* 22 (1): 3–12. doi:10.1080/03088839500000028.

¹⁵⁴ Pruyn (2016) see footnote 76 above.

¹⁵⁵ Pruyn, J. F. J. 2013. “Shipping and Shipbuilding Scenario Evaluations through Integration of Maritime and Macroeconomic Models.” PhD, TUDelft.

¹⁵⁶ Furuichi and Otsuka (2014) see footnote 48 above.

¹⁵⁷ International Union Marine Insurance (2020): *Things to ponder for insurers as Arctic routes open up*; mentioned in Runhaar (2025) see footnote 120 above.



The challenges of operating in the region—and a dearth of emergency response capabilities—have resulted in higher risk evaluations by insurance companies. Shipowners pay greatly increased insurance costs that reflect the significant risks associated with operating in the High North.

4 NSR AND LOGISTICS

4.1 INTRODUCTION

Challenging weather and geographical conditions set their own requirements for the ships and infrastructure along the Northern Sea Route. Dalaklis et al.¹⁵⁸ have listed current technical challenges of the NSR as follows:

- shallow waters limit ship size;
- lack of modern deep-water ports and very restricted SAR capabilities that require crossing ships to have very high standards of autonomy and safety;
- harsh weather conditions and free-floating ice make navigation more difficult and schedules more variable;
- more expensive ship construction and operation costs lessen the economic viability of this route.

The NSR needs improved shipping infrastructure and better safety, environmental protection and emergency responsiveness along the route before it can increase in popularity. There is an increased demand for ice-class ships and icebreakers before a full benefit can be taken from the NSR's extending shipping season and improved accessibility. There has been a lack of ships that meet the requirements of Arctic shipping¹⁵⁹.

Problems of the NSR are related to “sea ice and higher hazard levels¹⁶⁰¹⁶¹, higher risk of a reduced service¹⁶², greater navigational needs¹⁶³, higher unit costs per distance travelled, given the need for ice strengthening and ice breaker support^{164 165}.”

¹⁵⁸ Dalaklis et al. (2018) see footnote 20 above.

¹⁵⁹ Lasserre and Pelletier (2011) see footnote 73 above.

¹⁶⁰ Laulajainen (2009) see footnote 145 above.

¹⁶¹ Liu and Kronbak (2010) see footnote 50 above.

¹⁶² Hong (2012) see footnote 54 above.

¹⁶³ Liu and Kronbak (2010) see footnote 50 above.

¹⁶⁴ Ibid.

¹⁶⁵ Hong (2012) see footnote 54 above.



4.2 ICEBREAKER CAPACITY

There is a constant need to invest in construction of icebreakers because icebreakers are indispensable for shipping along the NSR. Icebreakers serve several purposes such as search and rescue, resupplying remote Arctic communities and ensuring shipping traffic channels remain ice-free, research, and drilling. Although the ice coverage in the Arctic decreases, the growing amount of shipping traffic and the challenging conditions require states to increase their icebreaking fleet.¹⁶⁶

Security has caused concern from the point of view of the NSR's smooth operation. There has not been sufficient ice-breaking capacity and search and rescue (SAR) coverage along the NSR¹⁶⁷. Moreover, the global icebreaker fleet is ageing quickly. There were 86 icebreakers and offshore supply vessels in the world in 2015, and the average age of icebreakers was around 35 years¹⁶⁸.

In 2026, Russia has more icebreakers than any other country, 57. This is less than it needs to ensure passage in the Eastern parts of the NSR and keep the NSR operation year-round. Russia has an ongoing icebreaker construction program. However, it has been hindered by longstanding problems in Russian shipyards. In addition to renewing the fleet, the question is also about determining the optimal number and type of icebreakers. These, from its part, depend on cargo volumes, as well as on season, routes and vessel sizes¹⁶⁹.

Nuclear-powered icebreakers can be used in escort convoys (Østreng et al, 2013), they can break channels through thick sea ice, and provide real-time ice and weather data. They are also being increasingly used as first-line Search & Rescue (SAR) platforms due to the NSR's extended shipping season and improved accessibility.

The Arctic Council's 2011 SAR Agreement determines that Russia is responsible for the SAR missions on the NSR. Russia has invested 910 million rubles (\$30.1 million) for establishment of ten SAR centers along the NSR¹⁷⁰. The NSR SAR centres spread between the westernmost center of Murmansk

¹⁶⁶ Dalaklis et al. (2018) see footnote 20 above, 138.

¹⁶⁷ Li, G. 2013. "Arctic North Sea Route Study." *IHS Maritime*; mentioned in Pruyn (2016) see footnote 12 above.

¹⁶⁸ CRSL – Clarkson Research Services Limited (2015) Clarksons World Fleet Register; mentioned in Kiiski (2018) see footnote 22.

¹⁶⁹ Ragner, C.L. (2000) Northern Sea Route cargo flows and infrastructure – present state and future potential. Lysaker, Norway: Fridtjof Nansen Institute. FNI report 13; mentioned in Kiiski (2011) see footnote 22.

¹⁷⁰ Farré AB, Stephenson SR, Chen L, Czub M, Dai Y, Demchev D, Efimov Y, Graczyk P, Grythe H, Keil K, Kivekäs N, Kumar N, Liu N, Matelenok I, Myksvoll M, O'Leary D, Olsen J, Sachin Pavithran AP, Petersen E, Raspotnik A, Ryzhov I, Solski J, Suo L, Troein C, Valeeva V, van Rijckevorsel J, Wighting J (2014) Commercial Arctic shipping through the Northeast Passage: routes, resources, governance, technology, and infrastructure. *Polar Geogr* 37:4, 298–4, 324. <https://doi.org/10.1080/1088937X.2014.965769>; mentioned in Kiiski (2018) see footnote 22.



and the easternmost one of Provideniya. Centers that are situated between these outermost facilities are in Arkhangelsk, Dudinka, Pevek, Vorkuta, Nadym, Anadyr, and Tiksi. Two marine rescue operations headquarters, dividing responsibilities between eastern and western sectors, coordinate oversight of SAR and oil spill response along the NSR. Two marine rescue coordination centres (MRCCs) and four marine rescue sub-centres (MRSCs) support their work. The two MRCCs are located in Murmansk and Dikson, while the MRSCs are located in Arkhangelsk, Tiksi, Pevek, and Provideniya.¹⁷¹

The NSR Information Office also informs that five icebreakers, NS Yaygach, NS Yamal, NS 50 Let Pobedy, NS Taimyr, and Admiral Makarov, from which two also have dive equipment and oil spill response equipment, are available and capable of providing icebreaker support for vessels along the NSR.¹⁷² There still remains a challenge of very long distances and response time between the NSR's SAR centers and sub-centers, which is problematic from the point of view of being able to prevent fatalities in case of an emergency (Hansen et al., 2016).

However, Russia commissioned earlier three nuclear-powered icebreakers (Arktika, Sibir, and Ural) of the Project 22220 (LK-60Ya class). Moreover, Russia has purchased Arc7 ice-classed LNG carriers, which are available for rescue operations, too, although their main task is transportation. They are capable of breaking through 2.1 m of ice.¹⁷³



Project 22220 icebreaker *Stalingrad*¹⁷⁴

¹⁷¹ Bennett, Mia. "Russia opens first of ten new search and rescue centers in the Arctic", Foreign Policy Association. Available at: <https://fpa.org/russia-opens-first-of-ten-new-search-and-rescue-centers-in-the-arctic/> accessed on March 29, 2026.

¹⁷² Ibid.

¹⁷³ Dalaklis et al. (2018) see footnote 20 above.

¹⁷⁴ Палуба, "На Балтийском заводе ОСК заложили атомный ледокол «Сталинград» проекта 22220", November 18, 2025. Available at: <https://paluba.media/news/204752> accessed on: April 16, 2026.



The NSR has a remarkable advantage that Russia is the only country to have nuclear-powered icebreaking vessels¹⁷⁵, which makes refueling unnecessary and increases its range of operation, which is indispensable of the conditions of the Arctic Ocean with huge distances.

Currently, Russia's Rosatomflot has eight nuclear-powered icebreakers in operation. By 2030 the fleet is set to encompass ten vessels. Russia's operational nuclear icebreakers as of early 2026 are Arktika, Sibir, Ural, Yakutiya, 50 Let Pobedy, Yamal, Taymyr, and Vaygach.¹⁷⁶

To underline Russia's positive progress in securing sufficient icebreaker capacity on the NSR, Russian authorities announced at the beginning of 2026 plans to construct 10 more icebreakers along with 46 rescue vessels. To support the operations, Russia plans to establish three rescue fleet bases along the NSR. According to Russia's Deputy Prime Minister Yuri Trutnev, this should ensure a year-round navigation through the Arctic.¹⁷⁷

Dalaklis et al.¹⁷⁸ conclude that Russia has significantly invested in building icebreakers and it is a leader in the Arctic field and has means available to support shipping operations in the NSR. Russia has a strong advantage both due to the number and autonomy of its icebreaking fleet, whereas the USA icebreaking fleet is comprised of only two operational vessels.¹⁰ Furthermore, importantly, Russia has already made more investments in order to guarantee needed capabilities.

Furthermore, it was already pointed out there is still a large gap in properly trained crews for Arctic conditions and that the lack of a reliable marine traffic system to improve monitoring and tracking of marine activity, as well as augment vessel management services to reduce the risk of incidents, facilitate response, and provide awareness of potential user conflict, is standing out. There are also other gaps in the necessary support of shipping operations in the Arctic: The infrastructure deficit includes a lack of navigational charts (although an effort of update/improvement has already started). Furthermore, some aspects of available regulation need to be more detailed; for example, establishment and communication to those interested parties of places of refuge in the NSR is still pending. The creation of robust centers along this route

¹⁷⁵ Domonoske C. (2016) "Russia launches world's biggest, most powerful icebreaker", *NPR*, June 16, 2016. <https://www.npr.org/sections/thetwo-way/2016/06/16/482288188/russia-launches-worlds-biggest-most-powerful-icebreaker> accessed on March 29, 2026.

¹⁷⁶ Dalaklis et al. (2018) see footnote 20 above.

¹⁷⁷ "Russia to Build 10 More Icebreakers and 46 Salvage Vessels to Develop NSR", *The Maritime Executive*, February 13, 2026. Available at: <https://maritime-executive.com/article/russia-to-build-10-more-icebreakers-and-46-salvage-vessels-to-develop-nsr> accessed on March 29, 2026.

¹⁷⁸ Dalaklis et al. (2018) see footnote 20 above.



with port services capable of providing reception facilities for ship-generated waste should also be considered.¹⁷⁹

However, in order to navigate safely in the Arctic Ocean, there is a need for more (appropriate) infrastructure support and trained personnel who are clearly capable of safely operating their vessel in these truly harsh and very icy conditions. This can be achieved only via tailor-made training courses and accumulating practical experience in these unfriendly waters. Russia is expanding that fleet and upgrading Arctic ports such as Murmansk and Arkhangelsk. This infrastructure push aligns neatly with Chinese ambitions, including projects tied to the so-called “Polar Silk Road”, Beijing’s Arctic extension of the Belt and Road Initiative.¹⁸⁰

4.3 REQUIREMENTS FOR SHIPS’ DESIGN AND EQUIPMENT

Navigation in the difficult operational conditions in the Arctic waters sets its requirements concerning ships’ design and equipment. The ships need to be ice-class. The ice-class requirements refer to “ships with reinforced hulls and powerful engines to ensure adequate safety and operational performance”. Furthermore, “IA ice-class according to the FSICR is considered an effective compromise between the economic and safety criteria for transiting the NSR”¹⁸¹. Current NSR navigation rules also allow those vessels that have an ice-class lower than IA in ice-free conditions to enter the NSR.¹⁸²

International Maritime Organization's International Code for Ships Operating in Polar Waters (Polar Code) affects these criteria. The Polar Code is mandatory under both the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution from Ships (MARPOL). The Polar Code requires vessels to follow a stringent criteria of design, equipment and rescue. The Polar Code entered into force on 1 January 2017.¹⁸³

The Polar Code requires ships aiming to operate in the Arctic waters to apply for a Polar Ship Certificate. The Polar Ship Certificate classifies vessels to

¹⁷⁹ Dalaklis et al. (2018) see footnote 20 above.

¹⁸⁰ Ibid.

¹⁸¹ Erikstad, S.O. and Ehlers, S. (2012) Decision support framework for exploiting Northern Sea Route transport opportunities. *Ship Technology Research* 59(2): 34–42.

¹⁸² Kiiski et al. (2018) see footnote 22 above.

¹⁸³ IMO – International Maritime Organization. “International Code for Ships Operating in Polar Waters (Polar Code)”. Available at: <https://www.imo.org/en/ourwork/safety/pages/polar-code.aspx> accessed on March 29, 2026.



Category A, B, or C, according to their capability to sail in polar waters. The categories' descriptions are as follows:¹⁸⁴

- Category A ship - ships designed for operation in polar waters at least in medium first-year ice, which may include old ice inclusions;
- Category B ship - a ship not included in category A, designed for operation in polar waters in at least thin first-year ice, which may include old ice inclusions;
- Category C ship - a ship designed to operate in open water or in ice conditions less severe than those included in Categories A and B.”

The development of the Polar Code was in response to the increased interest in maritime shipping routes in the Arctic.¹⁸⁵ Russia's Rosatom has been tasked under the Federal Law in 2018 to adhere to the Polar Code and to ensure safe navigation, through permission for navigation, icebreaker assistance, pilot assistance and radio communication between ships and the NSRA.¹⁸⁶

The size of ice-class fleet has been considered to be a critical factor for growth of the NSR. For long, the ice-class fleet did not seem able to catch up with the available cargo volumes.¹⁸⁷ However, findings of Lasserre and Pelletier¹⁸⁸ show that there is an overcapacity in the ice-class fleet no need for remarkable growth of fleet.

Kiiski et al.¹⁸⁹ found that a sufficient number of icebreakers and ice-class ships is pivotal for any future development of the NSR. Building of ice-classed ships that are capable of operating independently in the Arctic is an alternative for icebreakers. However, such ships are often too expensive to offer a commercially profitable alternative.

Ships that sail on the NSR have to be ice-class, even when they are escorted by an ice-breaker¹⁹⁰. Furuichi and Otsuka¹⁹¹ note that ice-classed ships' building costs are 10-30 per cent higher than normal ships¹⁹² ¹⁹³. Building of ice-class ships requires high-level engineering skills concerning hull thickening,

¹⁸⁴ Ibid.

¹⁸⁵ Gosnell (2020) see footnote 29 above.

¹⁸⁶ Okochi, M. (2020), “The Northern Sea Route International Law and Russian Regulations”, *European Institute of Asian Studies*, Briefing Paper, No. 4/2020. Available at: <https://www.eias.org/wp-content/uploads/2019/07/PolicyBrief-Northern-Sea-Route.pdf> accessed on March 29, 2026.

¹⁸⁷ Ibid.

¹⁸⁸ Lasserre and Pelletier (2011) see footnote 73 above.

¹⁸⁹ Kiiski et al. (2018) see footnote 22 above.

¹⁹⁰ Lindstad, Elizabeth & Bright, Ryan & Strømman, Anders. (2016). Economic savings linked to future Arctic shipping trade are at odds with climate change mitigation. *Transport Policy*. 45. 24-30. 10.1016/j.tranpol.2015.09.002.

¹⁹¹ Furuichi and Otsuka (2014) see footnote 48 above.

¹⁹² Verry and Grigentin (2009) see footnote 41 above.

¹⁹³ Liu and Kronbak (2010) see footnote 50 above.



greater structural support, rudder and propeller protection and heating for fuel tanks¹⁹⁴.

The NSR has its own geographical restrictions that affect vessels' size. In many parts of the Arctic ships' draft is a significant limiting factor for commercial traffic because "the largest and most economical vessels simply cannot transit the region regardless of time or weather factors". Requirements put on the navigable drafts on the NSR limit the size of vessel that can transit. (Eger 2010). Cargo ships that operate on the NSR have a draft limitation of around 3,000 TEU. This results in a higher cost per TEU than a Suez Canal transit, where ships usually carry more than 18,000 TEUs.

The draft of vessels that are sailing on the NSR cannot exceed 13 metres because of the shallow depth of the Sannikov straight in the east¹⁹⁵¹⁹⁶ and Yugorskiy Shar in the west. A second strait on in the west is the Kara gate, which has a much larger draft. Therefore, ships use it more frequently. The alternative straight in the east between the New Siberian Islands is even shallower, only 8–9 m.

The width of the icebreaker is another limit of the vessel's dimensions. This is remarkable because an icebreaker creates the channel that is equal to its width for a vessel that follows it. Therefore, naturally, the vessel's width cannot exceed that of the icebreaker. The maximum width of ships has increased from 30 m to 32 m after the delivery of new nuclear icebreakers in 2018¹⁹⁷. The width limit is especially important for those vessels that have lower ice class and that cannot sail on the NSR independently.¹⁹⁸

The Northern Sea Route Administration¹⁹⁹ divides different ice classes into different categories according to their ability to sail independently or with help of an icebreaker on the NSR. On the one hand, the NSRA allows a vessel with regular ice-class (ICE 1- ICE 3 see also (AICS 2006)) to only transit the NSR independently in summer in light ice conditions. On the other hand, "a vessel with an arctic ice-class ARC 4 is able to travel independently year-round in light ice and even in medium ice conditions in the summer along a part of the NSR". Finally, vessels with ice class from ARC 7 upwards are allowed to sail independently in all conditions in the summer and winter (with a few zonal

¹⁹⁴ Ibid.

¹⁹⁵ Verny and Grigentin (2009) see footnote 41 above.

¹⁹⁶ Liu and Kronbak (2010) see footnote 50 above.

¹⁹⁷ Erikstad and Ehlers (2012) see footnote 181 above.

¹⁹⁸ J.F.J. Pruyn, E. van Hassel, The impact of adding the Northern sea route to the Belt and Road Initiative for Europe: A chain cost approach, Transportation Research Interdisciplinary Perspectives, Volume 15, 2022, 100659, ISSN 2590-1982, <https://doi.org/10.1016/j.trip.2022.100659>.

¹⁹⁹ NSRA. 2020. Transit Fees Available at:

http://www.nsra.ru/en/ledokolnaya_i_ledovaya_lotsmanskaya_provodka/raschet_stoimosti_le_dokolnoy_provodki_v_akvatorii_smp.html accessed on March 29, 2026.



restrictions in the winter). In the heaviest weather conditions, only an ARC 7 is allowed to transit, but with an icebreaker (for four out of seven zones).

A remarkable issue in the recent transit of Chinese container ship Istanbul Bridge from China to the UK was that it did not have a proper ice-class rating i.e. it was not designed to operate safely in Arctic waters. The Istanbul Bridge lacked strengthened hulls and reinforced bows, which would have been capable of withstanding collisions with sea ice, thus making it vulnerable to ice damage and exposing it to significant risks.²⁰⁰

Conventional vessels without ice class are often used on the NSR during the optimal season from August to October. However, they need the support of icebreakers to navigate safely because of ice in East Siberia and the Laptev Sea. Vessels that transit along the NSR must sail under the control of Glavsevmorput, Russia's management organization of the NSR, and under the direction of a pilot in ice-covered waters.²⁰¹

Another drawback is the fact that the suitable ship size is much smaller than allowed for the Suez Canal Route (SCR). It would, therefore, be crucial to investigate the potential gains before these investments are made.²⁰²

4.4 GENERAL INFRASTRUCTURE

Many sources have complained about poor quality of infrastructure along the NSR in Russia,²⁰³ which limits the ship service and repair possibilities²⁰⁴.

The criticism for the level of infrastructure along the NSR is related to:²⁰⁵

- Sparsity of deep-water ports, which results in few options for resupplying or refueling vessels
- A lack of complete and accurate hydrographic data, with a further lack of navigational aides such as channel markers
- General under-development of infrastructure with few ports or readily deployable emergency response assets
- Underdeveloped search and rescue (SAR) coverage

²⁰⁰ Weisko (2026) see footnote 6 above.

²⁰¹ Hong (2023) see footnote 77 above.

²⁰² Pruyn (2022) see footnote 198.

²⁰³ Meng, Q., Y. Zhang, and M. Xu. 2017. "Viability of Transarctic Shipping Routes: A Literature Review from the Navigational and Commercial Perspectives." *Maritime Policy & Management* 44 (1): 16–41. doi:10.1080/03088839.2016.1231428 ; mentioned in Solvang, H. B., Karamperidis, S., Valantis-Kanellos, N., & Song, D. W. (2018). An exploratory study on the Northern Sea Route as an alternative shipping passage. *Maritime Policy & Management*, 45(4), 495–513. <https://doi.org/10.1080/03088839.2018.1446104>

²⁰⁴ Ho (2010) see footnote 13 above.

²⁰⁵ Gosnell (2020) see footnote 29 above, 198.



Several studies have acknowledged the need to improve the quality of infrastructure and port facilities along the NSR²⁰⁶. According to the NSR's stakeholder feedback, "NSR lacks sufficient infrastructure [...] and lacks supply capabilities owing to the limited infrastructure around the port cities". Other comments worried that "it needs time and cost to construct adequate port facilities and infrastructure". This made some scholars to conclude that "the likelihood of NSR becoming feasible looks further into the future than some of the literature would suggest".

Critics have highlighted that despite Russia and China's vocal intentions to make the NSR into a successful shipping lane, large investments have not been made yet in the required infrastructure. It has been reported that the NSR suffers from the lack of land and sea-based infrastructure such as refuge ports, communication, and sea lanes, which in combination with a large amount of ice in the sea is a big problem for the NSR.²⁰⁷

China and Russia have founded a joint committee on the NSR development in order to improve the quality of the maritime route's port infrastructure. China's goal is to develop the NSR into a year-round shipping corridor.²⁰⁸

The Russian government is willing to develop port and transportation infrastructure along the NSR in order to increase the volume of cargo. It approved the "Northern Sea Route Infrastructure Development Plan to 2035" on December 21, 2019. The development plan's main goals are "port and terminal infrastructure, development of the search and rescue fleet, development of the icebreaker fleet, and policies to promote NSR traffic and international transit".²⁰⁹ Thus, in order to avoid international shipping operators abandoning the NSR, the Russian government released a new development plan for the NSR in August 2022. Russia plans to spend \$29 billion over the next decade on new port facilities, oil, LNG and coal terminals and ice-class vessels and icebreakers.²¹⁰

Russia aims to revitalize the NSR with help of the Northern Transit Corridor Project (NTC), which is implemented by Rosatom Cargo. The NTC has three main components.²¹¹

²⁰⁶ VERNY and Grigentin (2009) see footnote 41 above.

²⁰⁷ Pruyt (2022) see footnote 198 above.

²⁰⁸ Weisko (2026) see footnote 6.

²⁰⁹ Ibid.

²¹⁰ Humpert, Malte, "International Shipping on Northern Sea Route Collapses As Foreign Companies Stay Away", High North News, September 12, 2022. Available at: <https://en.highnorthnews.com/business/international-shipping-on-northern-sea-route-collapses-as-foreign-companies-stay-away/113522> accessed on March 29, 2026.

²¹¹ Hong (2023) see footnote 77 above.



- the construction of container transshipment ports at both ends of the NSR
- the construction of an ice-class container fleet
- the development of the NSR infrastructure

Rosatom Cargo plans include building of a transshipment port between Murmansk on the west side and Vladivostok on the east side of the Arctic Ocean. The aim of the transshipment port is to establish regular container ship service with help of ice-class container ships and provide feeder services between Asia and Europe via the NSR by regular ships at the transshipment port. The transshipment port should start operation in 2026.²¹²

Alleged poor quality of infrastructure along the Russian parts of the NSR has been seen as an opportunity for Norwegian ports to compete with, or replace Russian ports along the route²¹³. Norway's ports "a stable political environment high level of technology, an unmistakably better infrastructure, good communication systems, and SAR operations compared to Russian ports". Consequently, there has been an idea to establish a transshipment hub in Norway and Alaska, on both sides of the NSR. The aim of this plan is to make vessels "independent of the poor infrastructure along the Russian coast" and to "limit the use of ice-classed vessels to the required areas".²¹⁴ A transshipment hub in Norway would allegedly have following benefits: "stable regulatory framework, transparent overview of charges and fees, less risk of corruption, ice free harbours, and modern port facilities".²¹⁵

²¹² Ibid.

²¹³ Tormodsgard, Y. 2014. "FACTS 2014 - The Norwegian Petroleum Sector." *Ministry of Petroleum and Energy*; mentioned in Solvang et al. (2018) see footnote 203 above.

²¹⁴ Solvang et al. (2018) see footnote 203 above, 505.

²¹⁵ Ibid. 507.



5 NSR AND GEOPOLITICS

5.1 INTRODUCTION

Geopolitical tension has returned to the Arctic. This can be seen for example in the form of raise of interest to Greenland from the part of the United States, as well as from the rise of level of militarization of the Arctic region. Melting of ice allows an access to larger territory in the Arctic, which increases human activity in the territory. Reasons behind the rising interest towards Greenland illustrate more widely the reasons for increased interest in the Arctic.

Great power tensions in the Arctic have gone up and down since the end of the Second World War. The US had a major interest in keeping military bases in Greenland during the Cold War because of a potential war between the US and the Soviet Union in the Arctic. The US military bases in Greenland were considered to be in 1946 of “outstanding importance” to US security. In the following years, Greenland was described by US military planners to be as “a major bastion of U.S. defence”. Later during the Cold War, radars in Greenland became an important node in the American early warning system. After the end of the Cold War, the US started to prioritize low politics issues and regional institution-building over military security. The Arctic region lost its military importance as global military tensions vanished and as the danger of a cross-polar nuclear attack was lessened significantly.²¹⁶

The US is often called as the reluctant Arctic nation because of its incapacity to fulfil its potential to become a circumpolar superpower. This can be explained by a lack of strong fleet of icebreakers, UNCLOS membership, and a regional nor grand strategy.²¹⁷ A sudden change to a rising interest towards the Arctic happened in August 2019, when the US president Donald Trump offered to buy Greenland²¹⁸.

There are two reasons why the great powers would want to own Greenland. On the one hand, the great powers eye natural resources of the Arctic. The Arctic is attracting an increasing amount of interest as the global demand for natural resources grows. A picture has emerged of the Arctic as the last “resource

²¹⁶ Danish Institute for International Affairs. (1997). *Grønland under den Kolde Krig, Dansk og Amerikansk Sikkerhedspolitik 1945–68*. Copenhagen: Danish Institute for International Studies. Defense of Greenland. (1941), 79. https://www.loc.gov/law/help/us-treaties/bevans/bk-ust000007_0107.pdf accessed on March 29, 2026; mentioned in Rahbek-Clemmensen, J., & Nielsen, L.J. (2020). *The Middleman—The Driving Forces Behind Denmark’s Arctic Policy* in Weber (2020) see footnote 29 above.

²¹⁷ Rahbek-Clemmensen and Nielsen (2020) see footnote 202 above, 23.

²¹⁸ Salama, V., Ballhaus, R., Restuccia, A., & Bender, M. C. “President Trump eyes a new real-estate purchase: Greenland”. *The Wall Street Journal*, August 16, 2019. <https://www.wsj.com/articles/trump-eyes-a-new-real-estate-purchase-greenland-11565904223> accessed on March 29, 2026.



frontier”²¹⁹. Control of Greenland, which offers 30 critical minerals with the world’s two largest rare earth mines, would act as a counterweight for the US for China, which has monopoly on 50 critical minerals. Greenland has lacked the capabilities and industrial infrastructure for their extraction and the US and China would both be ready to provide their expertise and investment.²²⁰

The second reason is strategic. Melting of ice on Greenland (it loses 270 billion tonnes of ice a year) reveals its strategically important positioning. Greenland is the largest non-Continental island in the world. Greenland marks the top end of the Greenland-Iceland-UK Gap, which the US and NATO have to carefully keep an eye on for Russian submarines.²²¹

The US started to be interested in the Arctic again from 2016 onwards after the rise of China and Russia as its competitors on the global level. Since then, “regional competition with China and Russia and a general fear of Chinese and Russian encroachments have become paramount”. The 2019 Department of Defence Arctic Strategy stated that the Arctic is “a potential avenue for expanded great power competition and aggression” and argued that “U.S. interests include maintaining flexibility for global power projection, including by ensuring freedom of navigation and over flight; and limiting the ability of China and Russia to leverage the region as a corridor for competition that advances their strategic objectives through malign or coercive behaviour”^{222 223 224}.

The strategy illustrated that the US was worried for Russia and China for different reasons. On the one hand, the US was concerned about Russia’s military presence in the Arctic. On the other hand, the US worried about China’s economic presence in the Arctic region.²²⁵ What has raised concerns in the US is that Chinese companies have invested in Greenland’s mining sector and China has aimed to establish a satellite receiver station there. Moreover, China and its state-owned companies have tried to acquire contracts to construct critical infrastructure such as airports and harbours, which can potentially be used in dual purpose by China’s military in future operations in the Arctic. The US has also seen a risk that the volume of China’s investments, even if modest on a large scale, are so significant from the point of view of Greenland’s small

²¹⁹ Nuttall, M. (2010). Pipeline dreams, people, environment, and the Arctic energy frontier. Copenhagen: International Work Group for Indigenous Affairs.

²²⁰ Gray, James. "War in the Arctic?" *U.S. Naval Institute Proceedings*, Vol. 152/1/1,475 (Jan 2026).

²²¹ Ibid.

²²² Department of Defense. (2019). Department of defense Arctic strategy. Washington, DC: Department of Defense; mentioned in Rahbek-Clemmensen and Nielsen (2020) see footnote 201 above.

²²³ Ibid.

²²⁴ Rodman, L. L. (2019, September 25). Iceberg dead ahead. deconstructing the pentagon’s Arctic strategies. *War on the Rocks*. Available at: <https://warontherocks.com/2019/09/iceberg-dead-ahead-deconstructing-the-pentagons-arctic-strategies/> accessed on March 29, 2026;

²²⁵ Department of Defense (2019) see footnote 204 above, 4-5.



economy, that it can be utilized by China to put the pressure on the US economic presence on the island.²²⁶

5.2 PROCESS OF MILITARIZATION OF THE ARCTIC

The 21st century has been characterized by growing military competition between the great powers in the Arctic. Russia has invested a lot in its military capacities in the Arctic, e.g. by reopening several Soviet era bases and by moving more modern and capable military assets to the region. Russia has built new military bases and airfields in the Arctic, such as Nagurskoye and Tiksi airbases along the NSR.²²⁷ They can be used by Russian combat aircraft to attack the US bases in Greenland, thus weakening the US missile defense and early warning system. Moreover, the New Siberian Islands now house a Bastion-P coastal missile system and a radar, which officially is to help protect the Northern Sea Route²²⁸.

Russia's main military objective in the Arctic is to ensure the survivability of its second-strike nuclear capabilities.²²⁹ The Arctic is the home base of a large part of Russia's nuclear deterrence capability, which is the main component in securing its great power position. Thus, the Arctic functions as the deployment area for Russia's strategic air force.²³⁰

The Russian Northern Fleet has its bases in the European part of the Russian Arctic. It is also the home of Russia's latest military district, North (Sever), and the HQ Joint Strategic Command (JSC). The Arctic is home to a large part of Russia's sea-based strategic deterrent in the Northern Fleet, approximately 60% of its sea-based nuclear warheads²³¹.

²²⁶ Rahbek-Clemmensen, J. (2019, August 28). "Let's (not) make a deal: Geopolitics and Greenland." *War on the Rocks*. Available at: <https://warontherocks.com/2019/08/lets-not-make-a-deal-geopolitics-and-greenland/> accessed on March 29, 2026.

²²⁷ Sukhanin, S. (2018). "The Arctic 'Trilistnik'—Russia's bid for regional military superiority." *Eurasia Daily Monitor* (EDM), 15(127). Available at: https://jamestown.org/program/the-arctic-trilistnik-russias-bidfor-regional-military-superiority/?mc_cid=d0826fe69b&mc_eid=11ee4659ba accessed on March 29, 2026; mentioned in Rahbek-Clemmensen and Nielsen (2020) see footnote 201 above.

²²⁸ TASS. (2019, May 27). "Russia, Canada and Denmark discuss claimed 'disputable' Arctic shelf zones." Ottawa. TASS. <https://tass.com/arctic-today/1060175>. Accessed on March 29, 2026.

²²⁹ Boulègue, M. (2019). Russia's military posture in the Arctic. Managing hard power in a 'low tension' environment, 7. <https://www.chathamhouse.org/publication/russia-s-military-posture-arcticmanaging-hard-power-low-tension-environment>. Accessed on March 29, 2026.

²³⁰ Åtland, K. (2018). The building up of Russia's military potential in the arctic region and possible elements of its deterrence. CRS—Centre for Russian Studies; mentioned in Staun, J. (2020). A Two-Faced Russia? Civilian Interests and Great Power Politics in the High North. In J. Weber (Ed.), *The High North Between Cooperation and Confrontation* (pp. 1-27). Springer. https://doi.org/10.1007/978-3-030-45005-2_1

²³¹ Åtland, K. (2014). interstate relations in the Arctic: An emerging security dilemma? *Comparative Strategy*, 33(2), 15; mentioned in Staun (2020) see footnote 230 above, 9.



Picture: Military bases in the Arctic belonging to NATO and Russia²³²

The NSR has a remarkable role as a part of Russia's militarisation efforts in the Arctic. A part of Russia's military exercises in the Arctic have focused on protecting the NSR. Moreover, Russia's new weapons systems deliveries to the Arctic have been accompanied by rhetoric concerning Russia's ability to protect the NSR.²³³

The US sees a serious risk that Russia could use its Arctic-based sub marine fleet to threaten Sea-Lines of Communication (SLOC) in the North Atlantic in case of an outbreak of a great power conflict²³⁴. In order to counter this threat, the US and some other NATO member states have strengthened their presence with Anti-Submarine Warfare (ASW) capabilities in the so-called Greenland-Iceland-United-Kingdom (GIUK) gap, which make up a choke point for submarines between the Arctic and North Atlantic.²³⁵

²³² Fleck, Anna. "NATO's and Russia's Militarization of the Arctic." *Statista*, 24 Jan. 2025. Available at: https://www.statista.com/chart/33824/military-bases-in-the-arctic-belonging-to-nato-and-russia/?srsltid=AfmBOop7XWVbHP4GHwuor-2dJOQfle-U17xb-2vhMeljB0l_kosAxbeA accessed on April 16, 2026.

²³³ Staun (2020) see footnote 230 above, 14.

²³⁴ Hamre, J. J., & Conley, H. A. (2017). The centrality of the north Atlantic to NATO and US strategic interests. In J. A. Olsen (Ed.), *NATO and the north Atlantic* (pp. 43–58). London: RUSI; mentioned in Rahbek-Clemmensen and Nielsen (2020) see footnote 202 above, 81.

²³⁵ Turnowsky, W. (2018, September 17). Amerikansk forsvar vil investere i grønlandske lufthavne; mentioned in Rahbek-Clemmensen and Nielsen (2020) see footnote 202 above 81.



Russian Foreign Minister Sergey Lavrov assured in September 2024 that Russia is fully ready for a conflict with NATO in the Arctic. He drew attention to NATO's desire to build up military potential near Russia's borders, close to the Northern Fleet's strategic submarine base. This, according to him, requires retaliatory measures to create an appropriate grouping of troops in North West Russia.²³⁶

Russian President Vladimir Putin stated in his speech in Murmansk in March 2025 that geopolitical competition and fighting for positions in the Arctic are escalating as the US continues to advance its geostrategic, military-political and economic interests in the region. Putin expressed his concerns that NATO countries are increasingly often designating the Arctic as a springboard for possible conflicts and are practicing the use of troops in these conditions. He added that Russia will respond to this.²³⁷

Russia has asserted unilateral control of their waters along the NSR and fortified certain shipping choke points along the route. Moreover, Russia demands that transiting ships pay tolls, take aboard a Russian ice pilot, and be inspected when required. Noncompliant ships are subject to being stopped, boarded, impounded and even destroyed. Foreign warships transiting the NSR must provide details on the ship's complement and armaments and file a route 45 days in advance of transit.²³⁸

Russia aims to be an internationally recognised great power. In the Arctic, Russia has two main policy lines. Firstly, Russia has a goal to turn the Russian Arctic into a resource base for the country. Russia wants the NSR to be recognized as part of national waters, and aims to increase traffic along the maritime route. Russia also wants to exploit the natural resources of its 200-nautical mile exclusive economic zone (EEZ). Secondly, Russia has launched a general military reform a considerable build-up of conventional and nuclear forces, also in the Arctic. Russia has around 60% of its seaborne nuclear weapons under the the Northern Fleet's command around the Kola Peninsula and contiguous waters²³⁹.

Russia and China's cooperation aims to create an alliance against the hegemonic aspirations of the United States. China is interested in the Arctic in order to find new sources of raw materials, which China needs to support its economic development and rising international political status. China

²³⁶ Gray (2026) see footnote 220 above.

²³⁷ Международный форум «Арктика – территория диалога», Президент России, March 27, 2025. Available at: <http://kremlin.ru/events/president/news/76554> accessed on March 29, 2026.

²³⁸ Auerswald, D. P. (2020). Arctic narratives and geopolitical competition, 266. In Weber (2020) see footnote 29 above.

²³⁹ Åtland (2014) see footnote 231 above, 153; mentioned in Staun (2020) see footnote 230 above.



expressed in 2018 that it has “important interests in the Arctic”. According to some estimates, the alliance between Russia and China may in the long term more broadly concern the military sphere too.²⁴⁰

The growing cooperation between Russia and China has already drawn attention of the western countries. Russia’s Navy Commander-in-Chief Alexander Moiseyev claimed in December 2025 that “[k]ey political statements [by US and European military-political leaders regarding the Arctic] emphasize the increasing pace of the Arctic’s militarization and preparations for a potential military confrontation in the region under the pretext of ‘protecting against threats from Russia and China’”.²⁴¹

The US and other NATO members have noticed an increased commercial activity resulting from the melting of ice and opening of new sea routes, which is simultaneously increasing military competition in the Arctic. Therefore, the NATO member states have increased their military activity in the Arctic e.g. in the form of organising military drills focused on operations in polar environment.²⁴²

The NATO has been urged to react to a growing Russian military activity in the Arctic, as well as to a risen interest of China in the Arctic. A report published in December 2025 by the Center for European Policy Analysis (CEPS) says that the NATO should build a fleet of polar-hardened aerial, ground-based and undersea drones to give the NATO an edge in the Arctic. According to the report, the NATO states should be able to “track Russian submarine patrols leaving the Kola Peninsula, monitor aircraft flights across the Barents and Bering Seas, identify changes in Russia’s Arctic force posture and infrastructure, and detect potential surface and subsurface threats to critical infrastructure”.²⁴³

Plans of the US with NATO regarding the future of Greenland heighten the military tensions in the Arctic too. US President Trump was reported to come to an agreement with NATO Secretary General Mark Rutte concerning “the framework for a future agreement” about “Greenland and the entire Arctic region”. Rutte argued that there was a need for new level of military activity in

²⁴⁰ Olech, Aleksander (2025, December 6). *Polar power play: China, Russia and the race for the Arctic (Part I)*. Defence24.com. Available at: <https://defence24.com/geopolitics/polar-power-play-china-russia-and-the-race-for-the-arctic-part-i> accessed on March 29, 2026.

²⁴¹ “US, European leaders’ Statements on Arctic expose their Russophobia — Russian Navy chief”, TASS, December 9, 2025. Available at: <https://tass.com/defense/2055779> accessed on March 29, 2026.

²⁴² Vandiver, John (2026), “‘Deterrence by detection’: NATO urged to deploy drones to track Russian activity in Arctic”, *Stars and Stripes*, January 2, 2026. Available at: <https://www.stripes.com/theaters/europe/2026-01-02/arctic-nato-drones-20274596.html> accessed on March 29, 2026.

²⁴³ Ibid.



the Arctic in order to “prevent both the Chinese and Russian from gaining any military or economic access to Greenland”.²⁴⁴

Norway has expressed its support for the further militarisation of the Arctic. Norway’s defence minister Tore O. Sandvik justified the growing military attention in the Arctic with Russia’s increased activity in the region, but also with the fact that climate change has opened up “new shipping routes above Russia that can be used by Chinese ships”. Sandvik also noted Germany’s increased activity in the Arctic, highlighted the importance of new naval cooperation with the UK and reminded about the organisation of annual NATO winter exercises in the Arctic.²⁴⁵

Norway’s defense minister Tore O. Sandvik also drew attention to Russia’s use of its so-called “shadow fleet” of old tankers and cargo ships in an effort to avoid sanctions on Russian oil and other exports.²⁴⁶ According to a western view, the NSR has turned into an illicit corridor for the Russian dark fleet. The Bellona Environmental Transparency Center, a Vilnius-based investigative group, the amount of vessels allegedly belonging to the Russian dark fleet has increased quickly. The Bellona claims that whereas there were seven oil tankers and six LNG tankers identified as so-called “shadow” ships navigating along the NSR in 2024, there were a hundred such ships under international sanctions in 2025. The Bellona sees that a vessel that belong to a shadow or dark fleet of vessels “sail under compromised flags, carry poor insurance, and often switch off their transponders to cloak their location”.²⁴⁷

Furthermore, the Bellona accuses Rosatom, Russia’s nuclear corporation, which is official operator of the NSR, to have a tendency to hide information. According to the Lithuania-based NGO, Rosatom ceased in 2025 to publish e.g. information about ships’ current location on the NSR.²⁴⁸

The US and other western states have put an increasing pressure on Russia’s naval transportations. The US seized in January 2025 in the Atlantic near Iceland a Russian-flagged oil tanker *Marinera*, whose original name was the *Bella-1*. The US military’s European Command said that the vessel was seized for violating US sanctions.²⁴⁹

²⁴⁴ “Norway remains firm on Arctic defense and sovereignty”, *NEWSinENGLISH.no*, January 22, 2026. Available at: <https://www.newsinenglish.no/2026/01/22/norway-remains-firm-in-davos-on-arctic-defense-sovereignty/> accessed on March 29, 2026.

²⁴⁵ Ibid.

²⁴⁶ Ibid.

²⁴⁷ Vakhrusheva, Ksenia (2025), “The Northern Shadow Route – 100 sanctioned ships sailed along Russia’s Arctic coast in 2025”, Bellona, December 15, 2025. Available: <https://etc.bellona.org/2025/12/15/nsr-2025/> accessed on March 29, 2026.

²⁴⁸ Ibid.

²⁴⁹ “Exclusive: US seizes Venezuela-linked, Russian-flagged oil tanker after weeks-long pursuit”, *Reuters*, January 7, 2026. Available at: <https://www.reuters.com/business/energy/us-seizing-venezuela-linked-oil-tanker-after-weeks-long-pursuit-2026-01-07/> accessed on March 29, 2026.



Similar incidents have happened before and after *Marinera's* seizure. The Swedish Coast Guard seized a false-flagged cargo ship *Caffa* off its southern coast in March 2026. It was believed to belong to Russia's shadow fleet and suspected of transporting stolen Ukrainian grain.²⁵⁰

The Belgian army seized an oil tanker *Ethera* at the beginning of March 2026. The vessel sailed under the Guinean flag, but it was believed to be part of a shadow fleet used by Russia to circumvent international sanctions.²⁵¹

Aide of the President of the Russian Federation Nikolai Patrushev gave an interview to the Russian newspaper *Argumenty i Fakty* in February 2026 concerning the seizures of Russian vessels by western states. He considered the seizures as pirate attacks on Russian maritime trade, which, according to him, indicates that western states have decided to strike at Russian foreign trade and want to paralyze it.²⁵²

Patrushev argued that the Europeans, by implementing their plans for a naval blockade, are deliberately pursuing a scenario of military escalation, testing the limits of Russia's patience, and provoking active retaliatory measures. He warned that if a peaceful resolution to this situation fails, the Russian Navy has to break and eliminate the blockade. He also hinted that Russia might too be interested in seizing ships that sail under European flags as a countermeasure.²⁵³

²⁵⁰ "Här bordas statslösa fartyget – som var på väg till Ryssland", TV4, March 6, 2026.

Available: <https://www.tv4.se/artikel/Qg0HCZSYoft2YcJKIXAvq/fartyg-har-bordats-i-oestersjoen-av-insatsstyrkan> accessed on March 29, 2026.

²⁵¹ "L'armée belge a arraisonné l'*Ethera*", La Libre, March 1, 2026. Available at: <https://www.lalibre.be/dernieres-depeches/2026/03/01/larmee-belge-a-arraisonne-lethera-VRFVISAZT5EIZCC6NMIXZE5F3Q/> accessed on March 29, 2026.

²⁵² "«Блокаду прорвёт ВМФ». Патрушев — о защите судоходства и морских границ РФ", Аргументы и Факты, February 18, 2026. Available at: <https://aif.ru/politics/russia/-blokadu-prorvyot-vmf-patrushev-o-zashchite-sudohodstva-i-morskih-granic-rf> accessed on March 29, 2026.

²⁵³ Ibid.



5.3 COOPERATION IN THE ARCTIC COUNCIL

The Arctic Council was formally established in 1996. The Ottawa Declaration defines eight states as Members of the Arctic Council. Canada had an idea already in 1989 to institutionalize the cooperation within the Arctic Environmental Protection Strategy (AEPS) a more comprehensive regional organisation and had subsequently pushed for the establishment of an Arctic Council (AC) through diplomatic channels.²⁵⁴

The Arctic Council acts as a loose forum for consultations among the Arctic states. The Arctic has five coastal states, Canada, Denmark (via Greenland), Norway, Russia and the US. These states have sovereign rights, according to the UN Convention on the Law of the Sea (UNCLOS). Furthermore, the Arctic Eight includes Finland, Iceland, and Sweden as additional members of the Arctic Council, which is a forum for coordination on Arctic matters.²⁵⁵

There are two kinds of tensions in the Arctic between different states. On the one hand, there are tensions between the five Arctic littoral or coastal states and the remaining three members of the Arctic Council. On the other hand, tension also runs high between these Arctic states and countries that define themselves as “Near Arctic” states, such as China, and all other interested parties.²⁵⁶

China has had an observer status in the Arctic Council (AC), which enables it to engage in projects of the AC’s working groups. China does not have sovereign rights in the AC, but its representatives have begun to define their country as a “near-Arctic” state. China’s increased activity in and towards the Arctic has made the US and Canada to express their growing concern regarding sovereignty, security, and influence, as well as potential resource gains.²⁵⁷

Scholars such as Heather Conley²⁵⁸ and Peter Viggo Jakobsen²⁵⁹ argue that there is a need for Arctic institutions to deal with security matters, which so far have been exempted from the work of the Arctic Council. The idea is well

²⁵⁴ Arctic Council, “About the Arctic Council”. Available at: <https://arctic-council.org/about/> accessed on March 29, 2026.

²⁵⁵ Reinke de Buitrago, Sybille. (2020). China’s Aspirations as ‘Near-Arctic state’: A Growing Arctic Stakeholder or Risk? 97; mentioned in Weber (2020) see footnote 29 above.

²⁵⁶ Weber (2020) see footnote 29 above, xiv.

²⁵⁷ Reinke de Buitrago (2020) see footnote 255 above.

²⁵⁸ Conley, H. A., & Rohloff, C. (2015). The new ice curtain. Russia’s strategic reach to the Arctic. CSIS Europe Program; mentioned in Staun (2020) see footnote 230 above 4.

²⁵⁹ Jakobsen, P. V. (2019, May 31). “Der er behov for en ny aftale om sikkerhedspolitik i Arktis.” *Jyllands-Posten*. Available at: <https://jyllands-posten.dk/debat/kronik/ECE11411435/der-er-behov-for-en-ny-aftale-om-sikkerhedspolitik-i-arktis/> accessed on March 29, 2026; mentioned in Staun (2020) see footnote 230 above 4.



justified as some countries have deployed more troops and military equipment to the Arctic.

Russia has considered the Arctic as a zone of peace and has thus had a goal of maintaining international cooperation there²⁶⁰. According to many estimates, Russia has played a constructive role in the Arctic Council and other Arctic institutions, such as the Barents Euro-Arctic Council (BEAC) or the Arctic Coast Guard Forum (ACGF)^{261 262 263}. Earlier, Russia for example proposed “a full-scale military and political dialogue between the Arctic states as a way to promote confidence and mutual understanding and prevent any type of escalation”, as well as the resumption of the currently suspended meetings of the Arctic Chiefs of Defence (CHOD)²⁶⁴.

However, instead of considering the Arctic as a zone of peace and cooperation, the US has started to characterize it as an arena of great power competition. Moreover, the US under the leadership of Donald Trump has favoured unilateralism and undermined the value of international institutions and treaties. Also in the Arctic, the US has preferred a unilateral perspective and they see the region as a competitive rather than a cooperative space.²⁶⁵

Secretary of State Mike Pompeo highlighted the competitive setting of the US with China and Russia in the Arctic in his speech at the May 2019 Arctic Council ministerial meeting. Pompeo said in his speech that “the region has become an arena for power and for competition. And the eight Arctic states must adapt to this new future.” He also rejected China’s claim to be a near-Arctic state, and said that “Chinese activity, which has caused environmental destruction in other regions, continues to concern us in the Arctic.” Pompeo also criticised Russia’s

²⁶⁰ President of the Russian Federation. (2016, 30 October). The foreign policy concept of the Russian Federation. Russian Foreign Policy Concept; mentioned in Schaller, B. (2020). The Non-Arctic Dimension of Military Security—Russia and the West Between Regional Cooperation and Geopolitical Confrontation. In L. Heininen (Ed.), *Handbook on Geopolitics and Security in the Arctic* (pp. 323–342). Springer. https://doi.org/10.1007/978-3-030-45005-2_19; in Weber (2020) see footnote 29 above, 333.

²⁶¹ Bergh, K. and Klimenko, E. (2016). Understanding national approaches to security in the Arctic. In L. Jakobson and N. Melvin (Eds.) *The new Arctic governance* (pp. 41–75). Oxford: Oxford University Press (SIPRI Research Report, no. 25); mentioned in Schaller (2020) see footnote 241 above, 333.

²⁶² Laruelle, M. (2014). *Russia’s Arctic strategies and the future of the Far North*. Armonk, New York: M.E. Sharpe, Inc. mentioned in Schaller (2020) see footnote 241 above, 333.

²⁶³ Baev, P.K. (2018). Russia’s Ambivalent Status-Quo/Revisionist Policies in the Arctic. *Arctic Review on Law and Politics*, 9(0), 408. <https://doi.org/10.23865/arctic.v9.1336>; mentioned in Schaller (2020) see footnote 241 above, 333.

²⁶⁴ Russian Foreign Minister, Sergey Lavrov. (2019). Foreign Minister Sergey Lavrov’s remarks and answers to media questions at the opening of the ministerial session of the 5th International Arctic Forum The Arctic: Territory of Dialogue. 5th International Arctic Forum The Arctic: Territory of Dialogue. The Ministry of Foreign Affairs of the Russian Federation. St. Petersburg, 4/9/2019; mentioned in Schaller (2020) see footnote 241 above, 334.

²⁶⁵ Auerswald, D. P. (2020). Arctic narratives and geopolitical competition, 264. In Weber (2020) see footnote 29 above.



actions in the NSR as “part of a pattern of aggressive Russian behaviour here in the Arctic. Its actions deserve special attention ... because we know Russian territorial ambitions can turn violent.”²⁶⁶

Equally, the June 2019 Department of Defense Arctic Strategy stated that the Arctic is “a potential avenue for expanded great power competition and aggression.” According to the US Arctic Strategy of 2019, the US has an interest in “limiting the ability of China and Russia to leverage the region [...] through malign or coercive behaviour”²⁶⁷.

The Arctic Council has been in the turmoil after the start of the war in Ukraine. The Arctic Council suspended its work on March 3, 2022, participants resumed written communication in the fall of 2023. In February 2024, a decision was made to resume the working groups, including Russia, through online meetings. The first meetings were held in the spring and summer of 2024.²⁶⁸

Russian Foreign Minister Sergey Lavrov was positive about the future of the Arctic Council in December 2025. He said that “the Arctic Council has a good chance of maintaining its relevance”, also emphasising the need to promote cooperation in the Arctic with non-regional countries such as China and India. Lavrov mentioned that there are relevant working groups in the Arctic Council and one of the priorities is joint work to unlock the transport and logistics potential of the Northern Sea Route.²⁶⁹

Russian views were more pessimistic in February 2026 about the future of the cooperation in the Arctic Council. Russian Deputy Foreign Minister Alexander Grushko said that cooperation in the Arctic is being destroyed, and the work of the Arctic Council has been effectively blocked. Grushko argued that the breakdown in relations is being used to militarize the region. He claimed that NATO and the European Union want to confront not only Russia, but also China.²⁷⁰

²⁶⁶ Auersweld (2020) see footnote 250 above, 267.

²⁶⁷ Department of Defense. (2019). Report to Congress on the Department of Defense Arctic Strategy (p. 5). Report 0-5064821, June 2019; mentioned in Auersweld (2020) see footnote 250 above, 267.

²⁶⁸ “Arctic Council has good chance of maintaining its relevance — Lavrov”, TASS, December 16, 2025. Available at: <https://tass.com/politics/2059559> accessed on March 29, 2026.

²⁶⁹ Ibid.

²⁷⁰ “Arctic Council effectively blocked as West dismantles cooperation — Russian diplomat”, TASS, February 12, 2026. Available at: <https://tass.com/politics/2086137> accessed on March 29, 2026.



5.4 CHINA IN THE ARCTIC

China's interest in the Arctic dates back a long time ago²⁷¹. China's first official research programme started in 1989 with founding of the Polar Institute of China in Shanghai.

The United Nations Convention on the Law of the Sea of 1982 (UNCLOS) is the basis for China's status in the Arctic. The Convention, which China ratified on 7 June 1996, states that non-Arctic states may conduct scientific research, maritime navigation, obtain natural resources, and participate in environmental protection in the region.²⁷²

China became more proactive in the Arctic affairs since 2010²⁷³, when Chinese Arctic specialists started to classify China as a “near-Arctic state” or an “Arctic stakeholder”²⁷⁴. China reached the peak of its new engagement in the Arctic in 2013, when its application for Observer status at the Arctic Council was accepted.²⁷⁵

Release of a White Paper “China's Arctic Policy” in January 2018 was an expression of China's modern position and ambitions in the Arctic^{276 277}. The document sought to justify China's role with vested interests in the Arctic by repeating calls for China as a “near-Arctic state” despite the absence of an Arctic border. China has two main interests in the Arctic. Firstly, China takes part in activities related to scientific research, resource exploration and exploitation, shipping and security. Secondly, China is involved in Arctic affairs to counter climate change and its consequences.²⁷⁸

In order to achieve its Arctic goals, China proposed to incorporate the Arctic as part of its Belt and Road Initiative (BRI) by encouraging joint efforts to construct

²⁷¹ Alexeeva, O., & Lasserre, F. (2012). The Snow Dragon: China's Strategies in the Arctic. *China Perspectives*, 2012(3), 61–68; mentioned in Chih Yuan Woon, Framing the “Polar Silk Road” (冰上丝绸之路): Critical geopolitics, Chinese scholars and the (Re)Positionings of China's Arctic interests, *Political Geography*, Volume 78, 2020, 102141, ISSN 0962-6298, <https://doi.org/10.1016/j.polgeo.2019.102141> Available at: <https://www.sciencedirect.com/science/article/pii/S0962629819303464> accessed on March 29, 2026.

²⁷² Olech, Aleksander, Defence24. (2025, December 7). *Polar power play: China, Russia and the race for the Arctic (Part II)*. Available at : <https://defence24.com/geopolitics/polar-power-play-china-russia-and-the-race-for-the-arctic-part-ii> accessed on March 29, 2026.

²⁷³ Tonami, A. (2016). *Asian foreign policy in a changing Arctic: The diplomacy of economy and science at new frontiers*. UK: Palgrave Macmillan.

²⁷⁴ Jakobson, L., & Peng, J. C. (2012). China's Arctic aspirations. SIPRI policy. Paper No.34. Available at: <https://www.sipri.org/publications/2012/sipri-policy-papers/chinas-arctic-aspirations> accessed on March 29, 2026.

²⁷⁵ Chih (2020) see footnote 271.

²⁷⁶ State Council of the People's Republic of China. (2018). China's Arctic policy; mentioned in Chih (2020) see footnote 271, 1.

²⁷⁸ Chih (2020) see footnote 271, 1.



a Polar Silk Road, which links “China and Europe through the Arctic Ocean via vast logistic and transportation networks”²⁷⁹.

The Polar Silk Road’s focus is to develop shipping networks and infrastructures in the Arctic. It provides an economic incentive for China to develop the necessary infrastructures for the extraction of the Arctic’s huge oil and gas reserves^{280 281}. In addition to oil and gas, China is highly interested in rare earths, uranium, zinc, and iron ore.²⁸²

Some Chinese experts think that geostrategic agendas should be higher in importance compared to economic ones in China’s decision to develop the Polar Silk Road^{283 284}. E.g. Li Zhengfu²⁸⁵ emphasises the “geostrategic implications of the confluence between Arctic shipping routes and the BRI”, referring to the Arctic as “the New Middle East”. Li argues that with “shorter sea routes and the abundant presence of oil and mineral deposits in the Arctic, the “centre of power will inevitably shift northwards”, thereby ushering in a change in the “global geopolitical pattern”.

Liu Huirong²⁸⁶ sees the Polar Silk Road as an opportunity for China to circumvent maritime chokepoints, such as Strait of Malacca and Strait of Hormuz through which China’s energy imports are currently being predominantly transported. Geopolitical risks of the current maritime routes are high, why, according to Li, it is in China’s interest to consider the NSR and other Arctic shipping routes as its new energy supply channel. Li claims that “whoever controls the Arctic region will be able to attain commanding heights in the world’s military affairs”.

²⁷⁹ State Council of the People’s Republic of China, (2018); mentioned in Chih (2020) see footnote 256 above.

²⁸⁰ Mu, C. H., & Song, D. J. (2018). Bingshangsichouzhilu Chuyi [opinions on the polar Silk Road]. Qiaoyuan, 2018(9), 10–11; mentioned in Chih (2020) see footnote 255, 5.

²⁸¹ Zhang, T., Wu, L. X., Xu, J. J., & Jiang, C. Z. (2019). Jiyu Bishangsichouzhilu de Woguo youqinengyuan zhanlue [China’s oil and gas resource strategy in light of the polar Silk Road]. Haiyang Kafa yu Guanli, 2019(2), 37–39; mentioned in Chih (2020) see footnote 271, 5.

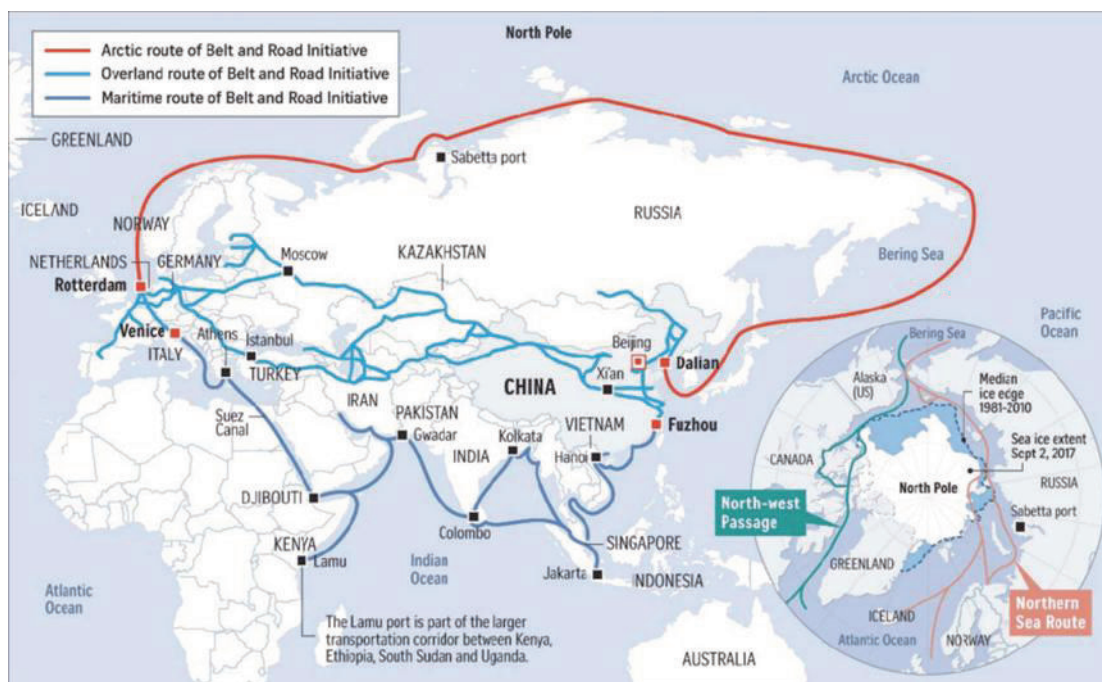
²⁸² Reinke de Buitrago (2020) see footnote 255 above, 99.

²⁸³ Li, Z. F., & Peng, Y. (2018). Bingshangsichouzhilu yu dabeiji wangluo: Zuoyong, yanhua ji zhongguo zhengce [The networks between the polar Silk Road and the North Pole: Effects, development and China’s strategy]. Dongya Jingji Yanjiu, 2018(5), 5–20; mentioned in Chih (2020) see footnote 255, 5.

²⁸⁴ Xiong, C. R., Wang, L. M., & Liang, M. L. (2018). Bishangsichouzhilu jianshe yu zhongguo de Diyuan zhanlue yiyi [The polar Silk Road and the geopolitical significance of China]. Xueshu Tansuo, 2018(12), 26–32; mentioned in Chih (2020) see footnote 256, 5.

²⁸⁵ Li, Z. F. (2016). Beijihangyun yu yidaiyilu zhanlue [The northern shipping route and the geopolitics of the Belt and Road initiative]. Zhongguo Chuanjian; mentioned in Chih (2020) see footnote 255, 5.

²⁸⁶ Liu, H. R. (2016). Yidaiyulu zhanlue Beijingxia de Beijihangdao kaifaliyong [The development of the Northern Sea route under the Belt and Road strategy]. Zhongguo Gongcheng Kexue, 2016(2), 111–118; mentioned in Chih (2020) see footnote 256, 5.



Picture: Map of existing and developing routes included in “Polar Silk Road”²⁸⁷

China has been economically active in the Arctic. In order to alleviate Russia’s suspicions of excessive Chinese influence, it has accepted *de facto* Russia’s demands of control of the NSR and to adhere to Russia’s internal regulations.²⁸⁸ It has built docks, railway lines and infrastructure in key Arctic ports.²⁸⁹

An example of China’s investments in the Arctic ports is the state-owned CNPC’s engagement together with the Silk Road Fund in Novatek’s Russian Yamal LNG terminal project, from which 4 million tonnes of natural gas are transported for China.

China is also developing its Arctic capabilities. It has at least five icebreakers: *Ji Di*, *Tan Suo San*, *Xue Long 1*, *Xue Long 2* and *Hao*. Three of the icebreakers were deployed in the Arctic in late 2024.²⁹⁰

Brady²⁹¹ sees that China is following the recommendations of Alfred Mahan for rising powers i.e. China is now building up its blue-water navy and it will then

²⁸⁷ Kovalenko, A. S., Morgunova, M. O., & Gribkovskaia, V. V. (2018). Infrastructural Synergy of the Northern Sea Route in the International Context. *Energeticheskaya Politika* (Energy Policy), 4, 57-67.

²⁸⁸ Olech (2025) see footnote 257 above.

²⁸⁹ Weisko (2026) see footnote 6 above.

²⁹⁰ Olech (2025) see footnote 257 above.

²⁹¹ Brady, A.-M. (2018, May 15). Contribution to podiums discussion. The Arctic of the future: Strategic pursuit or great power miscalculation? Panel II. Transcript. Washington, DC: CSIS. Available at: <https://www.csis.org/analysis/arctic-future-strategic-pursuit-or-great-power-miscalculation-panel-ii> accessed on March 29, 2026; mentioned in Reinke de Buitrago (2020) see footnote 255 above, 101.



use the navy to protect its sea lanes of communication, and then finally ensure resource and market access. Eder²⁹² adds that the BRI and the Polar Silk Road as part of it enables China “to connect the participating states via Chinese infrastructure projects, in return for access to their markets, secured trade routes and energy security”. Thus, BRI-related projects serve China’s foreign and security policy interests and the Chinese government is prepared to defend the security of Chinese investments and citizens in the states along the BRI.

China’s growing influence and activity in the Arctic region raises concern among other states. The US Department of Defence expressed its concern about China’s military activity in the Arctic in a report published in 2025 as follows: “In the decade since gaining observer status on the Arctic Council in 2013 China has massively expanded its Arctic footprint and has begun to work closely with Russia in its attempt to be seen as an Arctic power”.²⁹³ Eder²⁹⁴ points out that there are a number of Asian, European, and North American states that react to and coordinate their activities against the growing Chinese influence.

²⁹² Eder, T. S. (2018, June 7). Die Vermessung der belt and road initiative: Eine Bestandsaufnahme. Mercator Institute for China Studies; mentioned in Reinke de Buitrago (2020) see footnote 255 above, 101.

²⁹³ Gray (2026) see footnote 220 above.

²⁹⁴ Eder (2018) see footnote 276 above.



6 NSR AND SANCTIONS

6.1 SANCTIONS ON INFRASTRUCTURE

Sanctions imposed by western states on Russia are a source of vulnerability for the NSR. A part of those vulnerabilities can potentially make the transport system ineffective, impact shipping safety, and cause irreversible harm to the marine environment. Western states have imposed sanctions on technologies used in the construction of energy plants and terminals in Russia, including specialised high ice-class cargo carriers, and critical supplies needed for maintenance and replacement of faulty technical components for existing energy plants and various oil and gas field operations built with Western technology.²⁹⁵

Russian developers have a lack of access to critical supplies, which may impact both energy production and operational safety, and lead to interruptions or breakdowns of key plant and terminal operations. Russian energy and transport authorities had allegedly neglected the maintenance and upgrading of existing power and transport infrastructure in the Arctic already prior to the introduction of the current sanctions.²⁹⁶

Sanctions have prevented Russia from developing its port and transportation infrastructure in the Arctic Ocean. There is a need to improve the NSR's transportation infrastructure to ensure the reliability of Arctic shipping and in order to increase the cargo volume on the NSR.

Firstly, sanctions have slowed down the Russian government's NSR Development Plan. The Russian government aims to achieve 80 million tons of cargo on the NSR in 2024. However:

1) The construction process of Russian Arctic resource projects is significantly delayed due to a lack of technology and capital caused by the withdrawal of Western companies

²⁹⁵ Gunnarsson, B. (2024). On the Vulnerabilities of the Northern Sea Route's Maritime Transportation System. *Arctic Review on Law and Politics*, 15, 100.
<https://doi.org/10.23865/arctic.v15.6409>

²⁹⁶ Serbian, O., Izmailova, D., Mashkin, A. and Glagoleva, S. (2022), "Assessment of the Reliability of the Development of Infrastructure Projects on Transport in the Russian Federation", *Transportation Research Procedia* 68 (2023): 50–59; I. Popov, "Prospects of Development for Urban Areas in the Russian Arctic", *Sibirica, Interdisciplinary Journal of Siberian Studies* 21, no. 1 (2022): 79–100; mentioned in Gunnarsson (2024) see footnote 295 above.



2) The transportation infrastructure on the NSR is severely lacking due to a shortage of ice-class vessels and delays in the construction of nuclear-powered icebreakers

3) The development of port infrastructure is delayed due to the suspension of dredging work at ports in Russia's Arctic resource-producing regions and delays in the construction of the Port of Vladivostok.²⁹⁷

Secondly, western sanctions against Russia are expected to delay the schedule of the Russian government's Arctic Shipping Corridor (NTC) project. The Russian government appears to view the twice-yearly cabotage operations of the Rosatom-owned nuclear-powered icebreaker Sevmorput (1,324 TEU) as a preliminary preparation for the NTC project. In 2023, the Sevmorput is expected to begin round-trip Arctic voyages from St. Petersburg to Vladivostok on June 30 and September 30, respectively. If the cargo is well secured, there is a possibility that cargo from Asian countries such as China and India will be shipped. Furthermore, Korean logistics companies and shippers can also take advantage of these transportation opportunities to evaluate the level of Russian cargo transportation services on the NSR.²⁹⁸

It would also be possible for Russia to import sanctioned western equipment and machinery on behalf of Russia and then imported to Russia by countries that do not participate in imposing sanctions on Russia. However, although China does not support Western sanctions on Russia, it is weary of jeopardising trade relations with the US and the EU. Moreover, the lack of onsite knowledge and maintenance will still complicate the process, even if such imports become more usual. Imports of replacement parts from supportive countries are also likely to take a long time to arrive in the Arctic parts of Russia.²⁹⁹

Russia needs to find suitable replacements for Western technology and services, including project investment, in order to overcome the hurdles set up by western sanctions. Western companies previously provided Russia with specialised equipment, technical supplies, support, and logistics services. Russia's dependence on Western technology had been so significant that without the involvement of Western companies, extractive energy projects and the year-round shipping of commodities out of the remote Russian Arctic would likely not have been possible, and certainly could not have been developed so quickly. This cooperation led to a rapid industrial expansion never before witnessed in the Arctic.³⁰⁰

Russia has needed to build a large fleet of Arc7 shuttle carriers to serve several planned extraction projects along the NSR because it banned foreign vessels from transporting hydrocarbons on its waters in February 2018.⁵⁸ However,

²⁹⁷ Hong, (2023) see footnote 85 above.

²⁹⁸ Hong, (2023) see footnote 85 above.

²⁹⁹ Gunnarsson (2024) see footnote 278 above, 101.

³⁰⁰ Ibid. 118.



western sanctions imposed on the Russian shipbuilding sector in March 2022, as well as sanctions on critical construction technologies of LNG tankers, prevented this task from happening. Instead, Russia will likely be forced to rely on Chinese shipyards to deliver the needed vessels.³⁰¹

6.2 SANCTIONS' IMPACT ON SATELLITE MONITORING

There is a lack of high-resolution satellite monitoring of the NSR. The accurate and timely forecasting of sea ice conditions is of paramount importance for the safety of navigation, and the lack of data required for such forecasting is a major vulnerability of the NSR transportation system as shipping is faced with severe challenges due to sea ice and interannual sea ice variability. Current short-term sea ice and weather predictions on the NSR provided by Russia are likely to be inaccurate and provide far from the needed near-real-time assessments of local sea ice conditions.³⁰²

Western sanctions restrict Russia's access to foreign satellite images. This places limits on the data, which is available to suggest different sailing tracks for ships on the NSR based on the most favourable sea ice conditions at the time. Consequently, foreign vessels sailing on the NSR have needed to use non-Russian public or private ice-service providers, which track ship movements and suggest paths through the ice. Russia has opted for cooperation with China in order to improve its satellite coverage and sea ice forecasts on the NSR.³⁰³

6.3 SANCTIONS ON THE ENERGY SECTOR

Western countries imposed economic sanctions on Russia's oil and coal exports after the war in Ukraine started in February 2022. Moreover, Russia was excluded from the SWIFT banking system and access to Western loan institutions, and its gold reserves in Western banks were frozen. These financial sanctions limited Russia's access to capital for ongoing projects and the maintenance of existing energy and transportation infrastructure on the NSR. This has resulted in a shortage of available funds that could be used for new energy projects.³⁰⁴

³⁰¹ Ibid. 110-111.

³⁰² Gunnarsson (2024) see footnote 278 above, 107.

³⁰³ Humpert, Malte, "Lacking Own Satellite Coverage Russia is Looking to China for Northern Sea Route Data", High North News, March 30, 2023. Available at: <https://en.highnorthnews.com/business/lacking-own-satellite-coverage-russia-is-looking-to-china-for-northern-sea-route-data/157724> accessed on March 29, 2026.

³⁰⁴ Gunnarsson (2024) see footnote 278 above, 113-114.



Russia is also facing difficulties in exporting resources to Europe due to the EU's sanctions, and therefore needs to explore new export markets such as Asia.³⁰⁵ Western sanctions disrupted massive energy projects in the Arctic such as Yamal LNG on the Yamal Peninsula and Arctic LNG 2 on the neighbouring Gydan Peninsula. They were designed to export liquefied natural gas (LNG) via the NSR to both European and Asian markets. Due to the sanctions, Russian energy firms lost access to Western financing and technology, which forced Russia to seek alternative partners, mainly in China. Chinese investment became crucial for completing and operating the LNG projects that relied on the NSR for exports. The sanctions made the NSR a logistical artery linking Russia with China and other Asian markets.³⁰⁶

The US sanctioned Novatek's Arctic LNG-2 project and the two floating LNG transshipment facilities near Murmansk and on the east coast of Kamchatka in November 2023.³⁰⁷ Western sanctions have also halted or slowed down another project along the Northern Sea Route, Vostok Oil. The latest US sanctions block the sale, transport, and transshipment of LNG and gas condensate produced at the Arctic LNG-2 plant. Novatek now needs to sell its sanctioned LNG on the spot market in Asia and elsewhere, offering substantial discounts.³⁰⁸

Earlier, in addition to Russia's state-owned shipping company Sovcomflot, shipping lines from Northern Europe and Asia with ice-class vessels were engaged in Arctic shipping. Nordic carriers from Denmark, Germany, and the Netherlands were involved in the transportation of resources from Russia. However, due to Western sanctions against Russia, western shipping lines have stopped carrying out operations on the NSR.³⁰⁹

Since 2013, COSCO, China's state-owned shipping company, carried different kind of cargo e.g. wind power equipment, pulp, heavy and general cargo, on a total of 56 voyages. COSCO was expected to promote regular shipping services between Asia and Europe via the NSR from a strategic perspective in the future.³¹⁰ However, Chinese shipping company COSCO cancelled all of its planned Asia–Europe voyages through the NSR in 2022 and in 2023. The probable reason for the cancellations was that European countries were not willing to receive or deliver cargo through Russian NSR waters. China also wanted to shield a large and important shipping company from possible reputational consequences.³¹¹

³⁰⁵ Hong (2023) see footnote 77 above.

³⁰⁶ Weisko (2026) see footnote 6 above.

³⁰⁷ U.S. Department of State, Imposing Further Sanctions in Response to Russia's Illegal War Against Ukraine, September 14, 2023; mentioned in Chih (2020) see footnote 255, 114.

³⁰⁸ Chih (2020) see footnote 255, 114.

³⁰⁹ Hong (2023) see footnote 77 above.

³¹⁰ Ibid.

³¹¹ Gunnarsson (2024) see footnote 278 above, 116.



7 DATA ANALYSIS

7.1 CLIMATE

Predictions about the impact of climate change on the ice thickness in the Arctic Ocean and therefore for the navigability of the NSR have mainly been positive during the whole 21st century. The accessibility season i.e. the number of days when ships are navigable along the NSR rose from 84 days in the 1980s to 146 days in 2012.

Predictions about the future prospects of the feasibility of the NSR for navigations varied hugely during the first decade of the 2000s different, ranging in estimates about timing of a year-round ice-free Arctic route from as early as 2020 to as late as 2200. Predictions sharpened during the 2010s and became more optimistic, acknowledging that the ice cover in the Arctic was further decreasing, giving hope about a year-round commercial shipping along the NSR throughout the year in the near future.

The predictions of the 2010s turned out to be too optimistic. However, there is an increasingly clear idea in the 2020s about better future prospects concerning the navigability of the NSR. Most predictions of this decade estimate that the NSR could be navigable year-round by the year 2100.

A European Logistics Expert, which was interviewed to the study, the average navigation window nowadays is about four and a half months, lasting from late June or early July until mid or late November. The Chinese Lawyer shared this view with the European Logistics Expert.

The interviewees' views varied more regarding their estimates about the future prospects of navigability of the NSR. The European Logistics Expert did not expect big changes in the development of the NSR's navigability in the future during the next 15 years. However, the European Logistics Expert admitted that the extent of ice would reduce in the longer term.

A European former CEO was more optimistic concerning the future navigability along the NSR, noticing that the ice cover decreases all the time. According to the European former CEO's estimate, the NSR could be operational year-round in 30-40 years (2055-2065). The European former CEO had paid attention to Russia's preparation for the NSR's full operability in the form of investments to icebreakers.

The Chinese Lawyer was the most positive concerning the future prospects of the navigability along the NSR. According to the Chinese Lawyer, the NSR is



projected to become feasible for year-round commercial shipping by around 2035.

The European Logistics Expert argued that the current level of profitability of the NSR is rather modest. The European Logistics Expert referred to a lack of consistent cargo demand, which would give an incentive to initiate year-round transit operations. The European Logistics Expert argues that the NSR's current navigation window is attractive for a narrow segment of operators, primarily as a seasonal alternative route for exporting Russian resources to Asia.

The Chinese Lawyer illustrated how Chinese approach to the transportation along the NSR is as different as night and day compared to the European one. The Chinese Lawyer agreed with the European Logistics Expert that there are risks and challenges concerning the high costs, operational risks, and schedule unreliability of the NSR. Therefore, the current 4-5 months NSR navigable season is severely limited for the global commercial shipping mainstream. Consequently, the NSR is at most marginally attractive from the point of view of a conventional cost-benefit analysis and that is why the NSR is at least for the time being most suitable as a specialist route for specific cargoes

However, the Chinese Lawyer explained that for China, the development of the NSR is not merely a commercial opportunity but a strategic imperative to diversify trade routes, enhance energy security, and deepen cooperation with Russia under the Belt and Road Initiative. The Chinese Lawyer emphasised that Chinese shipping companies have a higher risk tolerance and longer-term strategic vision compared to many Western carriers, who have withdrawn due to geopolitical and environmental concerns. The Chinese Lawyer said that China is supposed to advance with its NSR strategy starting with highly managed, convoy-style operations for the highest ice-class vessels on key segments, underpinned by massive Sino-Russian infrastructure investment. The development of the NSR represents for China the culmination of a strategic national policy ("Polar Silk Road"). In the short term, China is not looking only for "tonnes shipped" or "days saved", but aiming to increase the robustness of the legal and environmental frameworks established to govern the NSR and international shipping more widely.



7.2 ECONOMIC VIABILITY

There is a huge potential for maritime trade between Europe and Asia, as a share of vessel port calls between the two continents was 80 per cent of all vessel port calls in the world in 2025. The Asia-Europe route is the world's busiest container shipping corridor, which accounts for 11.4% of global container trade.

103 transit voyages in 2025, compared to 97 in 2024. These vessels carried about 3.2 million tons of cargo. However, the NSR's proportion is minuscule compared to the SCR, as Asia–Europe corridor via Suez alone handles over 13,000 ships annually. The European former CEO believes that the smaller Chinese shipping companies that have recently sailed on the NSR route are in fact owned by Russians and their aim is to be a demonstrative marketing trick to raise the popularity of the NSR.

The NSR's main potential lies in about 30-40 % shorter distance between Europe and Asia compared to the Suez Canal Route, reducing the transport time from about 30 days on the SCR to about 19 days on the NSR. This leads to decrease in ships' transit time and fuel consumption depending on ice conditions. The European Logistics Expert explains that farther north the departure and destination ports are located, the greater the reduction in distance and time, as in the case of Murmansk–Busa.

Several studies have found that the NSR can be commercially feasible. According to the studies, the combination of the NSR and SCR shipping can compete with the SCR, when the NSR's accessibility period reaches 225 days. The increase in the number of annual voyages makes shipping through the NSR financially more attractive. Reduced transport time is a significant advantage against SCR shipping especially for high-value cargoes. However, according to the studies, a lot more ice has to melt in the Arctic Ocean before the NSR can become economically viable against the SCR.

The European former CEO is convinced of the lack of competitiveness of the NSR. The European former CEO points out that no charterer has never told what was their added value for transporting their freight along the NSR more quickly compared to the SCR.

The Chinese Lawyer admits that the NSR's economic viability will remain niche until at least the 2030s. However, the Chinese Lawyer says that the NSR holds a compelling advantage compared to the SCR from a pure distance and time perspective. Its full-scale economic competitiveness is lagging behind due to encompassing costs, reliability, risk, and scale. Therefore, the NSR remains a high-cost, seasonal, tactical option rather than a challenge to the Suez Canal's dominance.



Nevertheless, the Chinese Lawyer emphasises that for China, the competitiveness analysis is dual-layered. Firstly, the NSR is a marginal tool as a commercial shipping market participant for China. Secondly, it is an indispensable corridor for energy security, geopolitical diversification, and future influence in Arctic governance as a strategic actor within the Polar Silk Road framework,

The NSR has traditionally been popular for transport of liquid and dry bulk cargo and it is especially competitive in transport of natural resources. The Arctic Ocean has high potential for gas resources. Initially, European companies and states were interested in benefitting from these resources. However, they have left their place for Asians, which are world's top five LNG importers, accounting for nearly 59 percent of all global LNG imports.

The European Logistics Expert and European former CEO agree with each other that the NSR is only interesting because of transport of natural resources. The European Logistics Expert says that the development of the NSR will continue to be driven primarily by the export of Arctic resources: oil, gas, metals, and other minerals. The NSR is, according to the European Logistics Expert, significantly more attractive for resource exports than for regular liner shipping. "Liner operations require high predictability, stable schedules, consistent backhaul, and developed infrastructure along the entire route", adds the European Logistics Expert. The European former CEO also thinks that the NSR stays as a maritime route used for transportation of Russia's natural resources for the world markets.

The Chinese Lawyer agrees with other interviewees that the NSR is economically the most competitive for LNG and crude oil shipments from Russian Arctic projects to Asia. For these cargoes, the NSR is not an alternative but the essential artery. Dry bulk has conditional competitiveness for specific Russian exports,

The volume of cargo transported on the NSR has increased since 2010. The Northern Sea Route's trade volumes increased by 755% between 2014 and 2022. Simultaneously, Chinese operators have replaced western ones on the NSR. The European Logistics Expert says that the decision by Western operators to suspend the use of the Northern Sea Route is largely political at the present stage, although even before the current situation many companies viewed the northern route as a lower priority for pragmatic reasons. The former European Seafarer agrees with the European Logistics Expert, giving a glimpse of light for a potential change by emphasising that abandoning the NSR is a political decision, not an economic one. According to the former European Seafarer, if this policy changes, decisions will also change.

The Chinese Lawyer is convinced that Western operators' departure from the NSR is a deeply entrenched strategic position and not just a temporary tactical pause. In order to reverse the development, a "perfect storm of positive



developments” would be needed e.g. an end to sanctions, billions in infrastructure investment, a revolution in risk assessment by insurers, and a green light from environmental regulators. The Chinese Lawyer does not think that the Western operators return to the NSR in the short to medium term (5-10 years). Therefore, the NSR's near-term development will continue to be a Sino-Russian project, as evidenced by record Chinese container voyages in 2025.

There are growing prospects for container shipping along the NSR, too. Chinese container ship Istanbul Bridge's 20-day transit in 2025 through the NSR between Chinese Port of Ningbo and UK Felixstowe marked a significant milestone for the NSR and Arctic shipping as it carried nearly five thousand containers. The European Logistics Expert agrees with this view, saying that the NSR can be economically advantageous for container shipments when there are large consignments and two-way loads between northern European ports and East Asia

The Chinese Lawyer downplays the significance of the containers for the traffic on the NSR. According to the Chinese Lawyer, the containers are not competitive for the global market but, instead, they can be profitable and strategically vital within the dedicated China-Russia corridor for high-value goods. However, the Chinese Lawyer assures that China is also engaged to the container shipping on the NSR. The Chinese Lawyer explains the Chinese strategy along the NSR as follows:

“In the short term, the NSR is for China a strategic energy corridor and a testing ground for polar operations, with modest but profitable niche container services. In the medium term, it is an emerging seasonal trade artery to Europe, offering competitive advantages in speed and supply chain diversification. In the long term, China expects the NSR to be a vital component of its global maritime network and a key platform for participating in polar governance.”

The NSR offers opportunities for Germany, too. 90% of German exports relies on sea transport. The shipbuilding industry is one of the strategic branches of German economy. Germany's shipyards create a niche market requiring highly advanced technologies in order to provide icebreakers and vessels to ship liquefied gas in the Arctic conditions.

Northern Sea Route may create new opportunities for German shipping thanks to shorter travel times, less fuel use and lower costs. In the last decade, German cargo ships used the routes to deliver goods to West Siberia. Earlier, German navigation companies hoped to use the Northeast Passage to transport goods between Europe and East Asia. Moreover, German and Chinese ports have been connected to each other through the NSR in the past. First trial shipments of containerized freight and bulk cargo between China and Hamburg through Russia along the NSR were successful.



A European former Seafarer is cautious about the potential of the NSR for Germany in the near future. The interviewee thinks that Russia's northern Arctic coast may offer raw materials for European industry in the future. However, according to the former Seafarer, there will be no economic area in the foreseeable future that will emerge significant for international trade because of the prevailing conditions between the EU and Russia.

There is potential for the BRI as a transport corridor especially for higher-value goods. On the other hand, the NSR's capacity is very limited, and there are risks concerning delays - the addition of the NSR to the BRI could at least partly solve the capacity problems

The European interviewees are sceptical about the importance of the launch of the Polar Silk Road project and the connection of the NSR as part of China's Belt and Road Initiative. The European former CEO views that the concrete significance of adding the NSR as part of the Polar Silk Road has been minor. The European former CEO explains that the reason for the adding of the NSR to the BRI and the launch of the Polar Silk Road derives from the fact that Chinese energy companies are involved as investors in the Yamal gas field and Novatek. The European Logistics Expert thinks that the inclusion of the NSR in the Belt and Road Initiative and the promotion of the Polar Silk Road concept currently exert mainly political influence.

The Chinese Lawyer disagrees strongly with European interviewees concerning the importance of the Belt and Road Initiative and the Polar Silk Road projects to the development of the NSR. The Chinese Lawyer says that the BRI and PSR have transformed the NSR's strategic status from a geographic possibility to a pillar of national policy, mobilized capital for critical icebreaking and port infrastructure, and stimulated commercial demand and service innovation. The Chinese Lawyer assures that "the NSR is no longer a question of 'if' but 'how fast' it will grow, largely due to the concrete impact of its integration into China's Belt and Road vision".

Additional costs related to icebreaking and insurance harm seriously competitiveness of the NSR, in addition to bureaucracy. The European former CEO presents heavy criticism towards corruption and unpredictable bureaucracy along the NSR, which, according to the European former CEO, decreases the NSR's competitiveness. The European Logistics Expert equally thinks that the additional costs severely weaken the NSR's competitiveness as a universal, cost-driven alternative to the Suez route. Therefore, according to the European Logistics Expert, the NSR is not a "cheaper" option.



7.3 LOGISTICS

There is a constant need to invest in construction of icebreakers because they serve several purposes such as search and rescue, resupplying remote Arctic communities and ensuring shipping traffic channels remain ice-free. Currently, the situation of the NSR from the point of view of icebreakers' availability is in order. In 2026, Russia has more icebreakers than any other country, 57. This is less than it needs to ensure passage in the Eastern parts of the NSR and keep the NSR operation year-round. Russia has an ongoing icebreaker construction program.

Currently, Russia's Rosatomflot has eight nuclear-powered icebreakers in operation. By 2030 the fleet is set to encompass ten vessels. To underline Russia's positive progress in securing sufficient icebreaker capacity on the NSR, Russian authorities announced at the beginning of 2026 plans to construct 10 more icebreakers along with 46 rescue vessels.

The NSR has a remarkable advantage that Russia is the only country to have nuclear-powered icebreaking vessels. Russia has a strong advantage both due to the number and autonomy of its icebreaking fleet, whereas the US icebreaking fleet is comprised of only two operational vessels.

The European Logistics Expert says that icebreaker capacity has increased significantly in recent years as there are eight nuclear icebreakers currently in service, with additional vessels under construction, providing year-round support for existing resource projects. The European former CEO also says that the number of icebreakers along the NSR is sufficient to current traffic.

Russia has invested 910 million rubles (\$30.1 million) for establishment of ten SAR centers along the NSR. To support the icebreaking operations, Russia plans to establish three rescue fleet bases along the NSR, which should ensure a year-round navigation through the Arctic.

The European Logistics Expert raises concern for the NSR's search and rescue capabilities due to vast distances and sparse coastal infrastructure. According to the European Logistics Expert, timeline and specifics about the development of dedicated rescue capacities require detailed examination.

The Chinese Lawyer assesses that in order for the NSR to become a reliable, competitive global trade corridor attractive to international operators, beyond Chinese and Russian ones, the development of the SAR fleet and ancillary safety infrastructure is as crucial as the icebreakers themselves. According to the Chinese Lawyer, current SAR capacity is adequate for a controlled, resource-focused corridor, but not for an open, high-frequency shipping lane.

The ships need to be ice-class in order to navigate in the difficult operational conditions in the Arctic waters. The ice-class requirements refer to "ships with



reinforced hulls and powerful engines to ensure adequate safety and operational performance”.

The Polar Code requires vessels to follow stringent criteria of design, equipment and rescue. The Polar Code requires ships aiming to operate in the Arctic waters to apply for a Polar Ship Certificate. The Polar Ship Certificate classifies vessels to Category A, B, or C, according to their capability to sail in polar waters.

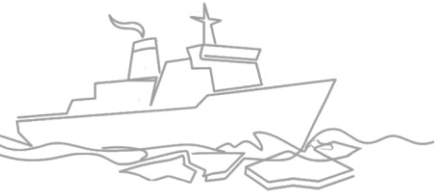
Ice-classed ships’ building costs are 10-30 per cent higher than normal ships. Building of ice-class ships requires high-level engineering skills concerning hull thickening, greater structural support, rudder and propeller protection and heating for fuel tanks.

The European Logistics Expert says that there are problems to construct high ice class vessels for new Arctic industrial projects especially in the oil and gas sector. Furthermore, the European Logistics Expert raises a problem that there are virtually no specialized ice class container ships available on the market and they must be designed and built from scratch. The former European Seafarer says disagrees with the European Logistics Expert, insisting that there are enough ships available for navigation on the NSR because around 5 percent of the global fleet is newly built each year.

The European former CEO says that the requirements for ships sailing in the Arctic waters complicate the development of the NSR. No one has built such container transport ships that could serve transition traffic and that would be adequately ice-strengthened. According to the European former CEO, the Arctic ships are extremely expensive. For example, the LNG ships of Yamal cost, when they were ordered, 210-220 million dollars, 340 million US dollars, whereas the market price of a normal LNG ship was 210-220 million dollars. “These ships are expensive due to their heavier hulls, more expensive and high-powered machinery, and ice-strengthened propellers”, explains the European former CEO.

The NSR has its own geographical restrictions that affect vessels’ size. In many parts of the Arctic ships’ draft is a significant limiting factor for commercial traffic because “the largest and most economical vessels simply cannot transit the region regardless of time or weather factors”. The draft of vessels that are sailing on the NSR cannot exceed 13 metres. The maximum width of ships has increased from 30 m to 32 m after the delivery of new nuclear icebreakers in 2018.

Geographical and technical constraints of the NSR are problematic in the view of the European Logistics Expert because of them the NSR is not suitable for the transit of the largest modern container ships. The Chinese Lawyer estimates that “there are enough ice-class vessels to support the current, resource-driven traffic pattern on the NSR, which is dominated by state-



prioritized LNG and bulk projects with dedicated shipping”. However, the Chinese Lawyer sees more problems if the NSR grows in popularity. According to the Chinese Lawyer, there are not enough ice-class vessels to ensure smooth and effective shipping flows for a diversified, high-frequency commercial corridor, particularly for container trade.

The Chinese Lawyer says that the geographical constraints render the NSR non-competitive for the large vessel classes (VLCCs, ULCCs, large Capesize bulkers, and ULCVs) that dominate cost-efficient global trade on the SCR. These constraints also ensure that the NSR will remain a supplemental corridor for specific markets (Arctic resources, niche container services) rather than a truly competitive alternative for mainstream global shipping lanes.

The criticism for the level of infrastructure along the NSR is related to sparsity of deep-water ports, which results in few options for resupplying or refueling vessels, a lack of complete and accurate hydrographic data, with a further lack of navigational aides such as channel markers, general under-development of infrastructure with few ports or readily deployable emergency response assets, and underdeveloped search and rescue (SAR) coverage.

Critics have highlighted that despite Russia and China’s vocal intentions to make the NSR into a successful shipping lane, large investments have not been made yet in the required infrastructure. Russia aims to revitalize the NSR with help of the Northern Transit Corridor Project (NTC), which is implemented by Rosatom Cargo. The NTC has three main components: The construction of container transshipment ports at both ends of the NSR, the construction of an ice-class container fleet, and the development of the NSR infrastructure.

The European former CEO is very critical of the quality of infrastructure along the NSR, which, according to the European former CEO, is “below standard”. The European former CEO says that “Russia talks a lot about building some kind of security infrastructure, weather services, rescue services, and other similar things along the way. But that’s pretty much just talk. This is just marketing talk. They are trying to create the impression that this is a competitive route. But if a ship gets into some kind of trouble somewhere in the Laptev Sea, there is no help available locally.”

The Chinese Lawyer also sees problems with the NSR infrastructure, which, according to the Chinese Lawyer, is inadequate for general commerce. The Chinese Lawyer says that particularly containerized trade currently lacks schedule reliability, diverse port calls, and rapid turnaround. The infrastructure is not high enough for smooth, effective, and competitive general shipping flows. The bottlenecks (dredging, port limitations, SAR, bureaucracy) are systemic and will require decades and immense investment to resolve. The Chinese Lawyer argues that “the infrastructure quality ensures the NSR functions as a specialized resource export corridor for Russia and its partners, but it



fundamentally limits the route's potential to become a broad, efficient, and attractive maritime transport corridor for the global market”.

Alleged poor quality of infrastructure along the Russian parts of the NSR has been seen as an opportunity for Norwegian ports to compete with, or replace Russian ports along the route. Norway’s ports “a stable political environment high level of technology, an unmistakably better infrastructure, good communication systems, and SAR operations compared to Russian ports”. Consequently, there has been an idea to establish a transshipment hub in Norway and Alaska, on both sides of the NSR. The aim of this plan is to make vessels “independent of the poor infrastructure along the Russian coast” and to “limit the use of ice-classed vessels to the required areas”.

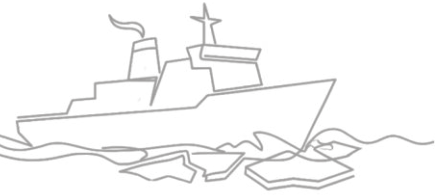
The European Logistics Expert assesses that a scheme without the participation of Russia is unrealistic at this stage. Under normal geopolitical conditions, each type of cargo would require an independent assessment. The Chinese Lawyer agrees with the European Logistics Expert. The Chinese Lawyer argues that “for any state or company seeking to use the NSR, the only pragmatic course is to engage with the reality of Russian coastal infrastructure”. According to the Chinese Lawyer, “the strategic focus should be on negotiating within that system—through long-term contracts, joint ventures, and diplomatic channels—to manage costs, ensure safety, and secure reliable passage for specific cargoes, rather than pursuing an alternative that currently exists only as a conceptual model”. The European former CEO reminds that the administration of Alaska has long found out possibilities for opening the former military base on the Adak Island as a transshipment hub point.

The European former CEO thinks that Alaska could be ready to host such a transshipment hub, if the state provided funding for re-opening of Adak’s former military base.

7.4 GEOPOLITICS

Geopolitical tension has increased in the Arctic. Melting of ice allows an access to larger territory in the Arctic, which increases human activity in the territory. The case of Greenland illustrates more widely the reasons for increased interest in the Arctic. There are two reasons why the great powers would want to own Greenland. On the one hand, the great powers eye natural resources of the Arctic. The second reason is strategic. Melting of ice on Greenland (it loses 270 billion tonnes of ice a year) reveals its strategically important positioning.

The US started to be interested in the Arctic again from 2016 onwards after the rise of China and Russia as its competitors on the global level. The 21st century has been characterized by growing military competition between the great



powers in the Arctic. On the one hand, the US has been concerned about Russia's military presence in the Arctic. Russia has built new military bases and airfields in the Arctic, such as Nagurskoye and Tiksi airbases along the NSR. On the other hand, the US worried about China's economic presence in the Arctic region.

The NSR has a remarkable role as a part of Russia's militarisation efforts in the Arctic. A part of Russia's military exercises in the Arctic have focused on protecting the NSR. Moreover, Russia's new weapons systems deliveries to the Arctic have been accompanied by rhetoric concerning Russia's ability to protect the NSR. NATO and its Member States have used Russia's increased activity in the Arctic, as well as new shipping routes above Russia opened up by climate change that can be used by Chinese ships as reasons for the NATO's growing military attention in the Arctic.

The European Professor says that everything changed after the Russian invasion of Ukraine in 2022. This meant that all the Western companies exploring the possibility of using NSR withdrew their activities. Mostly after this it has been Chinese vessels and companies that have explored the usability of NSR. The former European Seafarer agrees with the European Professor. According to the former European Seafarer, the NSR is currently exposed to increased risk for merchant ships.

The European former CEO illustrates the meaning of geopolitical tensions by saying that China's state-owned operator COSCO planned to initiate regular traffic on the NSR during the peak of the Arctic boom in 2011-2012. However, the company decided to pull out from Russia out of fear that anti-Russian sanctions could be applied to them. COSCO has therefore decided to abandon all the experiments on the NSR. The interviewee says that those Chinese companies, that have replaced COSCO in the Arctic, are private companies, and, according to the interviewee's suspicions, Russians acts behind those companies.

The European former CEO argues that the increase in the military tensions derives from the reason that Russia has rebuilt the military basis situated by the Arctic coast and islands that were abandoned during Yeltsin's era. Moreover, Russia has been building four armed icebreakers, two for the Navy and two for the Coast Guard. The European former CEO thinks that the increased military tension is a political risk towards the east too. The interviewee mentions as an example the case of the oil tanker Eagle S, which was suspected of damaging cables between Finland and Estonia in the Gulf of Finland. The US is such a big player that they can seize ships deliberately.

The Chinese Lawyer says that rising geopolitical tensions between the West (US and Europe) and East (Russia and China) complicate NSR operations by introducing high costs and regulatory barriers. Western sanctions restrict access to ports, insurance, and financial services, leading to soaring insurance



premiums and forcing many international shippers to avoid the route. Russia's control over the NSR mandates expensive icebreaker escorts and permits, while a lack of Western investment hinders infrastructure development. These factors fragment the market, as Western-aligned cargo shifts to safer routes, whereas the NSR remains used mainly for energy and commodity trade between Russia and China.

The Chinese Lawyer adds that from economic perspective, these tensions undermine the NSR's commercial potential by adding layers of risk, cost, and inefficiency. In the short term, the route is economically viable primarily for Russian-Chinese transactions, but broader international adoption is limited. The Chinese Lawyer emphasizes importantly that in the long term, the NSR may evolve into a bifurcated corridor, with its development dictated more by geopolitical alignments than pure economic logic. While climate change will enhance its accessibility, the ongoing rivalry ensures that operational complexities will persist, constraining the route's integration into global trade networks.

NATO has drawn attention to Russia's use of its so-called "shadow fleet" of old tankers and cargo ships in an effort to avoid sanctions on Russian oil and other exports. The US and other western states have put an increasing pressure on Russia's naval transportations and seized Russian tankers. In return, Russia has threatened to break and eliminate the blockade with its Navy. Russia has also hinted that it might be interested in seizing ships that sail under European flags as a countermeasure.

The former European Seafarer says that there is a risk of mutual escalation at the seas. The former European Seafarer reminds that seizure of ships belonging to a foreign state with which one is at peace is a violation of international law and international agreements. Therefore, according to the former European Seafarer, unilateral actions by the West in this way can lead to corresponding response from the other side. The former European CEO says that the increased military tension is a political risk towards eastern ships. The European CEO says that the US is such a big player that they can seize ships deliberately.

China became more proactive in the Arctic affairs since 2010, when Chinese Arctic specialists started to classify China as a "near-Arctic state" or an "Arctic stakeholder". China reached the peak of its new engagement in the Arctic in 2013, when its application for Observer status at the Arctic Council was accepted. China's White Paper "China's Arctic Policy" sought to justify China's role with vested interests in the Arctic by repeating calls for China as a "near-Arctic state".

In order to achieve its Arctic goals, China proposed to incorporate the Arctic as part of its Belt and Road Initiative (BRI) by encouraging joint efforts to construct a Polar Silk Road, which links "China and Europe through the Arctic Ocean via



vast logistic and transportation networks". The Polar Silk Road's focus is to develop shipping networks and infrastructures in the Arctic. It provides an economic incentive for China to develop the necessary infrastructures for the extraction of the Arctic's huge oil and gas reserves.

The "geostrategic implications of the confluence between Arctic shipping routes and the BRI", referring to the Arctic as "the New Middle East". Li argues that with "shorter sea routes and the abundant presence of oil and mineral deposits in the Arctic, the "centre of power will inevitably shift northwards", thereby ushering in a change in the "global geopolitical pattern". The Polar Silk Road is an opportunity for China to circumvent maritime chokepoints, such as Strait of Malacca and Strait of Hormuz through which China's energy imports are currently being predominantly transported.

China's growing influence and activity in the Arctic region raises concern among other states. The US Department of Defence expressed its concern about China's military activity in the Arctic in a report published in 2025 as follows: "In the decade since gaining observer status on the Arctic Council in 2013 China has massively expanded its Arctic footprint and has begun to work closely with Russia in its attempt to be seen as an Arctic power".

The Arctic Council acts as a loose forum for consultations among the Arctic states. Russia has considered the Arctic as a zone of peace and has thus had a goal of maintaining international cooperation there. According to many estimates, Russia has played a constructive role in the Arctic Council and other Arctic institutions. Earlier, Russia for example proposed a full-scale military and political dialogue between the Arctic states as a way to promote confidence and mutual understanding and prevent any type of escalation.

However, the US has started to characterize it as an arena of great power competition. The Arctic Council has been in the turmoil after the start of the war in Ukraine. The Arctic Council suspended its work on March 3, 2022, participants resumed written communication in the fall of 2023. In February 2024, a decision was made to resume the working groups, including Russia, through online meetings.

The Chinese Lawyer sees that the suspension of cooperation in the Arctic Council directly complicates shipping along the Northern Sea Route (NSR). A key problem is the fragmented implementation of the International Maritime Organization's Polar Code. While Russia claims alignment, the breakdown of multilateral forums like the Council hinders coordinated standard-setting, monitoring, and emergency response planning. This creates regulatory uncertainty, raises insurance costs, and deters mainstream Western shipping companies, confining the route largely to Russia-China energy trade.



The Chinese Lawyer raises other significant issues caused by the lack of cooperation in the international institutions such as the Arctic Council. These include:

- 1) Increased Operational Risk: The collaborative scientific data exchange on ice and weather conditions is impaired, affecting voyage safety and planning. Joint projects on oil spill response and search and rescue are stalled.
- 2) Market Distortion and "Shadow Fleet" Growth: Sanctions and the withdrawal of major container lines have fostered a parallel market reliant on older, often underinsured vessels, elevating environmental and accident risks in the fragile Arctic ecosystem.
- 3) Long-Term Inefficiency: The NSR's development becomes geopolitically driven rather than optimized for global efficiency. The lack of coordinated investment in infrastructure, technology, and sustainable practices increases long-term costs and undermines the route's economic potential as a reliable international corridor.

7.5 SANCTIONS

Sanctions imposed by western states on Russia are a source of vulnerability for the NSR. A part of those vulnerabilities can potentially make the transport system ineffective, impact shipping safety, and cause irreversible harm to the marine environment.

Russian developers have a lack of access to critical supplies, which may impact both energy production and operational safety, and lead to interruptions or breakdowns of key plant and terminal operations. Sanctions have prevented Russia from developing its port and transportation infrastructure in the Arctic Ocean. There is a need to improve the NSR's transportation infrastructure to ensure the reliability of Arctic shipping and in order to increase the cargo volume on the NSR.

Western sanctions against Russia are expected to delay the schedule of the Russian government's Arctic Shipping Corridor (NTC) project. Although China does not support Western sanctions on Russia, it is weary of jeopardising trade relations with the US and the EU. Russia needs to find suitable replacements for Western technology and services, including project investment, in order to overcome the hurdles set up by western sanctions.

There is a lack of high-resolution satellite monitoring of the NSR. The accurate and timely forecasting of sea ice conditions is of paramount importance for the safety of navigation. Western sanctions restrict Russia's access to foreign satellite images. This places limits on the data, which is available to suggest



different sailing tracks for ships on the NSR based on the most favourable sea ice conditions at the time.

Western countries imposed economic sanctions on Russia's oil and coal exports after the war in Ukraine started. Russia is also facing difficulties in exporting resources to Europe due to the EU's sanctions, and therefore needs to explore new export markets such as Asia. Due to the sanctions, Russian energy firms lost access to Western financing and technology, which forced Russia to seek alternative partners, mainly in China.

The Chinese Lawyer admits that Western sanctions have significantly constrained Russia's access to advanced foreign technology for developing the Northern Sea Route's (NSR) critical energy and port infrastructure, leading to delays, increased costs, and a scaling back of ambitions.

The Chinese Lawyer thinks that sanctions have severed access to specialized Western engineering, liquefaction technology, and key module suppliers. While Russia has turned to alternative partners, this has resulted in supply chain disruptions, construction delays, and reports of reduced operational capacity. Similarly, plans for essential support infrastructure, such as new rescue vessels and large-scale port dredging, have been hampered as sanctions block access to foreign contractors and equipment.

The Chinese Lawyer concludes by saying:

“Economically, these technological bottlenecks have crippled the NSR's development as a global transit corridor. The inability to efficiently build and maintain modern terminals and ice-class vessels has increased project costs, reduced commercial viability for broader international use, and solidified the NSR's current role as a geopolitically constrained energy export channel rather than a competitive global shipping lane.”



8 CONCLUSION

8.1 BREAKING THE ICE – FROM THEORY TO PRACTICE

This study has approached the topic of the feasibility of the Northern Sea Route for navigation from many angles. Firstly, the study has provided scientific information to be applied in a practical way. Secondly, the study has combined together long-time data from scientific publications with interviews of experts of Arctic shipping, which guarantees the highest level of expertise and relevance available to be published. Thirdly and finally, the expert interviews of the study provide a geographical distribution between Europe and China, which enables readers to pay attention to differences of perspectives in different continents.

This study has provided an overview to the most important perspectives to the shipping along the Northern Sea Route in the form of the literature review. The analysis part of the study highlighted the essential parts of the literature review and combined it with the content of expert interviews. The analysis pointed out to phenomena that describe best the current realities around the NSR.

The aim of this chapter is to offer an effective analysis of to the policy-makers by processing the most important information of previous chapters and structuring it in an easily disposable form. This will be done by drawing attention to the central content of the previous sections and by combining it with an innovative and fresh outlook to the topic.

Firstly, this chapter divides the gathered data of the previous chapters to the strengths and weaknesses of the NSR shipping. This will be done by combining the data of the literature review and expert interviews.

Secondly, this chapter draws guidelines for policy-makers by highlighting the most important choices concerning the future of the development of the NSR from the European point of view. The method of the chapter is the use of dichotomy to the most important phenomena that emerged from the study's content. The use of dichotomy ensures the supply of the highest level of understanding to the current realities concerning the NSR by providing both pros and cons of each phenomenon. This approach is useful for the policy-makers as it provides them with diverse perspectives and avoids the trap of excessive politicization of the subject by leaving leeway for their own thinking.



8.2 PRO's AND CON's OF SHIPPING ALONG THE NSR

8.2.1 STRENGTHS

STRENGTH 1: Future prospects of the NSR's navigability

There is an increasingly clear idea about better future prospects concerning the navigability of the NSR. There were differing expectations among the study's expert interviewees concerning the future navigability of the NSR. The Chinese Lawyer expected the NSR to be feasible for year-round commercial shipping by around 2035. The European former CEO was more cautious with predictions, stating that the NSR could be operational year-round in around 2055-2065. The European Logistics Expert did not expect big changes in the development of the NSR's navigability in the future during the next 15 years, but admitted that the extent of ice would reduce in the longer term.

STRENGTH 2: Shorter distance and saving in time and fuel

The NSR's main potential lies in about 30-40 % shorter distance between Europe and Asia compared to the Suez Canal Route, reducing the transport time from about 30 days on the SCR to about 19 days on the NSR. This leads to decrease in ships' transit time and fuel consumption depending on ice conditions.

The Chinese Lawyer, who was interviewed as part of the study, argues that the NSR holds a compelling advantage compared to the SCR from a distance and time perspective.

STRENGTH 3: Access to natural resources of the Russian Arctic

The NSR has traditionally been popular for transport of liquid and dry bulk cargo and it is especially competitive in transport of natural resources. The Arctic Ocean has high potential for gas resources.

The European Logistics Expert and European former CEO agree with each other that the NSR is only interesting because of transport of natural resources. The European Logistics Expert says that the development of the NSR will continue to be driven primarily by the export of Arctic resources: oil, gas, metals, and other minerals. The Chinese Lawyer agrees with other interviewees that the NSR is economically the most competitive for LNG and crude oil shipments from Russian Arctic projects to Asia. For these cargoes, the NSR is not an alternative but the essential artery.



STRENGTH 4: Icebreaking capacity

Currently, Russia's Rosatomflot has eight nuclear-powered icebreakers in operation. By 2030 the fleet is set to encompass ten vessels. To underline Russia's positive progress in securing sufficient icebreaker capacity on the NSR, Russian authorities announced at the beginning of 2026 plans to construct 10 more icebreakers along with 46 rescue vessels. The NSR has a remarkable advantage that Russia is the only country to have nuclear-powered icebreaking vessels. The European Logistics Expert confirms that Russia's icebreaker capacity has increased significantly in recent years.

STRENGTH 5: Logistical connectivity to China and Asia

China decided to incorporate the Arctic as part of its Belt and Road Initiative (BRI) by encouraging joint efforts to construct a Polar Silk Road, which links "China and Europe through the Arctic Ocean via vast logistic and transportation networks". The Polar Silk Road's focus is to develop shipping networks and infrastructures in the Arctic. It provides an economic incentive for China to develop the necessary infrastructures for the extraction of the Arctic's huge oil and gas reserves.

The study's interviewees have differing views concerning the real added value of adding the NSR to the BRI and PSR. The European interviewees were sceptical about the importance of the launch of the Polar Silk Road project and the connection of the NSR as part of China's Belt and Road Initiative. The European former CEO views that the concrete significance of adding the NSR as part of the Polar Silk Road has been minor. The European Logistics Expert thinks that the inclusion of the NSR in the Belt and Road Initiative and the promotion of the Polar Silk Road concept currently exert mainly political influence. On the contrary, the Chinese Lawyer disagrees strongly with European interviewees concerning the importance of the Belt and Road Initiative and the Polar Silk Road projects to the development of the NSR. The Chinese Lawyer says that the BRI and PSR have transformed the NSR's strategic status from a geographic possibility to a pillar of national policy, mobilized capital for critical icebreaking and port infrastructure, and stimulated commercial demand and service innovation.



8.2.2 WEAKNESSES

WEAKNESS 1: SHORT NAVIGATION SEASON

The attractiveness of the current 4-5 months NSR navigable season is severely limited for the global commercial shipping mainstream due to high costs, operational risks, and schedule unreliability.

WEAKNESS 2: LOW LEVEL OF ATTRACTION FOR CONTAINER SHIPPING

There has been a firmly established view that the NSR is more viable for bulk shipping than for containers due to prerequisites for liner shipping such as schedule regularity and the availability of feeder ports. Transit shipping will be much slower to come to the Arctic. For the container shipping of goods, shipping companies rely on economies of scale and on-time delivery within a tight schedule; ever-increasing capacities of ships help to lower costs

The Chinese Lawyer downplays the significance of the containers for the traffic on the NSR. According to the Chinese Lawyer, the containers on the NSR are not competitive for the global market.

WEAKNESS 3: EXPENSIVE ARCTIC SHIPS

The ships need to be ice-class in order to navigate in the difficult operational conditions in the Arctic waters. The ice-class requirements refer to “ships with reinforced hulls and powerful engines to ensure adequate safety and operational performance”. The Polar Code requires vessels to follow a stringent criteria of design, equipment and rescue. Ice-classed ships’ building costs are 10-30 per cent higher than normal ships.

The European Logistics Expert says that there are problems to construct high ice class vessels for new Arctic industrial projects especially in the oil and gas sector. Furthermore, the European Logistics Expert raises a problem that there are virtually no specialized ice class container ships available on the market and they must be designed and built from scratch. The European former CEO says that the requirements for ships sailing in the Arctic waters complicate the development of the NSR. No one has built such container transport ships that could serve transition traffic and that would be adequately ice-strengthened. According to the European former CEO, the Arctic ships are extremely expensive. The Chinese Lawyer estimates that there are enough ice-class vessels to support the current, resource-driven traffic pattern on the NSR, which is dominated by state-prioritized LNG and bulk projects with dedicated shipping.



WEAKNESS 4: HIGH LEVEL OF ADDITIONAL COSTS

Additional costs related to icebreaking and insurance harm seriously competitiveness of the NSR, in addition to bureaucracy. The European former CEO presents heavy criticism towards corruption and unpredictable bureaucracy along the NSR, which, according to the European former CEO, decreases the NSR's competitiveness. The European Logistics Expert equally thinks that the additional costs severely weaken the NSR's competitiveness as a universal, cost-driven alternative to the Suez route. Therefore, according to the European Logistics Expert, the NSR is not a "cheaper" option.

WEAKNESS 5: LOW QUALITY OF INFRASTRUCTURE

Many sources have complained about poor quality of infrastructure along the NSR in Russia, which limits the ship service and repair possibilities. Several studies have acknowledged the need to improve the quality of infrastructure and port facilities along the NSR. The criticism for the level of infrastructure along the NSR is related to sparsity of deep-water ports, which results in few options for resupplying or refueling vessels, a lack of complete and accurate hydrographic data, with a further lack of navigational aides such as channel markers, general under-development of infrastructure with few ports or readily deployable emergency response assets, and underdeveloped search and rescue (SAR) coverage.

Critics have highlighted that despite Russia and China's vocal intentions to make the NSR into a successful shipping lane, large investments have not been made yet in the required infrastructure. The European former CEO is very critical of the quality of infrastructure along the NSR, which, according to the European former CEO, is "below standard". The European former CEO says that "Russia talks a lot about building some kind of security infrastructure, weather services, rescue services, and other similar things along the way. But that's pretty much just talk. This is just marketing talk. They are trying to create the impression that this is a competitive route. But if a ship gets into some kind of trouble somewhere in the Laptev Sea, there is no help available locally."

The Chinese Lawyer also sees problems with the NSR infrastructure, which, according to the Chinese Lawyer, is inadequate for general commerce. The Chinese Lawyer says that particularly containerized trade currently lacks schedule reliability, diverse port calls, and rapid turnaround. The infrastructure is not high enough for smooth, effective, and competitive general shipping flows. The bottlenecks (dredging, port limitations, SAR, bureaucracy) are systemic and will require decades and immense investment to resolve. The Chinese Lawyer argues that "the infrastructure quality ensures the NSR functions as a specialized resource export corridor for Russia and its partners, but it



fundamentally limits the route's potential to become a broad, efficient, and attractive maritime transport corridor for the global market”.

WEAKNESS 6: HIGH LEVEL OF GEOPOLITICAL RISKS

Geopolitical tensions have increased in the Arctic. The US started to be interested in the Arctic again from 2016 onwards after the rise of China and Russia as its competitors on the global level. US has been concerned about Russia’s military presence in the Arctic.

The NSR has a remarkable role as a part of Russia’s militarisation efforts in the Arctic. A part of Russia’s military exercises in the Arctic have focused on protecting the NSR. Moreover, Russia’s new weapons systems deliveries to the Arctic have been accompanied by rhetoric concerning Russia’s ability to protect the NSR. NATO and its Member States have used Russia’s increased activity in the Arctic, as well as new shipping routes above Russia opened up by climate change that can be used by Chinese ships as reasons for the NATO’s growing military attention in the Arctic.

NATO has drawn attention to Russia’s use of its so-called “shadow fleet” of old tankers and cargo ships in an effort to avoid sanctions on Russian oil and other exports. The US and other western states have put an increasing pressure on Russia’s naval transportations and seized Russian tankers. In return, Russia has threatened to break and eliminate the blockade with its Navy. Russia has also hinted that it might be interested in seizing ships that sail under European flags as a countermeasure.

There is a serious risk that currently existing geopolitical tensions pose a serious risk for both Russian-Chinese and Western operators for their ships being seized, for Russian and Chinese ships in the waters close to the coastline of the Western countries, and for the Western ships along the Russian coastline in the Arctic. That kind of state of affair would render any NSR related cooperation between East and West impossible, cutting thus the continuity of the NSR between Europe and Asia.

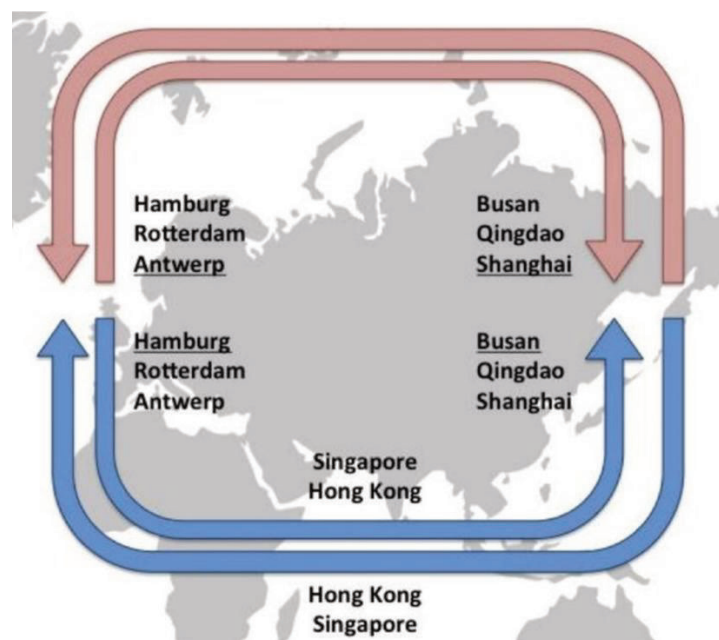
WEAKNESS 7: IMPACT OF SANCTIONS

Sanctions imposed by western states on Russia are a source of vulnerability for the NSR. A part of those vulnerabilities can potentially make the transport system ineffective, impact shipping safety, and cause irreversible harm to the marine environment. Russian developers have a lack of access to critical supplies, which may impact both energy production and operational safety, and lead to interruptions or breakdowns of key plant and terminal operations. Sanctions have prevented Russia from developing its port and transportation infrastructure in the Arctic Ocean.



Western countries imposed economic sanctions on Russia's oil and coal exports after the war in Ukraine started. Russia is also facing difficulties in exporting resources to Europe due to the EU's sanctions, and therefore needs to explore new export markets such as Asia. Due to the sanctions, Russian energy firms lost access to Western financing and technology, which forced Russia to seek alternative partners, mainly in China.

The Chinese Lawyer admits that Western sanctions have significantly constrained Russia's access to advanced foreign technology for developing the Northern Sea Route's (NSR) critical energy and port infrastructure, leading to delays, increased costs, and a scaling back of ambitions. The Chinese Lawyer says that "economically, these technological bottlenecks have crippled the NSR's development as a global transit corridor. The inability to efficiently build and maintain modern terminals and ice-class vessels has increased project costs, reduced commercial viability for broader international use, and solidified the NSR's current role as a geopolitically constrained energy export channel rather than a competitive global shipping lane."



Picture: Graph on Arctic shipping potential³¹²

³¹² Humpert, M., & Raspotnik, A. (2016, February 4). *Despite Global Warming, Suez Canal Will Remain Preferred Shipping Route in Coming Decades*. The Arctic Institute. Available at: <https://www.thearcticinstitute.org/despite-global-warming-suez-canal-will-remain-preferred-shipping-route/> accessed on April 16, 2026.



8.3 NORTHERN SEA ROUTE: DICHOTOMY OF CHOICES

8.3.1 RUSSIA AND CHINA: COOPERATION OR CONFRONTATION?

The new era of geopolitical uncertainty means that political risks caused by geopolitical tensions impact many political and economic decision-making processes. This has an effect on strategic planning of supply chains, including shipping routes such as the Northern Sea Route.

Currently, geopolitical tensions prevail between the West and the East, to the largest extent between the US and the EU, on the one hand, and Russia, on the other hand. The tension can also increase in the future between the West and China. The US and the EU have imposed a huge number of sanctions on Russia, and Russia has responded with its own sanctions against the US and the EU. To top it all off, EU countries have started to seize Russian ships at sea.

It is absolutely clear that in the current state of affairs between the EU and Russia, there are no future prospects for the EU Member States' possibility to connect to the Northern Sea Route. This applies both to connection to the energy resources along the NSR, as well as to connection through the NSR to the Asian markets. The EU and its Member States have to make a decision between different geopolitical models. The choice is between the Euro-Atlantic and continental models.

The currently dominant Euro-Atlantic model is based on the unity between North America and West Europe and the idea of the United States' hegemony. The Euro-Atlantic model is equally based on Sir Halford Mackinder's theory of containment. Mackinder's theory of the Eurasian "Heartland" wanted the maritime powers to contain Russia. According to Mackinder, protecting the "World-Island" requires blocking Russian expansion at the edges. Furthermore, Mackinder wanted to prevent Germany from allying with Russia.³¹³

The Euro-Atlantic model equals geopolitical tensions with Russia and China. Sticking to the Euro-Atlantic model would mean abandoning the idea of connecting European states through the NSR to natural resources of Russian Arctic and China's markets.

The comments of the European Logistics Expert and the former European Seafarer emphasise the political nature of the western operators' decision to abandon shipping on the NSR, simultaneously hinting that this decision could be changed. However, they do not see this happening in the near future. The Chinese Lawyer is also convinced that the western operators' decision to

³¹³ Michael Hochberg and Leonard Hochberg, "Confining the Enemy"—Halford Mackinder's Theory of Containment and the Conflict in Ukraine," *Naval War College Review* 76, no. 2 (Spring 2023): Article 7, 4.



abandon the NSR illustrates “a deeply entrenched strategic position, not a temporary tactical pause”.

8.3.2 SHORTSIGHTEDNESS OR FARSIGHTEDNESS?

This study has exposed a huge difference between European and Chinese mentalities concerning major logistical and economic projects, such as the NSR. Whereas European private companies concentrate on shortsighted economic benefits, Chinese public actors and state-owned companies build a long-term strategy, which takes into account perspectives other than narrowminded economic benefit.

This division between shortsighted and farsighted visions was clearly illustrated by this study’s expert interviews. The European experts concentrated in their comments almost solely on profitability and short-term economic incentive of the NSR. Simultaneously, however, the Chinese Lawyer explained that for China, the development of the NSR is not merely a commercial opportunity but a strategic imperative to diversify trade routes, enhance energy security, and deepen cooperation with Russia under the Belt and Road Initiative. The Chinese Lawyer emphasised that Chinese shipping companies have a higher risk tolerance and longer-term strategic vision compared to many Western carriers, who have withdrawn due to geopolitical and environmental concerns. In the short term, China is not looking only for “tonnes shipped” or “days saved”, but aiming to increase the robustness of the legal and environmental frameworks established to govern the NSR and international shipping more widely.

It is for the European Union and its Member States to decide whether they want to stick to shortsighted profitability calculation or take a more diverse perspective. In the era of unprecedented pressure towards global supply chains, caused e.g. by the blockade of Strait of Hormuz and the Red Sea crisis, there is certainly need for thinking that takes into account security of supply and energy security and alternative maritime passages. Isolating European countries from the NSR would mean maximising China’s influence on the shipping lane.



8.3.3 TRANSITION SHIPPING OR DESTINATION SHIPPING?

The NSR has been more viable for bulk shipping than for containers. Transportation choice between bulk and containers on the NSR is simultaneously a choice between destination and transit voyages. There has been strong demand for destination shipping between the Arctic and ports, which are situated outside the region, during recent years in Asia instead of Europe.

If European countries and their companies decide to re-engage in the NSR shipping, it will be for them to decide whether they want to concentrate on energy transportations and destination voyages, which already are competitive, or whether they prefer to have a more farsighted approach. The latter option would mean an intention to maintain a low level of container transport flows with help of certain already economically competitive niches, such as higher-value goods. The maintenance of shipping connections creates alternatives on the global level, which may pay off in the form of security of supply and energy security in case transportations in more popular shipping routes are interrupted.



8.4 NSR AND GERMANY

GERMAN SECTORS POSSIBLY BENEFITTING FROM NSR CONNECTION

- 90% of German exports rely on sea transport
- Germany ranks first in the world for container carriers, holding around 20% of the market share
- The shipbuilding industry is one of the strategic branches of German economy, which could benefit from providing icebreakers and vessels with highly advanced technologies to ship liquefied gas in the Arctic conditions
- Before the era of sanctions, German shipyards provided drilling platforms, high-tech vessels used for gas and oil exploration as well as for installation and servicing offshore wind farms
- The Sea Legend Shipping targeted premium cargo with high time sensitivity, such as electronics and fashion, and it aimed to capitalise on faster delivery cycles and inventory efficiencies enabled by the shorter maritime route offered by the NSR

POTENTIAL BENEFITS FOR GERMAN SHIPPING INDUSTRY

- Shorter travel times and thus lower fuel costs on the Northern Sea Route may create new opportunities for German shipping
- Distance from Shanghai to Hamburg via NSR takes half the time (24 percent shorter) of traveling through the Suez Canal
- NSR is over 70% shorter compared to the Cape of Good Hope route
- Passages between Rotterdam (Hamburg) and ports in East Asia would be commercially "marginally interesting" between July and October
- Russia's northern Arctic coast offers raw materials for European industry

POTENTIAL DRAWBACKS FOR GERMAN SHIPPING INDUSTRY

- The reasons why a 40% reduction in distance between Hamburg and Yokohama does not mean an equal cost saving are related to "increased cost of building ice-classed ships, the unpredictability of open waters, slower speeds, navigation difficulties, the greater risk involved and the availability of ice-breaker services"



PAST SUCCESSES

- German and Chinese ports have been connected to each other through the NSR in the past
- Trial shipments of containerized freight and bulk cargo between China and Hamburg through Russia along the NSR were successful
- Port of Hamburg Marketing (HHM) signed a cooperation agreement with Russia's Rosatom in 2018. The aim of the agreement was to strengthen and develop cooperation between the ports along the NSR and the ports in the Hamburg Metropolitan Region. The Port of Hamburg and Rosatom were interested in the development of the NSR's ports, exploitation of raw materials in Russia, as well Arctic LNG production.

RECENT SUCCESSES

- European shipping lines have had an incentive to look for alternative trade routes due to crises in the Red Sea and more recently in the Persian Gulf
- Chinese niche liner Sea Legend Shipping launched a direct container service between China and northern Europe via the NSR in September 2025
- The Sea Legend Shipping planned to start a regular service during warmer months between Chinese ports such as Qingdao, Shanghai, and Ningbo, and European ports such as Hamburg, Rotterdam, Gdansk, and Felixstowe
- Danish shipping and logistic company Maersk conducted successfully a test voyage sending the first-ever container ship along the route in August 2018. The Venta Maersk delivered containerized cargo from Asia to Bremerhaven and Saint Petersburg.

RECENT SETBACKS

- 22 international shipping companies informed in 2022 that they are committed to avoid the NSR
- Sea Legend Shipping informed in November 2025 that it had ceased its China-Europe Arctic Express (CAX) service after only one single sailing
- MSC Mediterranean Shipping Company also informed in September 2025 that it continues to avoid the NSR because the NSR "remains underdeveloped for commercial shipping since safe navigation and transit are not assured"
- Hapag-Lloyd, while acknowledging benefits of the NSR in offering significantly shorter voyage time and distance between Europe and Asia,



informed in October 2019 that the company does not use the NSR for environmental reasons

- Maersk decided after the test that it would remain a one-off and it would not return to the route in the near future

FUTURE PROSPECTS FOR GERMANY'S NSR CONNECTION

- The western operators' decision to abandon shipping on the NSR is political, not economic, and it can be redefined depending on the political will.

BREAKING THE ICE



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