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Will Arctic Shipping Routes Eat Singapore's Lunch? Not Anytime Soon, and Maybe Never

By *Ian Storey**

EXECUTIVE SUMMARY

- Singapore's successful bid for observer status in the Arctic Council in 2013 was motivated by a long-standing interest in global governance issues as well as the Arctic's economic potential.
- Rapid sea-ice retreat caused by global warming has made access to Arctic resources easier and lengthened navigational seasons along trade routes that reduce journey times between Europe and Asia by 30-50 per-cent. While Singapore's world-class maritime industries are well placed to take advantage of the commercial opportunities created by the growth of shipping in the Arctic, it has been suggested that the opening of routes through the Arctic Ocean—especially Russia's Northern Sea Route (NSR)—could divert lucrative sea-borne trade away from the country's ports.
- Proponents of the NSR highlight three advantages over traditional routes: cost savings, climate change mitigation and a low-threat security environment. However, these factors require critical assessment: shorter does not necessarily mean cheaper; increased traffic could in fact exacerbate

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global warming; and the safety advantages of the NSR have been exaggerated. Furthermore, and crucially for Singapore—a global maritime transhipment hub—geographical and environmental conditions on the NSR impose severe economy of scale limitations on containerized shipping.

- While local traffic on the NSR is expected to increase over the next few decades, hard commercial realities, continued harsh weather conditions and infrastructural shortcomings suggest that it is unlikely to pose a major challenge to the established maritime trade routes on which Singapore depends for its continued prosperity.

INTRODUCTION

In May 2013 Singapore was granted observer status in the Arctic Council, a high-level intergovernmental forum established in 1996 to maintain peace and stability in the Arctic, promote cooperation and sustainable growth, protect the environment and preserve the rights of indigenous peoples.

Although Singapore is a tropical country located far from the Arctic, it has multiple interests in the High North, including critical global governance issues such as responsible ocean management, the upholding of maritime legal regimes and climate change response. The city-state also has economic interests in how the Arctic develops over the next few decades. Its world-class maritime industries are keen to take advantage of growing commercial opportunities in the Arctic, including port management and the application of new shipbuilding and offshore engineering technologies.

Singapore is also monitoring whether the opening of Arctic shipping routes—especially the NSR which links Europe with Asia across the northern Russian coastline—will divert maritime traffic away from the city-state. This paper argues that due to the limited window of navigational seasons, harsh and unpredictable weather conditions, infrastructural shortcomings and economy of scale limitations on containerized shipping, it is highly unlikely in the foreseeable future that the NSR will grow to rival established maritime trade routes on which Singapore's economic prosperity depends.

OPENING ARCTIC TRADE ROUTES

Sea-ice retreat in the Arctic caused by global warming has opened the prospect of easier access to, and longer navigational seasons on, maritime trade routes between Europe and Asia and North America and Asia. The three principal routes are the Trans-Polar Route (TPR), the Northwest Passage (NWP) and the NSR. Each route passes through the Arctic Ocean and links the Atlantic and Pacific oceans.

The shortest distance between Europe and Asia is across the North Pole. While civilian airlines have long utilized this route, the year-round presence of thick ice in the centre of the Arctic Ocean means that the TPR is currently not a viable option for commercial shipping. In the future this could change: the US Navy predicts that by 2020 the TPR might be navigable for eight weeks a year during the summer, rising to 16 weeks by 2030.¹ However, due to severe weather conditions, dangerous ice floes, the absence of search and rescue (SAR) services, and the lack of opportunities to trade along the way, shipping traffic along the TPR is likely to remain very limited even by mid-century.

¹ The Chief of Naval Operations, "The United States Navy Arctic Roadmap for 2014 to 2030" (February 2014), p. 11.

The NWP runs through the Canadian Arctic, past Alaska and through the Bering Straits. In a landmark report issued in 2009, however, the Arctic Council concluded that due to complex geography, draft² restrictions and the presence of thick, multi-year ice, the NWP is unlikely to become a major trans-Arctic trade route in the future.³

The third route, and the most important from the perspective of Singapore and other Asian countries such as China, Japan and South Korea, is the NSR. The NSR is a set of four shipping passages from Murmansk in northern Russia, across the top of Siberia and through the Bering Straits. The potential economic and strategic value of a maritime trade route from northwest Europe to Asia was recognized as early as the 17th century. However, it was not until the advent of the steam-powered icebreaker in the early 1900s—and especially the nuclear-powered icebreaker in 1959—that it was possible to transform potential into reality. From the 1930s the Soviet Union devoted considerable resources to developing its Arctic regions, and by the end of the 1980s over 300 ice-strengthened vessels, escorted by a fleet of 16 icebreakers, were transporting 7 million tons of cargo every year via the NSR.⁴ In 1991, Moscow opened the NSR to international shipping. However, following the dissolution of the USSR the same year, Russia's Soviet-era national infrastructure quickly atrophied, including that along the NSR, resulting in a precipitous decline in traffic volume from which it has yet to recover.

By the middle of the first decade of this century, two interrelated developments helped revive the NSR's fortunes. First, accelerated ice melt lengthened the navigational season during the summer months (typically from June to September). In the future, the window of operations is expected to extend into spring and autumn (current climate change models do not envisage an ice-free ocean during the winter months). The US Navy estimates that between 2014 and 2020 the NSR could be navigable for 75 days a year, rising to 85-95 days between 2020 and 2030 and 130 days beyond 2030.⁵ Second, the government of President Vladimir Putin identified Arctic resources (especially oil and gas) and shipping as a potentially lucrative source of national income that would help fulfil Russia's Great Power aspirations. Since then, the revitalization of the NSR has become a priority in the country's Arctic policy, and Moscow has increased funding to upgrade the NSR's infrastructure and improve the regulatory framework for domestic and foreign shipping.⁶ While some progress has been achieved, significant shortcomings still exist including gaps in navigational, meteorological and SAR services vital for maritime safety. Icebreaker support is critical for the future development of the NSR, and the current fleet of nu-

² Draft refers to the distance between the waterline and the bottom of a ship's hull. Draft determines the minimum depth of water a vessel can safely navigate.

³ The Arctic Council, "Arctic Marine Shipping Assessment" (2009), p. 38.

⁴ Nataliya Marchenko, *Russian Arctic Sea: Navigational conditions and accidents* (Heidelberg, Germany: Springer, 2012), p. 21.

⁵ "The United States Navy Arctic Roadmap", op. cit., pp. 11-12.

⁶ Arbakan Magomedov Ulyanovsk, "Russia's Plans for the Northern Sea Route: Prospects and Obstacles", *Russia Analytical Digest*, No. 29 (24 June 2013). P. 8.

clear-powered vessels is reaching the end of its operational life. Upgrading the NSR will therefore require considerable investment over the next few decades; Russia lacks the financial resources to do it alone, and so far foreign investors—including from Asia—have demonstrated little interest.

Notwithstanding infrastructural shortcomings, traffic volume on the NSR is on the rise. According to the Moscow-based agency that issues transit permits, the Northern Sea Route Administration (NSRA), 71 vessels used the NSR in 2013, up from 46 and 41 in 2012 and 2011 respectively, and just four in 2010.⁷ However, while these figures have been widely quoted in the media, they are singularly unimpressive when compared to other international sea routes: in 2013, 16,596 ships passed through the Suez Canal and 12,045 through the Panama Canal; and a staggering 77,973 vessels transited the Straits of Malacca.⁸ Moreover, a breakdown of the NSRA statistics reveals that the majority of traffic in 2013 was either destinational (i.e. involving community resupply, tourism or the transportation of resources between Russian ports) or intra-Arctic (i.e. between Arctic states): of the 71 vessels that received permits to use the NSR only 20 made the journey from Europe to Asia (or vice versa). The tiny volume of trans-Arctic transport highlights the NSR's current and future limitations.

WEIGHING THE PROS AND CONS

The principal advantage of the NSR is that it provides shorter sailing times between Europe and Asia. For example, for ships travelling between London and Yokohama, the distance using the NSR is 7,474 nautical miles (13,841 kilometres) compared to 11,447 nautical miles (21,200 kilometres) along the Suez-Malacca route and 12,581 nautical miles (23,300 kilometres) via the Panama Canal.⁹ Over the past several years, as interest in the Arctic has increased, media reports have emphasized the number of voyage days that ships can save by using the NSR instead of the Suez-Malacca run. For example, in August 2012, it was reported that a vessel carrying iron ore from Murmansk to Huanghua, China completed its journey in 23 instead of 43 days.¹⁰

Proponents of the NSR highlight three positive benefits: first, that the shorter route results in cost savings on fuel and crew; second, that reduced fuel burn benefits the environment; and third, that it is safer to use the NSR than the Suez-Malacca route because the latter bypasses “piracy hotspots”, the politically unstable Middle

⁷ Northern Sea Route Administration website <http://www.nsra.ru/en/celi_funktsii/>.

⁸ Suez Canal Authority <<http://www.suezcanal.gov.eg/reports.aspx>>; Panama Canal Authority <<http://www.acp.gob.pa/eng/>>; Marine Department Malaysia <<http://www.marine.gov.my/jlmeng/index.asp>>. Figures for the Straits of Malacca exclude destinational shipping.

⁹ Ulyanovsk, “Russia’s Plans for the Northern Sea Route”, op. cit., p.8.

¹⁰ “Breaking the ice for China”, *Straits Times*, 20 August 2012.

East and the South China Sea where tensions continue to fester over maritime territorial disputes. In assessing the potential impact of the NSR on Singapore, each of these assertions requires critical examination.

The Economics of Arctic Resources and Shipping

When considering the future growth prospects of shipping on the NSR it is important to consider two critical variables: first, the extent and commercial viability of Arctic resources; and second, its utility for containerized shipping.

The Arctic is rich in natural resources, and as the ice melts the prospect of enhanced access to those resources, especially oil and gas, has helped fuel international interest in the region. The development of off-shore energy fields in the Barents Sea over the past decade has already led to an increase in both destinational and intra-Arctic shipping on the NSR. And yet the scope and commercial viability of Arctic resources remain open to question. While the U.S. Geographical Survey's estimate that the Arctic could contain 13 and 30 per cent of total global undiscovered oil and natural gas respectively have been widely cited, these figures are highly speculative and should be treated with caution.¹¹ And even if these estimates are correct, rough weather conditions and operating in deep waters mean that extracting Arctic resources will be technically challenging and very expensive. It is easier, and therefore cheaper, to exploit energy reserves in other parts of the world, such as in the Middle East and, as a consequence of the shale gas revolution, North America. In 2012 Russia's Arctic energy ambitions received a severe setback when the development of its much-vaunted Shtokman natural gas field in the Barents Sea had to be suspended indefinitely because of rising costs and competition from cheap shale gas in the United States.¹² Higher demand for Arctic resources from countries in Northeast Asia will lead to an increase in bulk shipping on the NSR; but if minerals and hydrocarbons can be sourced more cheaply in other parts of the world the growth of trans-Arctic traffic will be stunted.

The second and more important variable from Singapore's perspective is container traffic on the NSR. Today, the majority of the world's manufactured goods are transported by sea in containers. Containerized cargo is measured in twenty-foot equivalent units (TEUs) which is based on the standard size of a shipping container. Until 2010, Singapore was the world's busiest container port before being overtaken by Shanghai. In 2013 Shanghai still retained its number one position, handling 33.77 million TEUs; but Singapore was a close second, moving 32.58 million TEUs.¹³

¹¹ "Circumpolar-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas in the Arctic", U.S. Geographical Survey, Fact Sheet 2008-3049 (2008).

¹² "Plug pulled on Russia's flagship Shtokman energy project", *The Guardian*, 29 August 2012.

¹³ Shanghai International Port <<http://www.portshanghai.com.cn/en/>>; Maritime and Port Authority of Singapore <<http://mpa.gov.sg/>>.

For a number of reasons, the NSR is unsuitable for container shipping. As shipping companies look to improve economies of scale, and hence their profit margins, container ships have become larger. The Maersk Group's new Triple-E Class container ship has a cargo capacity of 18,000 TEUs, and even larger vessels are on the drawing boards. However, due to beam (width) and draft restrictions imposed by narrow and shallow straits in parts of the NSR, the largest container ships that can operate there have a cargo capacity of only 2,500-4,000 TEUs.¹⁴ As a result, while it might be faster for a container ship to use the NSR than the Suez-Malacca route, the cost per container could actually be much higher due to economy of scale limitations.¹⁵ Profitable container shipping is also dependent on just-in-time delivery schedules, especially for component trade. Even as the ice melts and the NSR becomes more accessible for longer periods, dangerous ice floes, freezing fog and Arctic storms make delivery schedules uncertain (for bulk shipping on-time delivery is less critical). The NSR also offers poor network economics: container ships regularly call at major transhipment hubs such as Singapore to off-load and take on new cargo—but there are no major ports along the NSR and therefore limited opportunities to trade along the way.

For shipping companies contemplating the NSR there are additional costs: Russia levies mandatory fees for pilotage and icebreaker escorts (though ships using the Suez and Panama canals must also pay transit fees); ice-capable ships are expensive to design and construct, and their crews require special training; and the absence of SAR facilities in the Arctic, combined with severe weather conditions, raises insurance costs. In short, there are many reasons why shorter may not translate into more profitable.

Environmental Impacts

Will increased shipping on the NSR mitigate climate change? Not necessarily.

While the NSR reduces the geographical distance between Europe and Asia, ice will always be present along the route even during the summer, and pushing through ice requires ships to burn more fuel than on the open sea. Vessels traversing Arctic waters require heating for crew members and even for certain kinds of cargo which can be damaged by low temperatures, both of which increase fuel burn. Ice-strengthened ships are heavier than other kinds of vessels and consume greater amounts of fuel. Most importantly, ocean-going vessels today burn low-quality fuels that emit a fine particulate matter known as black carbon. Deposits of black carbon in the Arctic reduces the reflectivity of ice thus increasing heat absorption and hence ice-melt.¹⁶

¹⁴ The Arctic Institute, "The Future of Arctic Shipping: A New Silk Road?" (November 2013), p. 13.

¹⁵ Stephen M. Carmel, "The Cold, Hard Realities of Arctic Shipping", *Proceedings*, Vol. 139/7/1,325 (July 2013).

¹⁶ Arctic Council, "Arctic Marine Shipping Assessment 2009 Report", (2009), p. 142.

Until green ship technologies become widely available, therefore, increased traffic on the NSR could actually exacerbate global warming.

Political and Security Risks

Is it less risky for vessels to use the NSR than the Suez-Malacca route? While piracy was a problem in the Straits of Malacca in the first half of the first decade of this century, and a major threat to shipping off the coast of Somalia and in the Gulf of Aden in the second half of the decade, the number of attacks in both areas has since fallen dramatically due to international naval cooperation and other initiatives. According to the International Maritime Bureau (IMB), reported piracy attacks in the Straits of Malacca dropped from 75 in 2000 to just one in 2013, and from 160 in 2011 to seven in 2013 off the coast of Somalia—the figures for 2013 are thus negligible.¹⁷ Political instability in the Middle East is a perennial problem, but has not affected operations in the Suez Canal since the mid-1970s. And in the South China Sea, rising tensions have had little or no impact on commercial maritime traffic.

In the Arctic there are no pirates, and cooperation among the circumpolar states is longstanding. However, the Arctic may not always provide a benign security environment: serious interstate disputes could arise over fisheries, overlapping Extended Outer Continental Shelf claims and ownership of seabed resources, or even the legal status of the NSR itself (Russia claims the NSR as its internal waters while the United States and the European Union consider it to be an international strait).¹⁸ Moreover, geopolitical tensions in one part of the world could spill over into the Arctic, fueling existing disputes or at least constraining cooperation. Moscow's annexation of Crimea in March 2013 provides an important test case of whether or not the Arctic can remain insulated from growing tensions between Russia and the West.

CONCLUSION

According to the most recent report by the United Nation's Intergovernmental Panel on Climate Change, the effects of global warming are likely to be increasingly "severe, pervasive and irreversible".¹⁹ In the Arctic, rising air and sea temperatures will lead to continued rapid ice-melt, further resource extraction and longer navigational seasons. As a result, the volume of destination and intra-Arctic shipping on the NSR will experience growth.

¹⁷ *Piracy and Armed Robbery Against Ships* (London: International Maritime Bureau, various issues 2011-2013).

¹⁸ See Ian Storey, "'Arctic Lessons: What the South China Sea Claimants Can Learn from Cooperation in the High North", ISEAS Perspective #65 (16 December 2013).

¹⁹ Intergovernmental Panel on Climate Change, "Climate Change 2014: Impacts, Adaptation, and Vulnerability: Summary for Policymakers" (31 March 2014), p. 14 <http://ipcc-wg2.gov/AR5/images/uploads/IPCC_WG2AR5_SPM_Approved.pdf>.

However, for the reasons identified in this paper—harsh and unpredictable weather conditions, lack of infrastructure and economy of scale limitations for container ships—intercontinental maritime traffic is unlikely to expand as quickly. The US Navy estimates that by 2030 less than 2 per cent of global shipping will utilize the NSR.²⁰ But while the NSR is unlikely to pose a significant challenge to existing high-traffic maritime trade routes, it could provide an attractive seasonal alternative, especially for bulk shipping. Higher traffic volumes on the NSR will benefit ports in Northeast Asia and some traffic could be diverted away from Singapore.

But the precise impact on Singapore's bottom line is impossible to estimate at this time due to a host of uncertain variables such as future world trade patterns, advances in technology and global energy demand. What can be said with certainty, however, is that Singapore is much more concerned with the immediate challenge posed by the development of container ports in neighbouring Southeast Asian countries, such as Malaysia, Indonesia and Vietnam, than the threat posed by Arctic shipping lanes.

²⁰ "The United States Navy Arctic Roadmap", op. cit., p. 13.

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