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THE SUEZ CANAL VS. RUSSIA'S ARCTIC SHORTCUT: A NEW COLD WAR IN SHIPPING

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Abstract
The competition between the Suez Canal and Russia's Northern Sea Route (NSR) reflects a transformative shift in global trade dynamics, driven by climate change, geopolitical rivalries, and infrastructure strategy. While the Suez Canal remains the dominant year-round corridor for containerized and diversified cargo (handling 12% of global maritime trade), the NSR offers a seasonal Arctic shortcut reducing Asia-Europe distances by 30–40%. Russia aggressively promotes the NSR to export energy resources (e.g., LNG) to Asia amid Western sanctions, leveraging icebreaker fleets and port investments. However, the NSR faces operational constraints, including limited navigability (July–October), high costs (icebreaker fees, insurance premiums), and inadequate infrastructure. Environmental risks in the fragile Arctic—noise pollution, oil spills, and black carbon emissions—contrast with Suez's congestion and regional instability vulnerabilities. Geopolitically, the NSR fuels a "New Cold War," with Russia and China's "Polar Silk Road" challenging Western maritime dominance, while NATO counters via Arctic militarization. The rivalry underscores how climate-induced accessibility and great-power competition are reshaping trade, energy security, and global alliances.

INTRODUCTION

The veins of international trade are throbbing through a few narrow maritime straits, areas of critical and fragile necessity that determine the extent of trade, energy, and political influence. The Suez Canal is one of them, built in the 19th century and even now serving 12% of the entire world maritime trade volume by volume, directly linking the Asian manufacturing facilities with the European and other end consumers of products (UNCTAD, 2023). Its strategic value cannot be denied and this holds back international supply networks and domestic economies. The solid map of world shipping is, however, being changed fundamentally, by the twin engines of climate change and geopolitical upset. The threat to the Suez Canal could come from the ice around its melting waters, at least, Russia asserts itself through its Northern Sea Route (NSR), in the form of a seasonal competitor, especially after Russia Ukraine

conflict and imposed extensive Western sanctions. Such a juvenile rivalry is more than just a trade competition, it is a multifaceted process of transformation in the environment, resurgence and power struggle of great powers, and the chase of strategic economic superiority, and the question arises, does the emergence of NSR represent merely an opportunistic, commercially pragmatic response to changing climatic conditions or an economic opportunity brought about by changing climate and in an environmental geostrategic balancing, the genesis of a new Cold War unfolding on the frozen map of trade routes?

The dominance of the Suez Canal has become one of the pillars of a globalized economy. Its effective transit can take thousands of kilometres and weeks of trips in Asia-to-Europe routes than that taken by the Cape of Good Hope routes hence is an essential service to container ships, oil tankers, and bulk ships. Domination of this chokepoint grants colossal economic powers and strategic influences as literally epitomized during the Suez crisis of 1956 and very recently with the blocking of the Ever Given in 2021. However, this same centrality makes it vulnerable to any interference, namely, political instability in the region, piracy, terrorism, or accidents that could have a ripple effect on the global markets.

Enter the Northern Sea Route. Cutting across the Arctic coast of Russia, the NSR presents an impossibly shorter route between Northeast Asia and Northwestern Europe: the route could be shortened by up to 30-40% of the usual distance. Even though historically it was impossible to pass by the majority of the year and was dangerous because of dense, multi-year ice the determination of climate change is quickly changing this math. Satellite measurements reveal an acute reduction in the extent and thickness of the Arctic Sea icehas significantly dropped, especially during the summer period (NASA, 2023). This change in environment is opening up the NSR increasing its operating window and becoming feasible to use more specialized vessels, and in particular carrying the plentiful Arctic energy resources (such as Liquefied Natural Gas - LNG) of Russia to Atlantic energy markets in the east, in Asian markets. Putin himself has attempted to ensure greater federal control over the route by allocating financial resources to the construction of fleets of ice breakers (most notably the nuclear-powered variety run by Rosatomflot) and port facilities to facilitate Russian interests in securing Russian control over the route.

The chronology of the faster pace in terms of the development of the NSR cannot be considered devoid of a geopolitical context. Western sanctions greatly limited access to Russia to Europe's traditional markets and ports following the 2022 Russia Ukraine conflict. To this, the Kremlin turned sharply eastwards by trying out new trade partners, mainly China and India. The NSR became the key to this policy as a sanction-busting route to export Arctic resources directly to Asia and a possible region to trade between Asia and Europe that would not be on networks dominated by the West. The NATO members have taken this move with intense suspicion and a lot of counter-actions, especially on the part of the US and Canada who are looking at the militarization of the Arctic by Russia with grave concern and also looking at its unilateral claim over the governance of the NSR with great apprehension. At the same time, there is another aspect of great power competition in the Arctic theatre: an interest in the route, which is a part of the Chinese interests by developing its "Polar Silk Road" prospect, as part of its Belt and Road Initiative (BRI). In the meantime, the Suez Canal Authority of Egypt (SCA) is fighting back by making its infrastructure improvements, with an acute feeling of what the challenge can mean in the long term.

So, the ground is prepared for the complex competition. The rivalry between the Suez Canal and the Northern Sea Route is not a two-choice situation between shippers because of the cost and distance calculations. It is an intersection of the climate change impacts that are accelerating and the resurgence of hard geopolitics. This paper highlights a thesis that the competence of the Suez Canal and the Northern Sea Route in Russia is not a simple economic rivalry; rather, it is a referendum to the emerging new world order tormented by a changing climate, some powers rivalry, as well as a climate of infrastructure diplomacy. This introduction provides a background into discussing strategic, economic, and environmental stakes associated with this competition. The main research questions will be as follows: What are the specific strategic, economic, and environmental

implications of the competition between Suez and NSR? Most importantly, how are thematic geopolitical rivalries that exist today, especially the NATO-Russia confrontation and the West-China rivalry and confrontation system, actually altering the advancement, operation, and use of these vital sea infrastructures and the alliances that spring up around them. This dynamic needs to be understood to guide the future of global trade, energy security, and foreign relations in a climate where climatic change is marked by both man-made and natural catastrophes as well as geopolitical fragmentation.

2. Historical Context: Canal Politics and Polar Dreams

The modern competition between the Suez Canal and the Northern Sea Route (NSR) has an extremely ancient history, as it is written in the centuries of imperial desire, strategic rivalry, and the eternal desire to manage the most important maritime trade routes in the world. The history of these circumstances is vital to comprehending the high stakes of the current competition between the United States and China and indicates that this is part of a long-term trend where maritime infrastructure can be used as a source of national power as well as a geopolitical flash point.

Suez Canal: A Nationalist Projection of Imperial Lifeline

The history of the Suez Canal has its beginnings squarely in the age of European imperialism. The canal was trotted out by a French diplomat Ferdinand de Lesseps and funded by the French at large, the canal project was built by Egyptian forced labour between 1859 and 1869. The opening of it immediately revolutionized trade and military supply around the world by cutting the sea journey around Europe and Asia in half, by about 7,000 kilometres. Knowing how strategically significant it was, Britain did not waste time taking control. Compromising the canal in the form of the " imperial lifeline" to India and the East, the purchase of the share of Egyptian Khedive Ismail Pasha in 1875, gave Britain an upper hand in the canal; it was now in the position of strong financial control (Karabell, 2003). In 1882 the British military occupation of Egypt ensued, and no serious challenge to the British was perceived until its withdrawal in the 1950s. The Constantinople Convention of 1888 had established a legal framework, which ensured the neutrality of the canal and its use granted in peacetime to all countries free of charge.

The Suez Crisis of 1956 was a turning point that destroyed what was left of colonial domination and threw the canal into the epicentre of Cold War politics. In July 1956, the nationalization of the canal by the Egyptian president Gamal Abdel Nasser was a dramatic act of post-colonial independence and an Anglo-French hegemony. The later military incursion of Britain, France, and Israel was intended to take back the authority but miserably failed. This pressure was of such a severe nature that US President Eisenhower threatened to intervene and the prospect of the Soviets intervening led to the withdrawal in a very humiliating manner (Kyle, 2011). The crisis had established Egyptian independent ownership of the canal and the fact that control over international choke points is now central to the national power of the post-colonial states. It also demonstrated the dominating effects of superpower contests (US vs. USSR) that could determine success in any area with a strategic maritime asset in which geopolitical rivalry will be used as a precedent by those countries that will engage in future contestations. Throughout this time, the Suez Canal Authority (SCA), the operator of the canal now as an international waterway, has used the canal as a key economic and strategic instrument of Egypt, with regard to the shifting fortunes of the Cold War and the regional politics.

Northern Sea Route: Soviet Dreams and Arctic Militarization

The Suez Canal would be used by the southern empires; a Northeast Passage along the Arctic coast of Russia had intrigued the northern powers through centuries. The initial efforts of explorers such as Barents and Nordenskiold were not successful as they faced severe ice conditions. The Soviet Union struck the NSR with all the powers of economic need, ideological zeal, and strategic necessity and turned it into a somewhat workable reality.

The Soviet period witnessed huge state spending on Arctic exploration and Arctic infrastructure and, usually, at a gruesome human price (especially via the Gulag). In order to centralize the development of the

route to deliver the remote settlements and exploit northern resources, Glavsevmorput (Chief Administration of the Northern Sea Route) was founded in 1932. In 1932-33 the passage of the icebreaker Sibir was an important event. World War II confirmed the strategic military importance of the NSR in moving the navies across the Pacific and the European theatres. This concentration was heightened in the ensuing Cold War. The Arctic region and the NSR became an essential line of defence, as the bases of the Northern Fleet and ballistic missile submarines that were disguised under the ice became critically dependent on its logistical thoroughfare (Åtland, 2014). Considerable militarization has taken place, with nuclear-powered icebreakers being developed to keep the waters open throughout the year to allow military passage and to show technological capability. Although international commercial shipping did not start in the course of large-scale shipping, small-scale and scale-up shipping, ice conditions, secrecy, and Soviet control, the underpinning of state-managed Arctic shipping and the strategic importance of the route to the national security of all the countries was established.

Geopolitical Continuity: Maritime Control as Power Projection

Suez Canal history and the history of the NSR demonstrate one thing of remarkable continuity: that states have always been motivated by the desire to gain command over critical waterway corridors as tools of national power, economic benefits, and military force projection.

Imperial Rivalry:

The Convention has suggested that the Suez Canal streamed out of Franco-British rivalry and emerged as an essential part of British imperial policy. It was fought over and it became the centre of new order which replaced the weakening Ottoman rule in the Middle East, that of the Europeans. Likewise, the tsarist and Soviet interest in the Arctic partly like having a northern flank and exercising power across Eurasia at the expense of competitors such as Britain and the US.

Cold War Logistics:

The two routes had been caught up with, in the Cold War. Suez was a hot spot where the pressure of the super powers beat the interests of past colonialists. Access to Allies/ Resources was provided through control. The NSR, on the contrary, is created as a purely national Soviet vein with enormous external strategic military value, which allows the projection of forces and deters NATO. Its international use was hampered by secrecy and by military control.

Sovereignty and Strategic Leverage:

In the 1956 Suez Crisis was determined that domination of these chokepoints was a sovereign right as well as an effective weapon of middle powers such as Egypt. The present strategy of the Russian Federation of the NSR is the amplification of the Soviet precedent: the current strategy of the Russian Federation of the NSR openly presents it as a historically established national transport route within the Russian Federation with sovereignty over it (Russian Federation Strategy for the Development of the Arctic, 2020), going against international norms (such as UNCLOS Article 234) and threatening to use it as leverage against Western sanctions. The analogy can be drawn between Egypt and Suez, or Russia and the NSR, although Egypt used the Suez to its economic and political advantage after colonialism, Russia is doing the same on the NSR in its contested geopolitical space.

The spirit of imperial competition and the confrontation of the Cold War hence dwells largely over the present situation of competition of the Suez-NSR. The instruments may have changed a little but the cause has ever been the same, the wanting of means of controlling the great arteries of world commerce and strategy to gain national benefits in an ever-competitive world, nuclear icebreakers as opposed to the dreadnoughts, LNG carriers as opposed to coal-burning freight rimmers, economic sanction as opposed to outright conflict.

3. Technical and Commercial Comparison

The decision to use Suez Canal or the Northern Sea Route (NSR) is a complicated calculation of distance, time, price, infrastructure, and, weather and cargo compatibility. Although the NSR presents promising geographical potential, there are still considerable

operation and economic challenges that are reflected by the long-established though costly and relatively risky-at-times dock-to-dock service of the Suez Canal.

Transit Time & Distance: The Geographic Advantage vs. Operational Reality

The most notable point that argues in favour of the NSR is the fact that it can shorten the distance between major ports in Asia and Europe dramatically. One of the more popular voyages is a round trip between Yokohama, Japan, and Rotterdam, Netherlands, through the Suez Canal and has a distance of about 11,000 nautical miles (nm) with a journey of about 30-35 days. This distance is halved using the NSR and it can cut the voyage to 20-25 days, a cost-saving of 30-40 per cent on nautical miles, and 10-15 days (Østreng et al., 2013). Likewise, savings are offered on the routes linking Shanghai, or Busan to Northern European hubs. This will decrease directly to the amount of fuel consumed and the speed at which the cargo is delivered, which promises big economies of savings and responsiveness to the supply chain.

However, the seasonality factor and the lack of infrastructure severely limit the geographical advantage of the NSR. Only the passage along the short period without heavy icebreaker support is possible namely July-October (average 3-4 months/year) (Lasserre, 2019). This is in spite of the fact that even at this time, it is possible to have ice conditions change considerably on a year-to-year basis meaning that it will always require close observation and often the use of icebreakers to pass through it. Off this window, transportation is inhibitive hard, unsafe, and costly. In addition, NSR is also characterized by inadequate supporting infrastructure. The number of ports on the Russian Arctic coast is small, and they are generally limited to narrowly-focused freight (e.g., LNG exports, such as Sabetta) and cannot support large-scale containerized activity, nor a wide variety of cargo via extensive cargo handling equipment and intercontinental connections (Bennett et al., 2020). Search and rescue (SAR) is also better but not enough when compared with the already used pathways such as Suez and this is extremely dangerous.

The Suez Canal in sharp contrast is available throughout the year and 24 hours a day. Through its deep draft (66 feet today following the enlargements, through which it became possible to pass vessels of the maximum size and with maximum drafts) and its highly developed systems of traffic management, the uninterrupted traffic of international shipping was made possible (Suez Canal Authority, 2023). In the Mediterranean and Red Sea, the adjacent infrastructure is of the first order, including large transshipment centres (e.g. Port Said, Salalah, Jeddah), which are characterized by both capabilities to work with all types of cargo, repair, and provide bunkering services, as well as maintenance of the human personnel of the vessel. This consistency and overall support network are core to its domination.

Cost Comparison: Finding the Proper Balance between Savings and Surcharges

The possible cost benefit of the NSR is the low fuel consumption by virtue of the shorter distance and lower steaming speeds that are often achievable in the absence of ice in summer. It is also because lower crew costs are experienced during a period of less time on the voyage. These savings are however often subsidized, and mostly exceeded by large supplementary costs:

Icebreaker Escort Fees: NSR Transits are mostly required to have an icebreaker escort supplied by Russia at hefty fees. The rate of these fees can be determined by vessel type, size, ice classes, and ice conditions, but would only take a few hundred thousand dollars per trip (Humpert, 2021). The operation of the Russian nuclear icebreaker fleet (Rosatomflot) is expensive and this burden is transferred to the users.

Increased Insurance premiums:

There are increased risks with navigation in the Arctic, and hence the insurance premiums are higher. This, in turn, will result in much higher insurance premiums paid on hull and machinery (H&M) insurance with transits through NSR being 2-5 times (etc.) the price of a Suez transit (Marsh, 2022). Other premiums are also levied on P&I (Protection and Indemnity) clubs.

Ice Class Macro Requirement:

A safe operation in the Arctic requires vessels to be designed to a certain ice class (i.e., Arc4, Arc7) that is

more costly to build, maintain, and operate, since the hulls are reinforced, and there is stronger machinery. Vessels not belonging to the ice Class experience even more prohibitive insurance plans and limitations in operation.

Administrative Fees and Pilotage:
Administrative fees applied by Russia on permits, environmental protection monitoring, and prescribed pilotage along parts of the NSR apply.
The main cost of the Suez Canal on the other hand is its transit charge which is quite high and climbing. In 2023 the cost of transit before use by large container vessels might cost over 700,000 dollars per transit with VLCCs (Very Large Crude Carriers) paying even more (Suez Canal Authority revenue reports, 2023). Egypt modulates these costs as a matter of strategy, frequently increasing them when world freight rates are up or providing capital to carry out widening plans such as that of 2023. As high as it is, it is indeed a fee to pass through a fully serviced, low-risk corridor. The longer distance makes the fuel costs greater, insurance rates are normal, and no special requirements of any vessels other than the international standards are required. The main strengths are the predictability and most of the costs covered by the transit fee.

Types of Cargo- Divergent Specializations
The two routes have very dissimilar activities and as a result, they tend to specialize in the kind of cargo they handle:

Suez Canal:
Controls containerized trade, which makes up the bulk of manufactured products, electronics, clothes, and other perishable sensitive freight between Asia and Europe. It is also a vital line of passage of crude oil and finished products of the Gulf to Europe and North America as well as bulk goods such as grain and coal in different sources and destinations. Its predictability, service frequency, and linkage to principal ports around the world render it invaluable to complicated, high-quantity international supply chains. The centrality of container shipping has been well illustrated by its 2021 grounding, the Ever Given, which created enormous upheavals throughout the entire world (Allianz, 2021).

Northern Sea Route (NSR):
Although it also plays an important role in resource supply to Europe, its main role is the export of resources produced in the Russian Arctic, particularly. Liquefied Natural Gas (LNG) via the Yamal and Gydan peninsulas (e.g., Novatek projects) towards Asian markets. Such deliveries are done through high-ice Arc7 LNG vessels. The route is also used to export other bulk commodities such as oil, condensate, and minerals (e.g. nickel, coal), mined in the Arctic, albeit mainly eastwards to Asia (BuixadéFarréet al., 2014). Due to the seasonality of the route, increased expenses, and lack of infrastructural support, the route was, at large, not viable to operate commercial westbound container shipping between Europe and Asia regularly. Although pilot transits are already being made (e.g. Venta Maersk, 2018), large container carriers such as CMA CGM have made the resolve to not operate through the Arctic given both ecological and commercial unfeasibility (CMA CGM, 2019). Its present usefulness is, therefore, much more a matter of seasonal export of certain Russian Arctic resources, than an alternative to a variety of trade flows elsewhere in the world.

4. Climate Change and the Thawing Arctic: Reshaping the Maritime Map
The hectic rate of human-induced climate change is playing the dynamic role of a working architect of global maritime geography though not intentionally. There are no better examples of this transformation and its impacts than the Arctic, which is warming twice to four times faster than the rest of the world. Such a swift environmental transition is not just a scientific issue but also a milestone that opens the commercial and strategic possibilities of the Northern Sea Route (NSR) of Russia, and at the same time, creates significant ecological vulnerabilities and geopolitical willingness. The retreat of the ice cover is rewriting the popular seaside map which causes a striking dualism of opportunity and atrocity changing the physical basis of the rivalry between Suez and NSR routes.

The Losing Ice Shield: Facts and Future Potentials
The changes in the Arctic are indisputable and quantifiable. There is a sharp and gradual loss in the minimum coverage of sea ice in the Arctic, usually

registered at the end of the annual melting season each September tracking carefully by satellite records as shown by organizations such as NASA. It is impossible to deny the long-term pattern: the 17 lowest minimum extents happened during the last 17 years with 2012 being the record minimum and 2023 being one of the lowest ever observed (NASA, 2023). Most importantly, not only the spatial coverage of the ice is decreasing but also its thickness and its strength. Multi-year ice, which represents the strongest obstacle to navigation in history, is fast disappearing to be substituted with thinner, more seasonal ice cover that can be easily navigated by vessels but with much capability and support still required. This physical improvement is transferred directly to the increased time the NSR becomes available.

The science-based forecasts are in the image of further and faster change. According to the Intergovernmental Panel on Climate Change (IPCC) in the Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC), virtually sea ice-free Arctic Ocean in September, in terms of moderate emissions scenarios, is most likely to happen in the middle of this century (IPCC, 2019). More directly applicable to shipping logistics, there is the anticipation that in the next few decades, the navigable window of NSR will widen significantly. According to research, it is projected that by 2035 the route is likely to be regularly open to ice-class moderate vessels capable of operating in varying conditions of up to five months in a single year, possibly between June and October (or possibly longer) in extremely warm years (Smith & Stephenson, 2013; based on analysis of IPCC projections). It is the necessary condition of the very fact that Russia has planned to transform the NSR into one of the key international trade routes, one that essentially changes the parameters of east-west-bound maritime transportation.

The Double-Edged Sword: Benefits and Ecological Perils

There is a massive contradiction in the opening of the Arctic. On one hand, there is the prospect of massive economic and logistical gains through the reduction of the chain of supply that goes across the world. The fact that the NSR will reduce the distances between Northeast Asia and Northwestern Europe by a huge margin, potentially decreasing the transportation distances by 30-40 percent directly translates into the increased trip duration and decreased fuel consumption that will be needed to complete a journey under the extended operating hours. Such improved efficiency is of special interest to certain kinds of cargo, firstly, the point-to-point transportation of the resources extracted in the Russian Arctic itself, in this case, Liquefied Natural Gas (LNG) resources in the Yamal peninsula and Gydan systems. With these cargoes, the NSR offers a direct gateway to high-market Asian host destinations. In addition, the route has some element of diversification as an alternative to historical choke points, such as the Suez Canal, and may help alleviate some congestion risks or political risks to a tract, such as the Middle East in some flow lines of bulk commodities.

But the other side of the blade shows non-trifling and, perhaps, irrecoverable environmental dangers and imbalances. Adding shipping traffic in the untouched Arctic environment comes with a chain of threats. The vessel noise pollution caused by engines and propellers pages the communication, navigation, and hunting patterns of beings such as whales and seals, which are important orientations of the fragile Arctic ecosystem. There is the ever-present risk of disastrous oil spills but the remote and extreme nature of the Arctic, as well as the absence of cleanup infrastructure, multiplies the risks by orders of magnitude; intentional or accidental spills can be particularly hard and slow to contain in the icy waters, and their consequences last a long time. An invasive species through introducing the ballast water in these ships is another huge menace to the indigenous Arctic species. One of the most pernicious effects is that of black carbon emissions, or soot that emanates as the result of the use of ship engines and deposits on ice and snow. This makes the surface darker, which makes solar radiation absorption to a large extent and speeds up the melting rate, hence creating a hazardous feedback loop that enhances the decline in ice further making it easier to travel on water (Comer et al., 2020). Besides, industrial development of the Arctic and the opening of the region result in the destabilization of the lives and livelihoods of Indigenous communities and affect traditional hunting, fishing, and traveling patterns, usually

without proper consultation and equal benefits sharing, endangering food security and cultural existence (Forbes, 2021). Even its broader climatic effect is worrying because melting permafrost is leading to large amounts of methane, a powerful greenhouse element, being released, contributing to global warming even further.

The Arctic as a Contested Frontier

The unlocking of the Arctic by thawing ice changes it into a moving and evolving outskirt, yet the easy access implies rivalry and battle. Greater accessibility of enormous untapped oil, gas, and other mineral deposits (and rare earth elements used in modern applied technologies) inflames territorial ambition and struggle over resources among the coastal states of the Arctic (Russia, Canada, USA, Denmark/Greenland, Norway). The interests of non-Arctic states, especially China, are also becoming more and more aggressive, as the possibilities of obtaining resources and sea routes are concentrated on the "Polar Silk Road" under the guise of expansion. Although the 1982 United Nations Convention on the Law of the Sea (UNCLOS) is the main source of law on the subject and presents the most popular solution in cases of resolving maritime boundaries and declaration of the rights on continental shelf and Exclusive Economic Zones (EEZs), there are substantial overlapping claims (including those over the submarine Lomonosov Ridge) and differing interpretations of the rule, which present a fruitful base of contention.

Even the legal status of the NSR is one of the hotspots inside this frontier. Russia claims that the straits making up the NSR are either under her internal jurisdiction as part of her internal waters or under historic rights giving it an all-encompassing power of regulation. Such actions as compulsory pilotage, and fees for escort icebreakers, which are considered to be necessary in terms of the safety and protection of the environment, Article 234 of UNCLOS, provides the coastal states with an amplified level of regulatory intervention in ice-covered waters. On the contrary, the US and various other maritime states argue that some of the main passages of the NSR (including the Vilkitsky and Dimitri Laptev straits) are considered to be international straits as regards the UNCLOS Part III. Such classification would provide vessels with the right to transit passage, which is a much freer regime compared to innocent passage and highly limits the rights of Russia to any imposition of conditions and fees. Through this basic dispute of governing, there exists constant law ambiguity and attrition. The synergistic effect of the perception of the strategic and economic utility of the newly-opening Arctic has already catalysed military presence and exercise by hover-states, especially Russia (reactivation of its bases, deployment of specialized forces) and NATO member states, leading to a possible increase in military tensions in an area that has historically been managed to some interrelated extent by the cooperation of countries such as the Arctic Council. Development of infrastructure in the realm of NSR, including ports, and communications systems, therefore turns into not only a commercial project, but an efficient instrument of geopolitical dominance, on one hand, consolidating power, and on the other hand, winning new strategic allies.

Climate change is the inevitable and revolutionary phenomenon that became the driving force behind the new viability of the Northern Sea Route. The statistics of declining sea ice in the Arctic are strong and the trend shows a pattern of more and more accessible polar waters in the coming decades. Although this environmental transition has opened up real prospects in terms of economic gains (fewer distances and accessibility to resources), the ecological risks that come with it are critical and have international repercussions. More importantly, the fact that the melting Arctic has started to take place is not taking place in a vacuum, as it has become fast transformed into a geopolitical battleground. There are colliding pressures: competition for resources, deep-rooted conflict about regimes of the law that will govern the NSR and the growing military activity set in this vulnerable region. The geography that permits the challenge posed by the NSR to the status quo of the Suez Canal consequently boils down to a highly mixed conglomeration of environmental vulnerability, corporate greed, and ever-growing geopolitical competition, which in effect alters the already evolving landscape of international sea trade and security in grand proportions.

5. Geopolitical Dimensions: Infrastructure, Sanctions, and Spheres of Influence

The struggle that exists between the Suez Canal and the Northern Sea Route (NSR) is not just a logistical case, but it is determined deeply by the intentions and activities of great geopolitical powers. The strategic competing interests between China and India extend to a wider set of countries, with infrastructure development, economic coercion, and the ability to form alliances as the means to gain control of strategic maritime corridors in the new age of great power competition.

Russia's NSR Push: Leveraging the Arctic Lifeline

Continuous aggressive development of the NSR is a component of the Russian national strategy, especially important with Western sanctions. The key part of this flow is Rosatomflot, a subsidiary of the state nuclear corporation Rosatom. Rosatomflot manages the so far sole fleet of nuclear-propelled icebreakers (the latest Project 22220 grasping Arktika and Sibir among giant icebreakers) so vital in keeping clear of prolonged windows and escorting trade ships extensively along ice-infested NSR. In addition to icebreaking, Rosatom can be described as the infrastructure and logistics developer and organizer of the NSR, overseeing both the construction/redevelopment of ports (e.g. Sabetta to export LNG, Dudinka to supply Norilsk Nickel) and coordinating NSR logistics, essentially serving as the arms of the state in shipping in the Arctic (President of Russia, 2022). This is at the centre of control, which explains why the route held strategic rather than strictly commercial value to Moscow.

The strategic exports of energy to Russia mainly depend on the NSR infrastructure as it is the major conduit through which Liquefied Natural Gas (LNG) is transported to the completed projects on the Yamal and Gydan Peninsulas of the Novatek Company. Classic European markets have been cut off, and the scenes to target are now Asia, mostly China and gradually also India. NSR offers the most effective passage of these eastbound cargoes with the help of the Arc7 LNG vessels. Russia is pushing the use of the NSR to Asian partners not only in terms of their exports but also in possible use as an Asian-Europe general trade corridor, particularly as a means of forming a "sanction-proof" route. This corresponds to the overarching policy of Moscow to shift trade and political partnerships toward the East built on the Arctic resources and the NSR as the economic and geopolitical asset (Konyshev&Sergunin, 2021).

Western Responses: Securing Suez and Containing the Arctic

NATO and other Arctic powers, especially the US and Canada, suspect the intentions of Russia which is developing its NSR and other operations in the Arctic. The attention that NATO is paying to the Arctic has been growing considerably, and the organization now organizes more exercises and patrols (e.g., ICEX, Trident Juncture), as well as mentions the strategic value of the region in its strategic concepts (NATO, 2022). Both the US and Canada are concerned with the militarization of the NSR and the Arctic in Russia as such, with the reopened bases that were used during the Cold War, the pinpointing of high-tech missiles (e.g., S-400s), and the underground capabilities. They view Russia claiming vast regulatory power over the NSR under the UNCLOS Article 234 as an aim of claiming de facto sovereignty over an international waterway over the freedom of navigation (US Department of State, 2023). On its part, the West maintains the temperature regarding safe Arctic shipping due to harbouring the fears that NSR may become an instrument of Russian strategic coercion or that it might be used as a source of Russian military logistics.

At the same time, the Egypt Suez Canal Authority (SCA) is actively working to become more competitive realizing the long-term significance of the Suez Canal. The project to increase the width and depth of the southern part of the canal (making the two-way lane longer) in 2023 will make transit through the canal faster and allow the passage of more substantial ships, addressing the root cause of possible changes in the trade flows in the long-run and keeping its attractiveness at the forefront (Suez Canal Authority, 2023). Western powers are also working hard to consolidate allies in the Middle East and North Africa (MENA) region around handy Suez because it is one of the most likely places where they should build stability to guarantee the safeness of the canal. The security collaboration, and economic and diploma combinations in the Gulf states and with Egypt are

validating the stability of the Suez Road in the world trade dominated by the West.

Sanctions, Realignment, and the Polar Silk Road

The enactment of blanket Western sanctions after the 2022 Russia-Ukraine conflict has been a potent catalyst in the process of geopolitical realignment along the two lines. Sanctions have done a great job of making Russia more reliant on China and other non-aligned states. Since the NSR is becoming a sanction-busting bridge that allows Russia to export its energy resources to Asia through it, it is also further tightening the Sino-Russian relationship in the development of infrastructural building in the Arctic. This game promotes the economic shift of Russia and the reinforcement of the anti-Western camp.

At the centre of this rebalancing is the "Polar Silk Road" (PSR) which was officially incorporated into the China Belt and Road Initiative (BRI) in 2018. Although China may be presenting the PSR as a collaborative effort in terms of economic growth and scientific discovery, its strategic interests are quite clear: the access to the Arctic resources, in particular, energy and minerals, influence within regionally-based governance, and alternative sea routes so that the country is not vulnerable to choke points such as Suez or Malacca controlled by Western powers (Brady, 2017). China is investing in Russian LNG Arctic projects (e.g., Arctic LNG 2 by Novatek), constructing ships that can travel through ice (e.g. the Xue Long 2), and researching to facilitate eventual commercial navigation. Although in the near future, China needs the cooperation and infrastructure built by Russia to conduct transit through NSR, overall, its long-term goal is to become an independent major player in the Arctic, relying on its economic strength. The PSR is a conscious attempt to take advantage of the opening up of the Arctic and assimilate it into the Chinese vision of a Sino-centric international trading system, which directly criticizes the conventional Western maritime system.

6. Environmental Risks: Fragile Arctic vs. Congested Chokepoint

Suez Canal and Northern Sea Route (NSR) are governed by vastly different legal regimes and they are associated with different, but important, environmental issues. Such discrepancies also define their operational realities, risk profile, and even the geopolitical friction that they are surrounded by.

Governance: Stability and Contestation

The Suez Canal enjoys an already long and accepted legal status as an international waterway. Its use is predictable and found on a non-discriminatory basis (Kraska & Pedrozo, 2022), regulated by the so-called 1888 Constantinople Convention and solidly entrenched in the system of the United Nations Convention on the Law of the Sea (UNCLOS), where they are located in the provisions on international straits (Part III) and innocent passage (Article 45) (Collins, 2022). Egypt, via the Suez Canal Authority (SCA), controls transit and infrastructure though it does not lay claim to the actual waterway which obstructs the basic right of passage. This stability is one of the major pillars of its worldwide functionality. On the other hand, the legal position of the NSR is one of the key areas of disagreement between the Eastern world countries. Russia claims that the straits that make up the route are its internal waters or belong to its historic rights, which would give Russia wide control powers. Moscow explains its strict regulations including pilotage service, icebreaker escort, permission of route, and high fees by Article 234 of the UNCLOS (Ice-covered areas) granting coastal states more powers to protect the environment in the ice-prone areas (Byers, 2017). This interpretation is however strongly refuted by the United States, the European Union, and other maritime powers. They claim that important NSR straits (e.g., Vilkitsky, Dimitri Laptev) should be characterized as international straits in the context of UNCLOS Part III, the transit passage should supersede guaranteed (less restrictive than innocent passage) to pass through to a serious extent of the Russians dictations on terms of conditions and fees (US Department of State, 2023). Such inherent legal ambiguity serves as an ongoing source of conflict as well as non-confidence when international carriers contemplate the NSR.

7. Economic Stakeholders and Trade Flows

The rivalry between the Suez Canal and the Northern Sea Route (NSR) generates clear-cut winners and losers in the global economy and it defines the trade patterns and affects the policies of states and

businesses. Both routes develop their ecosystem of beneficiaries with different geographical, focus, and risk orientations.

Suez-dependent Economies: The Established Network

The Suez Canal cannot be ignored by its numerous economies, which are dependent on its effectiveness in connecting with the entire world in terms of trade. Those countries in the Gulf, especially Saudi Arabia, Iraq, the United Emirates, and Qatar rely on Suez to transport crude oil and liquefied natural gas (LNG) to Europe and North America. The Indian sub-continent (India, Pakistan, Bangladesh) draws on Suez as a lifeline in exporting textiles, manufactured goods, and agricultural products into Europe, as well as in importing energy and machinery. Suppliers of East Africa such as Kenya and Tanzania depend on the canal to deliver their products such as tea, coffee, and flowers to major markets in Europe and the Middle East. It is imperative to mention that the European Union (EU) is the major Western destination of Suez traffic receiving gigantic quantities of containerized cargo, energy, and raw materials imported by Asian and Gulf countries, which means that its economic prosperity is profoundly entangled with the efficiency of canal operation (UNCTAD, 2023). Blockages such as the grounding of the Ever Given strongly illustrate how fragile such interdependencies are to blockades in the Suez.

NSR beneficiaries The Arctic niche

The economic benefactors of NSR at this point are more specialized and condemned. The biggest beneficiary is Russia which uses the route as one of the key export corridors, particularly with sanctions. It is vital to supply LNG of Yamal and Gydan projects of Novatek, oil from such fields as Vostok Oil, and also mineral resources (nickel, copper) of Norilsk Nickel to the Asian market without interference, and by this to bypass the traditional western paths and markets (Konyshev&Sergunin, 2021). China also becomes a major player that can acquire these energy and raw resource imports through the NSR which does not involve its dependence on the longer and potentially more susceptible routes such as the Strait of Malacca and Suez. This relationship is further consolidated by the investments of the Chinese in the Russian Arctic projects. The rewards are also accrued by specially-equipped shipping entities: Arctic shipping consortiums (usually including Russian state structures such as Sovcomflot and Rosatomflot) and high ice-class LNG carrier operators (such as the vessels constructed to supply the projects of Novatek) also have a necessity of business along the NSR. The value of the route as a general west-bound container route between Asia and Europe was, however, marginal.

Private Sector Calculus: Experimentation vs. Avoidance

There are conflicting approaches to the NSR being found in the private shipping sector. Others have tested its possibilities; in 2018, Maersk carried out a pilot voyage with the ice-reinforced box vessel Venta Maersk, with frozen fish and electronics delivered between Vladivostok and St. Petersburg via the NSR. This experiment not only demonstrated an operation feasibility but also a logistic complexity and a niche application of container shipping (Lasserre, 2019). On the other hand, large operators such as CMA CGM have come out clearly to stay out of the Arctic routes on environmental grounds and due to the company policy not to go through areas that are fragile to the ecosystem. This position is one of the reactions to the mounting customer and investor pressure to focus on sustainability and corporate social responsibility (CMA CGM, 2019). The ruling is valuable in the sense that commercial feasibility cannot be determined solely in terms of distance but rather by reputational risk and ethics on the environment.

Insurance and Risk Assessment: One Ledger Too Far?

Insurance premiums and risk analysis are important determinants in the choice of routes and the two extremes of perils. Ensuring arctic navigation is so costly because the risk is high in the environment. H&M and P&I insurance on NSR transit: the tariffs can be between 2-5 times as strong as on Suez routes due to such risks as the damage caused by found ice, lack of emergency accessibility, adverse weather conditions, and the risk of environmental disaster liability (Marsh, 2022). Although the use of the Suez Canal normally attracts standard premiums, in the

international market, there are risk factors involved in the Suez Canal transit, which increases the costs. These are threats to regional piracy (especially the Gulf of Aden, alleviated by international patrols), the political risk of unstable neighbours, and the high cost of delays or residing on the ground due to persistent congestion. The Suez blockage in 2021 led to huge delays, cargo damage, and salvage insurance claims (Allianz, 2021). Changes in these risk premiums are continually recalculated by insurers and have a direct effect on the cost-benefit calculation faced by shipowners deciding which of the high-risk but potentially high-reward (in the case of certain cargoes) NSR to use, or the established congested though generally lower environmental-risk Suez route.

8. Future Scenarios and Strategic Forecasting

Suez Canal and Northern Sea Route (NSR) are subject to futures brought about by the complex interactions between the increasing rate of climate change, unstable geopolitics, and exponential technology as it has become blatantly clear that the futures of Suez Canal and Northern Sea Route (NSR) cannot be predicted. Prediction of their evolution needs to take into account several reasonable scenarios, which are based on various assumptions regarding such driving forces.

Scenario 1: NSR Dominance in Seasonal Bulk Shipping

The most likely short to medium-range outlook is that the NSR would overtake the Suez Canal on a seasonal basis on particular bulk cargoes, most likely Russian energy and non-ferrous metal exports to Asia. Such an overall shift would have been further entrenched by continued Arctic warming, which would lengthen the open window into 5 months or more by 2035 (IPCC, 2019; Smith & Stephenson, 2013), and ongoing sanctions against Russia, which would cause that country to pivot to the east. It is precisely instrumental type investment in Arctic LNG (examples include projects by Novatek) and oil (Rosneft Vostok Oil). The economic magnetic nature of point-to-point shipments using the route in delivering Russian Arctic commodities to Northeast Asia lies in the distance advantage that this route may otherwise have on deliveries to this region. During the summer months, Suez would still retain its place in container traffic and non-Russian energy movements, whereas the shippers of bulk commodities would gain more competition (Melia et al., 2016).

Scenario 2: The Hybrid Model Emerges

The even more complicated future is one with a hybrid in which the trade between Asia and Europe is seasonally divided between the two routes. Over the longer term during the prolonged Arctic summer (possibly June-October), some bulk non-Russian commodities (e.g., coal, minerals of non-sanctioned origin), and perhaps some specialty containerized cargoes (in case the availability of ice-class vessels rise and costs fall), might need to switch to the NSR to take advantage of distance and time savings, provided that Russia permits and does not make it excessively cumbersome to transit. To the end of the year, and to most of the containerized, time-sensitive, and diversified cargo streams, the Suez Canal would have been the lifeline. This situation will rely upon less geopolitical stress on the governance of NSR so that it is frictionless in the eyes of international shipping outside Russia, and a lot of capital resources invested to aid the NSR infrastructure (Bennett et al., 2020). Suez would respond by highlighting its all-season dependability and extending its optimization (e.g. through digitalization).

Scenario 3: Geopolitical Instability Forces Diversion

The worst cases include significant geopolitical strife and compelling sudden changes in the use of routes. In a more serious military conflict in the Arctic, either because of increases Russia NATO tensions or because of an un-sealed maritime dispute, it is possible that the NSR will become essentially out of use to international traffic as a result of safety considerations, withdrawal of insurance of, or military interdiction. On the other hand, a significant geopolitical conflict or prolonged instability in the Red Sea (e.g., flare-ups with the Yemeni Houthis, wider regional warfare) would have a devastating effect on Suez passages, as evident temporarily when attacks by the Yemeni Houthis carried them out in 2023-24. This would lead to a massive rush to alternatives: the Cape of Good Hope route will spike by a very high margin, which may make the NSR temporarily a better option, even as it has its loopholes should it be open and secured. These would lead to a huge

disruption of the supply chain, inflation, and an emphasis on the fragility of global trade to choke point instability (Chatham House, 2023).

Technology as an Enabler (and Monitor)

Artificial Intelligence (AI) and better satellite technologies are becoming very important in determining the viability and safety of both routes, especially the NSR. Artificial intelligence-based systems will improve route optimization, using mapping of current and forecasted ice conditions (via synthetic aperture radar satellites such as Sentinel-1), weather conditions, and ship performance to suggest the safest routes that also use the least amount of fuel. With the AI-powered analysis of satellite imagery, hazard surveillance is going to be enhanced because the presence of ice floes, icebergs, and oil slick possibilities can be spotted faster. In the case of ice navigation AI, integrated with sensors (lidar, radar) and electronic charts, will offer important decisions to captains operating complicated ice fields, potentially minimizing the capability of using icebreakers in less risky conditions. The distant Arctic will be connected by satellite communications and, as a result, the emergency response will be effective (e.g. via constellations such as Iridium Next or Starlink). Although these technologies can benefit Suez by predicting congestion and avoiding collisions, they are crucial in making NSR transit more secure, predictable, and, possibly, less expensive in the long term (Stephenson & Smith, 2015).

9. Conclusion

The competition between the Suez Canal and Northern Sea Route (NSR) of Russia is not about economic aspects of shipping. It represents a paradigmatic change in the world order, in which the dynamics of climate-induced geopolitics, a revival of hard power politics, and strategy-led competition of infrastructure are all present and influential. The current contest is not just one of shorter distances or cheaper prices: it is a model of the type of world where power over the key geography is the determinant of the national leeway, resiliency and economic independence in the time of newly intensified great power contention.

The rapidly melting Arctic region, on the one hand, opens up the possibility of utilizing the NSR, but on the other hand transforms the region into a geopolitical checkboard to be used as a weapon. Russia aggressive development of NSR as the means to exploit the nuclear icebreakers and energy exports supply to the east can become its economic lifeline on sanctions and further means to reinforce the anti-western axis with China. On the other hand, the strengthening of NATO position in the Arctic and the reinforcement of the alliances that are dependent on Suez provides evidence of the West readiness to defend the conventional spheres of influence. This is a form of new maritime multipolarity: a divided landscape in which Western-driven trade complexes focused around Suez are more and more challenged by a Sino-Russian realignment around the Arctic, embodied in the Polar Silk Road. The NSR used to be the backwater of the Soviet Union, which is currently an approved corridor that threatens the liberal order of the seas.

In this new cold world, the maritime infrastructure has been turned into one of the main battlefields. The commitment of Russia in its investments in the ports along the Arctic and icebreaker fleets, the construction of a wider Suez Canal by Egypt, and the dual-use Polar Silk Road projects being financed by China all underscores a race to seize control of the vessels of worldwide commerce. They are not simply instruments of trade. Such infrastructures are vehicles of coercion and alliance and strategic denial. Besides that, a climate resilience has been seen as a major aspect of power. The feasibility of NSR depends on an anti-image, the devastation of the environment- the route opened by ice melt is the reason the currently experienced crisis is intensified by the emission of black carbon and degradation of the environment. In the meanwhile, Suez has its own problems of climate threats, going against the rising sea level to the regional instability enhanced by the resource deficiency.

These three factors of competition, climate vulnerability, and infrastructure dominance will be the future of international trade. The NSR is potentially crucial to bulk cargo in the season, as the scenarios examined, but overall that challenge to Suez is hampered by legal grey areas and its environmental outrage and geopolitical threat. However, the situation of instability in the world which might be attributed to militarization of the Arctic area or

assaults in the Red Sea might shift the trade routes of the world in haste revealing the vulnerability of chokepoints. In the end, the Suez-NSR Cold War is an indication that we are back to the age where geography is a major determinant of strategic power and that now states have to negotiate through the receded ice as well as the crowded channel of canals, they must also swim through the broken mirror world full of debris.

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