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The Arctic: the last geopolitical frontier

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THE ARCTIC:
THE LAST GEOPOLITICAL FRONTIER

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Introduction

In recent decades, the Arctic has emerged as one of the most significant geopolitical frontiers globally, and its importance will continue to grow in the near future. Its relevance is based on several interrelated factors, ranging from climate change to access to natural resources, international maritime transport, security, territorial competition and its importance as a cornerstone of power relations.

It is one of the regions most vulnerable to climate change, and the policies and measures implemented in this area have global implications. The melting ice not only affects the local ecosystem, but also contributes to sea level rise, affecting coastal areas around much of the world. The exploitation of natural resources in the region also poses environmental challenges, from pollution to the potential disruption of marine ecosystems.

On the other hand, global warming has had a direct impact on the Arctic. Accelerated melting has opened up new shipping routes connecting the Atlantic and Pacific oceans, shortening distances in international trade. The distance from Rotterdam to Shanghai is 10,500 miles via the Suez Canal, while via the Northern Sea Route it is 8,500 miles. This represents a substantial saving in time and economic costs. While the Northern Sea Route is now open two months a year, the Northwest Passage is still closed to navigation. According to the US Geological Survey, the Arctic holds 13% of the world's undiscovered oil and 30% of its undiscovered natural gas. In addition, it contains rare minerals such as cobalt, nickel, copper and lithium, which are essential for the development of emerging and disruptive technologies. On the other hand, fishery resources such as fish *stocks* in the Arctic Ocean are also of great economic and geopolitical importance.

The Arctic is also home to numerous indigenous peoples such as the *Saami* in Northern Europe, the *Inuit* in Canada, Greenland, Alaska and Siberia, as well as other groups that depend on the Arctic lands and seas for their survival. They number just over
500,000 indigenous people spread across three continents and 30 million square kilometres (Arctic Council, 2024). Although these peoples have historically been marginalised in political decision-making, their role is becoming increasingly important, especially in defending their rights over the territory and in issues of sustainability and environmental protection.

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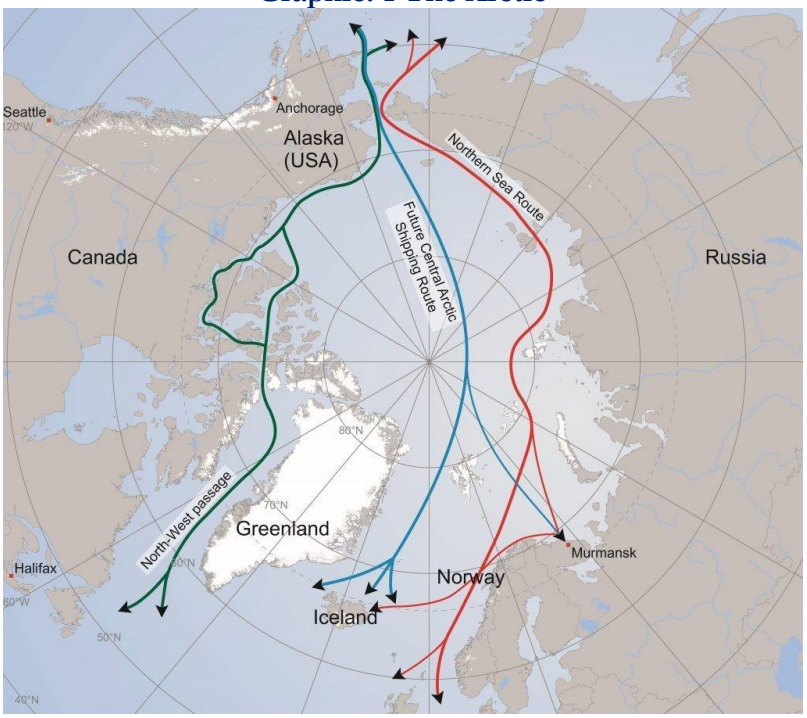
The geopolitical dispute over the Arctic: resources, sea routes and power in the far north

Sovereignty over the Arctic is being disputed by several coastal countries. On the one hand, claims between Russia, the United States, Canada, Norway and Denmark clash on the Extended Continental Shelf in the Central Arctic around the Lomonosov Ridge, while the claims of the United States and Canada clash in the Northwest Passage, as Washington considers its waters to be international waters, while Canada considers them to be internal waters.

Graphic: 1 The Arctic



Tensions are palpable, and countries have increased their military and scientific presence in the region. Russia has been one of the most active players, renewing its defence infrastructure and establishing military bases on the islands of Novaya Zemlya, Alexandra Land and Wrangel Island, including strategic points in the Barents Sea. Canada defends its sovereignty over the Arctic and has intensified surveillance in the region, as well as strengthening its control over maritime routes and resources. The United States has intensified its interest in the region, remilitarising the area and attempting to prevent Russia and Canada from exclusively controlling the various routes. However, other countries are also entering the fray. Although China has no direct territorial claims in the Arctic, its interest in the region has grown. In recent years, China has expressed its desire to become a "polar power", indicating its search for access to natural resources, trade routes and participation in infrastructure projects. In addition, Beijing has invested in scientific research in the Arctic, as well as in the development of new technologies for resource exploitation, particularly underwater mining.

For China, a new "Polar Silk Road" offers faster and potentially safer shipping than the Suez Canal and the Strait of Malacca. Beijing has used a hybrid strategy to deepen ties and links in the region, from higher education to environmental cooperation schemes and scientific missions. Furthermore, China has rapidly expanded its already large fleet of icebreakers and organised a joint patrol with Russia in the Bering Sea, near the coast of Alaska.

While US President Donald Trump seeks to annex Greenland, Russia is modernising its military bases in the Arctic. For Washington's national security interests, Greenland is an essential protective shield for US territory against a possible Russian intercontinental ballistic missile attack, while also forming a bulwark against a Russian maritime offensive entering the Atlantic through the GIUK gap. The United States currently maintains the Pituffik Space Base in Greenland.

In January 2025, the United States created *Joint Arctic Command* (JACOM), a unified command structure with the aim of coordinating military and humanitarian operations and responding to emergencies in Alaska and the Bering Strait. This initiative seeks to better integrate the capabilities of the Pentagon with those of the Coast Guard, NOAA and other federal agencies in the region. A public-private investment plan is also being promoted to expand the deep-water ports in Nome and Dutch Harbor, which are important for sustaining and developing naval operations in the North Pacific and consolidating the US presence in the High Arctic (Corera, 2025).

Other countries are also competing for the Arctic. Japan, South Korea, India and the European Union (EU) have begun to define strategies for involvement in the region, particularly in relation to scientific research, maritime transport and energy cooperation. In particular, the EU's Arctic strategy has evolved in response to the challenges and opportunities facing the region. In 2023, the European Commission proposed doubling its financial support to Greenland within its Multiannual Financial Framework 2028-2034, in order to defend European strategic interests in the region against the ambitions of Russia, China and the United States. The EU has also reaffirmed its commitment to NATO in the Arctic, especially in light of recent militarisation and the increased presence of Russia and China.

The European Union's Arctic policy is integrated into the broader framework of its regional policies and is coordinated through the European External Action Service (López Tárraga, 2025). From this institutional structure, the EU articulates its strategic approach to the Arctic, combining dimensions of foreign policy, security, sustainability and international cooperation. As for NATO, it has developed a strategy to address the challenges in the Arctic. This strategy focuses on four main areas: surveillance, deterrence, defence and cooperation. In terms of surveillance, the Alliance conducts air and maritime patrols in the region. In terms of deterrence, it seeks to prevent conflict situations from arising through the presence of military forces along the Arctic borders. Defence is one of the most important aspects of NATO's strategy in the region, which includes conducting military exercises and building infrastructure. Finally, cooperation is a key factor for NATO in the Arctic (Corera, 2025). In the early months of 2024 and 2025, the militarisation of the Arctic has seen a significant uptick. In March 2024, NATO conducted the *Nordic Frost* military exercise in northern Norway and the Canadian Arctic, with the participation of 20 countries and more than 35,000 troops; and in March 2025, NATO and the United States conducted military exercises called *Tower Citadel* in the Arctic. All of this was in response to Russia's growing. Russian presence near the Svalbard archipelago. Meanwhile, Russia has increased its Arctic command with S-400 air defence systems and expanded the Nagurskoye base, one of the northernmost in the world (Martínez Hanzeliková, 2025).

As technology and navigation conditions improve, these resources are becoming a strategic objective for countries with territorial claims in the Arctic. On the other hand, as the battle for one of the coldest places in the world intensifies, an increasingly fragile security balance could be breaking down, leading to a growing arms race.

From a geostrategic point of view, future military operations in the Arctic are subject to various operational constraints, including long preparation times, the prevalence of air and naval aspects, fundamental dependence on the region's harsh weather conditions, the ability to project combat forces, the sustainability of the battle, the efficiency in dealing with unknown capabilities and, especially, the cost-effectiveness and efficiency of the use of high technologies.

The Arctic, as the last geopolitical frontier, is emerging as an arena for competition and collaboration, where major powers vie for control over natural resources, shipping routes and security. Dominance of an emerging territory with vast resources such as the Arctic translates into global power and influence, with the capacity to prevent, anticipate or intervene in future conflicts. At the same time, environmental issues, sustainability and the rights of indigenous peoples are factors that further complicate governance in the region. Against this backdrop, the Arctic is becoming not only a strategic area for countries to project their power, but also a critical space for international cooperation, especially in terms of environmental protection and dispute resolution.

The Arctic in Transformation: Strategic Opportunities and Risks for the European Union

The Arctic is changing at an astonishing rate. The rapid retreat of sea ice recorded year after year by the *National Snow & Ice Data Centre* (NSIDC, 2023) is not only transforming the polar landscape: it is also opening up new shipping routes that are altering the way the world trades and how the major powers relate to each other. For the European Union, these transformations are not a distant phenomenon: they will have a profound impact on its economy, its strategic autonomy and its ability to influence global governance in the coming decades.
As the ice recedes, the dynamics of the Arctic Ocean are changing and seasonal navigation opportunities are emerging that were unthinkable just a few years ago. Studies such as those by Melia, Haines and Hawkins (2016) and Smith and Stephenson (2013) even point to trans-Arctic routes that could be navigable for part of the year. However, increased access does not imply stability: on the contrary, it increases volatility. The seasons are more accessible, yes, but also more unpredictable. In this sense, the Arctic is opening up, albeit under changing conditions that simultaneously generate opportunities and risks.

New Arctic routes: emerging, but more complex than they seem

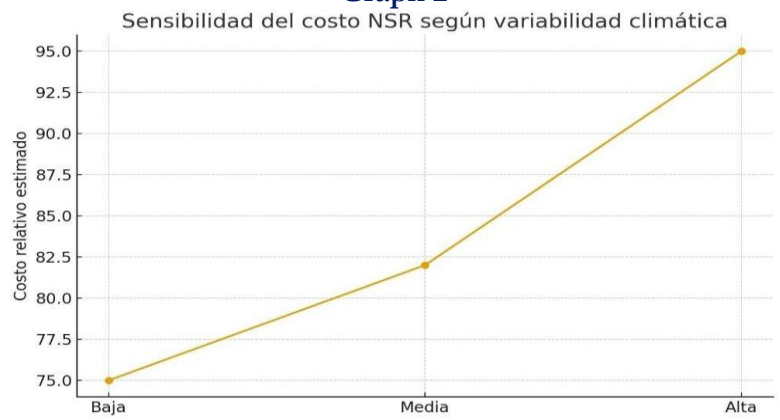
The possibility of connecting Asia and Europe via shorter routes has sparked growing interest, especially around the Northern Sea Route (NSR). On paper, this emerging sea route promises time and fuel savings, but its appeal does not depend solely on distance. Factors such as ice variability, operational risks, icebreaker availability, insurance premiums and Russian regulations are also decisive.

The *Arctic Shipping Cost Index* compiled by the *Middlebury Institute* (2024) clearly reflects this: Arctic routes are only truly competitive when the climate is benign and the political environment stable, a combination that is far from the norm, much □es in the current international context in which we live: uncertain, complex and belligerent.

Economic assessment: Suez versus the NSR

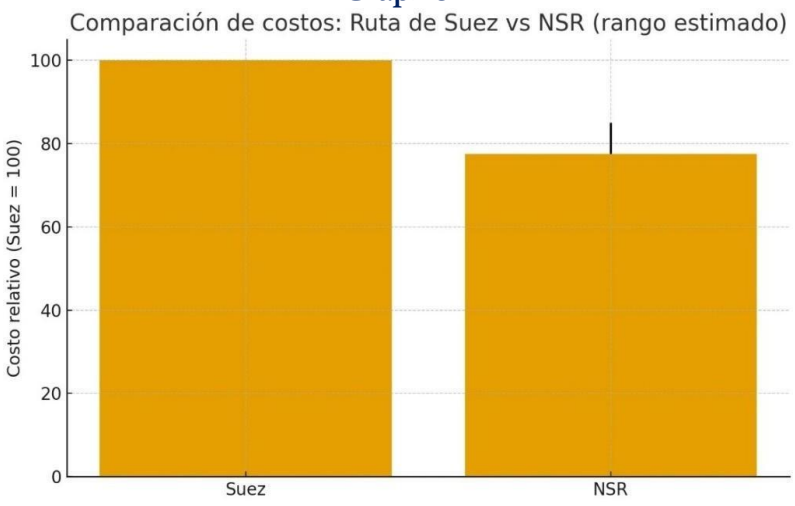
The comparison between the NSR and the traditional Suez Canal route involves multiple variables: ship performance, ice conditions, weather conditions, operational risk, insurance premiums, and regulatory requirements. Recent literature suggests that, under favourable conditions, the NSR can offer savings of between 15% and 30% compared to Suez (Li et al., 2023; Zhang et al., 2016; Middlebury Institute, 2024). However, this potential depends on a sequence of climatic and geopolitical factors that rarely align. To visualise this difference, the comparative graph sets the Suez route as a reference. (100) and presents the NSR within an estimated range of 70–85. This way of representing costs allows variability to be appreciated without relying on assumptions about the type of vessel or fuel.

Graph 2



This graph clearly illustrates that NSR can be competitive when environmental conditions allow for constant speeds, with low ice presence and no need for intensive escort. However, the variability of the range represented by the upper bar in the NSR column shows that the advantage can quickly evaporate under less favourable scenarios.

Graph 3



To better understand this vulnerability, a second graph is presented based on sensitivity analyses supported by documentation (Melia et al., 2016; Chou et al., 2017). The literature highlights that small variations in ice concentration can significantly increase the operating costs of the NSR, either due to the need to reduce speed, increase engine power, or hire icebreaker escorts.

Climate variability significantly increases operating costs. Under high variability, the NSR loses its competitive advantage and may prove more expensive than the Suez route, reinforcing the need to interpret it as a complementary route. This evidence reinforces the idea put forward by authors such as Lasserre (2020) and Furuichi and Otsuka (2015): polar routes are only competitive when climatic and geopolitical conditions remain stable. Even a small deviation is enough to quickly neutralise their benefits.

An increasingly geopolitical Arctic

These economic constraints are intertwined with a changing geopolitical landscape. The Arctic has become an arena for strategic competition between major powers, and the opening of new routes accentuates this rivalry.

Russia maintains operational and regulatory control of the NSR, backed by one of the world's largest fleets of icebreakers, including nuclear-powered vessels, and by a solid military and energy infrastructure in the region (SWP, 2022; Warsaw Institute, 2020; IFRI, 2024). China, for its part, is promoting its *"Polar Silk Road"* initiative, which combines diplomacy, science and logistics investment to consolidate its presence in the area (People's Republic of China, 2018; The Arctic Institute, 2023). The United States and Canada continue to strengthen their military capabilities, while Norway is positioning itself as a key player in scientific cooperation, emergency management and Arctic governance (Arctic Council Secretariat, 2024). The result is an increasingly complex geopolitical ecosystem, where access, rules and governance are in dispute.

Challenges for Europe

For Europe, this scenario carries obvious risks. First, there is a growing challenge of strategic dependence on Russia and, indirectly, on China. Accessing the NSR would mean accepting conditions regulated by Moscow, while China's growing logistical and technological influence could displace European standards in key areas such as maritime safety and environmental protection. Secondly, Europe could lose competitiveness in global supply chains if it does not adapt its infrastructure and internal corridors, especially in the north, to the new logistical realities emerging from the Arctic, as Poo (2024) warns. Thirdly, the EU's energy security could be compromised, given that a significant part of its liquefied natural gas supply is increasingly linked to the Arctic and, in particular, to Russian projects (IEA, 2023). Finally, there is a regulatory risk: if Russia and China lead the regulatory configuration of the Arctic, Europe could be relegated from positions of influence in polar governance, losing one of its main international assets: its leadership capacity in international standards (Smith & Stephenson, 2013).

A scenario fraught with challenges, but also opportunities

However, the outlook is not entirely negative. The EU has the opportunity to position itself as a key player in Arctic development if it adopts a proactive strategy.

This would involve:

- Investing in northern ports capable of absorbing new logistics volumes.
- Strengthening European search and rescue capabilities.

- Developing, albeit to a limited extent, its own polar navigation capabilities. • Strengthening alliances with Norway, Iceland and Canada, and consolidating scientific diplomacy initiatives such as EU-PolarNet.
- Integrating the Arctic into TEN-T network planning.
- Develop regulatory frameworks that promote strict environmental standards and ensure the protection of fragile ecosystems.

Strategic alternatives for the coming decades

Given the current context of relations between the Russian Federation and the European Union, characterised by a high degree of tension as a result of the armed conflict between Russia and Ukraine, the comparison between the NSR and the Suez Canal is clear: the Arctic route is not a stable or consistently cheaper alternative. Its potential depends on an exceptional combination of favourable climate, low ice variability, low operational risks and political stability in the Arctic. Therefore, in this sense, the NSR should be understood as a complementary option, not as a replacement for Suez. But beyond transport, the Arctic is becoming a crucial space in the 21st century. It affects security, energy, global supply chains and the balance between major powers. Europe is already feeling this impact.

The question is not whether it should take an interest in the Arctic, but whether it can afford *not* to. The window for influencing Arctic rules, alliances and infrastructure remains open, but it is narrowing every year. Acting now would allow the EU not only to adapt, but also to shape the new order that is emerging in this highly strategic region.

The alternative would be to accept a future defined by interests that are alien to Europeans. However, when the conditions are right for re-establishing relations with Russia, then investments in the Russian Arctic can be considered, given that there are already countries outside the region interested in investing in the Arctic, not only in the energy sector (gas, oil and rare earths), but also in real estate and tourism, as in the cases of China, the United Arab Emirates and Belarus. This was stated by Russian President Vladimir Putin during his speech at the 6th International Arctic Forum "The Arctic: Territory of Dialogue", held in Murmansk on 26 and 27 March 2025, under the slogan "Living in the North". The forum was organised by the Roscongress Foundation, which seeks socio-economic development, infrastructure and the use of the region's resources, with a special emphasis on the Northern Sea Route. At this forum, the Russian president provided figures that seemed to seek to justify his actions in the Arctic, as well as to expose his allies in this endeavour.

The Latvian intelligence service has pointed out that Russian provocations in the Baltic Sea increase the risk of accidental military incidents, including close encounters between Russian ships and aircraft and NATO units operating in the region. Beyond flights and naval manoeuvres, Russia has employed hybrid warfare tactics ranging from electronic interference to attempts at destabilisation. For example, GPS failures and navigation disruptions have been reported over Estonia and Finland, attributed to Russian electronic interference activities, suggesting a more aggressive use of these techniques in peacetime.

These incidents are occurring in the context of a general increase in Russian military activity near European borders. The expansion of bases and the concentration of military units in the "Leningrad Military District", which borders Finland and the Baltic states, has been interpreted as part of a strategic reinforcement that could allow Moscow to project power more quickly over Eastern Europe and the Nordic countries.

The combination of air incursions, maritime provocations and hybrid actions has prompted states such as Estonia, Latvia, Lithuania, Finland and Sweden to strengthen their defences, increasing security cooperation with NATO and modernising their armed forces in response to the perception of a persistent Russian threat. This has even led to the construction of defensive infrastructure on the Baltic borders and increased air surveillance in northern Europe.

In recent years, Russia's foreign and military policy has generated significant tensions in Europe, especially in the Nordic and Baltic countries. These tensions are not are limited to the war in Ukraine that began in 2022, but include a series of air incursions, airspace violations, hybrid actions and military provocations that have alarmed governments and alliances such as NATO.

A recurring phenomenon has been the violation of the airspace of NATO allies. In September 2025, Estonia and Poland reported incursions by Russian fighter jets into their airspace, an act considered contrary to international agreements and which led to interceptions by fighter jets from the military alliance. These reports describe airspace violations and provocations that have doubled in frequency and severity compared to previous years, forcing several countries to activate air defence procedures.

Greenland and the geopolitical reconfiguration of the Arctic space

Greenland has become one of the most important geopolitical areas of the century.XXI. Traditionally perceived as a peripheral territory, its strategic position, the acceleration of Arctic melting and competition between major powers have placed this island—an autonomous territory of the Kingdom of Denmark—at the centre of global power dynamics. The United States' desire to acquire Greenland highlights the geopolitical dispute between the United States, Russia, and China over control of the Arctic, both for its natural resources and for the new trade routes that are opening up. The island lies between North America and Europe, controlling access to the North Atlantic and the Arctic Ocean. It forms part of the so-called GIUK gap (Greenland–Iceland–United Kingdom), a crucial maritime and air corridor for monitoring naval and submarine movements, especially those of Russian origin (Conley & Rohloff, 2015).

With the progressive melting of the Arctic ice cap, this position takes on additional importance. New shipping routes, such as the Northern Sea Route, significantly reduce the distances between Asia, Europe and North America, altering traditional global trade flows (Arctic Council, 2021). Greenland is emerging as a key point for the control and logistical support of these emerging routes.

United States & Greenland

It should be remembered that, since the Second World War, Greenland has been a central element of the United States' security strategy in the Arctic. In 1951, Washington and Copenhagen signed a defence agreement that allowed for the establishment of US military bases on the island. The most important of these is the current Pituffik Space Base, formerly known as Thule Air Base, which began construction in 1951 and began operations in 1953 (U.S. Space Force, 2023). This base performs key strategic functions: early detection of

intercontinental ballistic missiles, space surveillance, satellite control, and support for North American and NATO defence operations.

During the Cold War, it played an essential role in the early warning system against a possible Soviet nuclear attack, and today it remains relevant in the face of modern threats, including Russian and Chinese hypersonic capabilities (Wezeman, 2022).

An episode illustrating US strategic interest was Camp Century, an underground base built in 1959 under the Greenland ice sheet as part of *Project Iceworm*. Although the project— which envisaged the deployment of nuclear missiles—was abandoned in 1967, it demonstrates the depth of US military interest in the Arctic (Nielsen et al., 2016).

The United States' interest in Greenland is not limited to the military sphere. Historically, the Americans have attempted to acquire the island on several occasions. Following the purchase of Alaska in 1867, Secretary of State William H. Seward already considered the possibility of incorporating Greenland. In 1910, US Ambassador Maurice Egan proposed a "territorial exchange," offering parts of the Philippines in exchange for Greenland and other Danish territories. The proposal did not materialise, but it demonstrated Washington's early interest (National Geographic Latinoamérica, 2025). By 1946, during Harry S. Truman's presidency, the United States made a formal offer to Denmark: $100 million in gold for Greenland, highlighting its strategic importance in the nascent Cold War. Denmark rejected the offer (National Geographic Latinoamérica, 2025). The last two attempts have been initiatives by President Donald Trump (2019 and 2026). Although no formal offer was made, public statements generated diplomatic tension and reaffirmed the island's strategic importance (DW, 2019; AP News, 2026).

Economic dimension, investment and trade

Beyond security, Greenland has significant economic potential. The melting ice is facilitating access to strategic natural resources such as rare earths, uranium, iron, zinc and possible hydrocarbon reserves (European Commission, 2020). These resources are essential for technology industries, renewable energies and defence systems, which is increasing international interest in the territory.

The United States and the European Union have shown growing interest in promoting Western investment in Greenland to reduce dependence on China for the supply of critical minerals. At the same time, the development of port and airport infrastructure could make Greenland an important hub for future Arctic trade (Lanteigne, 2020).

The dispute between the United States, Russia and China over control of the Arctic

The competition for Greenland is part of a broader context of rivalry in the Arctic. Russia considers the region central to its national security and has reinforced its military presence with bases, nuclear icebreakers and missile systems along its Arctic coastline (Wezeman, 2022). Although Moscow does not claim sovereignty over Greenland, it is closely monitoring any NATO expansion in the area.

China, for its part, defines itself as a "near-Arctic state" and has included the region in its *Polar Silk Road* initiative. Beijing has sought to invest in mining and infrastructure projects in Greenland, raising concerns in the United States and Denmark about the possible strategic use of these investments (Lanteigne, 2020).

Faced with these developments, the United States seeks to consolidate its influence through military presence, cooperation with Denmark, and economic support for Greenland, preventing the territory from becoming a platform of influence for strategic rivals.

The interest in controlling Greenland reflects a profound transformation of the Arctic in international politics. The island has become a point of convergence between security, economy, trade and rivalry between major powers. Its future will be marked not only by the strategies of the United States, Russia and China, but also by the decisions of the Greenlandic people themselves, who aspire to a greater degree of autonomy and influence over their destiny. In an increasingly competitive world, Greenland is no longer the frozen periphery of the international system, but one of its new strategic centres and, therefore, a new geopolitical hub that could determine not only the future of global investment, the economy and trade, but also the future of international security and global governance.

Conclusions: future scenarios

The Arctic is no longer a peripheral area but has become one of the strategic epicentres of this century, where geopolitical, economic, energy, commercial and security interests converge.
Far from opening up opportunities for cooperation between countries, generating new investment and creating new trade routes that increase global flows, the progressive melting of the ice is causing an escalation of political tensions between the major Arctic and non-Arctic powers, creating uncertainty about the future of the world order.

Given this reality, the following possible future scenarios are considered to be the most important:

1. **The Arctic as a new axis of geopolitical and systemic competition:** The dispute in the Arctic is part of a dynamic of structural rivalry between the United States, Russia and China:

    - Russia starts with a clear strategic advantage: it controls most of the Arctic coastline, has consolidated military and civil infrastructure, and exercises de facto control over the Northern Sea Route (NSR).

    - The United States, although a global power, has been slow to react in terms of Arctic infrastructure and is increasingly dependent on alliances (Canada, Denmark/Greenland, Norway). The United States influences strategic access to the NSR through the Bering Strait and the GIUK gap. Together with Canada, it also controls the entire Northwest Passage.

    - China, without being an Arctic state, positions itself as *a "near-Arctic state"*, using economic, scientific and technological instruments to secure future access to routes and resources.

The Arctic is emerging as a region of growing strategic interest, where various powers seek to strengthen their presence. It is advisable to encourage scientific cooperation, establish maritime transit agreements and promote preventive diplomacy, contributing to shared governance that reinforces regional security, stability and sustainability.

2. **Arctic countries as new global powers:** The Arctic Council is the ideal forum for reaching agreements, resolving disputes and planning sustainable development not only for member countries but also for other countries that are not part of the Arctic but will in one way or another benefit or suffer if cooperation is not achieved between the major powers vying for control of the Arctic.

3. **Cooperation scenario:** in this scenario, the United States and Russia, as two of the world's major powers and members of the Arctic Council, propose a common working agenda to all Arctic Council member countries that establishes common benefits for all countries, while also outlining a common strategy for cooperation with other major powers, China and India, which will undoubtedly benefit from the opening of new Arctic routes. Cooperation will always be better than confrontation.

4. **Confrontation scenario:** No agreement is reached between the major Arctic powers, the United States and Russia, and other countries will have to side with one or the other. Russia could further deepen its relations with China, opening the doors to the Arctic. In a scenario of prolonged confrontation, Russia could deepen its strategic alignment with China through structural agreements on access to the Arctic, such as port concessions, participation in critical infrastructure or logistical integration in the Northern Sea Route. Although this would not automatically make China an Arctic state or grant it full membership in the Arctic Council, it would de facto alter the regional power architecture, expanding its economic, operational, and political influence in polar governance. The United States would then cease to be the only major power within the Arctic Council. How would the other members react and act? Even more so if the United States continues with its current foreign policy, which is changing and uncertain. China could replace the United States in global leadership. It should be remembered that China has been implementing a foreign policy for years that seeks to consolidate that country as a defender of multilateralism, a promoter of free trade and a guarantor of peace and stability in the international system. It is also important to remember a significant fact that is often overlooked: China currently has more free trade agreements and bilateral investment treaties than the United States. According to UNCTAD, China has 109 bilateral investment treaties (BITs) in force and multiple free trade agreements (FTAs) with chapters on investment. The United States and China do not have a BIT, and the last time they negotiated one was in 2016. By the end of 2024, China had signed 23 free trade agreements (FTAs) with 30 trading partners and tax treaties or agreements with 111 countries or regions, of which 105 had entered into force. In contrast, the United States has 14 free trade agreements covering a total of 20 economies, including countries and regions around the world. All these data demonstrate China's capacity for influence compared to the United States. Most countries would have no problem opting to defend Chinese leadership in global governance issues (UNCTAD 2024, International Trade Administration 2025). In addition to all this data, China has significantly increased its commercial influence in the Arctic countries. Its presence is focused on investments in port infrastructure, mining and energy, especially in Russia, Iceland and Norway, and on the import of strategic raw materials such as oil, gas and metals. It also participates in scientific and technological projects for Arctic navigation and climate studies, ensuring future access

to routes such as the Northern Sea Route. Through bilateral agreements and strategic investment, China is positioning itself as a key player in the Arctic regional economy and governance.

5. **The Nordic and Arctic agenda in the European Union:** The Nordic countries rank among the top 10 countries with the highest level of innovation worldwide. Eight countries make up the Arctic Council (Canada, the United States, Russia, Denmark, Norway, Sweden, Finland and Iceland), five of which belong to the Nordic group of countries. This represents 62.5% of the political weight within the Council. In today's technological world, where governance is led by *Big Tech Companies*, the Nordic countries could see their political weight within the EU increase, given that the only way for the EU to achieve strategic autonomy is through greater investment in the design, production and commercialisation of technology. The United States and China confirm that if they are the powers they are today, it is thanks to such strategic actions, investing in science, technology and innovation. If we consider that the Nordic countries are in the majority in the Arctic Council, then their degree of influence would encompass the Arctic Council and the Council of the European Union. Control of the Arctic is not only in the economic and commercial interest, but also in the geopolitical interest.

6. **Increased influence of the Nordic countries in NATO**: The incorporation of Sweden and Finland into NATO has led to several changes in the structure of the security system in Europe and internationally. On the one hand, it demonstrates a strategic error on the part of Russia. Given that Russia's main argument for invading Ukraine was that it did not want to see NATO expanded through Ukraine's accession, then they were wrong, as Sweden and Finland are now members of NATO, when previously they not only did not want to be members, but were opposed to NATO. On the other hand, if Russia did not want NATO to have a direct border with Russia via Ukraine, it now has one with Finland. The incorporation of both Nordic countries has made a significant contribution in military, industrial and technological terms to the Alliance as a whole. In the military sphere, Sweden and Finland have modern, highly professionalised and fully interoperable armed forces, which have been practising and training alongside NATO for decades, despite their previous non-aligned status. Finland contributes one of the largest territorial defence capabilities in Europe, its capabilities in logistics, cybersecurity and ammunition, as well as a strong industrial base geared towards resilience. Sweden contributes with its defence industry, such as the Saab company, which produces advanced systems such as Gripen fighter jets, radars, submarines and high-tech weaponry. All this translates into a strengthening of NATO's deterrent, technological and operational capabilities, thanks to its two newest Nordic members.

7. **Greenland as a strategic hub and source of transatlantic friction:** Greenland is emerging as a key player in the Arctic security system. Its value is not only geographical, but also military (security, missile defence, surveillance), energy-related (critical minerals, rare earths) and political (growing autonomy from Denmark). The United States' explicit interest in strengthening its presence in Greenland has generated latent tensions within the traditional transatlantic link (United States-European Union), especially directly with Denmark and indirectly with the Nordic-Arctic countries, revealing a divergence of priorities:
    - The United States seems to favour a logic of hard security and strategic containment.

- The European Union tends to emphasise governance, sustainability and regulated cooperation.
- This translates into two ways of conceiving international relations and the exercise of diplomacy as a peaceful instrument for conflict prevention and resolution.
- This asymmetry weakens Western coherence in the Arctic and opens up room for manoeuvre for Russia and China.

8. **Control of maritime routes as the core of the conflict:** Arctic maritime routes, particularly the Northern Sea Route, are the main vector of power in the region. Currently, although Russia controls the infrastructure, icebreakers and regulatory frameworks, as well as the initiative to develop a network of Arctic ports, which would facilitate and increase trade flows, the United States influences strategic access to the NSR through the Bering Strait and the GIUK gap. The United States and the European Union question Russian control of the Northern Sea Route, appealing to freedom of navigation; this disagreement is not merely technical, but deeply geopolitical and normative. While for Russia the NSR is a strategic internal route, for the other Arctic countries and EU Member States it is emerging as an international space with global legal and economic implications. Control of these Arctic routes will not only determine the dynamics of Eurasian trade, but will also influence the future configuration of the global maritime order, defining how strategic corridors are regulated and protected and how the geopolitical advantages derived from the opening of the Arctic are distributed. The opening of the Arctic route would have a significant impact on several international trade flows. The main beneficiary would be East Asian-European trade, especially between China, Japan and South Korea and the main European markets, as the Arctic route would reduce distances and sailing times compared to traditional routes through the Suez Canal and the Strait of Malacca. This would favour the transport of manufactured goods, electronics and industrial components. Another booming and key trade flow would be energy, particularly exports of liquefied natural gas and oil from the Arctic regions of Russia, Norway and Alaska to Europe and Asia, strengthening energy security and reducing logistics costs. It would also benefit exports of critical raw materials, such as strategic minerals and metals, from Canada, Greenland and Scandinavia to major industrial centres. Finally, the opening of the route would boost port and logistics services in the Nordic countries, consolidating the Arctic as a new hub for global trade.

9. **Risks of fragmentation within NATO and its impact on US–EU relations:** NATO's recent northward expansion, with the incorporation of Finland and Sweden, strengthens the Western presence in the Arctic and reinforces collective defence capabilities. However, it also highlights certain internal tensions that could affect the Alliance's cohesion. These include differences in the degree of confrontation that member states consider appropriate towards Russia, divergent economic interests related to energy, trade and regional stability, and the absence of a fully integrated common Arctic strategy. These differences do not necessarily imply a permanent weakening, but they can limit the Western bloc's capacity for joint action and diplomatic effectiveness in highly complex scenarios. In particular, coordination between the United States and the European Union may be affected, reducing their room for manoeuvre and negotiating capacity vis-à-vis Moscow. To mitigate these risks, it is advisable to promote continuous political dialogue, shared strategic planning mechanisms and the harmonisation of Arctic policies within NATO, so as to preserve

the unity of the bloc and ensure a balanced approach that combines security, cooperation and regional stability.

10. **Final consideration:** The full impact of *Arctic Sentry* (also known as *Arctic Sentinel*) remains to be seen, but the initiative marks a significant shift in Arctic security coordination. Led by NATO in 2026, the operation unifies allied military exercises in the High North under a single command for the first time, integrating national manoeuvres such as Denmark's *Arctic Endurance* and Norway's *Cold Response* into a cohesive operational framework. The mission covers air, sea and land domains, with the aim of improving interoperability, logistical coordination and strategic cohesion among participating forces. Focused on Greenland and the surrounding Arctic regions, *Arctic Sentinel* expands surveillance capabilities, naval deployments and air patrols in response to perceived security challenges from Russia and China. The future of the Arctic will depend less and less on physical melting and more on the dynamics of cooperation and competition between major powers. Without a shared transatlantic strategy between the United States and its European allies, the region could become a theatre of permanent rivalry, where control of maritime routes and natural resources takes precedence over sustainable governance and multilateral cooperation. In this context, the Arctic transcends its role as a climate thermometer and becomes a barometer of the emerging international order. Prudent and coordinated management of strategic challenges in the Arctic will define not only regional security and trade, but also the strength of the principles of cooperation, governance and stability in the international system. The Arctic is thus becoming the final geopolitical frontier, where the interests of multiple actors intersect and strategic decisions will have global repercussions. Its development and management must be approached from a comprehensive geopolitical perspective, combining security, sustainability and preventive diplomacy, ensuring that the region is a space for multilateral cooperation and lasting stability.

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QUANTIFIABLE ECONOMIC AND COMMERCIAL IMPACT OF ROUTE DEVIATION (NSR VS. SUEZ)

In addition to the geopolitical analysis developed, a quantified economic assessment of the potential of the Northern Sea Route (NSR) compared to the Suez Canal is incorporated, based on a transparent and replicable operational model.

1. Operational assumptions and justification

To ensure consistency and traceability, the calculation is based on the following technical assumptions:

Ship type: 14,000 TEU container ship
Represents the typical range of vessels used in large-scale Asia–Europe services.

Base speed (Suez): 16 knots
Standard commercial speed on long routes to optimise consumption.

Average consumption: 150 tonnes/day
Conservative value for a 14,000 TEU vessel at economic speed.

Fuel price: 500 USD/tonne Approximate average for VLSFO 2024–2025.
The model uses 500 USD per tonne as a structural reference value to facilitate comparability with previous studies. However, given the volatile energy context, a sensitivity analysis is subsequently incorporated that considers an estimated range for 2026 between 450 and 750 USD per tonne, in order to assess the impact of fuel price variations on the relative competitiveness of the NSR.

Daily operating cost (OPEX + charter): USD 40,000
Includes crew, maintenance, basic insurance and financial cost of the vessel.

Total daily cost used in the model:
Nautical miles are used for consistency with speed in knots.
Fuel:
150 t × 500 USD = 75,000 USD
Ship cost: 40,000
Total daily cost = 115,000 USD

2. Distances used (nautical miles – nm)

Nautical miles are used for consistency with speed in knots.
Shanghai – Rotterdam
Suez: 10,500 nm
NSR: 8,500 nm

Busan – Rotterdam
Suez: 11,100 nm
NSR: 9,100 nm

The figures reflect an approximate structural differential of 2,000 nm between Suez and NSR, consistent with technical literature on Arctic routes.

3. Base calculation: Shanghai – Rotterdam Cost via Suez Sailing time:
10,500 / (16 × 24) = 27.34 days
Navigation cost:
27.34 × 115,000 = 3,144,531 USD
Suez toll: 500,000

Total Suez cost = 3,644,531 USD NSR

Scenarios

Three scenarios incorporating real operational factors are introduced:

Scenario	Speed	NSR fee	Extras	Expectations
Optimistic	16 kn	150,000	50,000	0
Base	14 kn	200,000	150,000	0
Pessimistic	12 kn	250,000	300,000	+2 days

The "extras" include insurance surcharges, Arctic services and possible technical assistance.

Results Shanghai – Rotterdam

Optimistic
NSR cost = 2,745,573 USD
Savings vs Suez = **+898,958 USD**
≈ 64 USD/TEU

Base
NSR cost = £2,745,573
Savings vs Suez = **+£385,305**
≈ £28/TEU

Pessimistic
NSR cost = 4,174,097 USD
Difference vs Suez = **–529,566 USD**
≈ –38 USD/TEU

Conclusion: competitiveness depends critically on effective speed and operational overheads. The higher the fuel price, the more attractive the NSR becomes in an optimistic scenario. However, if speed drops (base/pessimistic scenario), the savings quickly disappear.

We can express the differential as a simple function:
Differential (Δdays × consumption × fuel price) – (NSR extra costs + time penalty)
In practical terms:
Each increase of USD 100 per tonne of fuel:
Additional impact on NSR advantage = 780 t × £100 = £78,000 per voyage

This means:

- With cheap fuel → marginal NSR advantage
- With expensive fuel → advantage can double
- But operational risk remains decisive

Strategic conclusion:
NSR is more attractive in energy inflationary environments.

BUSAN – ROTTERDAM ROUTE (14,000 TEU)
Cost via Suez Time:
11,100 / (16 × 24) = 28.91 days
Shipping cost:
28.91 × 115,000 = 3,324,219 USD Toll: 500,000 USD

Total cost for Suez = 3,824,219 USD

Results Busan – Rotterdam

Optimistic
Savings = **+898,958 USD**
≈ £54/TEU

Base
Savings = **+359,635 USD**
≈ £26/TEU

Pessimistic
Difference = **–589,462**
≈ –42 USD/TEU

The results confirm that the economic differential is structurally similar to the Shanghai case, but with greater sensitivity to operational penalties.

UNIFIED COMPARATIVE TABLE
SAVINGS PER ROUTE AND SCENARIO (USD per trip, 14,000 TEU)

Scenario	Shanghai–Rotterdam	Busan–Rotterdam	Average savings (USD/TEU)
Optimistic	898,958	898,958	≈ 64
Base	385,305	359,635	≈ 27
Pessimistic	–529,566	–589,462	≈ –40

AGGREGATE MACROECONOMIC IMPACT
If approximately 5% of Asia–Europe traffic (≈17 million TEUs per year) were to use the NSR during the navigable season:
Estimated volume: ≈ 850,000 TEU
Equivalent in voyages (14,000 TEU; 85% utilisation): ≈ 71 trips per year Aggregate impact:
Optimistic scenario: ≈ 64 million USD Base scenario:
≈ 27 million USD Pessimistic scenario: ≈ –38 million USD

Conclusion:
The overall macroeconomic effect is limited, but strategically relevant in terms of resilience and diversification.

IMPACT OF CARBON COSTS (EU ETS)

Estimated fuel reduction per trip: ≈ 1,000 tonnes
Emissions avoided: ≈ 3,100 tonnes CO_2
General formula:
ETS savings = 3,100 × EU price (€/tCO_2)
Example with €90/t: ≈ 279,000
The regulatory impact marginally strengthens the competitiveness of NSR, but does not alter its dependence on operating conditions.

ECONOMIC CONCLUSION

The NSR would not represent a structural transformation of Eurasian trade. Its economic advantage is conditional, moderate and highly sensitive to:

- effective speed,
- logistical overheads,
- geopolitical stability,
- climate variability.

It should be understood as an instrument of strategic diversification and not as a stable substitute for the Suez Canal.

IMPACT OF CARBON COSTS (EUROPEAN ETS)

With a carbon reference price of €90/tCO_2, the estimated additional savings would be approximately €282,502 (≈ USD 310,752) per voyage. This component slightly reinforces the economic advantage of the NSR in regulatory terms, although it remains marginal compared to operational and geopolitical factors.

According to the calculations made, the Arctic route would not be a structural substitute for the Suez Canal, but rather a complementary alternative whose economic viability depends on very specific conditions.

Its competitiveness is essentially conditional: it can generate cost advantages when navigation takes place without speed penalties, with limited logistical surcharges and in a stable geopolitical environment. However, it is highly sensitive to operational variations, especially to effective speed reductions due to ice, increases in insurance premiums and additional regulatory requirements. Likewise, its appeal increases in contexts of high energy prices, given that the distance differential reduces fuel consumption, but it quickly loses competitiveness when climatic uncertainty, political instability or operational restrictions prevail. Consequently, its value should be interpreted in terms of strategy and logistical resilience, not as a structural transformation of Eurasian trade or as a new dominant axis of the international maritime system, but as a diversification tool that can mitigate vulnerabilities in scenarios of tension or disruption of traditional routes.