



RESEARCH PAPER

Climate Change and Geopolitics: How China's Policies are Transforming Arctic Shipping

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ABSTRACT

This study examines China's Arctic plans through analysis of the Polar Silk Road initiative alongside Chinese Arctic infrastructure development and cooperation with Arctic states. This research investigates China's strategies regarding Arctic energy security while also advancing its trade competitiveness and extending geographic presence in this region. The Arctic ice depletion resulting from environmental changes created maritime opportunity through the Northern Sea Route (NSR) and Northwest Passage. The research utilizes its findings on qualitative analysis of trade routes that serve as core components of China's Belt and Road Initiative's implementation. The routes present faster transportation alongside economic advantages which change historical trading patterns. The Chinese Arctic strategy improves global trade networks but challenges assessments of Arctic governance obligations as well as environmental preservation and Arctic security procedures. These internal environmental and security matters require universal governance standards that balance worldwide cooperation against geopolitical tensions.

KEYWORDS Arctic Shipping, China Policy, Climate Change, Environmental Impact, Geopolitics, Polar Silk Road

Introduction

Arctic is a region near the North Pole and is often used to describe the cold climate and environment in that area. A region that is sparsely populated, inhospitable, and probably rich in resources. The Arctic region has strategic importance involving waterways and skyways. The Soviet Union, Scandinavian states, the United States, and Canada. In short, the Arctic nations are all involved in the improvement and expansion of the region's fisheries, oil deposits, and other deposits of mineral resources like diamonds, phosphates, iron ore, gold, etc. The region that proposed a rapid flight lane between major cities in Europe, Asia, and America has been strengthened and armed with billions of dollars by both the Soviet and Western Bloc (Tamnes & Offerdal, 2014). The Arctic region is undergoing notable transformation due to the hybrid forces of climate change and global interest especially from major global players like China, Russia etc. Historically, observed as a remote and inhospitable area the Arctic region is become more accessible due to climate change which leads to the liquefying of polar ice. This phenomenon not only change the physical scenario but also opens up new maritime

routes that are important for international trade. Among these routes the Northern Sea Route (NSR) and the Northwest Passage (NWP) are attracting attention for their potential to reduce shipping traveling distance between Asia and Europe. China's engagement in Arctic shipping is initially driven by its billions dollar project named Belt and Road Initiative (BRI), which aims to enhance global trade connectivity through infrastructure development framework and purposeful partnerships. There are also a possibility that the north sea route can cut ten days off the trip from Asia to Europe when compare to the passages of the Indian ocean and the Suez canal. The total distance traveled between China and Germany has been reduced to 4000 km. Moreover , if a conflict were happening in a future between China and the USA avoiding critical trade choke points like the Malacca and Suez canals could possibly benefit the Chinese economy. These evaluation collectively highlight that while there may be advantages linked to new shipping routes there are also highlights obstacles that need to be navigated carefully. Another economic factor during this expansion is the abundance of valuable natural assets, for instance, hydrocarbons and minerals which become economically feasible to extract. The North Sea route not only offers a viable trade choices but also serves as a practical route for the Chinese navy if ties with the US were becoming fragile or challenging in future. Undoubtedly, the case that through the North Sea route, China could acquire access to the North Atlantic, enabled diverse tasks like intelligence gathering or nuclear deterrence patrols, as noted in **(China's Arctic Policy, 2018)**. The white paper was published china's arctic policy it can be read under governments website in the paper states that china has shared future with the rest of the world. In the arctic china's policy ambitions are expanding and enhancing participation in the arctic governance as to secure the common goals of all countries, the transnational communities with promoting sustainable development in the arctic region. China prioritizes scientific research, environmental protection, rational utilization of resources, law-based administration and international organization rules and regulation, focusing on maintaining a peaceful, secure and stable arctic order. The utilization of sea routes and exploration of the resources in the arctic may poses a significant impact on energy strategy and economic development of china.

The white paper goes as far as to use the term "Polar Silk Route," highlighting China's strategic interests in the Arctic. So, what investments has China made in this region thus far? Notably, there has been progress in developing the natural gas fields in Siberia and advancing the Northern Sea Route in collaboration with Russia. One of the key advantages of partnering with Russia lies in the potential to enhance their bilateral relationship. This cooperation is particularly significant given their shared rivalry with the United States, making it an increasingly critical alliance for both nations. Russia relies on Chinese investment to tap into the natural resources beneath the permafrost and to capitalize on its extensive Arctic coastline, especially in light of the US sanctions imposed following Russia's annexation of Crimea in 2014.

Literature Review

A White paper "China's Arctic policy" discusses China's Arctic policy reflects a multifaceted approach that encompasses economic, environmental, and geopolitical dimensions. Chinese governance has expressed its ambitions towards Arctic, emphasizing the requirements to understand, secure, develop and expand the arctic region through participation and collaboration in the governance of that region . According to a report from the University of Alaska Fairbanks, China has set target to improve its capability for scientific research in the region, bolster technological

advancement , and promote sustainable development practices which are advantageous for both China and Arctic communities (**China's Arctic Policy, 2018**).

An article 'China's Polar Silk Road: Implications for the Arctic Region' by Anu Sharma , his research investigates China's strategic aspirations in the Arctic through its programs to enhance the Polar Silk Road (PSR). Polar Silk Road is an crucial component of China's Belt and Road Initiative (BRI), which generally focusing in building new maritime trading routes that strengthen ties between Asia and Europe while utilizing the unexploited Arctic resources and minerals The article highlights China's dual focus on scientific inquiry and resource management , as well as its approach to reduce climate change impact in the region. The writer basically underscores the geopolitical implication of China's actions, specifically how they may reshape power ties among Arctic nations and other global states, highlighting the need for cooperative leadership to address potential clashes originated from increased competition and environmental challenges. There is a lack of complete analysis regarding how China's Polar Silk Road program part of BRI could effect on indigenous Arctic communities and their socio- economic circumstances amidst these geopolitical transformations (**Sharma, 2021**).

The article about 'Toward Sustainable Arctic Shipping: Perspectives from China' by Qiang Zhang, Zheng Wan and Shanshan Fu, in which authors highlights scientific exploration, attaining an equilibrium between commercial shipping and environmental protection, as well as nurturing active global cooperation in governance. This research emphasizes China's commitment harnessing scientific exploration for secure direction, encouraging sustainable shipping approaches, and play a vital and crucial role in joint Arctic leadership models. Nonetheless, there remains a notable research shortcoming in understanding the long-term environmental consequences of heightened shipping actions in the Arctic and China's potential to address these challenges while following its economic ambitions (**Zhang, Wan, and Fu, 2020**).

This article "Arctic Ambitions: China's Engagement With the Northern Sea Route" by Tiago Tecelão Martins, in which author analyse China's strategic involvement in the Arctic region, with specific focus to the Northern Sea Route (NSR). The primary driver of China's interest in this area is the pursuit of new energy resources and the creation of efficient maritime pathways for transporting these resources. The partnership between China and Russia has resulted in considerable Chinese involvement in NSR voyages; for example, in 2021, the China Ocean Shipping Company (COSCO) represented around 30% of these trips, operating 14 out of 26 voyages to China via the NSR. There is a lack of extensive research investigating the long-term geopolitical consequences of China's growing presence in the Arctic, especially regarding its effect on global shipping patterns and regional security (**Martins, Tiago Tecelão, 2023**).

Methodology

A qualitative methodology that includes case studies and document analysis will be used in this study. In terms of understanding China's Arctic policy's strategic objectives and implications for shipping routes, key documents will be analyzed. Examining relevant academic papers on Arctic governance as well as international agreements like the United Nations Convention on the Law of the Sea (UNCLOS) will be part of this. This study emphasis on offering a strong understanding about how China's arctic policies has changed Arctic shipping in the arena of intense climate change issues by examining the factors of policy frameworks, environmental effects, and geopolitical

tensions. The outcomes will help policy and decision makers in deep understanding about a number of possibilities for cooperation, collaboration, commitments and most importantly in resolution of disputes in the arctic region and offer deep knowledge about sustainable development in that region.

Changing dynamics due to Climate Change in the Arctic Region

Environmental changes have had a major impact on the Arctic region, and rapidly melting sea ice is a stark indicator of rising global temperatures. Arctic sea ice has decreased by over 40% since 1979, according to research by the Intergovernmental Panel on Climate Change (IPCC), and by the middle of the twenty-first century, it is predicted that the in the summer region may be ice-free. Environmental changes have had a major impact on the Arctic region, and rapidly melting sea ice is a stark indicator of rising global temperatures. Arctic sea ice has decreased by over 40% since 1979, and by the middle of the twenty-first century, it is predicted that the summer region may be ice-free. Globally, coastal areas are seriously threatened by rising and more extreme sea levels. These risks include increased coastal erosion, more frequent and severe coastal flooding, and the irreversible submersion of land as a result of rising mean sea levels or tides. Coastal habitats are also subject to deterioration, loss, and change, and agriculture and freshwater resources are at risk due to soil, groundwater, and surface water salinization. Flooding threats are increased by rising sea levels, which also obstruct drainage. Low-lying islands, coastal regions, and communities, whether urban or rural, continental or island, and regardless of their degree of development, are at serious risk from these issues in the long run if adequate adaptation measures are not taken (Buchanan, 2019). In addition to posing environmental challenges, this transformation is a significant geopolitical development as it generates new maritime routes, such as the Northern Sea Route (NSR) and the Northwest Passage. In terms of transnational trade, the more conventional routes, such as the Suez Canal, offer shorter travel times, lower costs, and less fuel use. Because these routes are easily accessible, both Arctic and non-Arctic states are fighting for influence in that area. Due to their close proximity and recognized legal claims under the UN Convention on the Law of the Sea, maritime nations like Canada, Norway, and Russia are in a significant designation (Treves & Tullio, 1982).

But in order to stay in the field, non-Arctic countries like China, which are engaging in rivalry, are also advancing economic cooperation and scientific research with the Arctic nations. China, in particular, has incorporated Arctic development into its mega project, BRI (Belt and Road Initiative), and referred to itself as a "Near-Arctic State." The Arctic Council, which acts as a platform for discussions and decision-making between Arctic states and local people, is one of the important stakeholders and players in the region that must work together in light of this growing interest. Maintaining equilibrium in economic prospects with environmental sustainability remains a challenge for all players in the region.

China's Arctic Ambitions

China has willingly turned its tilt to the Arctic, viewing it as an essential region for economic and strategic expansion. In 2018, the Chinese authority published its Arctic Policy White Paper, which described the country's intentions to grow its role in Arctic affairs. The document underscores China's commitment to cooperation in the region while also outlining its interest in promoting long-lasting development and safeguarding the environment (China's Arctic Policy, 2018). China declared itself a "Near-Arctic State"

In this policy, a position is used to argue that, although not being inside the Arctic Circle, its geographic location and significant nautical attention justify a share in Arctic affairs. This self-recognition is important for defining China's strategy and aims for regional influence. China's influential geopolitical strategy, particularly the Belt and Road Initiative (BRI), is closely linked to its Arctic policies. The "Polar Silk Road" program seeks to build up new maritime trade routes through the Arctic, which are part of the mega project of BRI China, initiating work on that in the Arctic region. These projects are designed in a way through which China's growing contributions to the Arctic infrastructure involve ports, research stations, icebreaker technology, and advanced technology that support the mobility of goods between China, Europe, and other states linked with that region. Behind China's broader strategic ambition and expansion in the Arctic region are securing command on new shipping trade routes, energy resources, and international partnerships (Tillman, Yang & Nielsson, 2018). These strategies emphasize China's interference in shaping the future of the Arctic and secure their position as a major player in the economic and political landscape of the Arctic region

Economic Implications of Arctic Shipping for China

The availability of routes offers cost savings and increased efficiency for maritime trade, making Arctic shipping significant for China. Compared to traditional maritime routes like the Suez Canal, the Northern Sea Route and Northwest Passage, which are becoming more navigable as a result of climate change, offer a quicker route between Asia and Europe. Research indicates that the Arctic routes can reduce travel time by up to 40% and fuel usage by about 20% to 30% (Zhu, Fu, Adolf, Luo & Ying-En Ge, 2018). China is one of the biggest trading nations in the world, and for the Chinese, that type of savings is found profitable. One major advantage for China is that he could do his trade with a number of states more quickly and cheaply, but it also increases its competitiveness in international markets. Furthermore, the evident economic benefit of Arctic shipping is crucial for China's energy security. Expanding energy needs in China can also be addressed through the Arctic because the Arctic region has found an abundance of untapped natural resources, such as minerals, gold, natural gas, oil, etc. China guarantees more efficient transportation of these resources from the region to its domestic markets and to consumers worldwide by safeguarding shipping routes via the Arctic. It is very vulnerable for China because in the contemporary world, he mainly focuses on reducing his dependency on conventional nautical shipping lanes, which are majorly vulnerable to political unrest and also raise the chances of hijacking, especially in the South China Sea (Bergmann & Svendsen, 2024).

China invests a lot in Arctic infrastructure to gain the benefit of these opportunities. For China, Arctic transport is proved to be more feasible almost in one year due to port development, such as the construction of Jiangsu Port in Russia, and the purchasing of icebreakers and other specialized instruments. Moreover, China is building research stations and is willing to expand them in the Arctic for the sake of expanding its technological and scientific influence there. Facilitating trade and shipping, these infrastructural initiatives demonstrate China's long-term commitment and investment for retaining its influence over Arctic affairs (Liu, 2020).

Geopolitical Implications of China's Arctic Policies

The introduction of China's Arctic policies highlights important geopolitical implications that reshape the power dynamic in the Arctic area. The Arctic region is

basically influenced by eight coastal states: Canada, Denmark, Russia, Norway, Finland, Iceland, Sweden, and the United States. These nations command vast areas of the Arctic and have long claimed sovereignty over Arctic territories, especially under the United Nations Convention on the Law of the Sea (UNCLOS). Additionally, as China grows its involvement in the region, it is challenging the traditional power structures and emphasizing its own interests, yet not being an Arctic maritime state. China's growing existence in the Arctic is largely driven by its strategic interests, especially protecting access to new shipping routes, natural resources, and global influence. As part of its "Polar Silk Road" program, China is largely investing in Arctic infrastructure, including ports, icebreakers, and research stations, and has integrated its scientific and economic partnerships with Arctic nations, particularly Russia (Zuo ,Xu &Yao, 2019).These advancements are aligning China as a crucial player in Arctic geopolitics, despite opposition from some Arctic nations. For example, Canada and the United States have expressed their ambitions regarding China's growing influence in the region, fearing that its expanding presence could undermine the sovereignty of Arctic countries and disturb the established geopolitical balance. One of the most significant geopolitical findings of China's Arctic strategy is the growing cooperation between China and Russia. Both countries share an interest in the Arctic's resources and shipping routes, and their collaboration is clear in projects such as the Yamal LNG project in Russia's Arctic region (Liu, 2020). This alliance not only enhances China's access to Arctic resources but also heightens Russia's reliance on China for investment in Arctic progress. However, this growing cooperation between China and Russia raises concerns in the West, as it could change the balance of power in the region and challenge NATO's strategic concerns. Additionally, the responses from Russia and the West and China's participation in Arctic administration through transnational organizations like the Arctic Council further hinder the landscape. Despite China not being an Arctic nation, it has been granted observer status in the Arctic Council, which allows it to interact in dialogue about regional authorities. This position enables China to influence the future of Arctic policy, including decisions on environmental protection, shipping frameworks, and resource extraction (Zhang, & Liao, 2018).

Environmental Concerns and Risks

While the economic and geopolitical factors in the Arctic are crucial, they come with notable environmental hazards. The Arctic region refers to an unusually fragile ecosystem and the home of various wildlife species, such as seals, polar bears, and multifaceted marine organisms. As shipping activities in the area rise, the environmental consequences become an emerging problem. A primary risk related to Arctic shipping is oil emission. The region's cold water creates a challenging situation in countering and cleaning up spills (Buchanan, 2019). There are major challenges, including the destruction of marine ecosystems, growing shipping traffic, and heightened noise pollution, which may interfere with nautical mammals' communication and maneuvering skills. The Arctic ecosystem is poorly outfitted to cope with the pressures of industrial operations, and the expansion of shipping routes and that delicate and fragile environment also compromise the region's biodiversity (Liu, 2020).

China's Arctic policy exists at the nexus of environmental commitments and economic goals and faces an obstacle in balancing its objectives for resource extraction and shipping routes due to the growing need for sustainable development and ecological

protection. Arctic ecosystems are already under stress from the melting of ice due to climatic change, and human activities like shipping, resource extraction, and infrastructure development might make the region's environmental condition worse. However, it also refers to significant environmental risks associated with the Arctic's natural resource extraction. Performing activities like oil and gas drilling and mining have the potential to disturb the whole region's ecosystems. As China aims to acquire these resources, it enhances pressure from environmental organizations, which leads to minimizing its impact on the region. Although China has committed to following long-term development in the Arctic, its actions frequently challenge these commitments, especially in gaining influence over the Arctic resource (Zhang, & Liao, 2018).

Case Studies

There are numerous examples that demonstrate the effect of China's Arctic policies. The Yamal LNG project in Russia is one of the most prominent projects. This project encompasses the progress of liquefied natural gas (LNG) that facilities Russian in the Arctic. A significant collaboration between China and Russia. Through its state-owned energy firm, China has invested a huge amount in their initiatives and programs. CNPC provides an opportunity to Russia for developing their Arctic energy assets in a more effective way. For China, the Yamal LNG project is a crucial element of its energy security strategy, allowing direct access to natural resources and also strengthening its alliance with Russia. Another important case study is Chinese interference in Arctic shipping. Currently, COSCO (China's state-owned shipping company) has transmitted vessels through the Northern Sea Route; in this way, Chinese ships have utilized this shortcut between China and Europe for the first time. This practice not only explained China's growing interest in Arctic shipping and, most importantly, highlighted the potential economic advantages of utilizing these new routes. The Northern Sea Route offers a rapid and more economical alternative to the traditional Suez Canal route and also reduces travel time and fuel costs for China (Zhang, & Liao, 2018). These shipping issues clearly reflect China's long-term dedication to expanding its influence in the Arctic, both for trade and strategic goals. Another vital factor of China's Arctic strategy is establishing a research station. With the collaboration of Norway and Iceland setting up a number of research services in the Arctic, conduct scientific examination and strengthen relations with Arctic nations. These research stations support China's scientific efforts and act as symbols of enhancing interest in Arctic affairs (Liu, 2020). These research programs enable China to gather factual data relevant to climate change, resource extraction, and shipping conditions, which strengthen their knowledge and provide a potential for future economic activity in a most effective way.

Challenges to China's Arctic Strategy

Russia and China pose particular challenges because of rising geopolitical tensions and competition. Russia has a hard security problem, while China has more of a soft security challenge. Chinese interest in the Arctic is being acquired through infrastructure across the region acquiring mineral licenses, perhaps not so much for their profitability but also for the chance to establish footholds and gain some ground that it could use in whatever its long-term plan, etc. Here, I have concerns about the national

security implications of Chinese acquisition of critical infrastructure. Major challenges that Beijing probably has are the belief that the Arctic is a global commons, that it is a place of undeveloped governance, and where resources are up for grabs, but it's not the case that there is also availability of international strong rules in the region, notably the law of the sea, which describes the coastal nations over their Arctic edges, which follow in practice and see the provision as consistent with customary international law, and also present the Arctic Council, of course, that puts eight Arctic states and the indigenous communities at the forefront of governance in the region and the framework that they need to grab but it's not the case there is also availability of international strong rules in the region notably the law of sea which describe the coastal nations over their arctic edges which follow in practice and see the provision as a consistent with customary international law and also present the arctic council of course that puts eight arctic states and the indigenous communities at the forefront of governance in the region and the framework that there need to reinforce .

China's ambition to gain control over essential resources and shipping routes is limited due to its non-Arctic status and it lack direct sovereignty over any part of the Arctic region. Although China has made investments in enhancing partnerships with Arctic nations like Iceland, Denmark, and especially with Russia, through comprehensive legal infrastructure, that command on Arctic resources and shipping routes must be navigate . Another significant challenge is the opposition from Arctic nations themselves. Countries such as Canada and the United States show concerns and working on introducing new policies regarding China's expanding influence in the region. These nations are mainly focused on the fact that China's heightened presence could endanger their sovereignty and security in the Arctic and it's a alarming situation for the major powers .Some Arctic countries have show concerns about China's environmental record , its resource drag out and most importantly infrastructure projects in the region China also suffer logistical tensions driving in the fragile and sensitive Arctic ecosystem (Buchanan, 2019).Harsh environmental conditions and melting of ice pose significant obstacles in shipping, exploration and construction in the region.To tackle with that challenges and concerns china invested in icebreakers and other important specialized instrument in recent years but the cost and complications of driving in such delicate ecosystem are the biggest challenge till now.

Conclusion

To be concluded China's Arctic policies have the possibility to reshape the geopolitics, economics, and subterranean environmental circumstances of the arctic region. Declaring itself to be a "Near-Arctic State" and that region is part of its mega project Belt and Road Initiative (BRI) , China is portraying itself as a major player in Arctic affairs. Arctic shipping and resource extraction guarantee economic benefits that are purposeful, giving China access to new maritime trading routes and energy sources. Although, these goals pose environmental disaster , as the fragile Arctic ecosystem is under pressure from rising industrial activity in the region. Beyond the South China Sea, China's Arctic ambitions can only be expected to develop as it is still contributing in infrastructure, make alliances with Arctic countries and focuses on its strategic and economic interests. China's potential to tackle these challenges, promoting positive collaborations, following by environmental guidelines, and understanding the administrative structures that describe Arctic relations will probably examines its future

in the arctic region .However, issues remain, especially in guiding the detailed legal and political frameworks that govern the area. The cooperation between Arctic and non-Arctic nations, along with the necessity for long-term development, will be crucial in shaping the path of China's Arctic policies. In the years forward, the balance between economic advancement, sustainable conservation, and geopolitical competition will command the future of the Arctic and China's role within it. China's strategic participation in Arctic shipping paths reflects its broader ambitions for resource extraction, economic development etc . As China seeks to leverage on the possibilities presented by environmental changes and build up of new trade routes, specifically through program like the "Polar Silk Road," china deal with numerous challenges due to its status as a non-Arctic nation, international legal limitations, and environmental considerations. The region's complex interaction between collaboration and competition is underscored by the potential for clashes with Arctic neighbors, particularly as China's contribution and military capabilities progressed.

Recommendations

- A multilateral governance framework should include Arctic and non-Arctic stakeholders to distribute resources fairly and keep environmental protections strong.
- International authorities should implement more robust rules to protect ecosystems from growing maritime operations and extraction activities.
- Achieve global cooperation pronounced for climate change mitigation through sustained development programs within the Arctic region.
- Promoting open policies related to the Arctic will decrease national disputes and strengthen connections between global stakeholders.

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