

Triple-helix knowledge-based Sino-Nordic Arctic relationships for trust and sustainable development

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Abstract This paper goes beyond Sino-Nordic Arctic science diplomacy and looks at Sino-Nordic Arctic triple-helix knowledge-based collaborations among academia, business, civil society (the inclusion of which moves beyond the original triple-helix concept), and government. In light of the potential of science diplomacy for building Sino-Arctic trust under systemic international conditions of power transition and globalization, this is the natural next step toward exploring triple-helix collaborations. Knowledge-based collaborations between academia, business, civil society, and government also open up avenues for innovation and entrepreneurship by both Arctic societies and Chinese society in attempts to address major challenges to sustainable development in these societies. This paper discusses possible triple-helix knowledge-based collaborations with China by each of the five Nordic countries, and highlights the innovation and entrepreneurial talents of summer school students at the University of International Relations in Beijing in developing projects as part of a course entitled “The Global Arctic”.

Keywords international relations, power transition, trust, science diplomacy, triple-helix, Nordic, China

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1 The Nordic countries in the circumpolar Arctic and the two grand international shifts

This paper discusses the role of Sino-Arctic knowledge-based collaborations among academia, business, civil society, and government as part of the Arctic region’s adaptation to power transition and globalization in response to systemic international political and economic changes. The Arctic is deeply affected by power transition and globalization^[1]. The rise (or the increase in the relative economic weighting in the global economy) of China is an instance of power transition in the international system, which has been a recurrent phenomenon historically^[2].

The transition of power is a complex and dangerous process to manage^[3]. A feature of the transition of power is fear and mistrust between status quo powers and rising powers, which is also the case between the West today

and China^[4] including in relation to the Arctic region. The argument here is that knowledge-based collaborations between academia, business, civil society, and government can contribute to managing the transition of power and mitigating distrust in the Arctic region. Lessons from managing the transition of power in the Arctic are therefore relevant in wider academic and policy contexts.

The material for this paper was collected during my time as a guest researcher at the China Nordic Arctic Research Center, Polar Research Institute of China, Shanghai, in March and April of 2016, as well as during my teaching of the summer school course entitled “The Global Arctic” at the University of International Relations (UIR) in Beijing from 11 to 22 July, 2016. The paper focuses on the five Nordic states (Kingdom of Denmark, Finland, Iceland, Norway, and Sweden) along with their three self-governing territories (Faroe Islands, Greenland, and Aaland) as well as the Saami indigenous people of Sápmi, spanning northern Norway, Sweden, and Finland.

The two major systemic international political and economic changes during the last 25 or more years, which

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have shaped and continue to shape the Arctic, were the end of the Cold War and bipolarity, and power transition and globalization. This paper focuses on the latter change. It is important to remember that the Arctic has for centuries been an integral part of and deeply influenced by the Western-dominated international political and economic system, and thus the Arctic should not be seen in isolation, either historically or today^[5].

The transition of power is evident from a study of long-term world economic development. It is clear that Asia is regaining the relative place it held in the world economy prior to around 1800, when Europe and North America came to wield preponderant influence. The spectacular economic growth of China since it was reopened to the world in 1978 is a major part of the ongoing transition of power in the international political and economic system. It is therefore appropriate to speak of the “return” of China to its historical relative place in the world economy to remind us all that Asia, of which China represents a major proportion, has historically represented more than half of the world’s economy, and that the Western global dominance of the last 200 or more years is merely a historical phase, and not a constant state^[6]. Two important characteristics of globalization are the effective compression of both time and space. Advances in information and communication technology, transportation, free trade, and financial deregulation have given today’s China a much greater presence in societies around the world, including the Arctic, than has historically been the case^[7].

2 Beyond science diplomacy

Scholars and policymakers are focusing their attention on science diplomacy in general, and in the Arctic region in particular^[8]. The research and policy argument in favor of science diplomacy is generally related to its potential for building trust through track 1.5 or track II diplomacy and creating epistemic communities. Science diplomacy comprises three elements: science informing diplomacy, diplomacy facilitating science, and science facilitating diplomacy^[9]. This paper seeks to go beyond science diplomacy in relation to science in the Arctic to knowledge-based cooperation between academia, business, civil society, and government. Before taking this step, the potential of Sino-Arctic science diplomacy for mitigating the distrust and governance challenges presented by the transition of power will be briefly outlined based on previous research by Bertelsen et al.^[10]

Bertelsen et al.^[10] point out that comparing the distrust surrounding the mere thought of Chinese investment in land and natural resources in the Arctic region contrasts clearly with more harmonious Sino-Nordic Arctic scientific collaborations. Therefore, their conclusion is that science diplomacy in the Arctic makes it possible for China to enter the Arctic, causing less distrust among Arctic states, and for Arctic states to integrate China into the Arctic region with greater confidence.

Distrust of China was evident in the controversy surrounding the proposal by Huang Nubo to establish a tourist resort in northeast Iceland^[11], which foundered in the atmosphere of Icelandic mistrust. Current trends in Chinese tourism in Iceland suggest that Huang Nubo’s plans were commercially sound. This mistrust was also evident on the Danish side toward both Greenland and China when Greenland was keen to obtain Chinese investment in iron-ore mining projects^[12]. It is important to emphasize that such distrust of investment by a rising world power has a significant structural element, which has repeatedly been observed in international history, for instance, in relation to Germany prior to the First World War^[13].

The Polar Research Institute of China (PRIC) is currently completing the construction of the Chinese–Icelandic Aurora Observatory in conjunction with Rannís, the Icelandic Center for Research, at Kárhóll in northeast Iceland, which has been well received. Further, the Yellow River Station on Svalbard is an important Arctic research connection between Norway and China. Meanwhile, PRIC is developing its research connections with Greenland. The China-Nordic Arctic Research Center (CNARC), which was originally a Sino-Icelandic initiative, is now the key Sino-Nordic Arctic social and human sciences forum. China’s observer status on the Arctic Council allows it to participate in the epistemic community of the Arctic Council’s working groups.

3 Knowledge-based Sino-Nordic Arctic triple-helix development

The next analytical and policy step is broader Sino-Arctic triple-helix knowledge collaboration. A triple-helix approach refers to collaboration in terms of research, development, and innovation between academia, business, and government^[14], which in the context of this paper is expanded to include civil society in light of the importance of both the local and indigenous communities in the Arctic region. As noted earlier, the trust-building and governance advantages presented by Sino-Arctic science diplomacy are in contrast to the pervading atmosphere of distrust regarding potential Chinese investment in the Arctic region. Observations gathered during my time as a guest researcher at the CNARC indicate possible areas for Sino-Nordic triple-helix cooperation. These areas can be developed in terms of both depth and scope, but are briefly outlined below.

Academics and policymakers are paying increasing attention to transforming the natural-resource-based economies in the Arctic to more innovative, entrepreneurial, knowledge-based economies. This goal presents opportunities for Sino-Arctic triple-helix cooperation that is mutually beneficial. Arctic communities are traditionally natural-resource-based economies, whether indigenous or local. Historically, they have survived by harvesting marine or terrestrial resources for both subsistence and export income. Industrialization in the Arctic has meant industrialization of

the natural resource extraction process, i.e. fishing trawlers or large-scale mining and oil and gas production^[15]. However, there are numerous environmental, social, and cultural sustainability challenges in relation to natural-resource-based economies. If they are based on renewable resources, sustainable management is crucial. If they are based on finite resources, sustainability issues become even more important. Discussions around China's interest in the Arctic have centered on natural resources, i.e. seafood, minerals, and oil and gas, as well as shipping access, but the focus could easily shift to more knowledge-based economic activities^[16].

I observed the following possible examples of Sino-Nordic Arctic triple-helix cooperation during my time as a guest researcher at the CNARC. **Kingdom of Denmark:** Hempel supplies advanced-technology coatings for ships, containers, offshore installations, and other challenging marine environments^[17]. China National Petroleum Corporation and the Silk Road Fund are major investors in the Yamal LNG project, which operates under extremely challenging climatic conditions^[18]. Therefore, the use of Hempel's coatings for ships and installations involved in Chinese investment projects in the highly challenging Arctic environment is a possible area of Sino-Danish Arctic high-tech collaboration. **Finland:** The Finnish airline Finnair has an exceptionally well-developed network of routes in Asia, taking advantage of the northeasterly location of Helsinki to link Europe to Asia (Finnair's strategy is reminiscent of Icelandair's successful strategy since the 1950s of connecting Europe and North America through Keflavík). Therefore, Finnair and other Finnish organizations have considerable expertise in developing Chinese and other Asian tourism in the Nordic countries, including the Arctic^[19]. **Iceland:** Since the late 1970s, Iceland has worked in partnership with China to develop China's geothermal energy resources through the United Nations University Geothermal Training Program hosted by the Iceland National Energy Authority. Clean energy is a key to sustainable development in China, and geothermal space heating will contribute significantly to curbing pollution. The Sinopec Green Energy Geothermal Development Company is a concrete example of Sino-Icelandic collaboration, spreading geothermal energy use in China^[20]. **Norway:** Norway has a highly developed maritime sector, including fishing and aquaculture, while China also has an enormous maritime sector, encompassing shipping, fishing, and aquaculture. Tromsø is a recognized center for cold and blue biotechnology^[21], and so Norway and China could pursue further high-tech collaboration in blue biotechnology. There is also the possibility of combining fish farming and seaweed farming to capture nutrients and carbon^[22]. **Sweden:** Arctic Sweden supplies 90% of Europe's iron-ore production^[23]. Since the 1890s, Sweden has built an advanced sociotechnical mega-system throughout northern Sweden and northern Norway integrating mining, processing, energy, transportation, communities, and defense^[24]. The knowledge required to create and develop such an advanced mega-system should be of great interest to China, which has

been criticized for the way in which it has sought to obtain natural resources from around the world.

4 UIR student projects

The other data used in this research were gathered from projects for innovative and entrepreneurial Sino-Arctic cooperation generated by Chinese undergraduate international relations students at the UIR in Beijing. These projects demonstrated the wide range of possibilities for Sino-Arctic joint projects, with most being in innovative areas such as academia, culture, and sustainable development rather than in the traditional fields of oil and gas exploration, shipping, and fishing. These student-driven projects also demonstrated that within a two-week period, highly talented Chinese undergraduate students with limited prior exposure to and knowledge of the Arctic could generate innovative ideas and identify relevant partners on both the Chinese and Arctic sides.

From 11 to 22 July 2016, I taught a summer school course at the UIR in Beijing entitled "The Global Arctic: Climate Change, Power Transition and Globalization". The course was taken by nearly 40 first- and second-year Chinese undergraduate students from a range of majors. The students were placed into 10 groups of up to four students, with a mix of gender and majors. The course assignment required each group to develop an idea for a collaborative project between Chinese and Arctic partners. Each project had to take into consideration climate change, international politics, economic globalization, and the political, economic, scientific, and transnational nexus between China and the Arctic country in question. The group had to write a short executive summary and give a class presentation. All of the groups had to question all the other groups after their presentations to ensure that there was active, thoughtful discussion of the issues.

4.1 Group 1: climate change research project

This group proposed a joint research project between the CNARC and the University of the Arctic. The aim of the project is to raise public awareness of climate change in the Arctic. The project will focus on the distribution of fish stocks, polar bears, and vegetation, and also touches on the impact of climate change on Russian Arctic economic development.

4.2 Group 2: Sino-Danish-Faroese wind energy research center

The framework for this project is the challenge of climate change and the necessity to transform energy systems using renewable energy sources. The project seeks to establish a joint wind energy research center between China, Denmark, and the Faroe Islands to explore the possibility and challenges of using the Faroe Islands as a stable, secure micro-grid supplied by renewable energy. The proposed partners are the China Energy Engineering Corporation, DONG Energy, and the Faroese utility SEV.

4.3 Group 3: Sino-Danish-Greenlandic cultural center project

This project outlines a partnership between the Beijing Language and Culture University (BLCU) and the University of Greenland to establish a Greenlandic cultural center at the BLCU and a Chinese cultural center in Nuuk. The group originally considered using Jilin University, because Jilin is a sister city of Nuuk, but the BLCU was chosen because it offers Danish language courses. The project relies on a sophisticated understanding of cultural and linguistic differences as the basis for strong political, economic, and scientific relationships.

4.4 Group 4: UIR–UmU exchange and cooperation project

This is another academic exchange project, this time between the UIR and Umeå University. These two universities were selected because the UIR is a leading Chinese university in terms of international relations and the growing importance of the Arctic for China, while Umeå University is a key Swedish university for Arctic studies. This project is more process-oriented, and proposes visits by Swedish academics to Chinese New Year celebrations, a cultural knowledge contest, exchanges of seminars and lectures, regular meetings of rectors, and a formal collaboration forum.

4.5 Group 5: UIR–PKU–HÍ exchange and cooperation project

This group also suggested a university collaboration program. This project is a joint summer school program between the UIR, Peking University (PKU), and the University of Iceland (HÍ). The UIR was again chosen for its key role in training Chinese international affairs professionals, while PKU was selected for its international studies and geothermal research competences, and HÍ was chosen for its competence in relation to geothermal energy. The projects seeks to promote Sino–Icelandic university collaboration in four areas: culture, tourism, research, and sustainable development. The project has intended learning outcomes in relation to the Arctic environment and intercultural communication and collaboration. These outcomes will be achieved through working on environmental questions, volcanism, and economic development in the Arctic region.

4.6 Group 6: Sino-Canadian Arctic oil and gas exploration and production collaboration

This project was one of only two traditional projects presented, in that it proposed Sino-Canadian collaboration to develop Canadian Arctic oil and gas resources. The aim is to combine environmental protection with cost-cutting and technological development. The project proposes a truly transnational triple-helix consortium consisting of the China National Offshore Oil Corporation, the Center for Polar and

Oceanic Studies (Tongji University), the Key Lab of Polar Oceanography and Global Ocean Change, and the Research Institute of Polar Law and Politics (both within the Ocean University of China), and the Chinese Government. On the Canadian side, it proposes the involvement of Encana Corporation, the Canadian Government, and the self-governing Inuit people.

4.7 Group 7: Beijing–Reykjavik geothermal heating collaboration

This group is inspired by the great challenge facing China in relation to air pollution, and how Arctic knowledge can contribute to solving the problem. The group proposed the transfer of knowledge gained from geothermal space heating projects in Reykjavik to heating in Beijing to curb winter air pollution. The proposed partners in the project are the China Development Bank, the Ministry of Science and Technology of the People's Republic of China, the Beijing Geothermal Research Institute, Sinopec Green Energy, Peking University, and on the Icelandic side, the University of Iceland, Orka Energy, and HS Orka HF. This is a clear example of the transfer of knowledge about renewable energy resources, rather than energy itself, between the Arctic and China to address a major sustainability issue in China.

4.8 Group 8: low-carbon Chinese tourism in Alaska

This project aims to increase Chinese awareness of both climate change and the Arctic region through low-carbon tours to Alaska. The group proposed tours emphasizing the Alaskan native heritage and environment while achieving carbon offsets. These tours will use the Arctic region to educate Chinese travelers about carbon-offset programs and carbon neutrality. The Chinese partners are the China National Tourism Administration and China Beijing Environmental Exchange, and on the North American side, the US Embassy in Beijing, Air Canada, the University of Alaska, and several Alaskan businesses.

4.9 Group 9: Dalian Maritime University–Arctic Council collaborative research on Arctic shipping

Group nine also presented a traditional Sino-Arctic project in looking at shipping via the Northern Sea Route. The group presented an argument highlighting the potential of the Northern Sea Route based on distance and proposed research collaborations between the Dalian Maritime University (having joined the CNARC), the Chinese icebreaking research vessel XUE LONG, and the Arctic Council to address technological challenges in relation to this shipping route.

4.10 Group 10: State Oceanic Administration, Ocean University of China, and Arctic Council collaborative research on Arctic fishing

This group combined the effects of climate change on migrating fish stocks and on Arctic land and sea ice with the

global governance challenges related to managing Arctic fisheries. The group proposed joint research on Arctic fishing between the China State Oceanic Administration, the Ocean University of China, the Arctic Council, the Russian Far Eastern State Technical Fisheries University, the NTNU-Norwegian University of Science and Technology, and the Norwegian Institute of Marine Research.

5 Conclusion

My work as a CNARC guest researcher revealed possible fields of Arctic knowledge-based collaborations among academia, businesses, civil society, and government between the five Nordic countries and China. These fields of knowledge-based triple-helix cooperation can transfer the trust-building and governance from science diplomacy to more commercial areas. Triple-helix knowledge-based cooperation is expected to mitigate the distrust of potential Chinese investment in Arctic natural resources and land that has been identified in science diplomacy research.

Tasking highly talented Chinese undergraduate international relations students to develop Sino-Arctic cooperation projects revealed great innovativeness and entrepreneurialism. These projects were mainly in the areas of academic collaboration, renewable energy, low-carbon tourism, and fisheries research, with only two projects proposed in traditional fields, one relating to Northern Sea Route shipping and the other to oil and gas exploration. These projects demonstrated that there is strong interest, innovativeness, and entrepreneurialism among Chinese people in developing triple-helix knowledge-based collaboration between Arctic societies and China.

These projects show promise in building trust and contributing to sustainable development in both Arctic societies and Chinese society. These societies should take notice of this innovativeness and entrepreneurialism and focus on facilitating such triple-helix knowledge-based collaborations as the future of Sino-Arctic relationships rather than continuing to focus on the traditional areas of oil and gas exploration, fishing, and shipping.

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