

Feasibility Analysis of Arctic Governance Based on International Public Goods Theory

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Abstract. As the geopolitical importance of the Arctic region has grown, the "geopolitics of the cryosphere" has been gradually developed. The study of geopolitical game phenomena such as territorial disputes and resource competition in the polar regions based on realism is the general context for the study of Arctic governance. This paper categorizes the subjects and objects in Arctic governance in the context of the geopolitics of the cryosphere and based on the theory of international public goods. This leads to an analysis of the respective dilemmas of the countries involved in Arctic governance and the areas targeted by it. Cases are also given to suggest solutions to the problems for the subjects and objects of Arctic governance. This paper analyzes the dilemmas that each participating subject and governance area may face in Arctic governance based on international public goods theory. It provides a theoretical basis in policy practice for countries to participate in Arctic governance and to carry out governance in solving problems in different areas. This paper uses the case study approach to analyze the governance dilemmas in the Arctic using international public goods theory. Finally, the dilemma faced by the governance subjects and governance objects was summarized, and corresponding policy suggestions were put forward.

Keywords: List the; keywords covered; in your paper.

1. Introduction

As the geopolitical importance of the Arctic region has grown, the "geopolitics of the cryosphere" has been gradually developed. This theory refers to the international political issues arising from changes in the cryosphere and its constituent elements due to climate warming, and the resulting interactions between state and non-state actors, such as competition, conflict, negotiation, and cooperation [1]. The study of geopolitical game phenomena such as territorial disputes and resource competition in the polar regions based on realism is the general context for the study of Arctic governance.

This paper categorizes the subjects and objects in Arctic governance in the context of the geopolitics of the cryosphere and based on the theory of international public goods. This leads to an analysis of the respective dilemmas of the countries involved in Arctic governance and the areas targeted by Arctic governance. Cases are also given to suggest solutions to the problems for the subjects and objects of Arctic governance.

This paper analyzes the dilemmas that each participating subject and governance area may face in Arctic governance based on international public goods theory. It provides a theoretical basis in policy practice for countries to participate in Arctic governance and to carry out governance in solving problems in different areas.

The overall research on Arctic governance has been relatively well developed, but there is still room for development in terms of the linkages between the various domains. Foreign research on Arctic governance has focused on the object, i.e., the field of governance, mainly in the areas of sovereignty politics and indigenous peoples, Arctic Passages utilization and resource management. Based on the realist theory of international relations, the research issues and results are focused on the sovereignty issues and regional governance in the Arctic. The study also focuses on the value of the use of Arctic Passages and resources in the Arctic region due to climate change and sea ice melting, and the resulting expansion of interstate disputes into new areas. Domestic research on Arctic geopolitical relations has focused on geopolitical games, Arctic Passages and resource economy.

While focusing on the sovereignty disputes in the Arctic region, China's Arctic geopolitics research focuses more on the geographical influence of several major Arctic states, including Russia, the United States, and Canada. Based on multilayer governance theory and collaborative governance theory, and the theory of through rights, it focuses on the subjects of Arctic governance, and also actively proposes Chinese solutions for Arctic governance. In terms of Arctic Passages utilization and resource economic development, domestic research focuses more on the impact of Arctic Passages on the international economic order, exploring its economic value and availability, etc. Quantitative analysis, qualitative analysis, and multidisciplinary research methods are commonly used in domestic and foreign research on Arctic governance, and there is diversity in this aspect. However, based on the characteristics of previous domestic and foreign literature, the research on Arctic governance is mainly carried out through the analysis of specific problems, lacking specific analysis and corresponding solutions for different types of countries and different fields. The process of participating in Arctic governance still has obvious "closed" characteristics [2]. Therefore, this paper attempts to improve the pertinence of research and the efficiency of policies in the dilemma of Arctic governance from the perspective of the governance subjects and objects.

Based on the theory of international public goods, this paper analyzes the dilemma faced by subjects and objects in Arctic governance, and proposes corresponding solutions. The theory of international public goods first originated from the concept of "public goods" in economics, and later, this concept was introduced into the discipline of international political economy by scholars such as Olson, Kindleberger and Gilpin, which gradually formed the concept of "international public goods" and developed the related theory [3]. The concept of "international public goods" has been gradually developed and related theories have been developed. Specifically, international public goods can be divided into three categories (as shown in Table 1) according to the classification of the main findings of the existing research, namely, pure public goods that are both non-exclusive and non-competitive, international public property resources that are both non-exclusive and competitive, and international coordinated goods that are both exclusive and non-competitive.

Table 1. Categories of international public goods

Classification Nature	Pure public goods	International public property resources	International coordinated goods
Exclusive/non-exclusive	Non-exclusive	Non-exclusive	Exclusive
Competitive/non-competitive	Non-competitive	Competitive	Non-competitive

The objects in Arctic governance belong to different international public goods, and therefore the governance measures adopted by the governing subjects in different areas are bound to be different. These measures can also be seen as another form of international public goods' provision.

2. Case Description

The Arctic region refers to an area centered on the Earth's North Pole, including the Arctic Ocean and its islands, the North American continent and the northern edge of the Eurasian continent. Nowadays, with the deepening of the study of the Arctic region, people have gradually learned about the Arctic overview (shown in Figure 1). In recent years, with global warming, the rate of ice melting in the Arctic region has accelerated. While the overall level of human technology has improved, the possibility of resource utilization in the Arctic has greatly increased, and the geopolitical importance of the Arctic region has gradually increased. So, it is significant to do the research on the Arctic governance.



Fig. 1 Arctic overview[<https://www.economist.com/science-and-technology/2012/09/22/now-you-dont>]

The geopolitical game subjects and areas of existence in the Arctic are diversified and multifaceted. Therefore, the challenges and problems faced by Arctic governance are also complex. Based on the international public goods theory, the author will analyze the subjects and issues in Arctic governance, and explore the problems and possible solutions of each. At present, the geopolitical structure of the Arctic region presents a confrontation between central countries, and the structural network is constantly expanding outward-centered-subcenter-peripheral structure [4]. At the same time, since China, as a near-Arctic country, is also part of the Arctic community of destiny, the study of Arctic governance based on international public goods theory is similar and relevant to China's goal of creating a human community with a shared future. This paper also provides theoretical support for China's participation in Arctic governance.

3. Analysis of Problems

3.1 Analysis of the Dilemma Faced by the Subjects of Arctic Governance Based on International Public Goods Theory.

3.1.1 Classification of Arctic governance subjects

Since the influence of geopolitical games in the Arctic region has gradually become obvious, the main subjects involved in the games can be divided into three categories: Arctic states, near-Arctic states, and indigenous peoples, whose relations and behaviors affect the overall dynamics of Arctic geopolitics. Although relevant international organizations, non-governmental organizations and multinational enterprises have gradually participated in Arctic governance, there is no doubt that sovereign states still dominate the current governance of Arctic issues [5].

The Arctic countries include the United States (Alaska), Russia, Canada, Denmark (Greenland), Norway, Sweden, Finland, and Iceland, with a total of 29 administrative regions or autonomous regions. The relationship between the eight Arctic countries is complex, and the competition among them is dominated by the competition over waterways, resource development and environmental protection due to the dispute over sovereignty.

Near-Arctic countries, including China, Japan, South Korea and India, do not have territories in the Arctic region, but they are actively involved in the management of the Arctic region, and thus their voice and influence in the Arctic region are gradually increasing.

The indigenous people of the Arctic region are mainly located in the special zones of the eight Arctic countries, and they also have interests to fight for in Arctic governance in terms of livelihood,

environment, land, and traditional culture. The interests of the indigenous peoples in the Arctic have been seriously weakened by climate change and resource exploitation by other countries. This makes their position in Arctic governance not negligible.

3.1.2 Applicability of international public goods theory to Arctic governance subjects

Since there is no unified government in the international community to the domestic community, but in a state of anarchy, international political scholars believe that the global international public goods are mainly dependent on the supply of the hegemonic state or the supply of the international system. However, according to the hegemonic cycle theory, when the hegemonic power is weakened, its willingness and strength to supply international public goods will decline, which will lead to the undersupply of international public goods. In order to solve the problem after the decline of hegemony, scholars such as Keohane have proposed a way of international institutional supply, which provides a solution to the phenomenon of "international political market failure".

Therefore, the Arctic states can be considered as the "hegemonic powers" in Arctic governance, and the participation of the near-Arctic states and the indigenous peoples in the Arctic region in Arctic governance as an important way to build an international system. Thus, it is feasible to apply the international public goods theory to the dilemma faced by the Arctic governance subjects.

3.1.3 The dilemma of the Arctic countries

On one hand, in terms of international public goods supply in the Arctic region, hegemonic states can be understood as states that are more involved in the Arctic geopolitical game, i.e., states with more relevant interests in Arctic governance. However, as analyzed in the previous section, these states are complex, with vastly different strengths and different problems. Therefore, it is difficult to promote Arctic governance by "providing international public goods by hegemonic states. In this regard, the problem facing Arctic governance is whether the dominant Arctic states can coordinate their actions and reduce the problem of "free-riding" caused by too many subjects and conflicting interests, so as to promote the cooperation of the dominant states in Arctic governance and provide more international public goods and services.

3.1.4 The dilemma of near-Arctic states

On the other hand, since the Arctic countries are not only involved in Arctic governance, but also the near-Arctic countries and the indigenous peoples of the Arctic region, this also requires the extra-Arctic countries to actively enhance their participation in Arctic governance and provide more paths for Arctic governance or their own interests when their own geopolitical environment or strength is not superior. As important subjects in the Arctic geopolitical relations, the near-Arctic countries, due to their geographical and historical limitations, have focused more on the construction of environmental protection and governance systems, promoting cooperation and scientific research development, as well as reconciling the relations among Arctic countries and coordinating with the Arctic countries in general.

3.1.5 The dilemma of the Arctic's indigenous peoples

The indigenous peoples of the Arctic region have their own needs for participation in Arctic governance due to their unique production and lifestyle, traditional culture, and so on. In the context of climate change, the production and livelihood of the Arctic indigenous peoples have been greatly affected, and their survival and economic development have been transformed to different degrees, and environmental protection has become one of their important tasks. The history of Arctic civilization is inseparable from its environmental changes. Changes in the environment have almost directly affected the migration of primitive tribes, population growth and decline, and the rise and fall of culture [6]. However, the coordination of interests and cooperation between indigenous peoples and Arctic and near-Arctic countries in the real Arctic governance still needs the joint efforts of all countries.

3.2 Analysis on the Dilemma of the Objects of Arctic Governance Based on the International Public Goods Theory.

3.2.1 Applicability of international public goods theory to Arctic governance subjects

According to the above classification of international public goods, the main areas of geopolitical games in the Arctic are not all international public goods, that is, the international public goods theory does not apply to all objects of Arctic governance. Among them, traditional sovereignty, and arguably national security issues, do not fall into the category of international public goods at all. For example, the dispute between Canada and Denmark over the ownership of Hans Island and Norway's sovereignty over the Spitsbergen Islands, the maritime boundary between Canada and Denmark in the Arctic Ocean, and the maritime boundary dispute between Norway's Svalbard and Denmark's Faroe Islands [7, 8]. Russia, Norway, Denmark, the United States, and Canada have also expressed or proposed their respective views on the delimitation of the 200-mile continental shelf. Russia, Norway, Denmark, the United States, Canada and other countries have also expressed or put forward their respective views on the delimitation of the 200-nautical-mile continental shelf as a way to assert their sovereignty or seek interests. As the issue of the outer continental shelf in the Arctic Sea involves an ever-expanding range of conflicts of interest, it is no longer just a game of interests of individual countries, but needs to be coordinated from the perspective of the interests of the entire international community [9]. In short, it is difficult to change the dynamics of the game of sovereignty among the countries in the Arctic region, and they can only try their best to bind each other and reduce friction by establishing an international treaty system with legal significance.

Therefore, international public goods theory still has limitations in the field of Arctic governance, and this field cannot explain and address the current situation well in the face of traditional security and sovereignty issues.

3.2.2 The dilemma of resource issues

Another area of Arctic governance, resources, falls into the category of international public goods. The rich hydrocarbon, biological and mineral resources contained in the Arctic region are non-exclusive in nature. In other words, any country with capital and technology can explore and exploit the resources of the Arctic region. However, due to the limited nature of the resources themselves, the natural resources of the Arctic region are also competitive as they can be competed for by various countries. Therefore, the issue of resources in Arctic governance is a matter of national public property resource allocation. Such as promoting the orderly, sustainable and sharing of resources in the process of resource exploration and exploitation among countries is the problem facing Arctic governance in this area.

3.2.3 The dilemma of Arctic Passages

The third aspect, which is also a new area in Arctic governance, is the issue of Arctic Passages. This issue belongs to the category of international public goods. With the melting of the glaciers and the rapid development of navigation technology, the Arctic shipping route will become a new corridor for the world economy, and its opening will break the original world trade pattern [10]. With the intensification of global warming and glacier melting, more Arctic Passages that can be developed will appear in the Arctic region in the future, and more countries will want to make economic and even political interests through the Arctic Passages. This will make the waterways that could be exploited by any country involved in governance become the object of coveting by some countries, thus gradually losing the non-exclusivity of the Arctic Passages. The non-competitive nature of the Arctic Passages will also be further lost if countries become more competitive for the lanes and try to bring some of them under their own jurisdiction. In this way, the Arctic Passages may change from a purely public good to an internationally coordinated good, thus making it even more difficult to govern this issue.

4. Suggestions

In response to the problem of multiple subjects in Arctic governance, according to the theory of international public goods, Arctic governance can be carried out by constructing international mechanisms. The establishment of the Arctic Council, for example, is an institutional international public good, and it provides an example of a mechanism for Arctic governance. The Arctic Climate Impact Assessment Report released by the Arctic Council in 2004 has played an important role in Arctic climate governance, as the participation of near-Arctic countries in Arctic affairs has expanded in recent years and the attention of countries to Arctic climate change and environmental protection has gradually increased.

The resource and Arctic Passages issues in the governance, which are international public goods, can also be solved through the construction of international cooperation and monitoring mechanisms. In the construction of the mechanism, it can also be done by focusing on issues in different fields at the initial stage and then gradually spilling over to politicization. For example, the Arctic Council, established in 1996, is the only intergovernmental organization that includes eight countries in the Arctic Ocean. The Arctic Council, for example, is the only intergovernmental organization that includes eight countries in the Arctic Ocean. In addition to planning and supervising the use of resources and Arctic Passages, organizations like the Arctic Council can also act as a political constraint on countries, so that Arctic governance is no longer limited to the Arctic region, but becomes a matter of human interest.

5. Conclusion

This paper takes the geopolitics of the cryosphere as the research background, classifies the participating countries and fields involved in Arctic governance research according to the subjects and objects in Arctic governance, analyzes the dilemmas faced by each. The corresponding solution measures and cases are also proposed.

The international public goods theory, which is the theoretical basis of this paper, still has certain applicability shortcomings, but it can provide strong support for both the participants in Arctic governance and the problems faced by the fields of Arctic governance. Therefore, it also provides a reference for countries' Arctic governance policy formulation.

At the same time, because of the similarity between the international public goods theory and the concept of the "human community with a shared future" proposed by China. China also belongs to one of the important subjects in Arctic governance. China's strategic choices and policy directions in Arctic governance are also the issues that this paper aims to explore. China's strategic choice in the Arctic region is to promote international cooperation in Arctic governance. China strives to participate in the changing geopolitical relations in the Arctic by using economic, scientific and diplomatic means, to propose Chinese solutions, to maintain the security environment in the Arctic region, and to provide public goods and services.

China's actions in the Arctic region can be exemplified by the construction of the "Polar Silk Road", which is not only an important part of the "Belt and Road" strategy, but also has great significance for the extension of China's geopolitical space to the north. The construction of the "Polar Silk Road" is centered on the concept of a community of human destiny, which demonstrates China's advocacy against zero-sum games and the pursuit of win-win cooperation in Arctic geopolitics, and seeks to break away from the traditional realist national order arrangement in certain areas and promote the development of Arctic governance in the interests of all mankind.

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