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Master's Thesis

2011 **Irina Valko**

CHARLES UNIVERSITY IN PRAGUE

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Cold Waters, Hot Stakes:
Systemic Geostrategic Analysis of International Relations in the Arctic Transborder Region

Master's Thesis

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Anotace

Cílem této práce je zaplnit mezeru v civilním výzkumu pomoci vlastní dvoufázové verze systémové, dynamické a interdisciplinární analýzy vývoje Arktického transhraničního regionu, jehož jižní hranice je limitovaná polárním kruhem. Výzkum je založen na předpokladech nového geopolitického myšlení a systémového modelování, a vnímá geostrategickou analýzu jako povinný akademický příspěvek k 'umění' řízení státu. První fáze analýzy je induktivní, deskriptivní a statická. Definuje Arktický region jako systém pěti geostrategických akčních prostorů, fyzického prostoru (S_1), vojenského prostoru (S_2), ekonomického prostoru (S_3), demografického prostoru (S_4) a informačního prostoru (S_5). Po stanovení základních charakteristik fyzického prostoru, analýza sociální síti je aplikovaná na čtyři, lidmi vytvořené prostory (S_2-S_5) – tj. jsou vymezené základní sítě vztahů (linky) mezi klíčovými hráči (body). Matice symetrických vztahů ve vojenském prostoru (S_2), ekonomickém prostoru (S_3), a demografickém prostoru (S_4) ukazují vztahovou intenzitu. Pro faktické zobrazení toho jak změny v jednom prostoru vedou ke změnám v jiných prostorech, je představeno deset primárních kanálů mezi-prostorového afektu. Druhá fáze analýzy je deduktivní, analytická a dynamická. Jelikož se může region stát zónou konfliktu a nebo zónou spolupráce, dalším cílem této práce je předpověď, který ze dvou scénářů převládne v roce 2040. Ze začátku jsou představeny síly podporující a oslabující stabilitu současného systému. Dále, Lawson W. Brighamovy čtyři scénáře možného vývoje regionu do roku 2040 ("globalizovaný prostor", "adaptivní prostor", "opevněný prostor" a "spravedlivý prostor") jsou přizpůsobeny souhře těchto sil. Na konci je nabídnut hybridní scénář jako nejpravděpodobnější.

Abstract

This work aims to fill the gap in the civil scientific agenda by offering its own, two-stage version of a systemic, dynamic, and interdisciplinary analysis of the developments in the Arctic transborder region; by fixing the region's southern border at the Arctic Circle, adjusting to the premises of new geopolitics, using systemic modeling, and viewing geostrategic analysis as an obligatory academic contribution to the 'art' of statecraft.The first stage of analysis is inductive, descriptive, and static. It defines the Arctic region as a system of five geostrategic action spaces, physical space (S_1), military space (S_2), economic space (S_3), demographic space (S_4), and information space (S_5). After defining essential elements of the physical environment, social network analysis is applied on four human-constructed geostrategic spaces (S_2-S_5) – i.e. the basic networks of relationship (links) between the key actors (nodes) are created. Matrices of symmetrical relationships for military space (S_2), economic space (S_3), and demographic space (S_4) are constructed to demonstrate the links' intensity. In order to illustrate the fact that changes in one action space ultimately transform other spaces, ten possible channels of inter-space affection are illustrated. The second stage of analysis is deductive, analytical, and dynamic. As the region can turn into an area of conflict or cooperation, the work attempts to predict which scenario will prevail by 2040. Firstly, the forces strengthening the system's stability and weakening the system's stability are identified. Secondly, four Lawson W. Brigham's "Scenarios for 2040" ("Globalized Frontier", "Adaptive Frontier", "Fortress Frontier", and "Equitable Frontier") are adjusted to interplay of these forces. Finally, a 'hybrid' scenario is offered as the most probable outcome of the development in the region in the next 30 years.

Klíčová slova

Geopolitika, Geostrategie, Arktida, Systém, Mezinárodní, Regionalismus

Keywords

Geopolitics, Geostrategy, the Arctic, System, International, Regionalism

DECLARATION:

I hereby declare that this thesis is my own work, based on the sources and literature listed in the appended bibliography. The thesis as submitted is 209 939 keystrokes long (including spaces), i.e. 83 manuscript pages.

Irina Valko Date

I am grateful to the following people those wisdom and patience helped me to realize this research:

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Charles University in Prague
Faculty of Social Sciences
Institute of Political Sciences

MASTER'S THESIS PROJECT

TOPIC:

Cold Waters, Hot Stakes: Systemic Geostrategic Analysis of International Relations in the Arctic Transborder Region

Author: Irina Valko
Major: Geopolitical Studies, 1. year
Academic year: 2010/2011
Supervisor: PhDr. Michael Romancov, PhD.
Date of submission: May 2010

I agree to supervize this thesis: _____

Structure:

1. Introduction
2. Systemic geostrategic analysis of international relations in the Arctic transborder region – theoretical and methodological considerations
   2. 1. Delineating the Arctic transborder region
   2. 2. Polar geopolitics: old and new
   2. 3. Systemic modeling in geopolitics
   2. 4. Geostrategic analysis: contributing to statecraft
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5. Conclusion

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Appendices

The Problematic

The Arctic region seems unique to political geographers and geopoliticians. Firstly, together with the Antarctic, it has been a 'no man's land' for the most of human history and, consequently, it is still about to form as an international region. Secondly, it consists of frozen ocean (glaciers) and land (permafrost) – both are subject to significant change of climate due to a so-called global warming. Finally, several decades ago the strategic role of the region in global politics has started to change: while being, exclusively, a military-strategic location within the Cold-War system of international relations, today it is more and more an economic potential that defines its 'attractiveness' to a globalizing world community. These developments indicate that modern Arctic is *in transition*. Tensions arise around various topics, from subregion-specific (as fishing rights in the Barents Sea) to supra-regional (as environmental hazards, denuclearization or rights of indigenous population).

Even though a lot has been said and written on the issue of changing politics in the Arctic region, a *systemic*, *dynamic*, and *multi-dimensional* geostrategic reflection of this process is still missing from the non-military[1] scientific agenda.

[1] Strategic analyses of particular international regions are mainly done at the military colleges, usually by applying PMESII, DIME and/or SWOT frameworks. For example: KNELL Niave, 2008. *Reemergence of the Arctic as a Strategic Location*. Fort Leavenworth (Kansas): School of Advanced Military Studies, United States Army Command and General Staff College.

Aims and Objectives

(1) to fill a gap in the systemic geostrategic analysis of international relations in the Arctic region;
(2) to provide the latest quantitative and qualitative evidence on the developments in the region;
(3) to offer own version of systemic geostrategic analysis of the Arctic region by fixing the region's southern border at the Arctic Circle, basing the analysis on the premises of new geopolitics, considering elements of systemic modeling in geopolitics, and viewing geostrategic analysis as an obligatory academic contribution into the practice of statecraft;
(4) defining the Arctic geostrategic transborder region as a system of five geostrategic action spaces: physical space (S_1), military space (S_2), economic space (S_3), demographic space (S_4), and information space (S_5);
(5) applying a social network analysis – i.e. constructing the basic networks of relationship (links) between the key actors (nodes) – on four human-constructed geostrategic spaces (S_2-S_5);
(6) constructing matrices of symmetrical relationships showing intensity for military space (S_2), economic space (S_3), and demographic space (S_4);
(7) merging five geostrategic action spaces into a complex system of inter-space affection;
(8) evaluating the forces that strengthen and weaken the system's stability;
(9) offering possible scenarios for the future strategic developments in the region;
(10) offering directions for further research.

Subject Significance

According to the latest report by Arctic Monitoring and Assessment Programme, the Arctic ice cover diminishes by 1-2 percent per year and this process accelerates in time. In 2007 some ice-free areas of the Arctic Ocean were as much as 5°C warmer than the long-term average. On land, the limits of permafrost also indicate a warming trend: most of the region, especially tundra areas, show an increased plant growth over the period from 1981 to 2005[2]. In practice it means that the region becomes more accessible from the south, in both political and economic terms.

Various scenarios of the scramble for the polar region fuel the debates among policy-makers. The stakes are especially high in Canada, Russia, the United States, Norway, Denmark, Sweden, Iceland, Finland – the countries actually bordering the Arctic region. But more than 20 other states (including the United Kingdom, Japan, China and South Korea) indicate readiness to invest into commercial development of the Arctic. The tensions to become extremely high (especially if the global economic recession continues), the countries can even opt for an open armed conflict over the disputed areas. The demonstrative military maneuvers have already started to occur.

Unfortunately, the statesmen often lack comprehensive and adequate contributions from academia. Until recent, few articles and books have been devoted to geopolitical changes in the Polar Regions. Interdisciplinary, systematic, and macro-scale approach is missing from the political research on the Arctic. This situation must change.

[2] AMAP. *Update on Selected Climate Issues of Concern: Observations, Short-lived Climate Forcers, Arctic Carbon Cycle, and Predictive Capability*. Oslo: Arctic Monitoring and Assessment Programme, 2009; pp. 3-5

Research Questions

Stage I of the analysis is inductive, descriptive and static. Firstly, the region's physical setting is summarized and the following question is answered:
(1) *What are the main characteristics of the Arctic physical space?*
Secondly, key nodes and links within individual Arctic geostrategic action spaces (S_2-S_5) are identified. The following questions are answered:
(2) *What are the main nodes and links within the Arctic economic space?*
(3) *What are the main nodes and links within the Arctic military space?*
(4) *What are the main nodes and links within the Arctic demographic space?*
(5) *What are the main nodes and links within the Arctic information space?*

Stage II of the analysis is deductive, analytical and dynamic. The following research questions are addressed:
(6) *What forces strengthen the stability of the current system?*
(7) *What forces weaken the stability of the current system?*
(8) *What is the most probable scenario of international relations in the Arctic region by 2040, given interplay of the forces strengthening and weakening the system's stability?*

Research Limitations

Imprinting the complexity of the modern world is the main goal of any interdisciplinary social analysis. Given the grandiosity of the project the researcher must work with different scientific domains, numerous (and often conflicting) schools of thought, disinformation, etc. This work is limited in several ways. Firstly, there are several versions of systemic analysis (for example, by Robert Jervis, Saul Cohen, etc.). For the reason of relative simplicity, this work combines Gerard Dussouy, Guyla Scurgai, and Niave Knell's methods of geopolitical analysis. However, there are certain limitations. First of all, there is a risk of reproducing the integral biases (if such exist) of these three approaches. Secondly, there is the risk of incomplete and incorrect empirical data. Thirdly, due to space limits, the empirical evidence should be sorted. In such cases, there is always a risk of author's subjective selectivity. Fourthly, the analysis is only a partially complete systemic approach. Limited nodes and links between these nodes are assessed, while the connections between individual spaces are omitted. Finally, while the well-known problem of systemic analysis – issue of scale – is fixed, another methodological problem – system's inputs/outputs – is still a source of model deviance.

Subject motivation

In contrast to other directions of political research, geopolitics and political geography of the polar regions is an exciting, but, so far, a poorly analyzed area. On the other hand, different versions of systematic geopolitical analysis are not perfect in reflecting the changing climate of the Polar Regions. The author would like to start her academic career by applying to the Faculty's PhD. program (specialization: political geography/geopolitics) with the goal of building systemic, dynamic geopolitical model(s).

Potential sources of reference

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Contents:

Illustrations:

1. Introduction

According to the latest report by the Arctic Monitoring and Assessment Programme[3], the Arctic ice cover is diminishing by 1-2 percent each year. This process has been accelerating with time: in 2007 some ice-free areas of the Arctic Ocean were as much as 5°C warmer than the long-term average. On land, the limits of permafrost also indicate a warming trend: most of the region, especially tundra areas, showed an increased plant growth over the period from 1981 to 2005 (AMAP 2009: 3-5). In practice it means that the Arctic has become more accessible from the south, in both political and economic terms.

Various scenarios of the scramble for the polar region fuel debates among policy-makers. The stakes are especially high in Canada, Russia, the United States, Norway, Denmark, Sweden, Iceland, and Finland – countries whose territories actually lie within the Arctic Circle[4]. But more than 20 other states (including the United Kingdom, Japan, China and South Korea) indicate readiness to invest in commercialization of the region. The political and economic tensions to become extremely high, the countries can even opt for an open armed conflict over the disputed areas. Some provocative military maneuvers have already taken place.

Unfortunately, statesmen often lack comprehensive and adequate contribution from academia. Until recently, relatively few articles and books have been devoted to polar geostrategy. Even though much has been said and written on the issue of climate change in the region, a *systemic, dynamic, and interdisciplinary* geopolitical reflection of this process is still missing from the civil scientific agenda[5]. So far, there are two main gaps in the knowledge of Arctic geopolitics: first, a still dominant national (i.e. not regional) perspective and, second, little debate over how regional development is facilitated or constrained by security policies and military activities in the region, as "….defining and addressing security from a regional perspective has been a difficult, or even taboo, issue" (Einarsson et al. 2004: 222).

At the same time, the Arctic region occupies a unique place within the system of international relations. Firstly, together with the Antarctic, it has been a 'no man's land' for most of human history and, consequently, it is yet to emerge as an

[3] Working Group of the Arctic Council; Norway, Oslo.
[4] 66° 33' northern latitude.
[5] Strategic analyses are mainly done at the military colleges, usually by applying PMESII, DIME and/or SWOT frameworks to particular international regions.

international region. Secondly, it consists of frozen ocean (glaciers) and land (permafrost) – both of which are subject to a significant change of climate due to global warming. Thirdly, the sustained increase in energy prices makes Arctic hydrocarbon reserves more attractive for surveying, mining, and exporting via the Northwest Passage and the Northern Sea Route. Finally, several decades ago the strategic role of the region in global politics started to change: while it had been an exclusively military-strategic location within the Cold-War system of international relations, today its 'attractiveness' to the global community is more and more defined by its economic potential. Such developments indicate that this transborder region is highly unstable. Tensions arise around various topics, from subregion-specific (such as, until recently, fishing rights in the Barents Sea) to supra-regional (such as denuclearization).

This work aims at contributing to geopolitical analysis by:

(1) providing the latest empirical evidence on the developments in the region;
(2) offering its own version of systemic geostrategic analysis by fixing the region's southern border at the Arctic Circle, adjusting to the premises of new geopolitics, using systemic modeling, and viewing geostrategic analysis as an obligatory academic contribution to the 'art' of statecraft;
(3) defining the Arctic geostrategic transborder region as a system of five geostrategic action spaces: physical space (S_1), military space (S_2), economic space (S_3), demographic space (S_4), and information space (S_5);
(4) applying a social network analysis – i.e. constructing the basic networks of relationship (links) between the key actors (nodes) – on four human-constructed geostrategic spaces (S_2-S_5);
(5) constructing matrices of symmetrical relationships showing intensity for military space (S_2), economic space (S_3), and demographic space (S_4);
(6) merging five geostrategic action spaces into a complex system of inter-space affection;
(7) evaluating the forces that strengthen and weaken the system's stability;
(8) offering possible scenarios for the future strategic developments in the region;
(9) offering directions for further research.

In order to accomplish these goals the work implies a two-stage geostrategic analysis. Stage I is inductive, descriptive and static. After summarizing the vital

elements of physical geography, key actors (nodes) and relationships (links) are identified for four human-constructed geostrategic action spaces (S_2-S_5). Stage II is deductive, analytical and dynamic. The system's dynamics is evaluated via a prism of prospects for conflict or cooperation. Four scenarios of the region's development by 2040 by Lawson W. Brigham ("Globalized Frontier", "Adaptive Frontier", "Fortress Frontier", and "Equitable Frontier") are applied to the interplay of the forces strengthening and weakening the system's stability.

A 'hybrid' scenario is offered. While assuming competition (conflict) to be the main engine of international relations, it predicts regional integration into global economy to be controlled (limited) and gradual; economic activities not to boom yet; fishing industry to be open to the Arctic states (that will regulate the rights); air and marine traffic to be regulated internationally; tourism to flourish; the profile of indigenous peoples' organizations to be high; impacts of climate change to be dramatic over physical and human environments; the Arctic states to assert their sovereignty rights over resources beyond 200 nm (thus the United States is assumed to ratify UNCLOS); the Arctic Council to serve as a main dispute resolution mechanism; and outside (external) participation to be restricted to the Arctic states.

The system is not just a simple sum of subsystems, but a complex organization of subsystem connections. A change in one subsystem ultimately diffuses into others. Some locations gain strategic significance and the others lose it, so do the political stakes. Merging individual action spaces into one complex perspective allows for the most accurate reflection and prediction of strategic developments in the region, given the unchanging nature of the legal international framework.

The work is organized as follows. Section 2 summarizes the theoretical and methodological considerations behind the model. Section 3 first defines the Arctic geostrategic transborder region as a system of six action spaces, then merges them into a complex perspective. Section 4 presets forces strengthening and weakening the system's stability, and embed them in Lawson W. Brigham's "Scenarios for 2040". Section 5 summarizes the findings, assesses them against the existing literature, and provides directions for further research.

2. Systemic Geostrategic Analysis of International Relations in the Arctic Region – Theory and Methodology

According to Alexander Murphy,

> It is difficult to come up with any domain of the social sciences that is more complicated, contingent, and dynamic than geopolitics. Myriad events, arrangements, and ideas influence geopolitical developments, and the terrain is in constant flux. (Murphy 2010: 151)

This work attempts to illustrate the geostrategic effects of the changing climate in the Arctic transborder region. Geopolitics is understood broadly – as a system of ideas describing the interrelationships between politics and the geographical environment. In practice, these ideas translate into various forms of control over physical space. As a derivative of geopolitical theory, geostrategy aims to supply the policy-maker with a set of valuable scenarios of future developments within a given physical space. In its search for an interdisciplinary output, the analysis incorporates theoretical and methodological essentials from physical geography, political geography/geopolitics, political science, regionalism, international relations, macroeconomics, international law, human geography, sociology, and war studies.

Firstly, the Arctic region is defined and delineated (2. 1.). Then, the evolution of geopolitical thought up to a new geopolitics is presented (2. 2.); the essentials of the systemic modeling (2. 3.) and geostrategic analysis (2. 4.) are summarized; and the model of systemic geostrategic analysis of international relations in the Arctic region is introduced (2. 5.).

2. 1. Delineating the Arctic Transborder Region

Although the Arctic region has been of interest to scholars since as early as the 18th century (Scoresby 1799); only in 1980s did it start to appear as a distinct international political region in scientific journals (Bloomfield 1981, Griffiths 1988, Scrivener 1989, Young 1996). One of the most probable reasons for such conceptual 'delay' was that "…unlike more familiar regions, such as Southeast Asia, the Middle East, or South America, the Arctic consists largely of segments of nation states whose political centers of gravity lie, for the most part, far to the south" (Einarsson et al. 2004: 18). Surprisingly to those who live in the region, some scholars doubt the appropriateness of treating the Arctic as a distinct region at all. They refer to sharp historical, political and economic differences among the Arctic states: "[These states]

are largely different and have largely different orientations to the "Arctic"… They are primarily related through the security conflict over the Arctic during the Cold War" (Keskitalo 2004: 42). In other words, the idea of the Arctic as a distinct political region (with a policy agenda of its own) is little more than "…an artificial construct that requires serious manipulation of the facts to seem credible" (Einarsson et al. 2004: 18).

Bordering the Arctic is a task that depends upon the subject of investigation and technical capability. First and foremost, it is the world's smallest ocean surrounded by islands and mainland that is, so far, frozen for the greater part of the year (Hnízdo 1995: 57-58). The region's northern limit can be defined as the geographic North Pole, but it is of no help in delineating the Arctic southern limit (Sale 2008: 15). Specifically, there is the problem of identifying which specific provinces/territories of the Arctic states to include in the analysis. Geographers prefer straight-line boundaries, such as parallels of latitude and meridians, and therefore use the Arctic Circle (Osherenko and Young 1989: 11). It is an exact delineation that falls on 66° 33' northern latitude, everywhere on the globe at a distance of 2 655 km from the North Pole (Keskitalo 2004: 32).

Other definitions are mainly based on physical characteristics of the region. The tree line definition (an area, beyond which trees cannot grow) approximately coincides with the temperature definition of the Arctic, the July 10-isotherm (area where the mean temperature in July is ten degrees Celsius). The region can be also defined by permafrost, above which the soil remains frozen throughout the whole year. In marine environments, the boundary is seen to form where cool Arctic Ocean water meets warmer, saltier water. Even ecological characteristics (flora and fauna) can serve as the region's delineators. Such environmental definitions are weak in several ways. Some scholars point to the fact that alpine regions (higher elevations of mountains, wherever these may be) are physically and biologically similar to polar areas (Young 1992). Others believe that "…the tree line, mean temperature, and marine boundary of the Arctic all lie significantly farther north in northern Europe than in North America[6] …[Also, these] lines are not actual lines, but rather broad ecological zones 50-100 km in width" (Keskitalo 2004: 30-32). Finally, because the changing climate alters dramatically the Arctic physical space (AMAP 2009: 14),

[6] Due to the warming effect of the North Atlantic Drift.

environmental delineation cannot be used when producing scenarios of future developments.

There is also one prominent non-environment definition of the Arctic, which relies on comparison with Antarctica[7]. It is the domestic Canadian definition that limits the Arctic region at 60° northern latitude, analogous to the Antarctic delineation of 60° southern latitude (Keskitalo 2004: 32). This definition says much about Canada's symbolic treatment of the Arctic (geopolitical representations/'mental maps'), but is of no use when dealing with an international transborder region with a certain number of actors that strive for the rational maximization of power.

The region itself is a very broad concept. Regions can be found at all political levels. Defining their limits is probably the most challenging task for a researcher who focuses on the spatial differences among distinct locations (Romancov 2007: 420). In political geography, the term usually refers to two basic types of areas defined by their historical, cultural, economic, social or political distinction from the surrounding area (Gallaher et al. 2009, Cihelkova 2007, Lantsov 2009, Csurgai 2009). The first is a world-region, such as the South Asia or the Caribbean basin, which is composed of multiple states and organized around specific geographic subdivisions[8]. The second type of region represents a typically smaller area at the sub-national level that is frequently associated with strong local ethnic identity, such as East Timor or Catalonia (Dahlman 2009: 210).

The former, macro-scale perspective assumes three types of international political regions. The first is a pan-region – a large (often a 'continental') space with certain politico-civilizational elements that distinguish it from other regions, such as Latin America or the Middle East. The second is a transnational political region that reflects the integration of political and cultural factors of several (minimum two) states, for example the African Maghreb or Scandinavia. The third type of international region is a transborder region. It ignores the state borders as the limits of national sovereignty and strives to connect the border areas of at least two states into a single political unit, like the Chaco region encompassing territories of Argentina, Bolivia and Paraguay (Hnízdo 1995: 64-91). The Arctic region belongs to the third type of international regions. To Northerners (i.e. indigenous populations) it is a

[7] Many scholars believe that the Arctic and the Antarctic are too different regions to be cross-referenced (Chaturvedi 1996, Glassner 1990, Dowdeswell and Hambrey 2002, Keskitalo 2004).

[8] For example, Cold-War division (First, Second and Third Worlds), socio-economic development (global North and South) or newly formed regional associations (the European Union).

distinct region, where, potentially, a common Arctic identity could be formed – a first step towards a single political unit. To Southerners (i.e. states bordering the region) the area consists mostly of the ocean that is open to power projections (Osherenko and Young 1989).

In practical terms, the delineation of the Arctic is not the primary goal of this work. Therefore the analysis defines the region in a manner that is compatible with studies of other Arctic issues, instead of adopting yet another approach to determine the extent of the region. This work refers to the definition based on the Arctic Circle, which, despite its various shortcomings,[9] fulfills two fundamental requirements (see Figure 1). Firstly, given the modern change of climate ('global warming'), this version of delineation is probably the most stable[10]. This condition is crucial for the prediction of future developments. Secondly, it is beneficial in terms of empirical data, because specialized Arctic agencies (AMAP, AHDR, UNEP/GRID) produce statistical reports that always consider the area within the Arctic Circle.

Figure 1: Political Map of the Arctic

Source: <http://maps.grida.no/go/graphic/arctic-map-political>.

[9] This definition of the region does not consider atmospheric circulation, faunal distribution, climate change, the tree line, the limits of permafrost, or general isotherm patterns. Therefore, "…it is artificial and irrelevant" (Chaturvedi 1996: 13).

[10] During a period of approximately 40 000 years the Arctic Circle's latitude varies with a few degrees.

Some scholars believe that there are five Arctic states – Canada, Denmark (via Greenland), Norway, Russia, and the United States (via Alaska) (Holmes 2008, O'Rourke 2010). Other researchers also include northern territories of Sweden, Finland, Iceland, and even the Faroe Islands (Currie 2007, Conley and Kraut 2010). With the exception of Iceland[11], this work focuses on the northern territories of seven states (see Table 1).

Table 1: The Arctic States' Territories within the Arctic Circle

Canada	Yukon, Northwest Territories, Nunavut; Canadian Arctic Archipelago
Denmark, Greenland	Qaasuitsup, Northeast Greenland National Park, Sermersooq
Finland	Rovaniemi, Tornio Valley, Tunturi Lapland, Eastern and Northern Lapland
Norway	Finnmark, Tromso, and Nordland Counties; Svalbard Archipelago, Jan Mayen Island, Bear Island
Russia	Murmansk Oblast, the Nenets, Yamalo-Nenets, Taimyr, and Chukotka autonomus okrugs, Vorkuta in the Komi Republic, Norilsk and Igarka in Krasnoyarsky Kray, and those parts of the Sakha Republic whose boundaries lie closest to the Arctic Circle, Franz Josef Land, Novaya Zemlya Islands, Severnaya Zemlya Islands, New Siberian Islands, Wrangel Island
Sweden	Norrbotten and Vasterbotten Counties
United States, Alaska	Barrow, North Slope and Northwest Arctic Boroughs

2. 2. Polar Geopolitics: Old and New

Since 1608, when Hugo Grotius introduced the Freedom of the Seas Doctrine[12], the Arctic Ocean was used in the 'non-rival' way – one country's use of the oceans for navigation did not impede another country's ability to navigate; while another important activity of the high seas, fishing, was considered inexhaustible (Holmes 2008: 324). As of the coastal states, the 1648 Peace of Westphalia began their quest for internal and external sovereignty – a long and painful journey from

[11] Grimsey island is the only territory of Iceland that is located on the Arctic Circle. It is only 5,3 sq km with population around 100. Therefore Iceland is excluded from the analysis.

[12] The Freedom of the Seas Doctrine allows free navigation and fishing, shared by all nations. It is based on the assumption that the oceans are fluid; therefore they cannot be demarcated or occupied. It still forms a basis for modern maritime law.

overlapping medieval authorities towards a modern world of mutually exclusive territorial jurisdictions (Jackson 2007: 5-8). However, due to the harsh climate and lack of technology, the Arctic region was neglected by the coastal states' policy-makers up until the mid-20th century.

According to Simon Dalby, classical geopolitics of the first half of the 20th century "…treats the States as autonomous spatially defined entities struggling with other similar entities in attempts to enlarge their power by increasing their control of the territory" (Dalby 1990: 40). The rise of geopolitics significantly affected developments in the Arctic region. Following the idea of Alfred Mahan that "…naval supremacy was the prerequisite to ascendancy in the world political order" (Sumida 2003: 39), Harford Mackinder searched for ways for Great Britain to save its global maritime supremacy during the post-Columbian Age, when no lands were left to conquer, the world political system was closed, and the dominant form of power was that coming from the continental mass (Kearns 2009: 146). In his famous work *"The Geographical Pivot of History"* (1904) he asked: "Is not the pivot region of the world's politics that vast area of Euro-Asia which is *inaccessible to ships* [my emphasis] ...[but] is today about to be covered with a network of railways?" (Mackinder 1904: 37). Without going too deep into heartland theory,[13] it can be concluded that, given the fundamental 'seapower versus landpower' dualism, the main tension came from the fact that northern part of Eurasia (i.e. Tsarist and then Soviet Russia) was not accessible by other countries' fleets via the 'Icy Sea' – the Arctic Ocean.

Although Mackinder did not offer an advanced analysis on the implications for the Arctic for being the 'Icy Sea', his theory made a giant impact on the further development of the Arctic – since the 1940s, it has been militarized. According to Alexander de Seversky's *"Victory Through Air Power"* (1942), the polar regions were the new zones of conflict. The Arctic was particularly significant because it comprised the shortest air route between Russia and North America (Flint 2006: 22). The vision of the Arctic as a future Mediterrainean of the air was "...an idea that contained all the elements of probability" (Fifield and Pearcy 1944: 181). Similarly, the region's maritime space gained strategic significance – the ice was not a big problem for nuclear submarines (Hnízdo 1995: 57). Besides, not only did it

[13] A useful insight on Mackinder's contribution to geopolitics can be found in Kearns, Gerry. *Geopolitics and Empire: The Legacy of Harford Mackinder*. Oxford: Oxford University Press, 2009.

accommodate the Iron Curtain, but it was also a place where the main rivals, the United States and the Soviet Union, shared a common border[14] of approximately 2500 km (Blake 2007: 98).

Both the German and Russian schools of geopolitical thought belong to the tellurocratic tradition. The former, invented by Karl Haushofer, imported the talassocratic idea that the Arctic was a strategic location: "...from Sir Harford Mackinder, Haushofer seized upon the concept of the heartland" (Herwig 2003: 220). The latter, dominated by Eurasianists[15], did not find support among Soviet leaders. Because of its German origin[16], the very notion of geopolitics became an official taboo[17] in the Soviet Union (Solovyev 2005: 129). Consequently, Germans and Soviets understood the particular role of the Arctic region in the same way as did British and Americans – as a frozen gateway to the Soviet Union. That is why, during World War II, the Arctic was so crucial for German and Russian submarine convoys (Holmes 2008: 325).

To sum up, the Arctic was one of the primary strategic locations within the Cold-War system of international relations, in line with the main arguments of the Anglo-American school of geopolitical thought. This position left no room for non-military use of the region by the surrounding states.

At the beginning of 1990s the Arctic region was probably one of the first to experience geopolitical transition. If a Cold-War world order was more or less stable set of international, geographically-based power relations (Taylor 1990), the post-Cold War period marks 'geopolitical disorder' – the decline of postwar bipolar order, yet without any alternative (O'Loughlin 1994: 92). The new multipolar system promised equality among all international actors, leaving no rationale for imperialism: "…cooperation, not security competition and conflict should have become the defining feature of relations among great powers" (Mearsheimer 2001: 360). However, that did not happen.

[14] Delimitation at the Bering Strait (1867 Convention).
[15] Eurasianist ideas were popular among Russian émigrés in the 1920s. Russia was seen as a "world of its own", a "middle continent" (Eurasia), rather than as a land divided between Europe and Asia, with the latter predominating.
[16] Whether geopolitics (as a science) is responsible for Nazi crimes is a highly questionable issue.
[17] There were, for example, Stalin's concept of spheres of interests (underlying the specifics of the Yalta-Postdam system of international relations) and Brezhnev's Doctrine (limiting the sovereignty of the Warsaw Pact countries), but these were "...permeated by the philosophy of *realpolitik* and were constructed in the spirit of traditional imperialism" (Solovyev 2005: 129)

Burdened with Cold-War militarization, the Arctic transborder region entered the new era of global politics, characterized by the destruction of the ozone layer, climate shifts, finite natural resources, topsoil erosion, deforestation, and the oceans' inability to be both food producer and waste receptacle. Pollution is produced at a rate that far exceeds nature's capacity to render it harmless, and many species are to become extinct (Chaturvedi 1996: 1). Can these new realities be explained by classical, geographically deterministic geopolitics? In the twenty-first century, geopolitics cannot be limited by geographical factors, despite the fact that "…because humans are physical beings who occupy space and have physical needs geography cannot be dethroned from its central position in the international sphere" (Walton 2007: 101).

Instead, the new thinking in geopolitics refers to geographical possibilism rather than determinism. Geography is one of many possible conditional factors in international relations, but it has a facilitating rather than a pure effect (O'Loughlin and Anselin 1993). Humans have to make decisions among possible choices. Modern geopolitics is diachronic: it is an active process of constituting the world order rather than an accounting of permanent geographical constraints, where the nature of competition moves from the military-political sphere to the economic dimension (Corbridge and Agnew 1991). This is true also for the Arctic. Recent geopolitical analysis indicates the tendency of non-geographic factors to get ahead of the traditional military-oriented vision of the region (Sale and Potapov 2010, Zellen 2009, Keskitalo 2004, Knell 2008).

The advocates of a critical (or postmodern) approach believe that geopolitics is a much broader and more complex problematic than is acknowledged in traditional understanding of the concept: "Geography is an inescapably social and political *geo-graphing*, an 'earth writing'…[It is] a cultural and political writing of meanings and politics of states" (O'Thuathail 2003: 109).

The critical approach distinguishes between formal, practical, popular, and structural geopolitics. Given the scope of this work, structural geopolitics is relevant, because, first, it is based on social-constructivist assumption[18] and, second, it implies "…the study of the structural processes and tendencies that condition how all states practice foreign policy. Today, these processes include globalization,

[18] This approach assumes the researcher to realize that the world is a social construction.

informationalization and the proliferating risks unleashed by the successes of our techno-scientific civilization across the earth" (O'Tuathail 2003: 110). Each of these processes has found a significant reflection in the modern development of the Arctic region, but the change of climate can alone bring a paradigm shift in geopolitics (Chaturvedi 1996: 10). Practical geopolitics is also relevant, because geostrategic analysis aims at contributing to the actual making of a state's foreign policy.

However, the critical tradition is so far too heterogeneous to offer a single, formal and non-discursive[19] method of analysis of international relations in a particular international region. It is subject to a substantive methodological criticism. Specifically, it is blamed for the absence of a clear position of what 'critical geopolitics' actually means; little consideration of non-hegemonic states or international political actors; and lack of attention to subjectivity and *material* environmental variables (Criekemans 2009: 40).

2. 3. Systemic Modeling in Geopolitics

Depending on the subject of assessment, geopolitics refers to various types of research design. Although systemic modeling first appeared in natural sciences (biology) it has been successfully applied in many branches of social sciences, including geopolitics (Marinchenko 2009: 24). First and foremost, it is an ancient idea. Greek and medieval philosophers did not ignore the system of organized totality, which could not be simply reduced to the sum of its parts. However, the concept of complexity did not allow Aristotelian science to be successful in understanding the physical world. In fact, it was Galileo who all abandoned reference to the All and, therefore, enabled real progress in Western physics. Reductionist (mono-causal) methods boomed in the 18th and 19th century, but, from the beginning of the 20th century, the tendency to conceive holistic interdependence returned to all sciences: within a system, any modification of a unit or variable was supposed to have direct or indirect effects on other units (Dussouy 2010: 134). The turning point was clearly in sociology, where Talcott Parsons, inspired by cybernetics, came up with the action theory, wherein politics was understood as a functional sub-system within a society (Říchová 2007: 169). Every social phenomenon was treated as a structured and

[19] Critical geopolitics scholars are usually interested in the question of how the meaning of 'places' and 'geopolitical space' is constructed in (foreign) policy. Such problems are best solved by the use of discourse analysis (Criekemans 2009: 38).

limited complex of social relations, with both internal and external dynamics (Kubátová 2006: 94).

The systemic approach also became a powerful methodological tool in political science as many scholars believe that it is relatively 'neutral' (Říchová 2007: 169). Some authors even claim that, in fact, it is the best approach ever imagined when comparing heterogeneous political systems (Berg-Schlosser and Stammen 2000). David Easton (probably the first and best-known advocate of systemic thinking in political science) started using it as a central means of understanding how political systems operate (Easton 1953). Three components are assumed to be part of system: (1) definite actors – individual or collective; (2) definite links of interdependence between the actors; (3) definite borders that clearly distinguish the system from its surroundings[20]. Easton assumed the system's inputs (everything that is imported into the system from its surroundings), outputs (everything that is exported from the system to its surroundings), and feedback as the means of understanding how the system and its surroundings interact with, and affect, each other (Říchová 2007: 170-171).

The system as such is not alien to the discipline of international relations to which, as Michael Romancov points out, geopolitics relates the most (Romancov 2007: 408). International relations traditions can be categorized as either positivist or normative[21]. The former consists of realists and neo-realists, liberalists and neo-liberalists, followers of the British school (Daddow 2009: 60). All of them agree that a system of international relations exists, and its nature is anarchical. However, objects of their research differ (Drulák 2003: 146). Realists and neo-realists focus on the balance of power (Kissinger 1957), liberalists and neo-liberalists – on international institutions, regimes and transactions (Keohane 1984, Mitrany 1943), followers of the British school – on international society as an alternative to an international regime (Bull 1977), and critical approaches – on structural effects (Wallerstein 1974, 1980, 1989).

What constitutes a system of international relations? According to Hedley Bull, two or more states form a system when they "have sufficient contact between each other, and have sufficient impact on one's other decisions, to cause them to

[20] For example, a state in relation to other states, or a family in relation to other families.

[21] Explanatory (positivist) theory "sees the world as something external to our theories about it" while constitutive (normative) theory "thinks our theories help to construct the world" (Smith and Owens 2008: 176-7).

behave – at least in some measure – as parts of a whole" (Bull 1973; cited in Daddow 2009: 106). Morton Kaplan defines six possible systems of international relations: 'balance of power', 'loose bipolar system', 'tight bipolar system', 'universal international system', 'hierarchical international system', and 'unit veto international system' (Kratochvíl and Drulák 2009: 19). Kenneth Waltz concludes that systemic transformations are observable elements of global politics. He also stresses the crucial importance of the balance of power: the causes of tension lay not so much with the actions of the system's units (states) but at the level of the system itself (Daddow 2009: 103). Assuming that the relative power of each state should shape its behavior within this system, Waltz deduces that, in contrast to multipolarity, bipolarity is less likely to produce war (Daddow 2009: 124).

Advocates of normative (critical) approach understand the system differently. Karl Marx's 'global capitalism' is a system where (1) forces structure state interactions and (2) capabilities and interests are not defined in terms of raw power, but rather in terms of to which social class an individual belongs; the bourgeoisie or proletariat (Daddow 2009: 122). Immanuel Wallerstein's World System theory assumes that within the modern era of capitalist world-economy, state interactions are governed by unseen systemic forces; international relations are organized within the capitalist world-economy or empire, where the former is a short-term, transitory stage before the latter emerges (Drulák 2003: 114-5).

Recent attempts to apply systemic modeling to geopolitics belong to the French school[22], whose main goal is to reconstruct the strategic behavior of the system's participants. In order to be successful, these scholars react to criticism of systemic modeling in other fields of social sciences, especially the realm of international relations. On the one hand, classical international relations theories – Realism, Liberalism, Marxism, Functionalism – have a common feature: they constrain the interpretation of international relations to oversimplified reductionist (mono-causal) research designs. However, such approaches fail to reflect the complexity of the contemporary world system[23]. That can lead to a 'mistaken diagnostics' of the state of international affairs, a distorted reflection of reality and, consequently, inappropriate policy advice (Csurgai 2009: 48). On the other hand,

[22] Among others, Stephane Lupasco, Edgar Morin, Gerard Dussouy, Aymeric Chapraude.
[23] For example, Marxists maintain that war between communist countries could not happen despite some possible rivalries. However, the war broke out in 1978 between the Khmer Rouge of Cambodia and the Vietnamese communists for the countrol of a part of Mekong delta.

theories of international relations tend to focus too much on the question of balance (Dussouy 2010b: 179). Clearly, geopolitical analysis cannot use systemic approaches from other branches of social sciences without modification.

Gerard Dussouy's 'Global Interpretation Method of the World' (2010) is a recent attempt to produce a systemic geopolitical analysis that has already provoked a wide academic discussion. The idea is that "...no two-dimensional map can capture the multi-scalar intersection of physical, demographic, strategic, socio-economic, and cultural-ideological forces at work in the geopolitical arena; instead, we need to think in terms of the interaction of all these things in different places and under varying circumstances" (Murphy 2010: 151). This approach adheres to the theory of German hermeneutics: strategies are placed into a context which always has a structure – 'nothing is given, everything is built'.[24] According to Dussouy, it is not possible to adopt a strictly axiomatic approach because "...it is impossible, in all social sciences, to practice any sort of a priori verification" (Dussouy 2010a: 136). In fact, a hypothetical-deductive aspect and an empirical-inductive aspect are complementary approaches. Without attempting to produce a general theory, Dussouy presents a "...methodology for gathering data that can serve as the basis for an empiric-inductive theory" (Cohen 2010: 163).

Dussouy breaks down the global system into five distinct geopolitical action spaces: physical, natural space (C_1); demo-political space (C_2); diplomatic-military space (C_3); socio-economic space dealing with globalization (C_4); symbolic, idealistic and cultural space (C_5) (see Figure 2). C_1-C_4 form the system's objective structure and C_5 is the system's subjective component. In order to discover the transforming tendencies, each space is subject to a spatial analysis capable of extracting structural logic and the obstacles it has to face (Dussouy 2010a: 143).

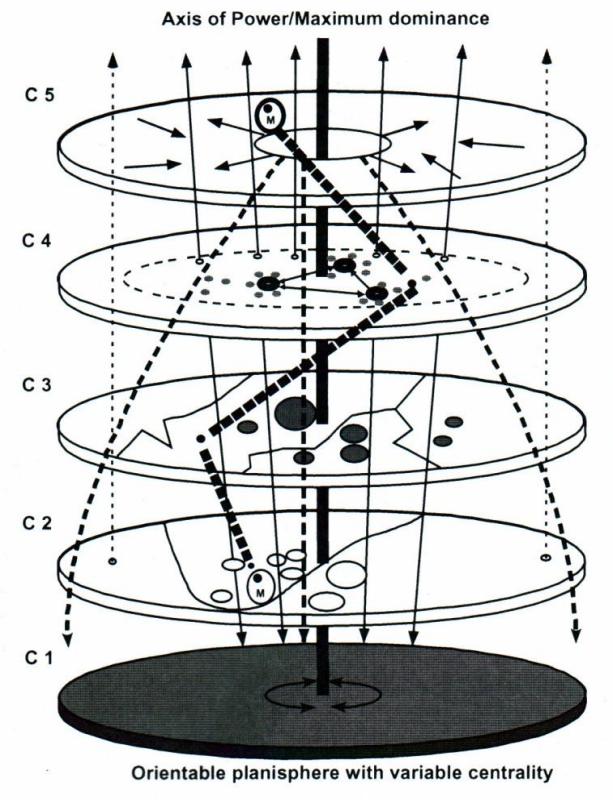
The model has both strengths and weaknesses. On the one hand, it is broad enough to capture almost any imaginable dimension in geopolitical practice: "viewing any geopolitical topic against the model could highlight which physical, structural and ideological realms are being emphasized and which are being taken for granted" (Murphy 2010: 155). Additionally, it is based on axioms that have been widely accepted in scientific literature (see Table 3). It is also a relatively simple method of

[24] Original quote from Bachelard 1934.

systematization that can be applied not only globally, but regionally as well. Finally, it offers a unique research perspective:

> ...Yet attention to how we might approach the study of geopolitics methodologically and theoretically has not been matched by a literature encouraging consideration of the potential influences on geopolitical developments that exist within the global system" (Murphy 2010: 155).

Figure 2: Dussouy's 'Global Interpretation Method of the World'



Source: Dussouy 2010a, p. 143.

Table 2: Dussouy's Four Axioms of Systemic Modeling in Geopolitics

Axiom	Historical example
Systemic configuration is based upon the intention and capacity of participants to act in a system	The birth of modern nation states
The relative space constituting geopolitical configuration is organized around alternative centers	The Cold War
The tangible reality of a geopolitical infrastructure interfaces with intangible reality to determine the configuration	Nationalism as a reaction to a globalizing economy
The global system induces geopolitical spatial forms, mainly the territory and the network, that are the results of participants' strategies	European integration

Source: Cohen 2010, p. 157-60.

On the other hand, Dussouy's approach is subject to criticism. Alexander Murphy questions the general connections in the model ("under what circumstances is one layer more important than the others?") and the author's ignorance of different scales of political ideology ("adding them to an already complex model would risk making it almost incomprehensible") (Murphy 2010: 152-4). Saul Cohen disagrees with Dussouy's rejection of developmentalism[25]: "geopolitical system evolves along developmental principles whereby periods of great change serve as historic milestones that mark its progress" (Cohen 2010: 161). Robert Jervis adds that similar problems can be successfully solved by other methods of research, for example by game theory (Jervis 2010a: 170).

Dussouy presents a systemic approach without offering any hint of how to construct individual action spaces. In contrast, Guyla Csurgai offers individual components of nine factors of geopolitical analysis without any subsequent systematization: elements of physical geography, natural resources, identity factors, geopolitical representations, ethnic composition and demography, boundaries, historical factors, socio-economic factors, and strategies of actors (Csurgai 2009: 51).

2. 4. Geostrategic Analysis: Contributing to Statecraft

According to Michael Noonan, geopolitics can be divided into two schools, the first consisting of organic state thinkers wishing to transcend the balance of power, and the second consisting of geostrategists wishing to maintain the balance of power. "While the first school largely disappeared with the demise of the Third Reich and General Karl Haushofer, the second school remains and has many different variants" (Bonadonna et al. 2000: 131). This work defines geostrategy as a derivative of geopolitics aiming at discovering the interplay between physical space and classical strategic goals – "answering the question how the resources of the nation, material and human, can be developed and utilized for the end of maximizing the total effectiveness of the nation in war" (Brodie 1949: 476).

Already in Venice, as well as the Ottoman, and Ming Chinese empires[26] three perspectives appeared to be primary: geography, geopolitics, and geostrategy; whereas "...geography was the geological reality of the earth, composed of mountains,

[25] The developmental model is a theory of the whole process of geopolitical change that takes place in clearly identifiable stages, and according to a distinct set of rules (Cohen 2010: 162).
[26] 11th - 16th centuries.

rivers, seas, climate and so on; geopolitics was a combination of geological features (e.g. natural resources) with human activity (e.g. production and technology) that altered the value of places; and geostrategy described where a state directed its military and diplomatic efforts" (Grygiel 2006: ix-x). Consequently, "...the most successful states ... match their geostrategy to the underlying geopolitical reality" (Grygiel 2006: 1). Arthur Lykke uses the 'chair metaphor' to describe the essence of strategy – the relationship between objectives (ends), concepts for accomplishing objectives (ways), and resources for supporting these concepts (means). Ends, ways, and means are presented as three legs of a stool upon which military strategy rests. If any leg is out of balance, the risk is too great and the strategy collapses. Therefore, Lykke argues that a valid strategy must have an appropriate balance of objectives, concepts, and resources. This can be done by adding resources, using different concepts, or changing the objectives (Lykke et al. 2001).

Geostrategic analysis is an obligatory scientific contribution to the policy-making process. The strategy should not be reduced to pure geography: "...in an era where no peer competitor exists and no countervailing ideology threatens the nation, it seems that geostrategic analysis is more useful than ever" (Bonadonna et al. 2000: 132). Geostrategic analysis is important, because it considers information, infrastructure and technological developments within particular regions. To begin with, geopolitical theory has often rested on the premise that technology could help shape the geopolitical world[27]. Technological and information gaps were, and still are, critical to the fortunes of great powers. Not only do they drive economic and social progress, but "...the very concept of a revolution in military affairs is built on the presumption that new technologies – whether they are computer viruses or nuclear warheads – can have a critical impact on the outcome of conflicts if they are leveraged properly" (Walton 2007: 101). Infrastructure, on the other hand, acts as a force multiplier across the spectrum of the state's activities (Lonsdale 2003: 146). If a state's infrastructure is underdeveloped, it takes more time to mobilize national resources (military, human) in the case of conflict. Factors to be considered include: industrial infrastructure (water and energy supplies), transport infrastructure (road, rail, marine, and air networks), and hydrocarbon pipelines.

[27] Halford Mackinder believed that the railways were the key to unlock the potential of heartland – that signaled the rise of continental powers at the expense of the maritime states.

In 2008, U.S. Army Major Niave F. Knell[28] performed a net operational assessment of the Arctic region. He combined three strategic frameworks. The first is PMESII as it considers political, military, economic, social, infrastructure, and information subsystems of the region. They are displayed and analyzed separately as parts of a complex, open geopolitical system. Then, the author assesses the system's potential in order to answer the question of whether the Arctic is to reemerge as a strategic location; by using DIME (diplomacy, information, military, and economic), and SWOT (strengths, weaknesses, opportunities, threats) approaches (Knell 2008: 10-1). However, the work exclusively solves exclusively the case of the United States; therefore a more regional perspective remains missing from the literature.

2. 5. Systemic Geostrategic Analysis of International Relations in the Arctic Transborder Region

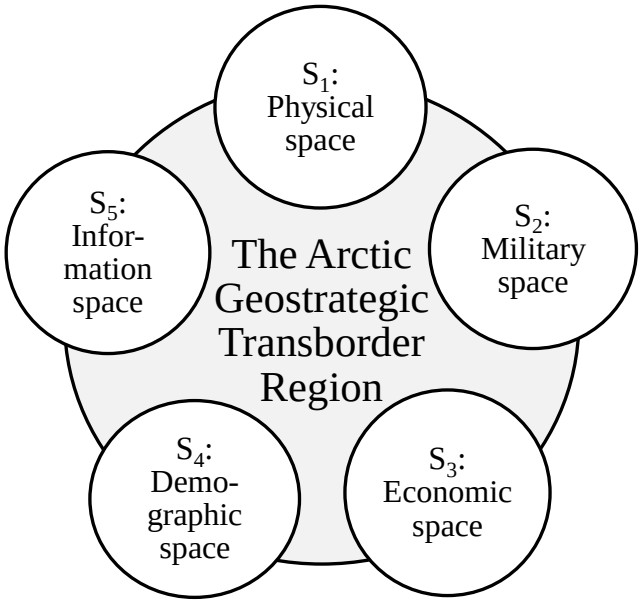
Defining the Arctic as an international transborder region, limiting its southern border by the Arctic Circle, incorporating the premises of new geopolitical thinking, systemic modeling, and strategic analysis, this work aims at producing an interdisciplinary reflection of international politics in the Arctic region. Multi-dimensional assessment remains popular among scholars of political science/ international relations because it allows, firstly, to widen the spectrum of traditional analytic quantitative and qualitative methodology and, secondly, to improve the validity of forecasting (Borishpolets 2010: 141). Csurgai points to the particular cases of identity conflicts, 'de-structured states', resource wars, minority issues, and economic rivalries – all posing a considerable challenge to the stability of the current international system. Consequently, "...in order to examine such situations, an interdisciplinary approach that integrates the multiple causes and dimensions of conflict is required" (Csurgai 2009: 48). Surprisingly, this approach is now more popular among non-academic[29] researchers (Hakim 2000: 176). This work aims at bringing an interdisciplinary framework back to the academic agenda.

Five geostrategic action spaces are constructed for the Arctic region: physical space (S_1), military space (S_2), economic space (S_3), demographic space (S_4), and information space (S_5). This selection incorporates elements of the three approaches of Dussouy (2010), Csurgai (2009) and Knell (2008). In order to achieve maximum

[28] The 22nd U.S. Military Police Battalion (CID).
[29] E.g. the research units of central government departments, or independent research units.

objectivity, potential intangible elements of the system[30] are intentionally omitted in this work. Diplomacy/international law and infrastructure variables cannot be categorized separately as they serve as primary links within human-constructed action spaces. Consequently, they are mentioned for each space (see Figure 3).

Figure 3: The Arctic Region as a System of Five Geostrategic Action Spaces



S_1: Physical space. Dussouy (2010) and Csurgai (2009) stress that location, size, physical shape, distribution of territory, climatic conditions and even deposits of natural resources are all factors of physical geography that should be considered in any geostrategic analysis, because they have "...a major impact on geopolitics in periods of peace as well as in war" (Csurgai 2009: 52). These are constant conditions[31] that define, together with other factors, the strategic balance in a given international region. For example, being a buffer zone can often imply vulnerability for a country/region located between two or more competing powers – certainly the case for Lebanon and Poland. In contrast, the favorable geographic location of the United States became an important factor contributing to its rise as the world's superpower. Therefore, "states can elaborate efficient strategies to seize the opportunities provided by favorable geographic factors and reduce the vulnerabilities caused by certain geographic constraints" (Csurgai 2009: 54).

[30] E.g. Dussouy's 'symbolic space' consisting of geopolitical representations and 'mental maps'.
[31] Due to a continuing melting of the Arctic ice, even though elements of the natural space may seem relatively constant in comparison to other, human-constructed elements (e.g. economic, demographic); they are still in a state of flux.

S_2: Military space. Traditionally, the international military balance enjoys a primary role in geostrategic studies, as "...the use of spatial dimensions in the logic of armed conflict, the application of geographic reasoning in the conduct of war and in the organization of the disposition of national defense" (Csurgai 2009: 81). Similarly to the case of economic integration, regional military cooperation is also an imprescriptible element of geostrategic research, as it allows the prediction of the main 'practical' sources of conflict or cooperation (Knell 2008: 21). The following national security elements are relevant to geostrategic analysis: the availability of conventional and non-conventional (i.e. nuclear) weapons, elements of national defense (satellites, radar and missiles), air force, ground forces, naval bases, coast guards, and even indigenous forces.

S_3: Economic space. Dussouy (2010), Csurgai (2009), and Knell (2008) agree that a state's capacity to project power also depends on its economic potential. Without national material wealth, a state cannot maintain an effective political and military strategy. The recent rise of geoeconomics as a distinct branch of political science evidences that a comprehensive theoretical and methodological reflection of economic globalization is about to form (Kochetov 2010). As globalization accelerates, using geoeconomic strategies to achieve a state's international goals (e.g. to enlarge zone of influence) can be even more efficient than the use of military force (Csurgai 2009: 75). Several branches of economic science[32] should be integrated into geostrategic analysis, and the following economic factors should be considered: the region's wealth, center-periphery economic disparity, the level of industrial development, the sector and spatial distribution of economic activities, bilateral trade flows (exports/imports), taxation, specifics of the labor force, the legal business environment, the inflow of foreign direct investments, etc. The 'depth' of regional economic integration[33] can be a powerful indicator of a state's adherence to cooperation because it implies a certain level of common institutionalization (Cihelková et al. 2007: 13).

S_4: Demographic space. Globalization is not an exclusive economic matter. It is also a demographic process that can provoke interstate migration flows, lead to social unrest, and even cause the outbreak of a secession movement (Csurgai 2009:

[32] Macroeconomics and international political economy (Csurgai 2009: 76).
[33] Counting from the most shallow to the most advanced form of interstate integration: regionalization, regional forum, state-supported regional integration, free trade area, customs union, common market, monetary union, economic union, and political union (Cihelková et al. 2007).

76-7). Because there are two primary conditions for a state's sovereignty – territory and population – the role of the latter is truly strategic (Jackson 2007). Neither strategy can be realized without an adequately educated population. Interstate social movements and incentives may lead to either cooperation or conflict, or both, depending on the goals of policy-makers. Thus, the following factors are important in geostrategic analysis: the ethnic composition, natural growth rate, and life expectancy of the population; the level of unemployment, social exclusion, and percentage of displaced persons; literacy rates, the availability and technical equipment of educational and medical institutions, available instruments of the welfare system, etc.

S_5: Information space. Given the ongoing progress in information technology, it becomes more and more evident that the availability and technological intensiveness of information plays a strategic role in a state's politics despite the fact that, in contrast to other forms of strategic power (sea, land, air, or space), information space does not have its own physical environment, except physical assets – satellites, cables, and computers (Lonsdale 2003: 139). Nevertheless, various forms of strategic power can be projected through and within this distinct environment. And, because weapons (e.g. malicious software) can also flow through the infosphere, this 'fifth dimension' has "enormous economic, social, political, and military relevance" (Ibid.). Consequently, the availability of Internet access, percentage of main line- and cellular phone users, and the existence of local newspapers, radio or television stations should be incorporated into the research.

Stage I of the analysis is inductive, descriptive and static. Firstly, the region's physical setting is summarized and the following question is answered:

(1) *What are the main characteristics of the Arctic physical space?*

Secondly, key nodes and links within individual Arctic geostrategic action spaces (S_2-S_5) are identified. The following questions are answered:

(2) *What are the main nodes and links within the Arctic economic space?*

(3) *What are the main nodes and links within the Arctic military space?*

(4) *What are the main nodes and links within the Arctic demographic space?*

(5) *What are the main nodes and links within the Arctic information space?*

In order to discover the strategic organization within four human-constructed geostrategic action spaces (S_2-S_5), the work refers to the methodology of social network analysis. Todd La Porte, author of the concept of organized social

complexity, concludes that this kind of analysis must rely on three factors: the number of units comprising the system, the relative variety of units, and the degree of the units' interdependence (La Porte 1975). A social network is a "group of actors – people, organizations, governments – who are linked together by some common actions, common membership, shared communication, or some other form of exchange" (Mahheim et al. 2006: 218). The framework is also concerned with the implications rising out of these processes (Wasserman and Faust 1994: 17).

Assuming that power relations drive political, social and economic domains of human life, social network analysis is a technique that systematically characterizes the patterns of exchange among key actors within a given system. Consequently, "...it advances political science research by focusing on [both] the structure and character of political relationship" (Manheim et al. 2006: 227). The entities that participate in a network are the nodes. They can be individual or collective social units. Links are the ties (i.e. relationships) among the nodes, and they can have different intensities. The tie is inherently a property of the pair, thus it cannot be assigned to an individual actor. A dyad consists of a pair of actors and the possible tie between them. Consequently, a dyadic analysis focuses on the properties of pair-wise relationships (Wasserman and Faust 1994: 18). This is especially true in international politics, where the legal framework operates on the principle of reciprocity[34].

When constructing a map of such network, then, there is a number of choices to make: "which nodes we want to include, which resource flows we want to include, the extent or intensity of the flows, and the direction in which those resources flow" (Manheim et al. 2006: 219). Geopolitics can be internal and external. The former studies the domestic geopolitical circumstances of a particular state, and the latter deals with external (international) geopolitical conditions governing a state's policy-making (Csurgai 2009: 50). This work focuses on external geopolitics, as it analyzes the relationship between seven Arctic states (Canada, Denmark, Finland, Norway, Russia, Sweden, and the United States).

Since their inception in late 19th century, the social sciences have been dominated by a state-centric epistemology. Among the disciplines, political science (including geopolitics) has been the most explicitly state-centric (Brenner 1999: 46). The Critical school has enriched geopolitical theory with the analysis of non-state,

[34] Benefits/penalties that are granted by one state to the citizens or legal entities of another, should be returned in kind.

supra- and sub-national actors (O'Tuathail 2003), however, the scientific ground is, so far, insufficient. Consequently, this work relies on the state-centric approach, whereas the states are viewed as "politically sovereign and economically self-propelled entities, with state territoriality understood as the basic reference point in terms of which all sub- and supra-state processes are to be classified".

In order to make the system more shock-sustainable,[35] a flexible selection of nodes and links is performed. The governments-in-power of seven Arctic states[36] are viewed as the definite actors of international relations – the final decision-makers in judicial sense. However, in the case of a significant capability to influence the strategic position of state in international relations; non-state, supra- or sub-regional actors will be also mentioned. The selection of the links of relationship between the actors follows the same logic: international state-level treaties and agreements are prioritized.

Stage II of the analysis is deductive, analytical and dynamic. Firstly, it assesses the factors leading to conflict (forces that weaken the system's stability) and cooperation (forces that strengthen the system's stability) in the region. Secondly, after setting up a time limit for prediction, year 2040, in accordance with regional-scale modeling essentials, four scenarios of the Arctic development by Lawson W. Brigham are adjusted to interplay of these forces. The prospective approach allows the development of scenarios – frameworks for possible evolution of the current geostrategic situation in a given international region. "Prospective is not telling the future. However, it can play an important role for analyzing the trends by developing future scenarios; thus geopolitical prospective helps to anticipate different situations" (Csurgai 2009: 51). The following research questions are addressed:

(6) *What forces strengthen the stability of the current system?*

(7) *What forces weaken the stability of the current system?*

(8) What is the most probable scenario of international relations in the Arctic region by 2040, given interplay of the forces strengthening and weakening the system's stability?

The empirical data is taken from English, Czech and Russian scientific monographs, textbooks, and journals (Geopolitics, Foreign Affairs, Parameters,

[35] The ability of a system to absorb change and adjust itself to new environment.
[36] See Section 2. 1.

World Politics, Journal of International Affairs, Global Governance, Central European Journal of International and Security Studies, Rossiya v globalnoj politike, Obshestvennye nauki i sovremennost, Acta Politologica, Mezinárodní vztahy, etc.), online social science library (questia.com), reports by international organizations (AMAP, WB, UNEP, Pugwash Group, CIA, CSIS, EU Commission DG Trade, NSIDC, OSCE, WSD, WNA, etc.), national statistical agencies, map collections (grida.no, arctic-council.org, etc.), media reports, conference and roundtable outputs, and Arctic States' foreign and regional policies.

Limitations. Imprinting the complexity of the modern world is the main goal of any interdisciplinary geopolitical analysis. Given the scope of the project the researcher must work with different (and often conflicting) schools of thought, disinformation, etc. This work is limited in several ways. Firstly, there are several versions of systemic analysis (e.g. the ones by Robert Jervis or Saul Cohen). For the reason of relative simplicity, this work combines Gerard Dussouy, Guyla Csurgai, and Niave Knell's methods of geopolitical analysis. However, there are certain limitations. First of all, there is a risk of reproducing the integral biases (if such exist) of these three approaches. Secondly, there is the risk of incomplete and incorrect empirical data. Thirdly, due to limits of space, the empirical evidence should be sorted. In such cases, there is always a risk of the author's subjective selectivity. Fourthly, the analysis is only a partially complete systemic approach; limited nodes, and links between these nodes, are assessed, while connections between individual spaces are omitted. The six geostrategic action spaces do not exist in vacuum. They are open to influence from the system's surroundings. Also, they are interdependent: for example, certain geographic factors (such as climate, vegetation, arable land, natural resources, etc.) influence military capability and the economic activity of the state, which, in turn, can have a direct impact not only on the environment, but also on technological progress and the wealth of the state. Fifth, there are general limits to formal model-building ('if slightly inaccurate values are assigned to just a few variables – a likely situation given the verification problem – the results can be meaningless') (Murphy 2010: 152-4). Finally, while the well-known problem of systemic analysis – issue of scale – is fixed, another methodological problem – the system's inputs, outputs, and feedback – is still a source of deviance for the model.

3. The Arctic Region as a System of Five Geostrategic Action Spaces

The Arctic region is a perfect example of an open, complex system. It interacts with its surroundings. Both can adapt, and both are affected by the environment (Knell 2008: 8). The processes within a system exist as a set of interconnected elements, as changes in the some nodes or links ultimately result in changes elsewhere in the system. For example, as water travels clockwise around the North Pole, a potential oil spill on the one side of the Arctic will cause damage on the other. This may first change the migration patterns of some Arctic fish, but will eventually affect predators and finally some of the indigenous people whose survival depends on hunting. If some Arctic states decide to change their oil transit procedures, the price of oil and the shipping industry would be affected immediately.

Knell then points to the fact that "…any purely linear approach to the Arctic would be doomed because it would not recognize the complexity and the second and third order effects of any one action… It is then necessary to study the system's dynamic interaction of parts" (Ibid.). This research distinguishes between five distinct geostrategic action spaces of the Arctic region – physical space (S_1), military space (S_2), economic space (S_3), demographic space (S_4), and information space (S_5).

3. 1. Physical Space (S_1)

The Arctic Circle delimits the unique geographical space and the world's largest intact ecosystem (Ahlenius et al. 2010: 6). It includes the northernmost coastal parts of three continents: North America, Europe and Asia; a series of archipelagos between them; and the relatively enclosed waters of the ocean surrounding the geographical North Pole (Dowdeswell and Hambrey 2002: 6). The Arctic physical space is an open, complex system. Internally, it depends on the balance between land, coastal and marine resources (Ahlenius et al. 2010: 12). Externally, it is subject to the atmosphere, oceans and rivers that feed it.

Geology. The Arctic Ocean is the world's smallest ocean[37]. Approximately half of its floor is a shallow extension of the bordering countries' land (continental shelf), and the other half is a deep basin. The relief is distributed unequally: the continental shelves of Eurasia are extensive – they occupy 35 percent of the area of the Arctic Ocean, yet account for only two percent of the water volume (Sale 2008:

[37] It spans over 14 million sq km, which makes it less than twice the size of the United States.

37). The Siberian shelf, which forms part of the Eurasian shelves, is the world's widest – 900 km. North America is almost twice as close to deep oceanic basins as Eurasia. The Arctic basin (consisting of the Nansen Basin, Fram Basin, Makarov Basin, and the Canadian Basin) is defined by several Arctic ridges (Mid-Atlantic Ridge, Nansen-Gakkel Ridge, Lomonosov Ridge, and Alpha Cordillera/Mendeleev Ridge). The deepest place is the Fram Basin (4500 m). The seas that overlie the Eurasian shelves – Barents Sea, Kara Sea, Laptev Sea, East Siberian Sea, and Chukchi Sea – are mostly shallow, being only 10-20 m deep. In contrast, the depth of the Greenland Sea and the Norwegian Sea exceeds 2000 m. The North American continental shelf is also covered by the Baffin Bay and the Beaufort Sea (1000 m and 3000 m deep, respectively). A differentiated depth of the ocean may affect, among others, the character of the region's traffic.

On the surface, the landscape is extremely diverse: it varies from pack and drift ice to rugged shores, flat coasts, hills, glaciers, mountains surpassing 3500 m above sea level[38], and seismically active areas[39] (Ahlenius et al. 2010: 7). The land is covered by a huge cup of perennial ice[40] for most of the year. There are two major reasons why the long Arctic summer[41] does not melt the sea ice. Firstly, the sun in the region is always at a low angle in the sky, so there is a significantly small energetic input per unit area. Secondly, not all of the radiation that reaches the Earth is absorbed – some of it is reflected due to the albedo effect[42]. The rate of evaporation is much lower in comparison to tropical seas. Large Siberian and Canadians rivers bring fresh water into the Arctic Ocean, which than becomes part of the glaciers. The relief implies a limited connection and outflow to surrounding oceanic waters with higher salinity. Hence the Arctic sea ice has the lowest salinity among all oceans[43] (Sale 2008: 17). Some part of this ice is drifting, due either to local sea movements or to macro-drifts[44].

[38] E.g. Gunnbjornsfjeld Peak, 3708 m (Greenland).
[39] E.g. the Verkhoyanskiy Mountains (Siberia).
[40] I.e. ice that does not melt from season to season and is more than 2 years old.
[41] Due to equatorial inclination the sun is visible at all times at the region for six months a year ('Arctic summer'), while for the other six months it does not rise above the horizon ('Arctic winter').
[42] Darker surfaces absorb more of the incident radiation than the lighter ones. Dark soils absorb 90% of radiation and reflect only 10%. For the ice of the Greenland ice sheet these figures are reversed. Clouds also reflect radiation. As the low-level stratus dominates in the Arctic during summer, its albedo reaches 70% (Sale 2008: 73).
[43] Although the Arctic Ocean has only about 1% of the earth's volume of sea-water, it receives around 11% of the total freshwater input.
[44] The Transpolar Drift, Polar Ice Current, Beaufort Gyre, and Siberian Ice Current.

Climate. The severity of climate varies across the region. It is coldest and driest in the areas that lie further from the influence of relatively warm waters of the Atlantic and Pacific Oceans, as the region's interior is very cold[45]. Also, during late winter and spring, storms occasionally bring warm air masses into the region from the south. The Eurasian seas differ substantially: while the Barents Sea has the mildest climate due to the influence of the North Atlantic Drift (the mean January temperature of air above is –10°C), the Kara Sea is much colder (–30°C, respectively). Some areas also remain ice-free during the summer, as the southern half of the Barents Sea, which is influenced by the North Atlantic drift; the Laptev Sea, which receives relatively warm fresh water from the Siberian rivers; or the Chukchi Sea, whose waters' temperatures are regulated by warmer water entering the Bering Strait.

Svalbard is the warmest archipelago in the region thanks to the presence of the Norwegian Current. The mean annual temperature in Longyearbyen, Svalbard's main settlement, is –6°C. But inland areas, distanced from 'favorable' maritime conditions, suffer from extremely low temperatures. The mean temperature at Gloermerniy Station (Severnaya Zemlya), 3500 km eastern to Svalbard, is –16°C. Similarly, the capital of Greenland, Nuuk, on the west coast of the island has a mean air temperature of –0.8°C, while that at Ittoqqortoormiit on the east coast is –6.4°C. The Siberian continental climate experiences higher wind speeds in winter than in summer, the result of which is that the latter are cool whilst the former are cold. In contrast, the Atlantic Arctic has a maritime climate. It is dominated by the North Atlantic Drift, which gives rise to cool winters and warm summers, even in the Franz Josef Land. As the northern Pacific is colder than the Atlantic, the area has higher wind speeds. Consequently, Alaska is generally cold in winter and warm in summer (Sale 2008: 74). Within the Canadian Arctic, temperatures are relatively high near the southern tip of the Baffin Bay, as it is climatically similar to the Atlantic. However, moving north, temperatures decrease: while the mean annual temperature in Ikaluit is –9 °C, it drops to –20°C in Eureka on the Ellesmere Islands (Dowdeswell and Hambrey 2002: 65-8).

The Arctic is a cloudy region, especially during the summer when low-level stratus clouds dominate. The cloudiest area is the Atlantic Arctic (80 percent cover almost constantly throughout the year). In contrast, the sunniest places are inland Greenland, Alaska and the Canadian Arctic islands. Inland and maritime parts of the

[45] The lowest temperatures have been recorded at the North Ice station in Greenland, –66.1 °C; and at Oymyakon in the Verkhoyanskiy region of north-east Siberia, –77.8 °C (Sale 2008: 75-6).

Arctic also have different roles in the hydrological cycle. Warm ocean currents bring heat and moisture to the air and frontal activity results in increased precipitation, usually in the form of snowfall, in the maritime areas. Again, it decreases as one moves north. Hence, southern Iceland, southern Alaska and parts of the Norwegian coast receive 3000 mm of precipitation each year, while inland areas with continental climates and lower temperatures receive less than 150 mm (NSIDC 2011: 1). The central Arctic basin is a polar desert – an area where the annual precipitation does not exceed 130 mm annually.

A large portion of the region is underlain by permafrost[46]. Since snow provides insulation against the severe cold of winter, "topographic relief has major implications for vegetation distribution and nutrient cycling, and therefore for both plants and wildlife" (Ahlenius et al. 2010: 8). Regional vegetation includes a wide range of plant life with unique adaptations to the harsh climate: taiga forests of pine, spruce, willow, birch and poplar, flat tundra, steppe landscapes, wetlands, and cliffs fringed at their bases by rich vegetation fertilized over decades by the droppings of nesting seabirds.

Fresh water exists in the Arctic in still, frozen, and running forms. When the massive glaciers of the ice age receded, a vast system of lakes and wetlands in depressions in the landscape emerged throughout the region[47]. Greenland glacier[48] and smaller glaciers in Franz Josef Land, Novaya Zemlya, and Severnaya Zemlya store vast amounts of fresh water (Baldursson 2011: 3). The annual mean freshwater input of almost 40 percent to the Arctic Ocean is dominated by four rivers – the Mackenzie, Lena, Yenisei, and Ob. The total freshwater export from the Arctic Ocean to the North Atlantic is dominated by ships through the Canadian Arctic Archipelago and via the Fram Strait (Serreze et al. 2006: 1, 3). There is an interaction between the fresh water provided by the rivers, the existing sea water, and the melting ice within a large-scale freshwater cycle.

Compared to other regions of the world, bio-diversity is low in the Arctic region; hence the relations between species[49] are relatively simple. Also, mammals,

[46] Ground that does not thaw for two or more years, those thickness can reach up to 1000 m, as it does on the North Slope of Alaska.
[47] For example, these lake and wetland systems cover 8.5% of Sweden and 10% of Finland.
[48] Greenland glacier, 1.7 million sq km, constitutes 12% of the total ice in the world (second in size after the Antarctic ice cap).
[49] The polar bear, musk ox, lemming, fox, hare, caribou, reindeer, glaucous gull, fulmar, little auk, kittiwake, seal, whale, walrus, polar cod, squid, benthic fish, prawn, mussel, snail, etc.

birds and fish migrate to the Arctic in summer to feed and breed at the sea ice margins, coastal zones, estuaries and wetlands, and during the winter they go south[50]. At low altitudes the Arctic islands support rich flora. The flowering period is less than two months but it is enough for insects to emerge.

Natural resources. The Arctic holds substantial reserves of hydrocarbons, base metals, precious materials, and radioactive elements. Approximately 61 large oil and natural gas fields have been discovered within the Arctic Circle in Siberia, Alaska, Canadian Northwest Territories, and the Northern Counties of Norway. 43 of the 61 large Arctic fields are located in Russia (35 of these fields, 33 natural gas and 2 oil, are located in the West Siberian Basin). Of the 8 remaining large Russian fields, five are located in the Timan-Pechora Basin, two are in the South Barents Basin, and one is in the Ludlov Saddle. Among the 18 large Arctic fields outside Russia, 6 are in Alaska, 11 are in Canada's Northwest Territories, and one is in Norway (Budzik 2009: 4).

Some hydrocarbon deposits had already been discovered in the mid-20th century, such as the Prudhoe Bay field on the North Slope of Alaska, the northern part of the Norman Wells in the Mackenzie Delta in Canada, or the Tazovskoye field and Urengoy basin in the Yamal-Nenets Autonomous Okrug in Russia. Other fields were not known until the late 1970s-1980s: the Sverdrup Basin, Melville Island, and Sabine Peninsula at Nunavut in Canada; the Norwegian Snohvit and Russian Shtokman fields in the Barents Sea; and the Nakhodka gas field in the Yamal Peninsula.

In 2008, the U.S. Geological Survey (USGS) completed a quantitative assessment of undiscovered conventional oil and gas resources in 25 Arctic provinces north of the Arctic Circle. Scientists concluded that more than 70 percent of the undiscovered oil resources were estimated to occur in five provinces: Arctic Alaska, the Amerasia Basin, the East Greenland Rift Basins, the East Barents Basins, and West Greenland-East Canada; while more than 70 percent of the undiscovered natural gas was estimated to occur in three provinces, West Siberian Basin, East Barents Basins, and Arctic Alaska (see Appendix A, p. 93). It was further estimated that approximately 84 percent of the undiscovered oil and gas was to be found offshore. The total mean undiscovered conventional oil and gas resources of the Arctic were

[50] No other place on Earth receives so many migratory species from nearly all corners of the planet.

estimated to be around 90 billion barrels of oil; 1669 trillion cubic feet of natural gas, and 44 billion barrels of natural gas liquids (Bird et al. 2008: 4).

Besides oil and gas, the following resources can be found in the region: coal in Norway, Greenland, and Russia; iron ore in Sweden, Finland, and Greenland; copper in Sweden, Finland, Russia, and Canada; nickel in Russia; silver in Sweden and Finland; lead in Sweden, Finland, Greenland, Alaska, and Canada; zinc in Sweden, Finland, Greenland, Alaska, and Canada; gold in Sweden, Finland, Greenland, Russia, Alaska, and Canada; platinum in Greenland and Russia; diamonds in Russia and Canada; uranium in Sweden and Greenland; molybdenum in Greenland; sand and gravel in Canada; and also tin, gemstones and apatite in Russia (Lindholt 2006: 30-5).

As the Arctic region is a complex system, its physical environment is fundamentally interconnected with human-made constructs; while the former is extremely vulnerable to the human inputs (accidental and intentional), the latter are subject to the influence of the following variables:

(a) Ice[51]*;*

(b) Diverse relief and climate;

(c) Unequal distribution of natural resources.

3. 2. Military Space (S_2)

The United States and Russia, the main rivals of the Cold War, are immediate neighbors in the Arctic. Western Alaska and eastern Siberia are only 90 km apart at the Bering Strait, while the Bering Sea is essentially enclosed by the Russian and American territories (Osherenko and Young 1989: 17). The Arctic Ocean also separates the United States from Greenland and Norway; Canada from Greenland, Norway, and Russia; Greenland from Canada, United States, Russia, and Norway; Norway from Greenland, Canada, and the United States; and Russia from Canada and Greenland. Similarly, the shortest air route between the two countries is across the Arctic basin.

Due to harsh physical conditions, exploration of the Arctic waters from the south has not been intensive in comparison with the penetration of other oceans. Until relatively recently, conventional military forces (i.e. ground forces, coast guards) were of little use in the polar climate. As the Arctic states did not expect a sudden

[51] The impact of the Arctic ice melt on the Arctic system will be assessed in Section 4. 2.

attack via the icy ocean[52], they maintained a minimum military alignment consisting of local soldiers with 'proper' equipment (skis and guns). So, for more than forty centuries[53], the physical survival of the indigenous inhabitants had been the only security concern.

In mid-20th century, the rise of nuclear technology allowed the main rivals of the Cold War, the United States and the Soviet Union, to utilize the region as the shortest air and maritime route for their nuclear long-range ballistic missiles and submarines. Consequently, throughout the postwar era the region has possessed "…an irreducible strategic significance" (Osherenko and Young 1989: 17). The logic of nuclear proliferation was based on, firstly, the realist concept of the balance of power and, secondly, the theory of deterrence. The former provided no room for cooperation between the great powers: "…the Arctic remained a critical theater of [military] operations… Security in the region was understood entirely in military terms" (Huebert 2004: 2). The latter implied: "when a parity relationship is combined with the enormous absolute costs of nuclear war, a deliberate (i.e. rational) war is at once unthinkable and virtually impossible…[Therefore] the nuclear balance is unusually robust and stable" (Zagare 1996: 368, 371).

During the first decade of the 21st century, the Arctic military space has inherited the Cold-War configuration. The United States and Russia continue believing that nuclear deterrence and mutual assured destruction (MAD) are the main mechanisms for maintaining international peace, and therefore routinely deploy nuclear warheads on their strategic submarines that transit the Arctic waters, and still use early warning systems to protect their territories (Erickson 2008: 6).

Nodes. The seven Arctic states are the only nodes within the military space, as there is no room for either non-state or supranational actors. The Nuclear Non-Proliferation Treaty[54] implies: the United States and Russia are official nuclear states; while Canada, Denmark, Finland, Norway, and Sweden are non-nuclear states (Zellen 2009: 21). Equipped with the most destructive weapons, the United States and Russia are therefore more militarily-capable than their non-nuclear Arctic neighbors[55].

[52] Medieval maritime technologies did not allow the vessel to overcome the icy sea.
[53] The earliest inhabitants of North American Central and Eastern Arctic belonged to the 'Arctic Small Tool Tradition', which settled at Bristol Bay, Alaska, around 2500 B.C.
[54] In effect since 1970.
[55] The United States provides defensive 'shield' to its NATO Allies against a nuclear attack by a third party.

The United States maintains numerous military installations in the region. Twenty long-range missile interceptors are positioned at Alaska as part of the North Warning System[56] – the northernmost component of the Ballistic Missile Defense System, which integrates air-, land-, sea-, and space-based means of national defense. Two tandem satellites in the low earth orbit and the Sea-Based X-Band (SBX) Radar provide space tracking and surveillance of potential attacks of the ballistic missiles from across the Arctic Ocean. A significant portion of them patrols the waters of the Arctic Ocean. Located in Anchorage, the Alaskan Command (ALCOM) maintains air sovereignty, deploys forces for worldwide contingencies, provides support to federal and state authorities, and conducts joint training for the rapid deployment of ground forces. It consists of the 11th Air Force (Elmendorf), the U.S. Army Alaska (Fort Richardson), and the U.S. Naval Force Alaska (Juneau). The U.S. Strategic Command (USSTRATCOM) is responsible for space operations (e.g. military satellites), information operations (e.g. information warfare), missile defense, intelligence, surveillance, and strategic deterrence. The offensive system consists of, first, prepositioned launch bases of ballistic missiles (located, however, outside of the Arctic Circle); and, second, 71 operating nuclear submarines (WNA 2010: 1). Nuclear-powered submarines are prone to aging[57]. Dismantling them has become one of the most expensive tasks for the U. S. Navy, as the reactors must be carefully recycled.

Canada hosts 11 long-range and 36 short-range radar centers of the North Warning System. Its permanent military presence in the Arctic consists of headquarters in Yellowknife, an air transport squadron of 35 Otter aircrafts, and communication center at the Canadian Forces Station Alert on Ellesmere Island. However, the country does not have an operational airbase in the region (Smol 2009: 4). Recently, Canada launched the construction of a new training centre at Resolute Bay and a military port at Baffin Island. The Canadian Navy consists of the Maritime Forces Atlantic (MARLANT), based in Nova Scotia and responsible for the control of the eastern part of the Canadian Arctic; and the Maritime Forces Pacific (MARPAC), based in British Columbia and responsible for the control of the western part of the

[56] The 4800 km-long and 320 km-wide system is stretching from Alaska, via Canada, to Greenland.
[57] Almost all current American nuclear warheads were built in the 1970s and 1980s. Until recently, the approximate lifetime of nuclear warheads varied between 45 and 60 years. Even though a 2006 study by the JASON scientific advisory group extended these estimates beyond 100 years, "…[nuclear arsenals] require ongoing surveillance and maintenance because their components deteriorate" (Medalia 2007: 2, 37).

Canadian Arctic. Also, the aboriginal peoples participate in the Canadian Forces Northern Area (CFNA). They conduct patrols and operations in the North, train the youth, and work with local communities (Lackenbauer 2007: 5).

Despite recent calls for greater autonomy of Greenland, Denmark is still responsible for the defense of the island. Island Command Greenland maintains and enforces maritime sovereignty. The Coast Guard, which carries out search and rescue operations, is also under Danish command, though staffed largely by the local population. The Royal Danish Navy operates a Sirius Sledge Patrol in Daneborg. The United States Air Force's northernmost overseas possession, Thule Air Base, is also located on the eastern side of Greenland. The country does not possess nuclear weapons.

Finland controls its northern territories with the Army and the Air Force, as the Archipelago Sea and Gulf of Finland maritime commands do not have direct access to the Arctic Ocean. The northern military province is equipped with a highly mobile field army, and backed up by local defense units. Based at Rovaniemi, the Lapland Air Command is responsible for protection of the airspace of northern Finland with F-18 Hornet fighters. The country does not possess nuclear weapons.

Norwegian military force is comprised of the Army, the Royal Navy (including Coastal Rangers and Coast Guard), the Royal Air Force, and the Home Guard. Several military bases are located within the Arctic Circle. Bodø Main Air Station, the largest air force base in Norway, lies just north of it. The base is operated by the Royal Norwegian Air Force and is home to the General Dynamics F-16 Fighting Falcons and Westland Sea King helicopters of the 330th, 331st, and the 332nd Squadrons[58]. It also hosts the Norwegian Advanced Surface-to-Air Missile System (NASAMS), and an air force training base. The main naval base, Haakonsvern, is located south of 66° 33' northern latitude, but the Trondenes fort (main base for the Norwegian Coastal Ranger Command), Tjeldsund base (secondary base for the Norwegian Maritime Special Forces Unit), and the Brigade Nord (regular Army) are located within the Arctic Circle. There are also four sites with prepositioned United States' equipment (DoD 2004:63). The country does not possess nuclear weapons.

Despite its longstanding national policy of non-alignment, Sweden maintains a permanent, well-armed and well-equipped army and air force presence in the Arctic –

[58] Approximately 50 percent of the Norwegian jet fighter force.

two full-sized regiments with regular soldiers, reservists, and conscripts; and a garrison consisting of artillery, mechanized infantry, tanks, and special forces (Smol 2009: 3). There is a specialized battalion of the ground forces in Norrbotten County, while the Arctic Rangers units of the 22nd Infantry Regiment in Kiruna provide training in unconventional warfare and guerilla tactics in polar conditions. A permanent Arctic air base is located at Lulea, less than 200 km south from the Arctic Circle. Lulea is the home port of the icebreaker armada, which allows sea traffic to continue at a virtually unchanged rate during the winter. Sweden lacks direct maritime access to the Arctic Ocean. The country does not possess nuclear weapons.

The Russian military control over, and defense of, the region is realized primarily with ballistic missiles. By the end of 2011, 24 satellites of the Glonass system – an ambitious attempt to maintain sovereignty through satellite navigation – should come into full operation. The main function of the Russian Strategic Rocket Forces (SRF) is similar to that of the American USSTRATCOM: to defend Russia's territory from an attack, and attack an enemy's offensive nuclear weapons, military facilities, and infrastructure. The total arsenal of the SRF includes 369 intercontinental ballistic missiles, including 171 SS-25 Topol missiles and 67 SS-27 Topol-M missiles (Podvig 2010: 27). Russian ground-based intercontinental and intermediate-range nuclear missiles can easily reach the coastal areas of North America via the Arctic Ocean. The Northern Fleet is another way of controlling the region: virtually all of Russia's largest naval bases are located within the Arctic Circle. The largest base is located on the Kola Peninsula, and support bases stretch from Murmansk to Archangelsk. The country relies on eight strategic submarines and 13 nuclear-powered attack submarines. By 2015, eight new submarines are planned to be constructed. The question of proper reactor dismantling remains open, as about 200 submarines are now retired, and 40 of them remain stored afloat indefinitely at Severodvinsk, in close proximity to the Arctic Circle (WNA 2010: 2). Their reactors have not been recycled properly, and nuclear waste has been leaking into the waters of the Arctic Ocean, posing great harm to the ecosystem. Although ground forces are extensive (and active) in other sub-regions of Russia, they do not serve as the primary means of maintaining military control in the Arctic, mainly due to the lack of infrastructure and the harsh climate. Therefore, Russia's military presence in the region is misbalanced in favor of non-conventional weaponry.

Links. The seven nodes of the Arctic military space (the Arctic states) do not exist in a vacuum. They are connected via the links of participation in certain international military institutions. The four main channels of military communication existing between the Arctic states are: NATO, OSCE, NORDCAPS, and NORAD. However, these channels have different intensities, as alliance preferences differ among the Arctic states.

The United States, Canada, Greenland, and Norway share a long-standing relationship – all are members of NATO. Their militaries conduct joint exercises and operations on a regular basis, as they participate in collective defense whereby, according to Article 5 of the Charter, member states agree to provide defense to each other in response to an attack by an external party. Due to military neutrality, neither Finland nor Sweden are members of NATO. Russia is not, and cannot be, a member of NATO, as acts as a balance against the absolute dominance of NATO in the Arctic region (as well as in other regions). Despite the existence of the NATO-Russia Council, military establishments within NATO members are still suspicious of Russia, and vice versa.

The Organization for Security and Cooperation in Europe (OSCE) is the second channel of military cooperation between all Arctic states. It deals with three dimensions of security – politico-military, economico-environmental, and human – and is the "…primary instrument for early warning, conflict prevention, crisis management, and post-conflict rehabilitation in its area." (Knell 2008: 21). However, decisions are politically, but not legally, binding, as the "…[OSCE] offers the region a forum for political dialogue and negotiations and a platform for multilateral partnerships that pursue practical work on the ground" (OSCE 2011: 1).

The third channel of military cooperation is the Nordic Coordinated Arrangement for Military Peace Support (NORDCAPS) which exists between Norway, Sweden, Finland, and Denmark. The organization strives to adapt and further develop Nordic cooperation within the area of military peace support operations (PSO), utilizing the proven ability of Nordic military interaction and enhancing the Nordic profile in such operations, in order to achieve more beneficial efforts to support international peace and security (NORDCAPS 2010: 1).

The North American Aerospace Defense Command (NORAD) is the fourth, bilateral channel of military cooperation in the Arctic region. It provides aerospace warning, air sovereignty, and defense for the entire territories of Canada and the

United States, including the Arctic region. Its bi-national command is manned by American and Canadian soldiers. Within this framework, the militaries of both countries are able to communicate on Arctic matters through the inter-institutional dialog between the Alaska NORAD Region (ANR), based at Elmendorf air base; and the Canadian NORAD Region, located in Manitoba.

As international diplomacy is based on the principle of reciprocity, a matrix of symmetrical relationships showing intensity can be constructed, according to three levels of cooperation: 'shallow integration' (one-channel link), 'moderate integration' (two-channel link), and 'deep integration' (three-channel link) (see Appendix B, p. 95). The analysis has shown that military integration is shallow between Canada and Finland, Canada and Russia, Denmark and Russia, Finland and Russia, Norway and Russia, Canada and Sweden, Russia and Sweden, Finland and the United States, Russia and the United States, Sweden and the United States (OSCE-only). Integration is moderate intensive between Canada and Denmark, Canada and Norway, Denmark and the United States, Norway and the United States (OSCE and NATO); Denmark and Finland, Finland and Norway, Denmark and Sweden, Finland and Sweden, Norway and Sweden (OSCE and NORDCAPS). Military integration is deep between Denmark and Norway (OSCE, NATO, and NORDCAPS), and between Canada and the United States (OSCE, NATO, and NORAD). Consequently, Russia is the least integrated into the regional military framework, in contrast to Canada, Denmark, Norway, and the United States.

Until recently, the military space has been the most developed human-constructed geostrategic space of the Arctic. It is primarily defined by:

(a) Buffer position;

(b) The legacy of the Cold War (nuclear arsenals);

(c) The seven Arctic states as the only nodes;

(d) The varying intensity of the relationships between the nodes.

3. 3. Economic Space (S_3)

According to Gail Osherenko and Oran Young,

> Though the Arctic may never emerge as a great center of manufacturing industries, the region is destined to become a major source of raw materials of critical importance to advanced industrial societies both in the Arctic rim states and in other

> Northeern Hemisphere states like Japan and Korea (Osherenko and Young 1989: 45).

The modern Arctic economic space consists of two economies, subsistence and global. The subsistence economies of Arctic sub-regions exhibit features of the least-developed economies, as they tend "…to become monocultures oriented toward the supply of raw materials to industries located elsewhere" (Young 1992: 222). Apart from very limited employment by national resource extractions companies, indigenous populations are typically involved in subsistence activities, such as reindeer herding, fishing, hunting, and farming. Among all native peoples of the Arctic, European Sami people and Canadian Inuits are the most advanced in terms of inclusion into the national economies: while the former are widely present in small-scale and handicraft industries, the latter have gone even further by entering the construction, tourism, and administrative sectors (Knell 2008: 31). In contrast, Russian people of the North are the least economically-included in all Arctic states.

The global economy penetrates the region from the south, mainly with resource extraction companies, their supply chains, elements of infrastructure, etc. Hydrocarbon and mineral resources, the main interests of these profit-makers, are subject to cyclic economic activity. As the profitability of Arctic extraction depends on the worldwide supply and demand of oil, it ceases to be profitable when oil prices per barrel drop below $100. When this occurs, economic activity slows down (Knell 2008: 32). The cyclic nature of the global trade in hydrocarbons is, in fact, very damaging to the subsistence economies of the Arctic, as, instead of satisfying the basic needs of indigenous populations, the latter is simply a supplement to the former. In Alaska, for example, 10 000 Inuit living in the North Slope Borough receive "…the bulk of [their] $98 million budget each year from taxing onshore oil operations" (Mouawad 2007: C10). However, $98 million can quickly be diminished to $40 million, without any influence by Arctic sub-regions themselves, but due to the shifts in global economy.

The Eurasian and North American parts of the Arctic differ in the level of economic development and the internal linkages. Finland, Sweden, and Norway have the highest shares of secondary (non-extractive) industries and fairly low shares of extractive industries (not exceeding 5-10 percent of regional GDP), and an advanced network of infrastructure. In contrast, the American and Russian Arctic economies are

strongly mineral-based, and Greenland's economy is based on the fishing industry. Their infrastructure is not developed sufficiently to allow balanced economic growth.

Nodes. In contrast to the Arctic military space (S_2), the region's economic space is more open towards non-state actors[59]. However, despite the fact that revenues of multi-national corporations are huge, they are still subject to national sovereignty. Hence, the seven jurisdictions of the Arctic states are the ultimate nodes of the Arctic economic space. Appendix C (p. 96) illustrates the activities in nature-based sectors in the Arctic economic regions.

The Alaskan economy, which constitutes 3 percent of US GDP, is resource-based; primary industries (petroleum, minerals, seafood, timber, and seafood, and tourism) account for approximately 85 percent of Alaska's GDP. Prudhoe Bay, the largest petroleum-producing province, generates almost 40 percent of total income tax in the region. Natural resources are extracted on-shore and off-shore, and are generally shipped out of the state for processing, although there is limited production of seafood[60] and petroleum. Zinc accounts for over 50 percent of all mineral production in the region, followed by gold and lead (16 and 10 percent, respectively). There is minor production of coal, and virtually all the output of the mining sector is exported. Secondary industries, which include manufacturing and processing, contribute only 8 percent to GDP; due to the limited infrastructure and the distance from major American and foreign markets. Natural gas, hydropower, petroleum, and coal are the primary sources of electric power. Agriculture and forestry play a negligible role in the Alaskan economy. The private sector is twice as large as the public, constituting 46 percent of GDP. Pipeline transportation, for example, generates almost 7 percent to Alaska's GDP. Thanks to a long-term trend in growth, tourism already employs 60 percent more people than the petroleum industry. However, tourism is a highly seasonal activity. International airfreight is a rapidly increasing service industry. Cargo operations continue to expand at the Anchorage Airport and in Fairbanks – potential transit points connecting Asian manufacture-intense economies (Chinese, Malaysians, and Vietnamese) and European and North American consumers (Glomsrod and Aslaksen 2006: 42-5).

As of 2006, the Canadian North (Northwest Territories, Yukon and Nunavut) generated 0.5 percent of the state's GDP. Similarly to Alaska, mining and

[59] Corporations, various lobbyists, etc.
[60] The Alaska fishing industry is close to full exploitation of its resource base.

hydrocarbons extraction are the major economic activities in the region in terms of gross production value: they account for 36 percent of total economic activity. Even though on-shore oil and gas extraction has been continually declining since 2001, the majority of already extracted crude oil is shipped to Ontario, and most of the natural gas is shipped to British Columbia. Fossil fuels are used as the primary energy resources. Public administration and defense is the second largest industry – it generates 17 percent of GDP, followed by mining (13.2 percent), as all of the diamonds currently mined in Canada are from the Northwest Territories. Financial services (including insurance) constitute the third largest sector of the Canadian Arctic economy, followed by construction (11 percent of regional GDP). In contrast to the Western part of the Canadian Arctic (whereas there is no significant fishing activities), the waters of the Central and Eastern Canadian archipelagos are home to capelin, cod, herring, halibut, shrimp, and snow crab. Nevertheless, fishing and agriculture are not significant contributors to regional GDP. Tourism is a small but steadily expanding sector. So far, underdeveloped infrastructure slows down economic growth; transportation involves 'ice' roads, while the Northwest Passage is still jurisdictionally disputed (Glomsrod and Aslaksen 2006: 46-8).

In fact, Russia is "…the only Arctic state that has established a true northern economy" (Knell 2008: 31) because, after discovering significant deposits of natural gas, oil, and minerals in the vast regions of Western and Eastern Siberia in late 1940s, the Soviet Union managed to construct and operationalize the Northern Sea Route (NSR) along all its Arctic coasts, from the Barents Sea to the Bering Strait. Either during the ice-free time of the year, or with help of ice-breakers, NSR allows, among others, transport of raw materials (timber, minerals) to Arkhangelsk and Murmansk; and equipment and other supplies to northern parts of Central and Eastern Siberia. Currently, in terms of "…production, output, manpower, number of settlements, geographical scope of activity, and composition and range of activities, the NSR and its adjacent land territories are the most pronounced exploitation areas in the whole of the Arctic" (Ostreng 1999: 3). As of 2006, the fuel industry, including oil and gas extraction, was the largest single industry in the Russian Arctic (36 percent of regional GDP). Roughly 55 percent of Russian oil is from Khanty-Mansi, and more than 85 percent of Russian natural gas is from Yamalo-Nenets. GDP per capita in both sub-regions is considerably higher than in other parts of the Russian Arctic (in fact, the second highest after the Moscow region). As a consequence of planned

public industry development, resource extraction and processing have to a large extent been organized in vertically-integrated state-owned companies (Gazprom, SibNeft, Lukoil) which produce multiple outputs. Electricity is mainly produced from fossil fuels (approximately 65 percent). Transportation of petroleum via pipelines generates an additional 7 percent of regional GDP. Chemical industries, as well as ferrous and non-ferrous metallurgy industries are relatively small (just 4 percent of regional GDP). 2 percent of the world's coal extraction takes place in the Russian Arctic (Lindholt 2006: 94). In comparison to other Arctic regions, the share of private and public services in the Russian Arctic is low. Tourism is significantly underdeveloped (Glomsrod and Aslaksen 2006: 59-60).

The Arctic part of Finland generates approximately 11 per cent of national GDP. North Ostrobothnia is the largest economic sub-region, even though Lapland covers almost two thirds of Arctic Finland. Since there is no hydrocarbon extraction or production, mining (e.g. iron ore, copper, lead, zinc, nickel, gold) is only 7 percent of GDP. Even though the overall value added of mining is small in Arctic Finland, the chromite mine in Lapland is the base of the third largest stainless steel plant in the World. Nuclear energy, wood fuel, oil, coal, (imported) natural gas, and hydropower are the main sources of electric energy. Public services contribute about 22 percent to regional GDP. The largest manufacturing industry is electronics (contributing 39 percent of the value added and 24 percent of the total employment of Northern Finland). The extensive processing industries consume more than 80 percent of the electricity generated in the region. Agriculture (crops and livestock) is not well-developed, as it generates only 2 percent of regional GDP. As of 2006, tourism accounted for almost one quarter of the value added of private services. Lapland and Kainuu are especially popular destinations in the winter (Glomsrod and Aslaksen 2006: 51-2). An extensive network of roads and railroads[61] allows a relatively steady economic development throughout the Finnish Arctic.

The two northern counties of Sweden (Vasterbotten and Norrbotten) account for slightly less than 5 percent of the total GDP of Sweden. The largest resource sectors are forestry (timber) and mining (iron ore, copper, lead, zinc, gold, silver, uranium). Hydropower is the primary source of electricity. There is no significant fishing activity in Sweden. Besides public and private services, the largest industry is

[61] Part of the Trans-European Road Network (TERN) – the biggest infrastructure project of the EU.

manufacturing (15 percent of regional GDP). Real estate (renting and business service) generates about 14 percent of GDP. Health and social work contribute an additional 10 percent. Tourism generates almost 3 percent of Gross National Product (GNP). An extensive network of roads and railroads[62] allows relatively steady economic development throughout the Swedish Arctic (Glomsrod and Aslaksen 2006: 62).

The largest part of the Norwegian Arctic economy is made up of education, health, and social work, followed by public administration and defense. The fishing industry, which is considered to be a core element of the Norwegian economy, generates only 3.7 percent of regional GDP; however, these numbers seem to be underestimated[63]. As of 2006, on-shore production of oil and natural gas was low; however, there are several off-shore deposits of hydrocarbons. Coal is mined mainly on Svalbard. Currently, a natural gas field is being developed north of Hammerfest, so that in the near future it will be liquefied (LNG) and exported by sea, since the warm Norwegian Current keeps the southern part of the Barents Sea ice-free throughout the year. Electricity is generated by hydro- and wind-power stations. In contrast to the agricultural sector (which produces less than 1 percent of regional GDP), tourism is the largest industry among the nature-based industries, both in terms of value added and employment. It generates approximately 60 percent more income than the fishing industry. The wildlife on Svalbard is the main tourist attraction. An extensive network of roads and railroads allows a relatively steady economic development throughout the Norwegian Arctic (Glomsrod and Aslaksen 2006: 57-8).

Although on-shore oil and gas extraction in Greenland is shrinking, fishing (with cold-water shrimps as the most important species[64]) turns out to be the largest industry (18 percent of regional GDP), followed by education, health, and social work (16 percent). Individual quotas in combination with other Home Rule [Dannish] regulations exist in fisheries. Cod fisheries are now of minor economic value, due to decline of the resource base. The agricultural sector (especially sheep husbandry) is slowly expanding due to the warming climate. Hydropower is the primary source of

[62] Part of the Trans-European Road Network (TERN) – the biggest infrastructure project of the EU.
[63] Fish is harvested by fishing companies with headquarters in the southern part of Norway. Consequently, part of the income from fishing in northern waters may be registered as income in the South of Norway.
[64] The export of shrimps alone accounts for about 50 percent of total export value.

electricity. There has recently been a marked increase in the exploration of gold, nickel and diamonds, and molybdenum. The government is the largest employer in Greenland (43.5 percent of total employment in Greenland). The second largest sector in terms of employment is retail trade (11 percent), and fish processing (8 percent). In contrast to the Scandinavian states, the tourist sector in Greenland is still underdeveloped. But, since recently, it is considered to have potential for further growth (Glomsrod and Aslaksen 2006: 53-4).

The European Union is an important external node (actor), as five out of seven of the Arctic states' economies are significantly tied to the European common market. As of 2009, 46 percent of Russia's exports went to the EU, as did 55 percent of Denmark's, 67 percent of Norway's, 52 percent of Sweden's, and 25 percent of Finland's exports (DG Trade 2010: 3; CIA 2011:1).

Links. Seven links of varying intensity exist between the Arctic states: the World Trade Organization (WTO), the Group of Eight (G-8), the European Union (EU), the European Economic Area (EEA), the North American Free Trade Area (NAFTA), the Nordic Council, and the Partnership and Cooperation Agreement (PCA).

Except for Russia, all Arctic states are members of the WTO[65]. WTO members trade with each other according to several principles: non-discrimination (consisting of the Most Favored Nation[66] rule (MFN) and the national treatment policy[67]), reciprocity, binding and enforceable commitments[68], and transparency. Member states bind themselves to grant significant reduction of tariffs to other member states[69]. As WTO membership is legally-binding, intra-regional trade is diverted against the organization's only regional non-member: Russia.

Canada, Russia, and the United States are members of the G-8**.** The heads of the G-8 states meet annually to discuss major economic issues. Ministerial meetings are attended by lower-ranking ministers as needed throughout the year. The recent

[65] The United States granted a Permanent Normal Trade Relations (PNTR) status to all Arctic states, except Russia.
[66] The MFN rule requires a WTO member to apply the same conditions on all trade with other WTO members (this measure deals with tariffs).
[67] Imported goods should be treated no less favorably than domestically produced goods (this measure deals with technical and security barriers to trade).
[68] Ability to invoke the WTO dispute settlement procedure.
[69] The Uruguay negotiation round, which led to the creation of WTO, extended the range of reduced tariffs and agricultural subsidies to approximately 40 percent, and a major extension of intellectual property rights.

agenda for the meetings included macroeconomic management, trade, and relations with developing countries (Knell 2008: 28). Even though the G-8 framework provides avenue to discuss major international issues and set priorities for economic policy, it is not institutionalized. If any decision is taken during the G-8 meetings, they are not, per se, legally-binding. Consequently, intra-regional trade is not diverted against non-G-8 states – Denmark, Finland, Norway, and Sweden.

Finland, Sweden, and Denmark[70] are members of the EU. They participate in the Economic and Monetary Union (EMU), so their monetary policies are fully coordinated by common institutions. The three countries share a single market with other EU member states (with no tariffs or quotas), and enjoy the free movement of four production factors (people, goods, services, and money). Of those three, only Finland has adopted the Euro as the basic currency. As a member of EFTA, Norway participates in the European Economic Area (EEA), which allows the country to participate in the EU common market without assuming the full responsibilities of EU membership (EEAS 2011: 1). Despite trade in agriculture and fisheries, which are not part of the EEA Agreement, Norway trades with EU member states without tariffs. EFTA membership is legally-binding; intra-regional trade becomes diverted against non-EEA members – Canada, Russia, and the United States.

The United States and Canada are members of NAFTA, a complex free trade regime, which dismantles all visible barriers to trade (tariffs and quotas), and includes some elements of a common market[71]. The two countries remain sovereign over external tariffs, technical norms, and border controls. NAFTA membership is legally-binding; intra-regional trade becomes diverted against non-members – Denmark, Finland, Norway, Sweden, and Russia.

Previously a parliamentary body and currently a regional economic forum, the Nordic Council connects Denmark, Finland, Norway, and Sweden. The Northern states communicate via the committee on Business and Industry, which "…deals with frameworks and parameters for the economy, production, and trade, including free movement in the markets and in the labor markets of Nordic countries" (Knell 2008: 30). However, the Nordic Council is a non-institutionalized integration channel: if any decisions appear during the annual Session, they are not, per se, legally-binding.

[70] In 1985 Greenland, unlike Denmark, left the European Economic Community (EEC). However, EU law still largely regulates the foreign trade of Greenland.
[71] Advanced cooperation in capital and labor markets, common regional policy, etc.

Consequently, intra-regional trade is not diverted against non-members of the Nordic Council – Canada, Russia, and the United States.

The PCA connects Russia and the EU member states, i.e. Denmark, Finland, and Sweden. The PCA is a preferential trade agreement, which is based on the principle of the lowest common denominator. It allows partial tariff reduction in goods and services within several sector agreements[72] (Cihelková 2003: 627). Heads of state, parliamentarians, ministers-in-charge, and senior experts of the four Arctic states meet on a regular basis to discuss specific trade issues (Valko 2010: 62). The agreement is legally-binding, but intra-regional trade does not divert against Canada, Norway, or the United States, as tariff reductions between non-signatories of PCA and the EU exceed those granted by the PCA. Finally, the Barents Euro-Arctic Council (BEAC), an intergovernmental forum that connects the European Union with Norway, Sweden, Finland, Russia, and Denmark, has several specialized working groups[73] promoting harmonization among national economic legislatures. However, according to international law, BEAC decisions are non-binding. Despite recent growth in bilateral trade, Russia and Norway account for an insignificant part of of each other' foreign trade,[74] and both countries are not yet connected via any international agreement[75] (NRCC 2011: 1).

International trade operates according to the principle of reciprocity. A matrix of symmetrical relationship showing intensity permits the distinction between four levels of economic cooperation: 'shallow integration' (one-channel link), 'moderate integration' (two-channel link), 'deep integration' (three-channel link), and 'extra deep integration' (four-channel) (see Appendix D, p. 97). The matrix indicates that economic integration is shallow between Canada and Denmark, Canada and Finland, Canada and Norway, Canada and Sweden, Denmark and the United States, Finland and the United States, Norway and the United States, Sweden and the United States (WTO), and between Canada and Russia, and Russia and the United States (G-8). Economic integration is moderate between Denmark and Russia, Finland and Russia,

[72] Textile Agreement, Steel Agreement, Science and Technology Agreement, Nuclear Safety and Nuclear Fusion Agreement, Fisheries Cooperation Agreement.
[73] Working Group on Economic Cooperation (WGEC), Working Group on Customs Cooperation (WGCC), and Committee for the Barents Euro-Arctic Transport Area (BEATA).
[74] Sweden, Denmark, and Finland are ahead of Norway by their foreign trade with Russia.
[75] Norway is a member of the European Free Trade Association. This organization does not have any comprehensive trade agreement with Russia. So far, negotiations are in a feasibility study phase (EFTA 2011: 1).

Russia and Sweden (PCA, BEAC), and deep between Canada and the United States (NAFTA, WTO, G-8). Integration is the deepest between Denmark and Finland, Denmark and Sweden, Finland and Sweden (BEAC, EU, WTO, Nordic Council); and between Denmark and Norway, Finland and Norway, Sweden and Norway (BEAC, EEA, WTO, Nordic Council).

The gradually-expanding Arctic economic space can be characterized by:

(a) The existence of two economies, subsistence and global;

(b) Strong influence of an external actor, the European Union;

(c) Disparity in economic development and internal linkages;

(d) Disparity in the intensity of linkages between the nodes.

3. 4. Demographic space (S_4)

The Arctic is home to some four million inhabitants. Approximately one third of this population lives in indigenous communities, and two thirds are newcomers (Ahlenius et al. 2010: 14). Similarly to the case of the Arctic economic space, there are two social systems in the Arctic demographic space: indigenous and modern.

Indigenous communities are usually small and remote, i.e. dispersed throughout the vast landmasses of the northernmost regions of the Arctic states. Their lifestyle is still based on the two most important subsistence resources: reindeer/caribou systems (on land) and sea mammals (in coastal areas). Social scientists and lawyers often describe them as belonging to the 'Fourth World' composed of "indigenous peoples who are locked into nations they can never hope to rule" (Osherenko and Young 1989: 72). In general, they do not have access to the range of social services, available to people living in the more densely populated southern regions of the world. Very often they suffer from inadequate housing, energy, water and transportation systems; limited economic opportunities; and underfunded and culturally-insensitive education systems (Zellen 2009: 92). Due to the lack of healthcare, infectious and chronic diseases (diabetes, cancer, heart attack, and stroke) and health problems such as alcoholism, drug abuse, and suicide are the most frequent causes of death among the Arctic populations (Knell 2008: 40). Infant mortality is several times higher for indigenous peoples than for the general population of the Arctic states (Ahlenius et al. 2010: 21).

Modern community is not bound to the Arctic ecosystem, but has emerged near the regional centers of economic activity. It consists of agglomerations of non-

indigenous people who have migrated from the southern parts of the Arctic states during the second half of the 20th century to extract, process, and transport natural resources, as well as to provide related private and public services.

Nodes. Both indigenous and non-indigenous agglomerations within the Arctic Circle constitute the nodes of Arctic demographics. As in the case of the economic space, they are subject to the jurisdiction of the seven Arctic states. Almost two million people live in the Russian Arctic (1.4 percent of the total population), with indigenous northerners forming less than 10 percent of this number[76]. Murmansk, Severomorsk, Monchegorsk, Severodvinsk, Kandalaksha, Apatity, Vorkuta, Pechora, Salekhard, Novy Urengoi, Norilsk, Talnah, and Kajerkan are the main agglomerates of the Russian Arctic. Russia has not ratified the ILO Convention 169 of 1989[77]. Consequently, even though the literacy rate reaches 99 percent, indigenous northerners are displaced, as their social system is inconsistent with their culture and lifestyle. The sharpest example is the Kola Peninsula, whose native inhabitants, the Sami, "…have been gradually forced off fertile tundra grazing land and away from the shores of the Barents Sea into artificially created towns" (Knell 2008: 38). Today there are just 1 600 Sami left in Russia, and the majority is unemployed, as "…they do not have a land settlement claim arrangement with the Russian government that would grant them a share in the oil and gas, industry, and forestry profits" (Ibid.). In contrast, those working for modern extraction, production, and transport of natural resources receive higher salaries and wider social services, than the rest of the country.

Among the 649 000 people living in Arctic Alaska (0.2 percent of the total population), the indigenous population constitutes almost 20 percent[78]. Fairbanks is the largest agglomerate within the Arctic Circle. The literacy rate reaches 99 percent. The ILO Convention 169 of 1989 has not been yet ratified. Hence, international law does not recognize the indigenous people as 'separate' nations. The majority of Alaska's land is owned and managed by the federal and state governments. According to the Alaska Native Claims Settlement Act, 12 regional, and dozens of local, Native corporations are entitled to ownership of only one-tenth of the state (WSD 2007: 1). According to the 2005-2007 American Community Survey, almost 85 percent of the

[76] Nenets, Komi, Mansi, Khanty, Selkups, Kets, Dolgans, Enets, Nganasans, Evenks, Yakuts, Yukagirs, Chukchi, Koryaks, Evens, and Siberian Yupik.
[77] Convention concerning Indigenous and Tribal Peoples in Independent Countries.
[78] Inuit, Aleut, Central Alaskan Yupik, Koyukon, Holikachuk, Tsimshian, and Eyak.

people speak only English at home. Less than 6 percent of Alaskans speak one of the states' 22 indigenous languages. All Aboriginal languages lack official language status. Education, social, and health systems are not adjusted to the needs of the indigenous inhabitants. Consequently, the latter are excluded from modern American society (Ahlenius et al. 2010: 16).

Among the 380 000 people living in Arctic Norway (10.2 percent of the total population), the indigenous inhabitants constitute approximately 10 percent[79]. Tromso and Bodo are the main settlements. The literacy rate reaches 99 percent. Norway has ratified the ILO Convention 169 of 1989, hence the Saami are recognized as an indigenous people. Since 1989, they have had their own national Sami Parliament (elected by and amongst the Saami), and special rights to reindeer husbandry. 'Siidas' are the main organizations for Saami representation in state institutions. Moreover, the Saami and Norwegian languages have equal standing. So, the Norwegian indigenous population is not socially-excluded, in comparison to Russia or the United States.

200 000 people live in Arctic Finland (3.6 percent of the total population), of which the Saami constitute less than 4 percent. Rovaniemi is the main settlement. The literacy rate reaches 99 percent. The Saami are recognized as 'people' by the national government. The Finnish Saami Parliament has existed since 1973, but the ILO Convention 169 of 1989 has not yet been ratified. The Saami have had limited access to native language instruction (in some schools), after the establishment of language rights in 1992. Finland has denied any aboriginal or land rights to the Saami people, as non-Saami can herd reindeer as well. Consequently, Finnish indigenous inhabitants are partially excluded from modern society.

Of the 264 000 people who live in Arctic Sweden (2.9 percent of the total population), 5 percent belong to the Saami communities. Kiruna is the largest settlement. The literacy rate reaches 99 percent. The Saami are recognized as 'people' by the national government. The Swedish Saami Parliament has existed since 1993, but the ILO Convention 169 of 1989 has not yet been ratified. 'Siidas' are the main organizations for Saami representation in state institutions. Saami pupils have the right to be taught in their native language, however, this legislation is often breached, as no suitable teachers are available. In addition, the current legislation technically

[79] Saami.

bans speaking in a language other than Swedish in the workplace. Hence, Swedish indigenous inhabitants are partially excluded from modern society.

Among the 57 700 people living in Greenland, the Kalaallit Inuit constitute the majority (76 percent or 50 000 people). Thule is the largest settlement within the Arctic Circle. The literacy rate reaches 99 percent. Since 1979, Greenland has been an autonomous country governed by Denmark, with a local parliament and full control of health care, education, and social services. In 1996, the country ratified the ILO Convention 169 of 1989, so Greenlanders have also been recognized as a separate group of people under international law. The 2008 referendum gave indigenous people control over the police force, coastguard, and courts; and Greenlandic became the sole official language of the island. Hence, indigenous inhabitants are not excluded from the modern society, in contrast to other Arctic states.

The Inuit constitute an absolute majority in the Canadian Arctic – 85 percent or almost 600 000 people (0.4 percent of total population of Canada). Yellowknife is the largest settlement. The ILO Convention 169 of 1989 has not yet been ratified. Hence, international law does not recognize the indigenous people as 'separate' nations. However, the Aboriginal Right to Self-Government policy implies that the Inuit have the constitutional right to shape their own forms of government, while the Health Transfer policy guarantees Aboriginal peoples the right to control health services via the National Aboriginal Health Organization (NAHO). In 1999 the Nunavut federal territory was officially separated from the Northwest Territories. Apart from English and French, the Official Languages Act recognizes nine Aboriginal languages of the Canadian Arctic[80], despite the fact that the policy does not address the education system. The literacy rate reaches 99 percent. Hence, the Canadian Inuit are still partially excluded from modern society.

The European Union is an important external actor, as it has launched two initiatives aimed at improving the health and social well-being of the Arctic indigenous inhabitants. On the one hand, the Partnership in Public Health and Social Well-Being (NDPHS), helps the Arctic states to reduce the spread of diseases in their northernmost regions. The Barents Health Cooperation Program (BHCP), on the other hand, contributes to the general improvement of the Arctic states' health systems (Knell 2008: 36).

[80] Chipewyan, Cree, Gwich'in, Inuinnaqtun, Inuktitut, Inuvialuktun, Slavey, and Tłįchǫ.

Links. All Arctic states are permanent members of the Arctic Council (AC), which strives to address issues faced by all Arctic governments and the indigenous people. One of six working groups of the AC, focusing on the living conditions of the Arctic residents, allows the experts to communicate on a daily basis, to prepare agenda for bi-annual meetings of ambassadors and senior foreign ministry officials of the Arctic states. However, the AC is an intergovernmental forum; hence the conclusions of these meetings are not legally-binding under international law. The Arctic states' indigenous communities are linked via participation in five out of six[81] indigenous networks that have Permanent Participant (PP) status[82] on the Arctic Council. The Inuit Circumpolar Council (ICC) connects all Alaskan, Canadian, Greenlander, and Russian Inuit communities (approximately 160 000 people). It aims at promoting Inuit rights on the international level; ensuring and developing Inuit culture; and stimulating the political, economic, and social inclusion of Inuit into modern resource-economies (ICC 2011: 1). The Gwich'in Council International (GCI) connects all Canadian and Alaskan Gwich'in communities (approximately 9 000 people). It has two primary tasks: firstly, to ensure that Gwich'in agglomerates are represented at the AC, and, second, to "…play an active and significant role in the development of policies that relate to the Circumpolar Arctic" (GCI 2011: 1). The Arctic Athabaskan Council (AAC) connects all Canadian and Alaskan Athabaskan communities (approximately 40 000 people). It aims at defending the rights and international interests of Americans and Canadians of Athabaskan origin; and "…fostering a greater understanding of the shared heritage of Athabaskan peoples of Arctic North America" (AAC 2011: 1). The Saami Council (SAAMI), connecting all Finnish, Russian, Norwegian, and Swedish Saami communities (approximately 120 000 people) into a non-governmental organization, has been actively dealing with relevant policy tasks: promotion of Saami interests on the international arena; recognition of the Saami as a nation; maintenance of economic, social and cultural rights of the Saami in the legislation of the four states (SC 2011: 1). The Aleut International Association (AIA), connecting Alaskan and Russian Aleut communities (approximately 18 000 people), was formed by the Aleutian/Pribilof Islands

[81] Although the Russian Association of Indigenous Peoples of the North (RAIPON) has a Permanent Participant (PP) status within the Arctic Council, it unites the indigenous peoples of the North, Siberia and Far East of the Russian Federation. RAIPON is excluded from the current research, as the latter deals exclusively with inter-state, not intra-state, links between the nodes.
[82] Permanent Participant (PP) status does not imply any legal recognition.

Association (the U. S.), and the Association of the Indigenous Peoples of the North of the Aleut District of the Kamchatka Region, of the Russian Federation (AIPNADKR). It aims at addressing environmental and cultural concerns of the Aleut "…those well-being has been connected to the rich resources of the Bering Sea" (AIA 2011: 1).

A matrix of symmetrical relationships, showing intensity, allows the distinction between four levels of demographic cooperation: 'shallow integration' (one-channel link – AC-only), 'moderate integration' (two-channel link – AC plus one), 'deep integration' (three-channel link – AC plus two), and 'extra deep integration' (four-channel link – AC plus three) (see Appendix E, p. 98). International social dialog between Canada and Finland, Canada and Norway, Canada and Sweden, Denmark and Finland, Denmark and Norway, Denmark and Sweden, Finland and the United States, Norway and the United States, Sweden and the United States is shallow, as it is limited to the AC. A moderate level of integration exists between Canada and Denmark, Russia and Canada, Denmark and Russia, Denmark and the United States (AC plus ICC); Finland and Norway, Russia and Finland, Finland and Sweden, Norway and Russia, Norway and Sweden, Russia and Sweden (AC plus SAAMI). Integration between Russia and the United States is deep, as three channels of communication exist between them (AC, AIA, and ICC). Finally, Canada and the United States are connected via four channels (AC, AIA, ICC, and GCI). This link is, therefore, the deepest of all links between the Arctic social nodes.

Scientific research on the climate change also links the nodes within the demographic space, as, since 2000, the number of scientific exchanges between Arctic states (especially between Canada, Russia, Norway, and the United States) has been steadily increasing. This channel should not be underestimated, as it may have a considerable impact on the regional political relations[83].

The Arctic demographic space can be characterized by:

(a) Two social spaces, indigenous and modern;

(b) Disparity in the level of social inclusion: social services are better for those indigenous inhabitants, who have settled land claims with their respective governments;

(c) Indigenous and non-indigenous Arctic agglomerations as the nodes;

[83] E.g., "…the U.S. government sponsored the first Arctic Climate Impact Assessment during its chairmanship of the Arctic Council (1998-2000)… When published, the document influenced political debates throughout the world and at every level, from the UN to the North Slope Borough" (Knell 2008: 37).

(d) Strong influence of an external actor, the European Union.

(e) Disparity in the intensity of linkages between the nodes.

3. 5. Information space (S_5)

All Arctic states dispose of information systems sufficient to their needs, as "…all states have national broadcast, Internet, magazine, newspaper, and press agency capabilities" (Knell 2008: 55). Throughout the Arctic Circle, at least one local media outlet – television, radio, or newspaper – is available. But, according to Knell, "…although some [Arctic] states show strong information systems, and even the weaker states are adequate, there is no real Arctic information system" (Knell 2008: 54).

Indigenous and non-indigenous communities within the Arctic Circle, the nodes of the information space, fall under the jurisdiction of the seven Arctic states. In fact, communications are designed to run north-south, and not within the region itself. Since, with the exception of the Internet, there is no inter-region information exchange, no links between the nodes can be identified.

Canada is well-equipped with information technologies; 53 percent of the population use main phone lines, while 67 percent rely on cell phones. Phone connection is provided by a domestic satellite system with almost 300 earth stations, submarine cables (linked to the United States and Europe), and 7 international satellite earth stations (6 over the Atlantic Ocean and 1 over the Pacific Ocean). CBC North offers northerners one local television channel and one local radio station, broadcast in English, French, and, for few hours per day, Inuktitut. The only local newspaper is published in English. Approximately 27 million people are active users of the internet (79 percent of the population) (CIA 2011: 1).

Greenland is the only Arctic state in which less than 50 percent of the population has access to main line phones and less than 75 percent to cellular phone communications. Phone connections are provided by the operation of 15 satellite earth stations (all over the Atlantic Ocean). Print, radio and television media reflect north-south ties, as they are in Danish. However, one national and one local newspaper are published in Kalaallisut. Recently, a few private local television and radio stations have started broadcasting. 36 000 Greenlanders are internet users (roughly 55 percent of the population) (ibid.).

The modern Finnish communications network is advanced: while 33 percent of people use fixed phone lines; cellular mobile phones connect almost 80 percent of the population. Phone connections are provided via digital fiber-optic fixed-lines, submarine cables, and one satellite earth station[84]. Since 2008, all television signals have become digital. Public broadcasting consists of 13 national and 25 local television and radio stations – all in Finnish. The only local newspaper in Lapland is also in Finnish. Almost 4.5 million people are active users of internet (roughly 80 percent of the population) (ibid.).

Approximately 46 percent of Norwegians use main phone lines, while 87 percent rely on cellular phone communications. In most cases, the latter are the only possibility in the rural and northernmost provinces. Phone connections are operated by buried coaxial cable systems, submarine cables, and three satellite earth stations[85]. There is one local television station and one local radio station which broadcast in Norwegian, one local newspaper in Norwegian, and one local newspaper in Saami. Almost 95 percent of Norwegians (including those living north of the Arctic Circle) are users of internet (4.4 million people) (ibid.).

Among all Arctic states' provinces, information technology is least developed in Russia's northern republics, oblasts, and autonomous okrugs. Only 32 percent of Russians use main phone lines, but almost 85 percent rely on cellular mobile phones. The telephone system operates via cross-country digital trunk lines run from Saint Petersburg to Khabarovsk, and from Moscow to Novorossiysk; digital telephone systems; analog and digital cellular services; undersea fiber-optic cables; and four satellite earth stations. However, in rural areas, including the Arctic region, the phone services are still outdated and inadequate. There are roughly 3 300 federal, regional, and local television channels; and 2 400 public and commercial radio stations. All broadcast in Russian. The Sakha, Karelia, and Arkhangel regions have only local newspapers (all in Russian) but no local television or radio stations. The Murmansk, Yamalo-Nenets, and Krasnoyarsk regions have mainly newspaper outlets, again in Russian. Less than 20 percent of the people living in the Russian North use the internet (ibid.).

[84] Shared with Sweden, Finland, and Denmark.
[85] Norway shares the Inmarsat earth station with the other Nordic countries (Denmark, Finland, and Sweden).

The Swedish Arctic is the most advanced in terms of information. As of 2000, Sweden had "the highest number of phone lines (fixed and mobile) per capita, as well as the highest percentage of Internet users in the world" (Knell 2008: 55). In 2006, the government launched a broadband internet network in Norbotten[86]. Over 93 percent of the region now has access to broadband, and all schools in Norbotten are connected to the internet. Within the Arctic Circle, there are two local television and two local radio stations that broadcast in Swedish, one local radio station that broadcasts in Saami and Swedish, and six local newspapers that are printed in Swedish. As of 2009, 88 percent of population was users of the internet (approximately 8.3 million people) (ibid.).

Residents of Alaska are not as advanced in information technologies as those from the rest of the country. For example, although there is a post office in Nuiqsut[87], no FM radio signal, or daily newspaper, is available within nearly 200 km (Knell 2008: 58). More than 50 percent of the Alaskan population uses main phone lines, and slightly over 60 percent rely on cellular phone communication. Phone connections are realized via a large system of fiber-optic cables, microwave radio relays, coaxial cables, multiple ocean cable systems, and 65 satellite earth stations (49 over the Atlantic Ocean and 16 over the Pacific Ocean). The State of Alaska owns two local television stations and one local newspaper, all broadcast or printed in English. As of 2009, approximately 62 percent of the Alaskan population used the internet on a daily basis (ibid.).

The Arctic information space can be characterized by:

(a) Sparse population disconnect;

(b) Reliance on cellular phone capabilities;

(c) Scandinavian strength and Russian backwardness.

3. 6. Merging Five Geostrategic Action Spaces into a System

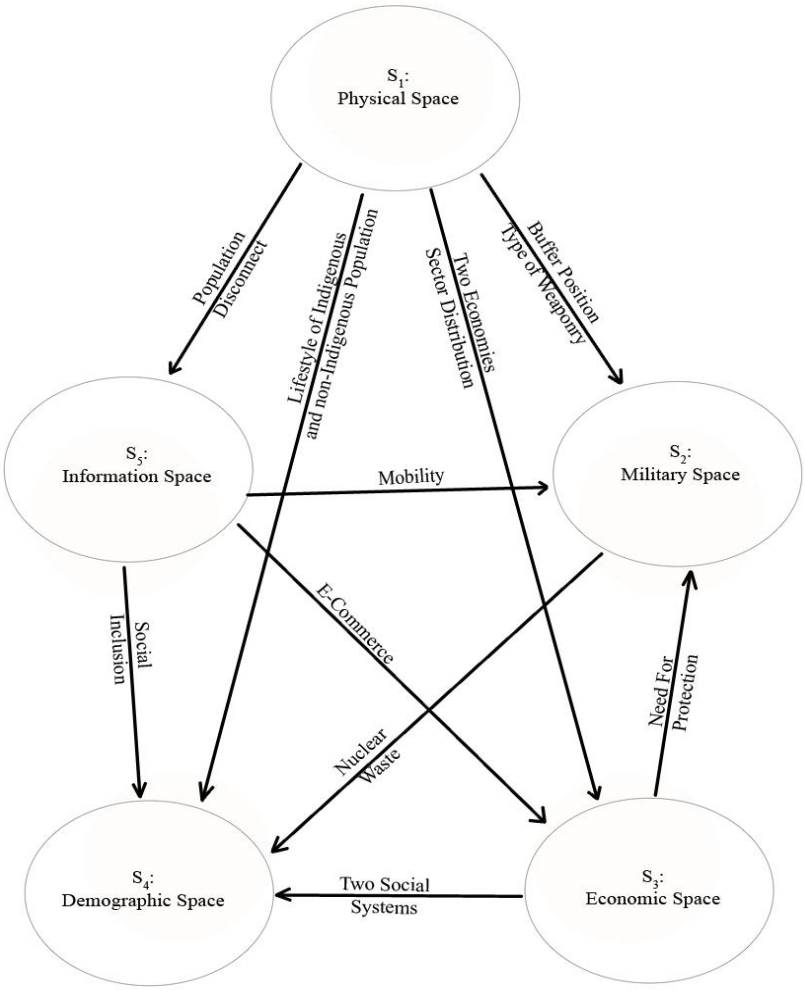
The five geostrategic action spaces (S_1-S_5) do not exist in vacuum. Apart from being influenced by their surroundings (i.e. by external players/domestic politics), they are also constantly influenced by each other. The spaces are, in fact, components of the complex geostrategic system of the Arctic. Changes in one space transform the

[86] Part of "Norra Norland" Program.
[87] A community of less than 500 people in Alaska's North Slope Borough.

other spaces, and the effects are non-linear. Ten possible channels of inter-space effect are illustrated in Figure 4.

It is obvious that human-constructed spaces (S_2-S_5) are not capable of constructing the physical space[88]. In contrast, certain elements of the physical environment determine the overall shape and internal organization of the human-made spaces (S_2-S_5). In his book on the history of the wealth and poverty of nations, Harvard professor David Landes[89] highlights how physical conditions in the tropics represent significant barriers to economic development. He did not consider the Polar Regions; but the Arctic physical space can be generally seen as an even bigger challenge to livelihood than the tropics (Glomsrod and Aslaksen 2006: 41).

Figure 4: Ten Possible Channels of Inter-Space Affection



[88] Even though there is a widely-accepted opinion that the current process of climate change is primarily caused by human activities; it is still not the result of developments within the Arctic region (S_2-S_5).
[89] Landes, D.S. *The Wealth and Poverty of Nations*. New York: WW Norton and Company, 1998.

First, the buffer position of the Arctic region implies a high level of militarization, as Russia and the NATO members still perceive each other with a certain suspicion (in line with the Cold-War rhetoric). Despite the transitive tendencies of the region (e.g. the ice cover melt), the location effect is constant, as the distance between the Arctic states is fixed. Besides, as Arctic climatic conditions are harsh, the utility of using different types of weaponry varies. The region's ice cover is a direct challenge to the ability of Arctic states to deploy ground forces and military infrastructure effectively. With the exception of Sweden, where limited polar-guerilla training is realized, all other states rely ultimately on the means of air and naval power, with ballistic missiles (positioned in strategic bombers/submarines and equipped with nuclear weapons) remaining the most reliable means of power projection. In fact, it is easier for the NATO members to rely on the United States' nuclear defense shield (NWS) than to develop their own ground forces of limited efficiency. The efficiency of air power depends on the distribution of clouds throughout the region. It suits Western Greenland, the Canadian Arctic, and Alaska; but it is almost useless around the Atlantic Ocean. The efficiency of naval power also varies due to the differences in the physical environment. Some parts of the ocean remain ice-free throughout the year due to the presence of warm currents, so the maritime Nordic states are able to use naval vessels more efficiently than continental Russia, as the mobility of the latter is seriously slowed by the need to use ice-breakers. In such cases, submarines remain the only effective naval means of military power projection.

Second, the Arctic physical space presents a number of hazards[90] to economic activity on land and in the waters near the coastlines and around the islands.

The presence of natural resources establishes two economies: subsistence and global. The former, serving to satisfy the basic needs of indigenous inhabitants, depends on regional bio-diversity, which is, in turn, defined by climate. The latter is challenged by the high costs of Arctic drilling. At the same time, many known mineral and hydrocarbon reserves are not exploited because of their inaccessibility (Lindholt 2006: 30). The unequal distribution of natural resources defines the sector distribution of Arctic economies: it allows some countries to benefit more from the extraction,

[90] Among others, travelling by icy sea is particularly difficult, as the non-icebreaker vessel can crash due to strong winds, or it can become trapped in ice several meters-deep (Dowdeswell and Hambrey 2002: 139).

production and transit of oil, gas and minerals (Canada, Russia, the United States); while others are based on fishing (Greenland) or services (Nordic countries). In general, the operation and shipping costs of doing business in the Arctic are considerable, particularly in terms of labor, maintenance, repairs, and insurance (Boult 2004: 6). Assuming the longest production chain, labor-intensive manufactures are especially vulnerable to changes in the physical environment.

Third, the region's physical environment shapes the lifestyle of indigenous and non-indigenous inhabitants. Due to low bio-diversity, reindeer/caribou and sea mammals remain the most important subsistence resources for indigenous peoples (Ahlenius 2010: 17). The seasonal movements of both species directly affect the level of food supply and distribution of inter-communal material flows. The lifestyle is adapted to the condition of a constant search for energy (heat). Being less dependent on the local ecosystem, non-indigenous agglomerations still suffer from seasonal climatic changes. In winter, when energy consumption is at its maximum, some social services become unaffordable[91] to low-income population groups. Moreover, during snowstorms, transport infrastructure is often paralyzed, thus the more remote settlements are disconnected from the social services of larger agglomerations.

Fourth, the Arctic information space is affected by the physical environment. Due to challenging climatic conditions, surface communication lines are limited. In terms of general connectivity, countries with mild maritime climates (Nordic states, Alaska, Eastern Greenland) are more advanced than those with a harsh continental climate (Russia, Canada, Western Greenland). Due to the existence of a deep basin, it is not technically possible to run submarine communication lines on the ocean floor through the entire North Pole. In fact, despite certain limitedness in the cloudy areas, satellites remain the only effective mean of broadcasting.

Fifth, the intensive military use of the Arctic during the Cold War makes its modern inhabitants face the danger of nuclear waste. All Russian Arctic agglomerations with populations above 200 000 people (Murmansk, Archangelsk, Novodvinsk, Severomorsk, Novy Urengoi) suffer from radioactive materials buried below the surface of the adjacent Novaya Zemlya – the result of a total of 132 nuclear tests conducted by the Soviet Union between 1955 and 1990 (Sale 2008: 604). The United States has also carried out some nuclear tests on Amchitka Island (Aleutians),

[91] Some private hospitals, legal services, kindergartens and schools raise the tariffs during 6 months of the Arctic Winter (Ahlenius et al. 2011: 34-38).

and trace radioactive materials were placed in locations around the site. Hence, the entire Alaskan territory, including the area within the Arctic Circle, faces increased levels of radiation, as do the majority of abandoned U.S. military stations in Greenland[92]. The toxic waste causes numerous health problems,[93] further pressuring the Arctic states' social welfare systems.

Sixth, the gradually expanding economic space seeks constant military justification of the national sovereignty rights of all Arctic states, since the latter is the primary means of the manifestation of political power. The ongoing militarization of the resource-rich Arctic regions of Canada, Russia, and the United States follows the pattern of the increasing economic presence of these countries in the region. The synergy of economic power and military power is visible in all Arctic states' regional strategies, as all of them stress that a continued military presence is essential for securing national interests in the region. For example, Russia "…highlights the need to make necessary preparations for the security challenges that may derive from the expected increase in economic activities in the Arctic" (Zysk 2010: 107).

Seventh, the economic space affects the demographic space. The existence of two economies: subsistence and global, implies the presence of two social systems, indigenous and modern. Moreover, the difference between the two economic systems reflects more or less accurately the difference between the two social systems. The earnings of people who participate in the global economy (i.e. work in resource-, capital-, and labor-intensive industries) are many times higher than those coming in the subsistence economy. Consequently, non-indigenous inhabitants may afford themselves better social services than their indigenous neighbors. Levels of social inclusion are, therefore, directly dependent on economic conditions.

Eighth, the Arctic information space affects the economic space. The availability of internet and an adequate supply of financial and postal services lead to a significant trade formation. The gravity model of trade says that a greater distance between two countries reduces their bilateral trade (Volbert and Von Furstenberg 2004: 12, 69). The availability of information technologies has the potential to reduce this distance 'virtually', as even remote areas can participate in the exchange of goods

[92] Part of Distant Early Warning (DEW) system.
[93] E.g., higher rates of infectious and chronic diseases, or greater infant mortality.

and services.[94] Hence, trade is promoted by technological advancement (e.g. Nordic states), and slowed by technological backwardness (e.g. Russia).

Ninth, the information space influences the military space. Similarly to the previous example, the advancement of information technology is beneficial to the Arctic states, as it allows greater mobility for their national security forces. Communication is exceptionally important in the polar region, as it may, at least partially, compensate for the technical military limitations posed by the vast size of territories and harsh climatic conditions. For instance, due to this inter-space relationship, Russia and the European Union have been developing the Glonass and Galileo projects. Their goal is to achieve 'information sovereignty' from the American GPS. This virtual sovereignty automatically implies real military independence.

Tenth, the information space affects the demographic space. The Arctic states rely on several satellite systems to transmit digital television and radio, and to provide the regional communities with broadband internet access. By allowing "…easy two-way communication within the Northern communities, among communities, and with people worldwide" (Christopher and Fast 2008: 2) the latter stimulates the acceleration of the process of social inclusion among indigenous, and even non-indigenous, populations.[95] Consequently, the effect of advances in information technology over living standards is directly proportional.

These are only primary channels of inter-space effects. Less obvious links of systemic interdependence exist between the five Arctic geostrategic spaces, as well as secondary, tertiary and higher-order derivative effects. However, this work aims at offering a hint at the nature of the system's complexity. The presentation of all internal interconnections within the Arctic transborder region is left for later research.

[94] Online services, e.g. virtual degree programs offered by real universities.
[95] The inhabitants of remote settlements use the internet to shop and receive financial and social services.

4. The System's Dynamics

An assessment of the individual components of the Arctic transborder region has demonstrated that the region's five geostrategic spaces (S_1-S_5) are not autonomous. On the contrary, they are constantly affected by each other and the system's surroundings. This section aims at demonstrating that these spaces are not static. In fact, given the transitive nature of the region[96], the five geostrategic spaces (S_1-S_5) are in constant flux, in terms of both the physical environment and human activity. In other words, the system is dynamic. So far, "…[it] is at a fork in the road between its two potential directions" (Knell 2008: 65). It can either become an area of conflict over the quest for vast natural resources and disputed territories, or an area of cooperation, with states securing their national interests within the scope of international law and regional integration frameworks.

The ultimate goal of this section is to predict which scenario will prevail in future.[97] Prior to the prediction itself, the forces that strengthen the system's stability (physical environment, Cold War alliances, and post-Cold War normalization of relations), and weaken the system's stability (climate change and the melting of the Arctic ice cap; unequal distribution of underwater topographical relief, climate and natural resources; unsettled territorial disputes; unbalanced security relations; consolidation of indigenous communities, and isolation of Russia), are demonstrated. Finally, Lawson W. Brigham's four "Scenarios for 2040" ("Globalized Frontier", "Adaptive Frontier", "Fortress Frontier", and "Equitable Frontier") are applied to the interplay of these forces.

4. 1. Forces Strengthening the System's Stability

Physical environment. Apart from the change of climate and the melting of the Arctic ice (whose disturbing effects will be discussed in Section 4.2) there are certain elements of the physical geography which hold the current system together: the lowest atmospheric temperature on Earth due to the highest latitude; the existence of the 'Arctic day' and 'Arctic night', with the sun rising and not rising above the horizon for six months a year, respectively; the presence of polar lights (e.g. the aurora borealis) and sound effects (e.g. the acoustical mirages) between 60 and 72 degrees north

[96] See Section 2. 2.
[97] "Near future" is defined in accordance with Lawson W. Brigham's "Thinking about the Arctic's Future: Scenarios for 2040." *The Futurist*, Sept.-Oct. 2007.

latitude; etc. The modern Arctic states are used to these conditions while organizing their military, economic, and demographic spaces. Despite the potential change of climate, it is unlikely that these characteristics will disappear in future.

Cold War alliances. The Soviet Union was the first Arctic state to launch the economic development of the Arctic. In the 1930s, it began systematically investing in infrastructure to develop the Northern Sea Route (NSR). In the late 1940s, the discovery of hydrocarbon reserves spurred further industrialization of the region, given the political attractiveness of Arctic resources[98]; since, during the Cold War, the North American Arctic was controlled by the United States and Canada, the western part of Eurasian Arctic was controlled by the United States' allies, and the Eastern part of Eurasian Arctic was under the control of the Soviet Union. Hence, both Cold War rivals could proceed with the exploitation of Arctic resources "…in an atmosphere of relative security and political predictability" (Osherenko and Young 1989: 45). In fact, this condition is still valid.

The mainstream logic of political science implies that the system of international relations is generally stabilized by long-term alliances, but only if the latter are led by an evident player (Krejčí 2007: 359). The alliances that emerged during the Cold War within the Western and Eastern blocs fit perfectly this definition: the conflict's major antagonists, the United States and the Soviet Union, provided other states with ideological and material benefits for joining either camp. Alliances tend to gain international influence over time (ibid.): the longer an alliance lasts, the lower the probability is of a political dispute among its participants, because it may risk a long-standing relationship (Knell 2008: 13-14).

This logic still applies to the modern Arctic system: its nodes do interact with each other via certain institutionalized links – both those created during the Cold War, and those which emerged after its end. Cold War coalitions are still effective. For example, Canada, Greenland (Denmark), Norway, and the United States are all members of NATO, and thus "they [still] share the success of Cold War cooperation that led to the downfall of the Soviet Union" (Knell 2008: 13-14). The participating states have managed to harmonize their military practices by conducting common operations and exercises. Military cooperation is further strengthened by the NORDCAPS and NORAD frameworks. Since at least four out of seven Arctic states

[98] In comparison to similar resources located in countries or regions (e.g., the Middle East) subject to internal turmoil or politically inspired disruptions of supply (Osherenko and Young 1989: 45).

are connected by strong military ties, the system's stability is strengthened (in contrast to a situation where no military alliance exists, all Arctic states follow the strategy of 'one-against-all').

Similarly, the system's stability is promoted by non-military Cold War-alliances. The economies of three Arctic states (Sweden, Finland, and Denmark) are fundamentally interconnected via the European common market, with its own standardized legal system.[99] Norway indirectly participates in the project via the EEA. European integration is further promoted by the Nordic Council. It is highly unlikely that these states would allow any dispute (including over issues related to the Arctic region) to danger their membership in the European Union – the deepest regional integration that has ever existing on the political map of the world. Besides, WTO membership has legally-binding implications for all Arctic states except Russia.[100] Similarly, NAFTA interconnects the economies of Canada and the United States.

The subjective side of geopolitics matters: as long as the governments of the Arctic states perceive each other through the lenses of Cold War-politics – i.e. rely on Cold War geopolitical representations ('mental maps') – the system will remain stable, as all its nodes prefer to maintain the status quo. This reasoning inherits the experience of multiple games of chicken[101] between the rivals at times of bipolar confrontation. As a result, the Arctic states believe in each other's rationality and their own ability to predict the behavior of their counterparts. Although the latter is subject to scientific criticism,[102] the modern Arctic system is still strengthened by the existence of long-term alliances between at least some nodes.

Post-Cold War normalization of relations. Prior to the end of the Cold War, the United Nations has been the only international organization connecting all Arctic states. The United States and the Soviet Union are Permanent Members of the Security Council. As the latter "…alone ha[d] the power to take decisions which Member

[99] Among others: the free movement of goods, people, services, and capital within the Schengen area; common policies on trade, agriculture, fisheries, and regional development; and enacted legislation in justice and home affairs.
[100] Russia's attempts to join WTO have, so far, been unsuccessful.
[101] The game of chicken is one of the primary frameworks for modeling a conflict. The game is zero-sum (non-cooperative): while each player prefers not to concede to the other, the worst possible outcome occurs when both players do not concede. This game had frequently been used to describe the Cold War-logic of mutual assured destruction (MAD) and the emergence of brinkmanship during the Cuban Missile Crisis in 1962 (Drulák 2003: 99).
[102] Among others, Woodrow Wilson claimed that alliances manifested a 'wrongful' balancing of superpowers (Krejčí 2007: 360).

States [had been] obligated to carry out"[103] (UN 2011: 1), Americans and Soviets were able to define the nature of diplomacy in the region.

The relations between the rivals started to normalize with the end of the Cold War. New bilateral and multilateral incentives have emerged with the objective of uniting all Arctic states under a common intra-regional framework. In contrast to the alliances left over from the Cold War, new incentives have so far, proven shallow. For example, although the NATO-Russia Council allows bilateral dialog on an equal basis, a dispute resolution mechanism is missing. Similarly, although BEAC connects the European Union with Norway, Sweden, Finland, Russia, and Denmark; its decisions are not legally-binding. Finally, although the Arctic Council has been successful in creating a dialog between the Arctic states' governments and indigenous communities of the North, its decisions are not legally-binding.

Nevertheless, the limitedness of the modern channels of intra-regional cooperation does not imply that they would not be overcome in future. Depending on the existence of common objectives, it is the responsibility of the Arctic states' 'goodwill' to change the quality of the relationship (i.e. to make the decisions of the NATO-Russia Council, BEAC, and the Arctic Council legally-binding). Consequently, even young and shallow attempts at integration strengthen the stability of the Arctic system, as even modest types of coordination among nations "foster relationships that may ease tensions during a critical time period" (Knell 2008: 17). Therefore, the system gains the ability to absorb an internal shock.

4. 2. Forces Weakening the System's Stability

Climate change and the melting of the Arctic ice cap. Resent scientific research has revealed the staggering pace of climate change in the region:

> In early 2008, new NASA satellite data has led its researchers to predict an ice-free summer Arctic in less than five years [i.e. in 2013] … The surface area of Arctic summer ice shrunk 23 percent below the previous minimum record … Surface temperatures in the Arctic Ocean during the summer were the highest in seventy-seven years of record-keeping (Gunitskiy 2008: 263).

This process constitutes the system's positive feedback mechanism. When the ice melts, heat from the sun is fully absorbed by the ocean, instead of being reflected off the white surface and back into space. This further speeds up the warming of the

[103] In other words, its decisions are legally-binding.

ocean waters and, consequently, leads to even more ice melting. According to Knell, throughout centuries, the system's self-regulation had allowed for relatively consistent levels of ice, as the system's negative feedback (via "flywheel" and "gateways")[104] had been compensating for seasonal increases in temperature (Knell 2008: 9). The recent melting of the ice strengthens the positive feedback without strengthening the negative feedback, so a fragile balance between the two is altered.

The intra-regional effects of climate change are numerous. Firstly, the physical space (S_1) is being transformed. Among others, the atmospheric circulation patterns are changing, exposure to storms is increasing, coastal erosion is widening (Ahlenius et al. 2010: 33), and the existing shape of the region's ecosystem is being altered. Plants are starting to grow more vigorously and densely (AMAP 2009: 5). On the one hand, species that are dependent on the current climate (e.g. polar bears and seals) are becoming extinct, while the number of incidents wherein large numbers of walruses come ashore has been steadily growing (Gunitskiy 2008: 263). At the same time, as the region warms up, "the probability of the introduction of invasive species through, for example, the dumping of ballast water from other regions as well as oil spills" (Ahlenius et al. 2010: 34). Appendix F (p. 99) illustrates the selected indicators of change.

Secondly, the change of climate also fuels the transformation of the human-constructed spaces (S_2-S_5). If the Arctic icecap continues to shrink, the region will soon become more navigable and more accessible (Holmes 2008: 324). The shape of the existing military space (S_2) will be altered significantly by the change of climate, as ice-free waters of the ocean and shrinking permafrost on land will allow the development of new ground and naval capabilities (regular forces and warships), while retaining the existing ones (submarines and ballistic missiles). In terms of economic space (S_3), the melting of the Arctic ice can introduce significant changes. As the two trans-continental waterways, the Northwest Passage and the Northern Sea Route, would open up, oil transport would increase, coastal development would accelerate, and new regions would become open for mining, fishing and other economic activities. Knell adds that, as the warming of the region is not equally distributed, so some Arctic states can begin extracting resources in areas that have been previously

[104] The "flywill" is a process where large volumes of water are first trapped in the clockwise flow of the Beaufort Gyre, and then released into the North Atlantic. The "gateways" are the exit points (Fram, Davis and Hudson Straits), which are bi-directional, as they, simultaneously, let the warmer Atlantic waters into the Arctic basin (Knell 2008: 9).

been considered economically inefficient sooner than others (Knell 2008: 60). Finally, the demographic space (S_4) will react accordingly to the change in the Arctic economic regions. The development of infrastructure would, on the one hand, provide a stimulus to the process of urbanization and advancement in the social services available; but, on the other hand, the reduction in sea ice is very likely to have devastating consequences for local people for whom animals are a primary food source (EPA 2011: 1). Finally, the warming of the region would allow the region to be supplied with advancements in information technology at a lesser cost; so the information space (S_5) will also be affected by the change of climate.

Consequently, climate change will affect all physical and human-constructed aspects of the Arctic. As the melting of the region's icecap accelerates in time, this process challenges directly the current state of affairs in the region (status quo). The system's stability is therefore weakened, and "…the region is exposed to more risk" (Knell 2008: 60).

Unequal distribution of underwater topographical relief, climate and natural resources. As highlighted in Section 3.1, territories within the Arctic Circle are not geographically-homogeneous. Some areas are colder; others are cloudier; and some contain certain natural resources which are absent in other regions. In terms of international law, such distribution implies certain discrimination. Upon ratification of the United Nations Convention on the Law of the Sea (UNCLOS), a coastal state has ten years to claim an extended continental shelf, which would provide exclusive rights to resources above or below the seabed of that extended shelf area (see Appendix G, p. 100). The deep basin is not part of the framework. In other words, due to the seabed's topographical relief, Russia is about to gain sovereignty rights over almost half of the Arctic Ocean, i.e. much more than its North American counterparts.[105] The unequal distribution of relief and climate implies certain military advancement of some Arctic states. For example, Robert Jervis claims that the effectiveness of air power is seriously limited in cloudier areas, e.g. in Central Europe. In fact, this claim is also true for the northernmost region (Jervis 2010b: 1). Consequently, in contrast to West Siberia, the Atlantic Arctic is a bad candidate for effective air surveillance. Favorable climate conditions are also facilitators of industrial and social development, as the cost

[105] Under the current legal framework, no state has sovereign rights over the Arctic Ocean. The coastal states are limited to an exclusive economic zone (EEZ) of 200 nautical miles (370 km) adjacent to their coasts. By extending the rights over the continental shelf, the coastal states gain exclusive rights to resources above or below the seabed of that extended shelf area.

of developing infrastructure and information technologies decreases with the rise in temperature. For example, due to the relatively warm Norwegian Current, population density is highest on the Scandinavian Peninsula. Besides, a differentiated depth of the ocean may affect, among others, the character of the region's traffic and economic activity.

As relief, climate and natural resources are not equally distributed within the Arctic Circle; some states feel physically-discriminated by their regional counterparts under the status quo. In contrast, they prefer to push the system into a transition that would, potentially, allow them to acquire a larger share of the region's natural wealth. However, as the nodes of the human-constructed action spaces (S_2-S_5) are not able to influence the internal organization within the physical space (S_1), they try to act via politics. This produces a conflict of interests within the system, weakening its stability.

Besides, as some regions of the Arctic are based on the extraction of natural resources, they become vulnerable to oil and gas price fluctuations, the danger of technical (infrastructure) shut-downs[106], and political decisions made at the national level. Non-energy resources are also subject to global, not regional, demand. Finally, multinational oil and gas corporations also contribute to the tension in the region through their competitive nature and business practices. Since they earn a lot of money, they are able to influence the politics of six Arctic states, and, in the case of Russia and Norway, compete with government-controlled Gazprom and Statoil (Knell 2008: 18-19).

Unsettled territorial disputes. The existing border delimitation provides room for the further scramble for the Arctic region, as the Arctic states actively explore their northern territories in search of factual justification for their territorial claims: the Northwest Passage (Canada vs. the United States), border delimitation in the Beaufort Sea (Canada vs. the United States), Hans Island (Canada vs. Denmark) and, until recently, the 'Grey Zone' in the Barents Sea (Norway vs. Russia) (see Appendix G, p. 100).

Despite the existence of several councils that address the rights of indigenous populations, preservation of marine life, etc.; there is no deep, region-specific integration framework that would have jurisdiction over addressing the territorial claims, boundary and passage disputes. The Arctic states have to solve the issues

[106] E.g., the shut-down of the Prudhoe Bay (Alaska) pipeline due to corrosion damage in August 2006.

either bilaterally, multilaterally, or, if they have signed UNCLOS, submit them to the International Tribunal for the Law of the Sea, the International Court of Justice, or United Nations Special Arbitration (Knell 2008: 17). Hence, as a common mechanism for conflict resolution is missing, the overall system becomes less resistant to internal shock.

Unbalanced security relations. So far, the Arctic military space (S_2) is still governed in the spirit of the conflict between the Western and Eastern blocs. Knell highlights that "…[although] in some ways and for some states, this legacy has positive effects, such as the Arctic-based Russian naval capability… In other ways and for other states, this legacy has negative effects, such as a limited capacity for security due to reliance on an alliance" (Knell 2008: 20). He also points out that "…although Cold War alliances proved beneficial overall, some decisions made during that time are now vulnerabilities in the Arctic military system" (Knell 2008: 24). The author refers to the case of the Nordic countries:

> As these states were able to maintain relatively small militaries despite the near Soviet threat because they were relying on the United States to become immediately involved if they were attacked. One state, Iceland, completely relied on alliances and never established a military at all. With a significant number of U.S. forces now returned back to the continental U.S. from Europe, and the U.S. focus in the Middle East, these Nordic militaries may not be large enough to guarantee security if the Russian threat reemerges (ibid.).

Intra-regional security cooperation is still limited to a NATO-Russia dialog. Because "…historically, NATO member states have almost never undertaken a major security initiative without at least the tacit acquiescence of the U.S." (Wallace and Staples 2010: 10), Norway, Denmark and Canada rely on the American Arctic strategy. In January 2009, the outgoing President Bush signed the Arctic policy directive, which has remained valid under President Obama. Firstly, it recognizes the ongoing reliance on conventional military power in the region. Secondly, it establishes three conditions for American support of a Nuclear Weapon Free Zone (NWFZ), since there is a lack of nuclear balance among the Arctic states – while the United States and Russia are nuclear states; Canada, Norway and Denmark are non-nuclear states (Zellen 2009: 21). In fact, these conditions have emerged as the real obstacles to the denuclearization of the region (see Table 3, p. 68).

Table 3: Three Conditions of American Support of NWFZ

Condition 1	The content of a NWFZ Treaty should not disturb the existing security arrangements or interfere with the rights of individual/collective self-defense guaranteed by Article 51 of the United Nations Charter.
Condition 2	A Zone should not affect the rights of the parties under international law to grant/deny transit privileges, including port calls and over-flights.
Condition 3	No restrictions should be imposed on the high seas freedom of navigation and over-flights by military aircraft, the right of innocent passage through archipelagic seas, and the right of transit passage through international straits.

Source: Wallace and Staples 2010: 10-11.

Condition 1 directly challenges the idea of Arctic denuclearization due to NATO members' adherence to the Strategic Concept and, specifically, to Article 5 of the Washington Treaty.[107] Condition 2 is problematic because transit rights are allowed only to ships and aircrafts not carrying nuclear weapons, which is in conflict with the long-standing American policy to neither confirm nor deny the presence of nuclear warheads on board its ships and aircrafts. Finally, Condition 3 is also problematic due to the ongoing United States-Canada dispute on the legal status of the Northwest Passage. Russia's approach is clearly modern (realist). In 2008, President Medvedev signed Russia's Arctic Policy until 2020, which clearly recognized the ongoing strategic relevance of the Arctic region to the Russian security agenda. Although there was no clear reference to the ongoing reliance on nuclear weapons, there is still explicit support for the Freedom of the Sea Doctrine, which, in fact, allows nuclear submarines in the high seas. Similarly to the American counterpart, Russia is to continue relying on the nuclear deterrent as the ultimate source of strategic parity with the United States (Medvedev 2008: 4-6).

The problem therefore extends beyond regional security concerns to the very nature of nuclear non-proliferation measures. In particular, the Non-Proliferation Treaty[108] is responsible for a significant 'imbalance of obligations': "...the non-nuclear-weapons status is immediate, legally binding and internationally verifiable and enforceable... But the commitment of nuclear-weapons-states to disarm is neither timetabled, nor precise, nor binding" (Thakur 1997: 7). It is therefore unlikely that

[107] Article 5 of the Washington Treaty says that the Parties agree that an armed attack against one or more of them shall be considered an attack against them all. Consequently, if such an armed attack occurs, each of them will assist the Party or Parties attacked, including the use of armed force, to restore and maintain the security of the North Atlantic area.

[108] Article 6 of the Non-Proliferation Treaty stipulates that non-nuclear-weapons states (NNWS) give up the nuclear option in return for nuclear disarmament by nuclear-weapons states (NWS).

either Americans or Russians would de-militarize the region, or declare any part of their northern territories free of nuclear weapons under the current legal framework. Consequently, the relationship of the five Arctic states is to remain unbalanced in the security domain. The lack of internal military equilibrium is a great obstacle to the stability of the system.

Consolidation of indigenous communities. Over the last 50 years, the process of political consolidation has begun within many indigenous communities, with the ultimate objective of tackling common issues (Knell 2008: 35). Five of them are able to participate in the official intra-regional dialog via indigenous networks that have Permanent Participant status in the Arctic Council – ICC, GCI, AAC, SAAMI, and AIA. Since, in many cases, current policy-makers systematically exclude the native northerners from the Arctic states' legal and social systems, the incentive of the latter to struggle against the status quo should not be underestimated. Recent success in land and cash settlements from their states, as well as a presence in national governments,[109] provides an important impetus for further consolidation of the 'indigenous force'. This process has a high potential to destabilize the Arctic system.

Isolation of Russia. The analysis of the links between the nodes of the military space (S_2), economic space (S_3), and demographic space (S_4) indicates that the intensity of integration varies among countries.[110] Despite having the most developed and populous northern territory, Russia is somewhat isolated from the rest of the region. After the end of the Cold War, Russia did not join the Western bloc. In fact, neither party wished Russia to become a member of the European Union or NATO. The consequences are tangible. For example, in the security dimension, Russia does not conduct combined military exercises with other Arctic states; and in the economic dimension, it does not trade with the other Arctic states according to the rules of the World Trade Organization (WTO). Besides, "the Russian Federation is also the only Arctic state that does not have Permanent Normal Trade Relations (PNTR) with the United States" (Knell 2008: 30). In terms of infrastructure, Russian Arctic regions are disconnected from most of their neighbors, as there are no long distance east-west road networks.

As the operational capability of Russia's navy and ballistic missiles diminishes (due to ageing and a lack of funding for maintenance), the government has begun to

[109] Except Russia.
[110] See Section 3. 2, Section 3. 3, and Section 3. 4.

realize that the Soviet ability to balance the West is lost. The 'lonely wolf' strategy has stopped paying dividends. It is still true that a bipolar international system is more stable than a multilateral one, but only if both players have equal material capabilities. In the Arctic region, the capabilities are unequal, unfavorable to Russia and favorable to all other Arctic states. The system's internal stability is, therefore, weakened.

4. 3. Lawson W. Brigham's "Scenarios for 2040"Adjusted for the Forces Strengthening and Weakening the System's Stability

The answer to the question of whether the Arctic region will become a future area of conflict or cooperation depends on a variety of factors. The stability of the Arctic system will be defined by interplay of forces that strengthen and weaken the status quo. Although the weakening factors are numerous (climate change and the melting of the Arctic ice; unequal distribution of relief, climate and natural resources; unsettled territorial disputes; unbalanced security relations; consolidation of indigenous communities, and isolation of Russia), they are, so far, successfully balanced by two strengthening factors (Cold War alliances, and post-Cold War normalization of relations). In other words, the realist aspirations of individual (national) power maximization are balanced by the liberal ideas of collective (international) governance in the region. However, this balance is fragile. The current system will be unsustainable in future without an adequate response from the forces strengthening the system's stability, to the forces weakening the system's stability.

Regional-scale modeling: accuracy of prediction. Assessing the future course of climate change in the region depends on both the researcher's geopolitical imagination, and statistical model allowing as 'accurate' prediction as possible, at any given point in time. This work focuses on the period up to 2040. Why? In 2008 the Arctic Council established the project 'Climate Change and the Cryosphere: Snow, Water, Ice, and Permafrost in the Arctic' (SWIPA), as a follow-up to the 2004 Arctic Climate Impact Assessment (ACIA) program. The study evaluated 25 models for their ability to simulate 20th century climate parameters (e.g. surface air temperature, sea level atmospheric pressure, and summer sea ice extent) and came to the following conclusion: all models are fairly consistent for the period up to 2040, but beyond that the projected temperatures vary enormously (see Appendix H, p. 102). Hence, "there is no single best model for all purposes", and "the predictive capacity of the models needs to be improved for possible impacts by the end of the century" (AMAP 2009:

13). To avoid falling into a methodological trap, this work limits the time span to year 2040.

When predicting the future of politics in the Arctic transborder region, it is necessary to adjust the interplay of forces weakening and strengthening the system to a set of standardized scenarios for the region's development. Since this work does not aim at identifying individual scenarios, it refers to Brigham's four "Scenarios for 2040" ("Globalized Frontier", "Adaptive Frontier", "Fortress Frontier", and "Equitable Frontier").

In 2007, the author identified four possible scenarios of the region's development by 2040, based on several core factors: global climate change, transportation systems, resource development, indigenous Arctic peoples, regional environmental degradation, the Arctic Council, and the overall geopolitical issues facing the region (Brigham 2007: 27). Appendix I (p. 103) illustrates the distinct features of each scenario.

The first scenario, "Globalized Frontier", assumes that the region will become an integral part of the global economy, with "abundant natural resources, a less-harsh climate, mostly sparse populations, and a geography permitting shorter global air and sea routes between North America and Eurasia" being the most critical factors influencing the development (Brigham 2007: 28). The nature of international relations is assumed to be driven by a realist vision of constant conflict. Integration into the global economy is supposed to be full (i.e. covering all sectors of the Arctic economy) and rapid (i.e. with a high pace of internationalization). Rising global prices for oil, gas, nickel, copper, zinc, coal, and freshwater should imply the region's natural resource extraction and transportation becoming economically-viable. At the same time, national regulation of fishing rights would lead to massive overfishing in some areas of the Arctic. Tourism is supposed to flourish as another commercially-efficient activity. Although "…anyone [will] have access by sea or air to the remotest Arctic regions" (ibid.), transportation would still remain in hands of national governments. The impacts of climatic change are supposed to be dramatic: the sea ice is estimated to disappear completely for a two-week period in summer, while permafrost in the Russian Arctic, Alaska and northern regions of Canada is expected to shrink. However, the profile of indigenous organization is to remain limited, as the decision-making process remains in the hands of national governments. Five Arctic States will assert their sovereignty over resources beyond 200 nautical miles from their shores;

while “only two small regions in the central Arctic Ocean remain under international jurisdiction” (Brigham 2007: 29). Consequently, this scenario implies that the United States will ratify the UNCLOS. The main role of the Arctic Council would be to resolve disputes between the participant countries, and restricting the outside participation.

The second scenario, “Adaptive Frontier”, assumes that the region will become an area of a widespread international cooperation, as “the circumpolar nations realize they have significant environmental, social, and economic interests and responsibilities in the Arctic” (Brigham 2007: 29). The region would participate in the globalized economy, but to a limited extent and with a slower pace. Although global prices for Arctic oil and gas would rise, they will still be “…not enough for all regions of the Arctic to be competitive” (ibid.). The fishing industries are expected to expand due to the warming climate, but, in contrast to the first scenario, overfishing would be regulated via stringent harvesting quotas and other bilateral agreements. Transportation systems are also expected to develop robustly, with international regulation of aircraft emissions being performed. Tourism is supposed to flourish, especially at Nunavut, Svalbard, Iceland, and Greenland. As greenhouse emissions are expected to remain relatively high, the change of climate and the melting of the Arctic ice cap would have a widespread and serious effect on the region. In contrast to the previous scenario, “the indigenous organizations around the Arctic [should] have a much higher profile and significant influence over decisions related to regional protection and economic development” (Brigham 2007: 29). Five Arctic States (including the United States, which will ratify UNCLOS) will assert their sovereignty rights over resources beyond 200 nautical miles from their shores, while “only two small regions in the central Arctic Ocean remain under international jurisdiction” (ibid.). The major role of the Arctic Council would be to promote sustainable development and social inclusion. Although the Arctic states try to restrict outside participation, there is still genuine pressure from outside governments (that wish the United Nations to have a greater role in Arctic affairs) and from several non-governmental organizations (which want the Arctic to remain a wilderness area).

The third scenario, “Fortress Frontier”, assumes constant tensions in international relations, in the spirit of classical political realism. Although the region is to become part of the global economic system (due to a widespread exploitation of natural resources by the circumpolar nations), “…any linkage [will be] orchestrated or

dictated by the most powerful Arctic states" (Brigham 2007: 32). Consequently, regional participation in the global market would be limited to mineral-based industries, but the pace of such integration would be rapid. Not only are the Arctic states' economies expected to boom, but fishing rights are also supposed to be denied to all but the Arctic states (the author uses the example of Japan being excluded from fishing in the Bering Sea). Regulation of air and marine traffic would remain in the hands of national governments due to the lack of a polar network. Specifically, Russia and Canada would continue to control the Northern Sea Route and the Northwest Passage, but some flexibility would be possible if significant economic gains are expected from foreign vessels transiting these routes. Tourism is expected to grow; and its development can, potentially, bring economic benefits to the local communities. However, the latter are expected to be systematically-displaced from their traditional homelands, as the profile of indigenous organizations is to be significantly limited by national governments. Since global warming is to resume unabated, the region will, most likely, be put under extreme environmental strain. As in the previous cases, the Arctic States will successfully assert their sovereignty over the resources beyond 200 nautical miles from their shores, with only two small regions in the central Arctic basin remaining under international jurisdiction. The Arctic Council would remain strong, but it will focus exclusively on economic and security concerns. The ultimate goal would be in "…making the region more independent and exclusionary – a position largely unchallenged by the global community due to the Arctic's collective economic and military strength… a total dominance over the Arctic Ocean [would be] thus achieved by a handful of Arctic states – the epitome of fortress mentality" (Brigham 2007: 33).

The fourth scenario, "Equitable Frontier", assumes that the region will become an area of international cooperation, in the spirit of classical liberalism. The Arctic states are ready to share their Arctic territories as integral parts of the global economy, but they choose gradualism as the main integration strategy. Although the extraction of mineral resources and fishing would still constitute the basis of the Arctic economies, these commercial activities would be "…tempered by greater consideration of broad social and environmental concerns" (Brigham 2007: 33). Respecting the environment and goodwill cooperation among the Arctic states will become a norm. In other words, non-economic considerations and tight international regulation would prevent mineral-based economic activities (oil, gas, and mineral

production) from snowballing. Traditional practices (reindeer herding, forestry, and fishing) will be prioritized. Arctic freshwater will become a valuable global commodity. Russia and Canada will develop plans for a network of pipelines to carry water south from their Arctic territories. Transportation will become a key Arctic industry; regional maritime commerce will increase fivefold due to the melting of the sea ice, causing air freight over polar routes to shrink modestly. International regulation will emphasize environmental protection of the key transport routes. Tourism will boom, so national parliaments will establish additional protected wilderness areas and biodiversity reserves. They will also add territories to existing Arctic national parks. The profile of indigenous peoples' organizations will be high and, as a result, new social and economic incentives will emerge.[111] Consequently, in contrast to the three previous scenarios, the impact of climate change will be less dramatic. Boundary dispute in the Barents (Norway vs. Russia)[112] and Beaufort (Canada vs. the United States) seas will be resolved, the United States will ratify UNCLOS, and therefore all Arctic states will assert sovereignty rights over resources beyond 200 nautical miles from their shores. The Arctic Council will be reoriented toward social equality and environmental well-being. Finally, in contrast to the previous cases, the restriction of outside participation will be seriously limited.[113]

Instead of preferring one out of four scenarios, the author tries to offer a structure for thinking about the region's future and its global impacts:

> …These four scenarios of the Arctic are designed to be provocative but plausible. Hopefully, they will stimulate strategic thought and rational discussion about how the Arctic region should evolve throughout the twenty-first century (Brigham 2007: 34).

In fact, many authors agree that the region is about to face extraordinary changes, but do not offer objective predictions about its future shape (Dowdeswell and Hambrey 2002, Einarsson 2004, Crawford 2008, Sale and Potapov 2010). In terms of the theory of international relations, the spectrum of Brigham's scenarios is wide – starting with defensive realism ("Fortress Frontier"), ending with liberal universalism ("Globalized Frontier"), and positioning "Adaptive Frontier" and "Equitable Frontier"

[111] For example, further development of the University of the Arctic; or revenue sharing from tourism, transportation, and minerals extraction.
[112] This dispute has already been resolved.
[113] For example, the Arctic Council will broker an agreement between Canada, Russia, and the United Nations High Commissioner for Refugees to allow the settlement of 30.000 environmental refugees in subarctic territories (Brigham 2007: 34).

somewhere between the two. Because, as has been pointed out by Gyula Csurgai, the main aim of geopolitics is to provide a policy-maker with a concrete diagnosis of the future state of affairs within a given region (Csurgai 2008: 48), this work adjusts Lawson W. Brigham's scenarios, firstly, for the forces strengthening the Arctic system; and, secondly, to the forces weakening the Arctic system.

Adjusting for the forces strengthening the Arctic system. Three factors promoting the system's stability – certain elements of the physical environment, Cold War alliances, and post-Cold War normalization of relations – should be taken into consideration when choosing among four possible scenarios of the Arctic region by 2040. Although they affect all four scenarios, influence is at its maximum in case of scenario one ("Globalized Frontier") and scenario three ("Fortress Frontier"), as both predict a reduction in cooperation between the Arctic states, in favor of intense competition.

First of all, some elements of the Arctic physical environment (the lowest atmospheric temperature on Earth due to the highest latitude; existence of the 'Arctic day' and 'Arctic night'; polar lights and sound effects between 60 and 72 degrees north latitude; etc.) do not depend on human activity in the region. Since it is unlikely that these characteristics would disappear by 2040, they will still define the Arctic states' military, economic, demographic, and information policies in polar regions, and determine the relations between the countries. Then, as demonstrated in Section 4.1, a continuation of logic of Cold War alliances contributes to the promotion of intra-region dialog between the national governments of all Arctic states, i.e. not only Canada, Denmark, Finland, Norway, Sweden, and the United States (the long-term military and economic allies), but also Russia (which, after the collapse of the Soviet Union, is little opposed to 'Western' integration practices). On the one hand, as Canada, Greenland, Norway, and the United States are connected by NATO; Denmark, Finland, Norway, and Sweden – by EU, EEA and Nordic Council; Canada and the United States – by NAFTA; Canada, Denmark, Finland, Norway, Sweden, and the United States – by the WTO. It is highly unlikely that these countries will risk their long-standing alliance relationships in line with Brigham's "Fortress Frontier". Also, since these countries are liberal democracies which respect the rights of individuals, the profile of indigenous peoples' organizations will grow in future. However, this condition goes against the prerequisites of "Globalized Frontier" and "Fortress Frontier", where national interests prevail over individual ones.

On the other hand, although Russia is not part of the integration networks mentioned above, there are evident signs that it does not plan to enter into direct confrontation with the rest of the Arctic states.[114] In contrast, as visible from the strategic behavior in other international regions, Russia seeks pragmatic cooperation with the West and benefits from the current (post-Soviet) legal configuration. Its uninterrupted willingness to join the WTO illustrates the case. New diplomatic incentives have emerged between the former Cold War-rivals. Despite the fact that they are shallow,[115] they indicate a gradual convergence of interests between all Arctic states.

Consequently, due to the continuation of the Cold War logic in intra-regional relations, no Arctic state has any preference for using military means of power projection over relying on diplomatic channels of inter-governmental communication. In contrast, all coastal states believe in each other's rationality and their own ability to predict the behavior of its counterparts. Coupled with factually-restricted outside participation, the balance of power in the region is clearly defined. Hence, as alliances tend to gain influence over time, and since all Arctic states are in favor of cooperation instead of conflict, the existing cooperation frameworks will clearly strengthen by 2040. The current process of harmonization of national standards of traffic regulation also assumes that the Arctic states will, most likely, rely on the international system of traffic control instead of national ones, as the latter has proved to be inefficient in other oceans.[116] Finally, in the "Fortress Frontier" scenario, the author seems to come up with a far-fetched idea of the Arctic Council being concerned exclusively with security and economy issues.

Therefore, despite having the right to exist as a potential 'extreme case', the "Fortress Frontier" scenario is highly improbable. The "Globalized Frontier" scenario is more realistic, but it still contains improbable essentials.[117] In contrast, the "Adaptive Frontier" and "Equitable Frontier" scenarios are better suited to the forces strengthening the stability of the Arctic geostrategic system.

Adjusting for the forces weakening the Arctic system. The two 'optimistic' scenarios offered by Brigham, "Adaptive Frontier" and "Equitable Frontier", should

[114] There is no reference to the possibility of a direct military attack on the other Arctic states in Russia's "Arctic Policy until 2020 and Beyond" by President Medvedev (2008).
[115] Decisions of those are not legally-binding.
[116] The idea of UNCLOS is to create a harmonized universal system of marine regulation.
[117] Among others, the national regulation of air and marine traffic, and the limited profile of indigenous peoples' organizations.

be adjusted for the forces weakening the system (discussed in Section 4.2). First of all, the actual effect of climate change and consequential melting of the Arctic ice are not considered in proper depth. The author summarizes the essentials of the phenomenon, but does present a factual application of particular territorial changes in the ice cover in both scenarios. However, as the change of climate has the potential to alter basic configurations within all geostrategic action spaces of the Arctic region, the objective manifestations of the process should not be omitted. Particularly, there is a significant difference between the observable sea-ice (as of September 2002) and the projected sea-ice (2070-2090), see Appendix J (p. 104). It is clear that, due to the intensive shrinkage of ice, the region's maritime routes will be open for navigation for the most of the year. However, as the legal status of both the Northern Sea Route and the Northwest Passage is not adjusted to the coming change in the physical environment, it is unlikely that either Russia or Canada will give up sovereignty claims over these routes in future, without at least a diplomatic struggle. Hence, Brigham's "Equitable Frontier", which does not predict any conflict among the Arctic states, is too idealistic and, therefore, unlikely.

Secondly, the unequal distribution of underwater topographic relief, climate, and natural resources is another source of conflict between the Arctic states in future. The conflict of interests is the product of some states continuing to feel discriminated by states that gain substantial shares of the region's natural wealth (specifically, on the continental shelf). Thirdly, territorial disputes are likely to exist in future. In addition to the questionable status of passages, problematic border delimitation in the Beaufort Sea (Canada vs. the United States) and Hans Island (Canada vs. Denmark) are likely to persist in future. In fact, all scenarios must be adjusted to the fact that, so far, the United States has not ratified UNCLOS. And, since there is no region-specific integration framework that would have jurisdiction over addressing the territorial claims, boundary and passage disputes, it is unlikely that any convergence of the Arctic states' interests will be smooth. Besides, in contrast to the "Equitable Frontier" scenario, the Arctic system will be less resistant to an internal shock, due to the lack of a common mechanism for conflict resolution.

Fourthly, the current institutional isolation of Russia will not disappear by 2040. In general, the pace of Russia's inclusion into the Western integration frameworks is, so far, relatively low (e.g. cooperation achievements of the NATO-Russia Council, or WTO participation). It is, therefore, unlikely that the former rivals

will become close allies, as neither strategic policy indicates any signs of this situation. Even though significant, quantitative upgrades may occur in regional relations; a systemic, qualitative change is unlikely to occur between the Arctic states in less than 30 years. At the same time, the current unbalanced security relations are likely to exist in future. The problem rises from inside the region (e.g. the region's buffer position and a consequent military oversaturation) and comes from the system's neighborhood (discriminative nature of NPT). Consequently, persisting competition between the Arctic states is inevitable in future.

Considering the role of the Arctic Council in future, the "Equitable Frontier" is too optimistic. Although governments of all Arctic states manifest strategies of a greater concern for social equity and environmental well-being, the ongoing development of the Arctic states' northernmost lands is governed, primarily, by incentives to invest in basic economic activities (oil, gas, and mineral resources extraction). Today, the Arctic states invest heavily in exploration of the region's natural richness. It is unlikely that they will renounce the collection of dividends over the next 30 years. Finally, the regional policies of the Arctic states do not indicate any willingness to allow outside participation in future, in either economic or security terms.

What shape will the region have in 30 years? Although there is always the possibility of an unpredictable change, a 'rough' prediction comes from Lawson W. Brigham's four scenarios. Previous analysis has demonstrated that the "Fortress Frontier" and "Equitable Frontier" scenarios are not realistic, as the former is too pessimistic and the latter is too optimistic. Taking into consideration the essentials of the five Arctic geostrategic spaces (S_1-S_5) and the forces strengthening and weakening the system's stability, a 'hybrid' scenario seems to be the most accurate. It is based on the following assumptions:

- Competition (conflict) is the main engine of international relations;
- Regional integration into the global economy is controlled (limited) and gradual;

- Economic activities are not yet booming (due to economic, rather than political, reasons)[118];
- The fishing industry is open to the Arctic states (which will regulate the rights);
- Air and marine traffic is regulated internationally;
- Tourism flourishes;
- The profile of indigenous peoples' organizations is high;
- The impacts of climate change over the physical and human environments are dramatic;
- The Arctic states assert their sovereignty rights over resources beyond 200 nautical miles from their shores;
- The Arctic Council serves as a main dispute resolution mechanism;
- Outside participation is restricted to the Arctic states.

[118] The intensity of economic activities in the region will depend upon the requirements of international trade, but not upon the predominance of social equality agenda among the Arctic states' politicians.

5. Conclusion

Where is Hans Island? Why is this uninhabited, 100-meter-long barren knoll of rocks located in Kennedy Channel of the Nares Strait claimed by both Denmark and Canada? Why did Russia launched the Arktika mission by sending a submarine to the bottom of the Arctic Ocean to plant a flag at the North Pole? Why did Canada respond with the construction of new military bases and upgrade of its warships and coastal patrol vessels?

Until recently, most people not actually living within the Arctic Circle treated the polar region as a remote place about which they knew (and needed to know) little or nothing (Snowman 1993: 14). Today, the Arctic is no longer a no-man's land of interest only to outdoor adventurers and military strategists. In fact, "in the not-too-distant future, the forces of climate change are going to transform this icy world into a new economic frontier" (Zellen 2009: 184). This change will ultimately bring about a new chapter in polar history. Since "it is undeniable that many Arctic issues and the conflicts associated with them are international or transnational in scope", scholars and policy-makers should be aware of the changing geostrategic role of the region.

This work has aimed to fill the gap in the civil scientific agenda by offering its own, two-stage version of a systemic, dynamic, and interdisciplinary analysis of the developments in the Arctic transborder region; by fixing the region's southern border at the Arctic Circle, adjusting to the premises of new geopolitics, using systemic modeling, and viewing geostrategic analysis as an obligatory academic contribution to the 'art' of statecraft.

The first stage of analysis is inductive, descriptive, and static. It defines the Arctic region as a system of five geostrategic action spaces: physical space (S_1), military space (S_2), economic space (S_3), demographic space (S_4), and information space (S_5). The region's physical environment is fundamentally interconnected with the human-made constructs; while the former is extremely vulnerable to human inputs (accidental and intentional), the latter are subject to the influence of ice, diverse topographical relief and climate, and the unequal distribution of natural resources. Then, a social network analysis is applied to the four human-constructed geostrategic spaces (S_2-S_5) – i.e. the basic networks of relationship (links) between the key actors (nodes) is created. Matrices of symmetrical relationships for military space (S_2),

economic space (S_3), and demographic space (S_4) are constructed to demonstrate the links' intensity.

As a result, the Arctic military space (S_2) is defined by the region's buffer position and the legacy of the Cold War (excessive nuclear arsenals), by the seven Arctic states as the only nodes, and by the varying intensity of relationships between the nodes (NATO versus Russia). The gradually-expanding Arctic economic space (S_3) proved to be characterized by the existence of two economies, subsistence and global; the strong influence of an external actor, the European Union; the disparity in economic development and internal linkages; and the disparity in the intensity of linkages between the nodes. The Arctic demographic space (S_4) consists of the following elements: two social spaces, indigenous and modern; disparity in the level of social inclusion (social services are better for those indigenous inhabitants who have settled land claims with their respective governments); indigenous and non-indigenous Arctic agglomerations as the nodes; strong influence of an external actor, the European Union; and a significant disparity in the intensity of linkages between the nodes. Finally, the Arctic information space (S_5) is defined by sparse population disconnect, the reliance on cellular phone capabilities, and Scandinavian strength and Russian backwardness.

Also, in order to demonstrate the fact that changes in one action space ultimately transform other spaces, ten possible channels of inter-space effects are illustrated: buffer position and type of weaponry ($S_1 \rightarrow S_2$); two economies and sector distribution ($S_1 \rightarrow S_3$); the lifestyle of indigenous and non-indigenous populations ($S_1 \rightarrow S_4$); population disconnect ($S_1 \rightarrow S_5$); nuclear waste ($S_2 \rightarrow S_4$); the need for protection ($S_3 \rightarrow S_2$); two social systems ($S_3 \rightarrow S_4$); e-commerce ($S_5 \rightarrow S_3$); mobility ($S_5 \rightarrow S_2$); and social inclusion ($S_5 \rightarrow S_4$).

The second stage of analysis is deductive, analytical, and dynamic. It demonstrates that the five geostrategic spaces (S_1-S_5) are in a state of constant flux, in terms of both the physical environment and human activity. The system is, therefore, dynamic. As the region can turn into an area of conflict or cooperation, the work attempts to predict which scenario will prevail by 2040. Firstly, the forces strengthening the system's stability (physical environment, Cold War alliances, and post-Cold War normalization of relations), as well as those weakening the system's stability (climate change and the melting of the Arctic ice; unequal distribution of underwater topographical relief, climate and natural resources; unsettled territorial

disputes; unbalanced security relations; consolidation of indigenous communities, and isolation of Russia) are identified. Secondly, Lawson W. Brigham's four "Scenarios for 2040" ("Globalized Frontier", "Adaptive Frontier", "Fortress Frontier", and "Equitable Frontier") are adjusted to the interplay of these forces.

Finally, a 'hybrid' scenario is offered as the most probable outcome of development in the region over the next 30 years. It is moderate: while assuming competition (conflict) to be the main engine of international relations, it predicts that regional integration into the global economy will be controlled (limited) and gradual; economic activities will be slow to boom; the fishing industry will be open to the Arctic states (which will regulate the rights); air and marine traffic will be regulated internationally; tourism will flourish; the profile of indigenous peoples' organizations will be high; the impacts of climate change will be dramatic over physical and human environments; the Arctic states to assert their sovereignty rights over resources beyond 200 nautical miles from their shores (thus the United States is assumed to ratify UNCLOS); the Arctic Council will serve as the main dispute resolution mechanism; and outside (external) participation will be restricted to the Arctic states.

The main logic of this work is in line with majority of modern polar analyses – the region is about to face a dramatic change in its physical environment and human constructs. In this sense, the conclusions are similar to those by, among others, Osherenko and Young 1989, Chaturvedi 1996, Bird et al. 2004, Christopher and Fast 2008, and Crawford et al. 2008. At the same time, this work does not agree with authors who stress the possibility of a real military conflict between the Arctic states (for example, Reid 2007). In contrast, despite the conflictive nature of international relations in the region, it assumes diplomatic action to be the main tool for resolving disputes (in spirit of Mearsheimer 2001). The systemic geopolitical approach is not frequent among experts on either geopolitical theory or polar affairs. Hence, in line with arguments of Dussouy (2010), Csurgai (2009) and Knell (2008), this work attempts to advance the study of international politics with a systemic geopolitical treatment.

So far, the research is not complete. It can be extended in several ways. Firstly, the study can be enriched by the assessment of the role of external actors, both national and international (e.g. China, European Union, United Nations). Secondly, internal links of inter-space affection (i.e. not only primary, but also secondary, tertiary, and higher order derivative effects) can be identified and assessed to a greater

extent. Thirdly, the Arctic states' strategies can be contrasted via the use of statistical apparatus, for example game theory. Fourthly, the subjective side of geopolitics (geopolitical representations, 'mental maps') can be added to the objective research, since the former may have a significant influence upon the latter. Finally, the role of supranational, sub-national, and non-state nodes, including the links between them, should also be assessed.

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Appendices:

Appendix A: Undiscovered oil and gas in the Arctic

a). Summary of Results of the Circum-Arctic Resources Appraisal by USGS

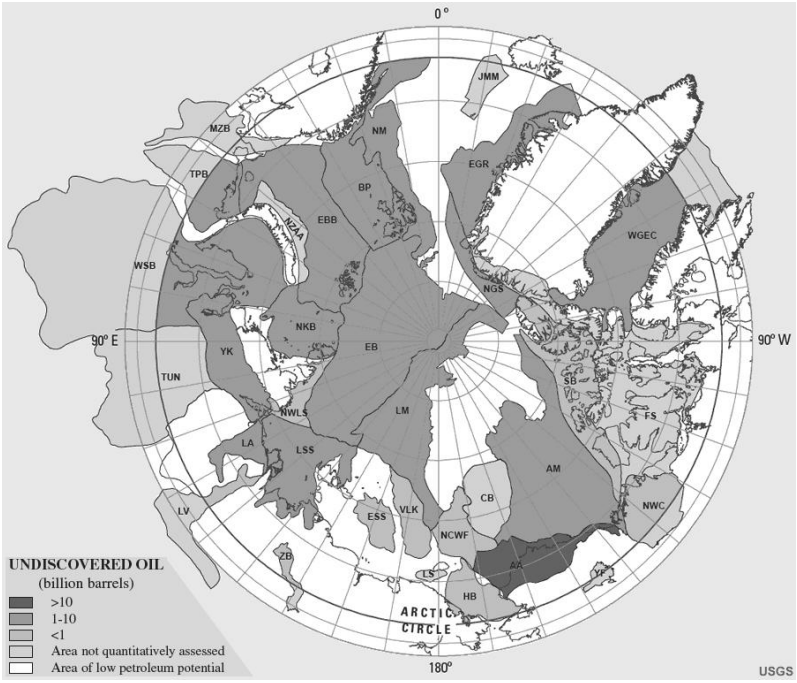
[MMBO, million barrels of oil; BCFG, billion cubic feet of natural gas; MMBNGL, million barrels of natural gas liquids; NQA, not quantitatively assessed. Results shown are fully risked mean estimates. For gas accumulations, all liquids are included as NGL (natural gas liquids). Provinces are listed in ranked order of total barrels of oil and oil-equivalent natural gas (BOE).]

Province Code	Province	Oil (MMBO)	Total Gas (BCFG)	NGL (MMBNGL)	BOE (MMBOE)
WSB	West Siberian Basin	3,659.88	651,498.56	20,328.69	132,571.66
AA	Arctic Alaska	29,960.94	221,397.60	5,904.97	72,765.52
EBB	East Barents Basin	7,406.49	317,557.97	1,422.28	61,755.10
EGR	East Greenland Rift Basins	8,902.13	86,180.06	8,121.57	31,387.04
YK	Yenisey-Khatanga Basin	5,583.74	99,964.26	2,675.15	24,919.61
AM	Amerasia Basin	9,723.58	56,891.21	541.69	19,747.14
WGEC	West Greenland-East Canada	7,274.40	51,818.16	1,152.59	17,063.35
LSS	Laptev Sea Shelf	3,115.57	32,562.84	867.16	9,409.87
NM	Norwegian Margin	1,437.29	32,281.01	504.73	7,322.19
BP	Barents Platform	2,055.51	26,218.67	278.71	6,704.00
EB	Eurasia Basin	1,342.15	19,475.43	520.26	5,108.31
NKB	North Kara Basins and Platforms	1,807.26	14,973.58	390.22	4,693.07
TPB	Timan-Pechora Basin	1,667.21	9,062.59	202.80	3,380.44
NGS	North Greenland Sheared Margin	1,349.80	10,207.24	273.09	3,324.09
LM	Lomonosov-Makarov	1,106.78	7,156.25	191.55	2,491.04
SB	Sverdrup Basin	851.11	8,596.36	191.20	2,475.04
LA	Lena-Anabar Basin	1,912.89	2,106.75	56.41	2,320.43
NCWF	North Chukchi-Wrangel Foreland Basin	85.99	6,065.76	106.57	1,203.52
VLK	Vilkitskii Basin	98.03	5,741.87	101.63	1,156.63
NWLS	Northwest Laptev Sea Shelf	172.24	4,488.12	119.63	1,039.90
LV	Lena-Vilyui Basin	376.86	1,335.20	35.66	635.06
ZB	Zyryanka Basin	47.82	1,505.99	40.14	338.95
ESS	East Siberian Sea Basin	19.73	618.83	10.91	133.78
HB	Hope Basin	2.47	648.17	11.37	121.87
NWC	Northwest Canada Interior Basins	23.34	305.34	15.24	89.47
MZB	Mezen' Basin	NQA	NQA	NQA	NQA
NZAA	Novaya Zemlya Basins and Admiralty Arch	NQA	NQA	NQA	NQA
TUN	Tunguska Basin	NQA	NQA	NQA	NQA
CB	Chuckhi Borderland	NQA	NQA	NQA	NQA
YF	Yukon Flats (part of Central Alaska Province)	NQA	NQA	NQA	NQA
LS	Long Strait	NQA	NQA	NQA	NQA
JMM	Jan Mayen Microcontinent	NQA	NQA	NQA	NQA
FS	Franklinian Shelf	NQA	NQA	NQA	NQA
Total		89,983.21	1,668,657.84	44,064.24	412,157.09

Source: Bird et al. 2008, p. 1

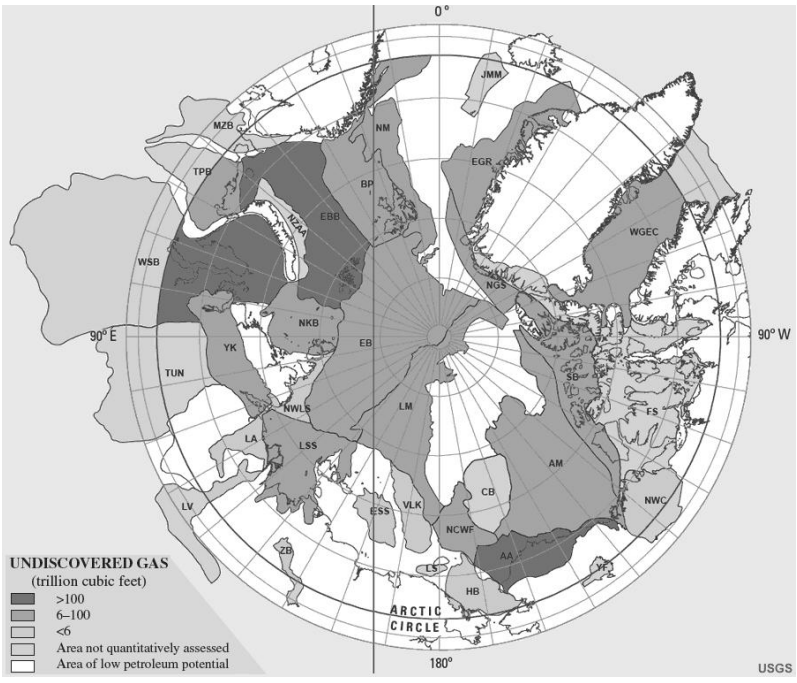
Appendix A *(continued)*: Undiscovered Oil and Gas in the Arctic

b). Undiscovered Oil within the Arctic Circle



Source: Bird et al. 2008, pp. 3-4

c). Undiscovered Gas within the Arctic Circle



Source: Bird et al. 2008, pp. 3-4

Appendix B: Military Space – Matrix of Symmetrical Relationships Showing Intensity

	Denmark	*Finland*	*Norway*	*Russia*	*Sweden*	*United States*
Canada	(**) OSCE NATO	(*) OSCE	(**) OSCE NATO	(*) OSCE	(*) OSCE	(***) OSCE NATO NORAD
Denmark		(**) OSCE NORDCAPS	(***) OSCE NATO NORDCAPS	(*) OSCE	(**) OSCE NORDCAPS	(**) OSCE NATO
Finland			(**) OSCE NORDCAPS	(*) OSCE	(**) OSCE NORDCAPS	(*) OSCE
Norway				(*) OSCE	(**) OSCE NORDCAPS	(**) OSCE NATO
Russia					(*) OSCE	(*) OSCE
Sweden						(*) OSCE

(*) – One-channel link ('shallow integration')
(**) – Two-channel link ('moderate integration')
(***) – Three-channel link ('deep integration')

	Canada	*Denmark*	*Finland*	*Norway*	*Russia*	*Sweden*	*United States*
Shallow integration (*)	Finland Russia Sweden	Russia	Canada Russia United States	Russia	Canada Denmark Finland Norway Sweden United States	Canada Russia United States	Finland Russia Sweden
Moderate integration (**)	Denmark Norway	Canada Finland Sweden United States	Denmark Norway Sweden	Canada Finland Sweden United States		Denmark Finland Norway	Denmark Norway
Deep integration (***)	United States	Norway		Denmark			Canada

Appendix C: Activities in Nature-Based Sectors in the Arctic Economic Regions

	Fishing	*Agriculture, livestock, forestry*	*Electric power production*	*Mining and petroleum*	*Tourism*	*(Maritime) transport activities*
Arctic Norway	Arctic cod, shrimp, capelin, salmon, trout	Reindeer-herding, hunting, trapping	Hydropower, windpower	Offshore oil and gas production, offshore exploration drilling, coal	App. 1.7 mill. guest nights in 2002	Many important navigation routes along the coast, from both Norway and Russia
Arctic Sweden	No significant fishing activity	Timber, barley, wheat, sugar beets, meat, milk	Hydropower	Iron ore, copper, lead, zinc, gold, silver, tungsten, uranium, arsenic, feldspar	App. 2.7% of GNP	Ice floes in the Gulf of Bothnia can interfere with maritime traffic
Arctic Finland	Inland fishing: herring, sprat, vendace, salmon, trout	Barley, oats, sugar beets, potatoes, milk, poultry, pigs, cattle, reindeer and forestry (timber)	Nuclear energy, wood fuel, oil, coal, natural gas, peat and hydropower	Iron ore, copper, lead, zinc, chromite, nickel, gold, silver, limestone	4.4 mill. guest nights in 2004	Ice floes in the Gulf of Bothnia can interfere with maritime traffic
Green-land	Northern prawns, halibut, lumpfish, snow crab, cod	Forage crops, garden and greenhouse vegetables, sheep, reindeer	Hydropower	Zinc, lead, iron ore, coal, molybdenum, gold, platinum, uranium, onshore oil and gas production	App. 64000 guest nights in 2004	Ships, aviation
Russia	*North-west:* cod, herring, saithe, capelin, northern shrimp, halibut; *Siberia*: no significant fishing activity; *Chukotka:* large-scale trawl fisheries, ground-fish (app. 90% walleye pollock)	Timber, much of the country lacks proper soils and climates (either too cold or too dry) for agriculture	Relies on fossil fuels for most of its electricity generation: app. 65% conventional thermal	Offshore and onshore oil and gas production and exploration, gemstones, fertilizer, nickel, copper, platinum, apatite, tin, diamonds, gold and coal	Science-based tourism and journalists. Rapidly growing industry	Unfavorably located in relation to major sea lanes of the world
Alaska	Ground-fish (app. 75% walleye pollock), salmon, halibut, shellfish	Timber, agriculture	Natural gas, hydropower, petroleum, coal	Mining for lead zinc and gold, off- and onshore oil and gas production and exploration	Season-dependent – 90% during the summer, but expanding	International air freight important
Canada	*West*: no significant fishing activity; *Center and East:* capelin, cod, sand lance, herring, halibut, plaice, snow crab, northern shrimp	Forestry, fur, trapping, greenhouse vegetable potential	Relies on fossil fuels for most of its electricity generation	Onshore oil production and onshore gas exploration, mining for diamonds, sand and gravel, lead, zinc, copper and gold	App. 85000 guest total in 2002, Aurora Tourism, vital and growing industry	Opening of north-west passage

Source: Glomsrod and Aslaksen 2006, p. 94 *(excerpts)*

Appendix D: Economic Space – Matrix of Symmetrical Relationships Showing Intensity

	Denmark	*Finland*	*Norway*	*Russia*	*Sweden*	*United States*
Canada	(*) WTO	(*) WTO	(*) WTO	(*) G-8	(*) WTO	(***) NAFTA WTO G-8
Denmark		(****) BEAC EU Nordic Council WTO	(****) BEAC EEA Nordic Council WTO	(**) BEAC PCA	(****) BEAC EU WTO Nordic Council	(*) WTO
Finland			(****) BEAC EEA WTO Nordic Council	(**) BEAC PCA	(****) BEAC EU WTO Nordic Council	(*) WTO
Norway				(*) BEAC	(****) BEAC EEA WTO Nordic Council	(*) WTO
Russia					(**) BEAC PCA	(*) G-8
Sweden						(*) WTO

(*) – One-channel link ('shallow integration')
(**) – Two-channel link ('moderate integration')
(***) – Three-channel link ('deep integration')
(****) – Four-channel link ('extra deep integration')

	Canada	*Denmark*	*Finland*	*Norway*	*Russia*	*Sweden*	*United States*
Shallow integration (*)	Denmark Finland Norway Russia Sweden	Canada United States	Canada United States	Canada Russia United States	Canada Norway United States	Canada United States	Denmark Finland Norway Russia Sweden
Moderate integration (**)		Russia	Russia		Denmark Finland Sweden	Russia	
Deep integration (***)	United States						Canada
Extra deep integration (****)		Finland Norway Sweden	Denmark Norway Sweden	Denmark Finland Sweden		Denmark Finland Norway	

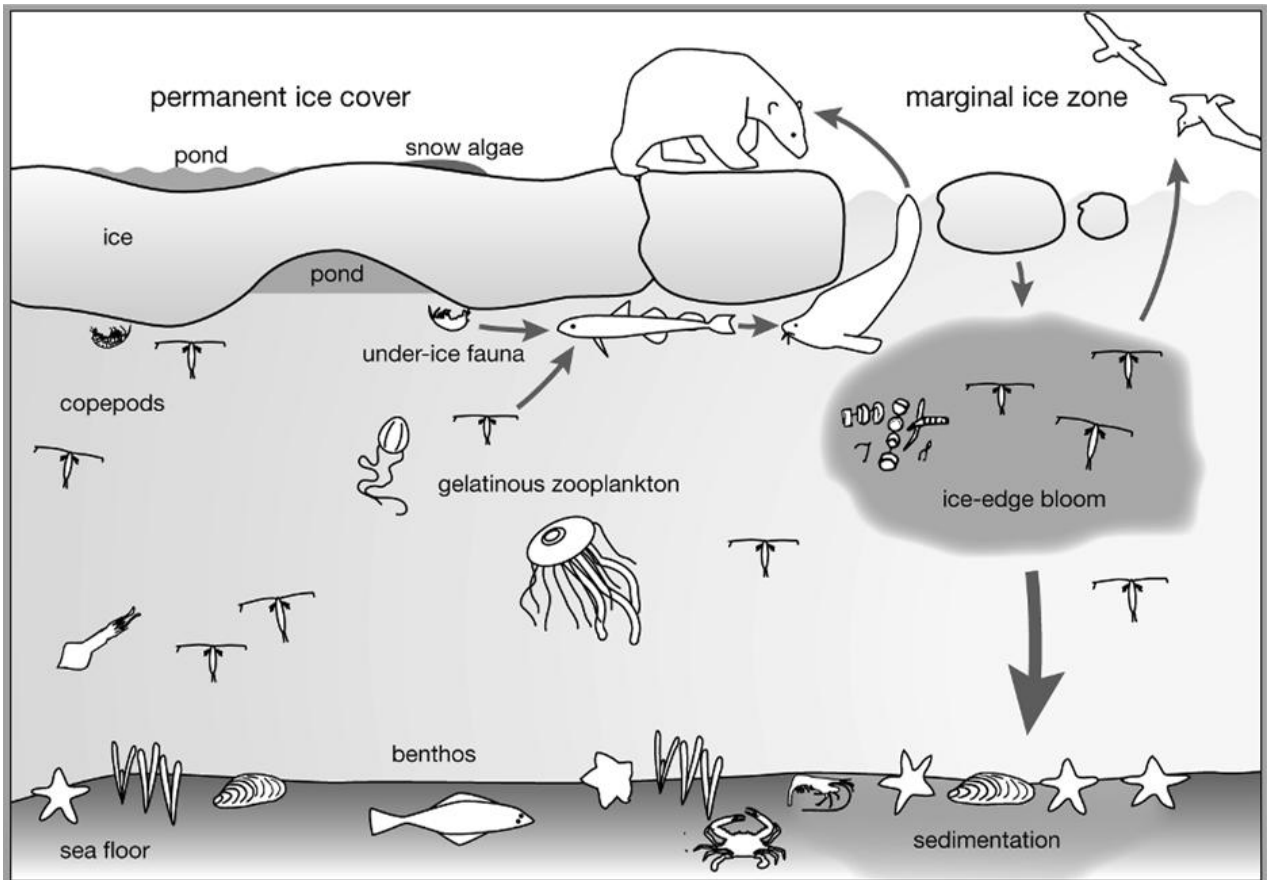
Appendix E: Demographic Space – Matrix of Symmetrical Relationships Showing Intensity

	Denmark	*Finland*	*Norway*	*Russia*	*Sweden*	*United States*
Canada	(**) AC ICC	(*) AC	(*) AC	(**) AC ICC	(*) AC	(****) AC AAC ICC GCI
Denmark		(*) AC	(*) AC	(**) AC ICC	(*) AC	(**) AC ICC
Finland			(**) AC SAAMI	(**) AC SAAMI	(**) AC SAAMI	(*) AC
Norway				(**) AC SAAMI	(**) AC SAAMI	(*) AC
Russia					(**) AC SAAMI	(***) AC AIA ICC
Sweden						(*) AC

(*) – One-channel link ('shallow integration')
(**) – Two-channel link ('moderate integration')
(***) – Three-channel link ('deep integration')
(****) – Four-channel links ('extra deep integration')

	Canada	*Denmark*	*Finland*	*Norway*	*Russia*	*Sweden*	*United States*
Shallow integration (*)	Finland Norway Sweden	Finland Norway Sweden	Denmark Canada United States	Denmark Canada United States		Canada Denmark United States	Finland Norway Sweden
Moderate integration (**)	Denmark Russia	Canada Russia United States	Norway Russia Sweden	Finland Russia Sweden	Canada Denmark Finland Norway Sweden	Finland Norway Russia	Denmark
Deep integration (***)					United States		Russia
Extra Deep Integration (****)	United States						Canada

Appendix F: The Effects of Climate Change on Arctic Biodiversity



Source: <www.arctic-council.org/article/2011/4/effects_of_sea-ice_loss_on_biodiversity>.

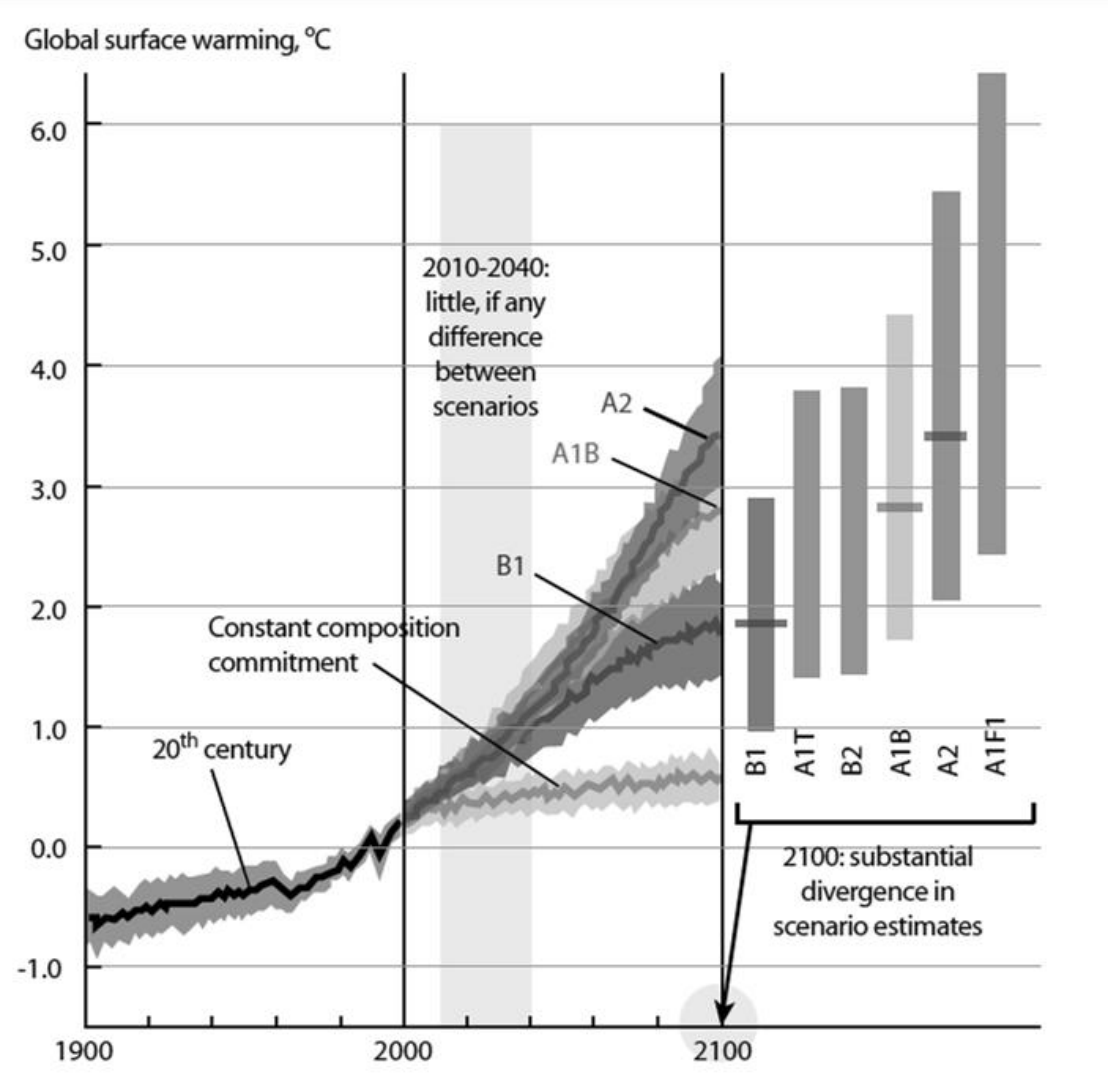
Appendix G: Arctic Sovereignty Claims

	Canada	Russia	Denmark	Norway	United States
UNCLOS ratification	2003	1997	2004	1996	Has not been ratified; approved by President Bush and Senate Foreign Relations Committee
UNCLOS submission	By 2013 Canada will make a "very strong claim", according to NR Minister Gary Lunn	Dec. 2001	By 2014	2006	No submission
Territorial claim	Submission pending; will be roughly 1 000 000 sq km	The largest Arctic claim: North Pole, extensions into the Central Arctic Ocean, the Bering Sea, the Barents Sea and the Sea of Okhotsk. Arctic states and UN call for more data	Submission pending	Extensions in three parts of the Arctic and northeast Atlantic: the Loop Hole in the Barents Sea; the Western Nansen Basin in the Arctic Ocean; and the Banana Hole in the Norwegian Sea. Further submissions to be made	No official UNCLOS claim
Existing disputes	Hans Island, Lincoln Sea (with Denmark); Beaufort Sea (with USA); Northwest Passage (with international community); Lomonosov Ridge (with Russia, Denmark)	Lomonosov Ridge and Mendeleev Ridge (with Canada, Denmark)	Lomonosov Ridge and Mendeleev Ridge (with Canada, Russia); Hans Island		Beaufort Sea (with Canada); Northwest Passage (with Canada). USA finds "major flaws" in Russian submission, claims Lomonosov Ridge outside of area state

Continued	Canada	Russia	Denmark	Norway	United States
Diplomatic action	Ilulissat Declaration; mapping partnership with USA (2008); mapping partnership with Denmark; Ambassador for Circumpolar Affairs (1994, since discont-ed); Founding chair, Arctic Council; supporting munitions clean-up in northern Russia; Hans Island weather monitoring (with Denmark)	Ilulissat Declaration; cooperate with Denmark on LOMROG mapping expedition; member, Arctic Council; treaty on maritime delimitation and cooperation in the Barents Sea ratified	Ilulissat Declaration (host); mapping partnership with Canada (LORITA-1); cooperate with Russia and Sweden on LOMROG mapping expedition; Hans Island weather monitoring (with Canada); member, Arctic Council	Ilulissat Declaration; current chair, Arctic Council; treaty on maritime delimitation and cooperation in the Barents Sea ratified	Ilulissat Declaration; member, Arctic Council
Military action	Plans to build two military bases: army training centre in Resolute Bay and deep-sea port in Nunalivut: yearly ranger patrols across the Arctic; $720 million icebreaker; $3 billion upgrade for warships and coastal patrol vessels	*Arktika* mission, 2007: flag-planting on North Pole; warship patrols in Arctic, first since Cold War; increased Russian air traffic in Canada's Arctic airspace; cooperation with Norway on Barents Sea oil and gas			U.S. Coast Guard icebreakers in Arctic (2007) to map Alaska's sea floor

Source: Crawford et al. 2008, pp. 15-6.

Appendix H: Model Projections of Global Warming under Different Scenarios



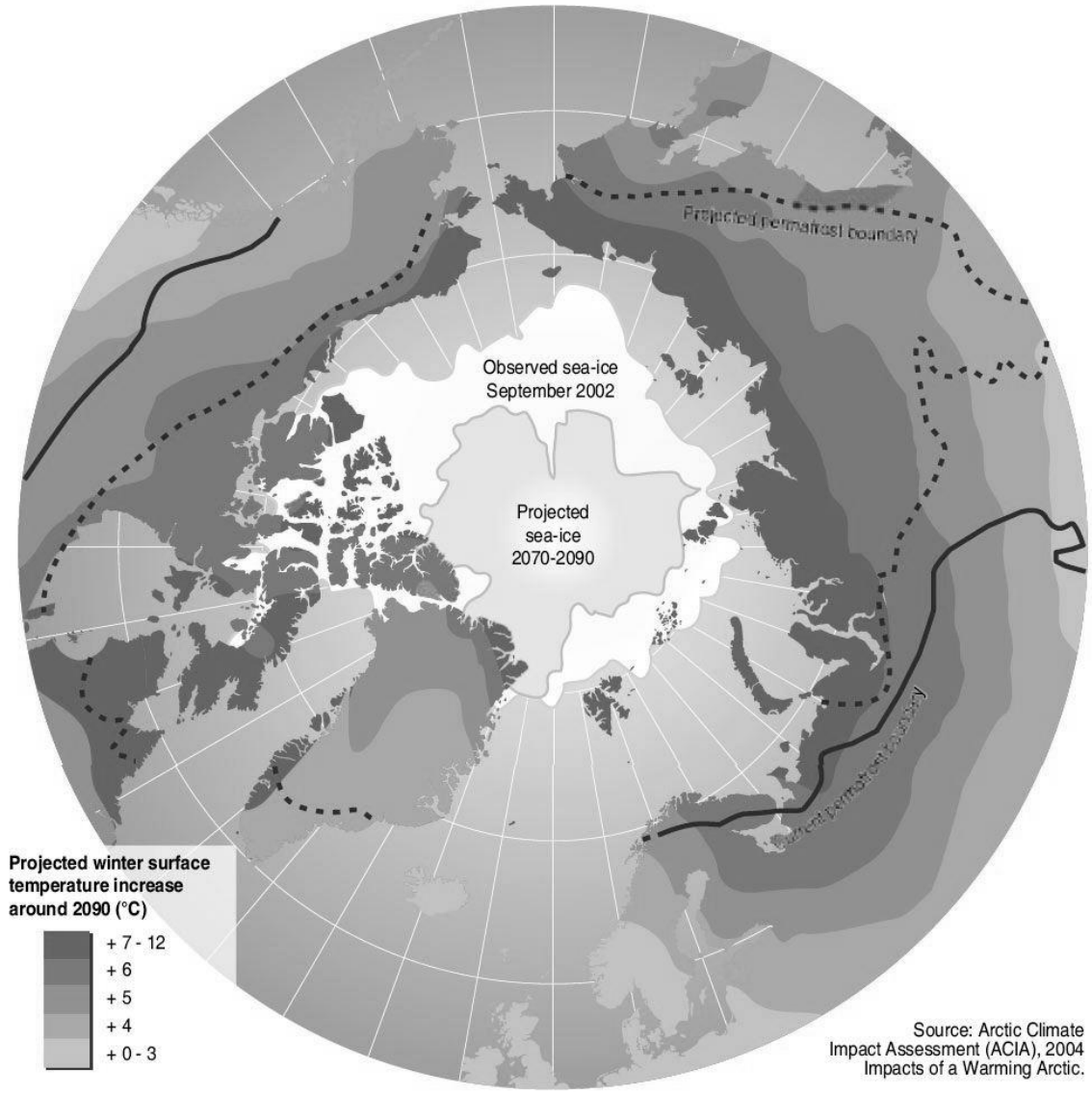
Source: AMAP 2009, p. 13.

Appendix I: Lawson W. Brigham's "Four Scenarios for 2040"

	Scenario One: *"Globalized Frontier"*	*Scenario Two:* *"Adaptive Frontier"*	*Scenario Three:* *"Fortress Frontier"*	*Scenario Four:* *"Equitable Frontier"*
Nature of international relations	Conflict	Cooperation	Conflict	Cooperation
Integration into global economy	Full, rapid	Limited, gradual	Limited, rapid	Full, gradual
Economic activity	Booming	Not yet booming	Booming	Not yet booming
Fishing	Free (Arctic States-only)	Regulated (Arctic States-only)	Free (Arctic States-only)	Regulated (Arctic States-only)
Air and marine traffic	National regulation	International regulation	National regulation	International regulation
Tourism	Flourishing	Flourishing	Flourishing	Flourishing
Impact of climatic change	Dramatic	Dramatic	Dramatic	Less dramatic
The profile of indigenous peoples' organizations	Limited	High	Limited	High
Scramble for the region	Arctic States assert their sovereignty over resources beyond 200 nm	Arctic States assert their sovereignty over resources beyond 200 nm	Arctic States assert their sovereignty over resources beyond 200 nm	Arctic States assert their sovereignty over resources beyond 200 nm
Role of the Arctic Council	Dispute resolution	Sustainable development, social inclusion	Economic and security concerns	Social equity, environmental well-being
Outside participation	Restricted	Partially-restricted	Restricted	Partially-restricted

Source: Brigham 2007, pp. 27-34.

Appendix J: Projected Sea-Ice and Winter Surface Temperature Increase around 2090 (^{o}C)



Source: Ahlenius et al. 2010, p. 34.