China seeking Arctic Resources - The Arctic seeking resources in China

Bislev, Ane Katrine; Gad, Ulrik Pram; Zeuthen, Jesper Willaing

Published in:
Arctic Yearbook

Publication date:
2018

Document Version
Publisher's PDF, also known as Version of record

2018 ARCTIC YEARBOOK

Arctic Development In Theory & In Practice

edited by: Lassi Heininen & Heather Exner-Pirot

nrf

Arctic Yearbook 2018

Heininen, L., & H. Exner-Pirot (eds.). (2018). *Arctic Yearbook 2018*. Akureyri, Iceland: Northern Research Forum. Available from https://arcticyearbook.com

ISSN 2298–2418

Cover Image Credit:

Olli Petterin

Dr. Alexander Pelyasov | Russian Academy of Sciences; Director of the Center of Northern and Arctic Economics; Ministry of Economic Development & Trade, Russian Federation

About Arctic Yearbook

The Arctic Yearbook is the outcome of the Northern Research Forum (NRF) and UArctic joint Thematic Network (TN) on Geopolitics and Security. The TN also organizes the annual Calotte Academy.

The Arctic Yearbook seeks to be the preeminent repository of critical analysis on the Arctic region, with a mandate to inform observers about the state of Arctic politics, governance and security. It is an international and interdisciplinary peer-reviewed publication, published online at https://arcticyearbook.com/ to ensure wide distribution and accessibility to a variety of stakeholders and readerss.

Arctic Yearbook material is obtained through a combination of invited contributions and an open call for papers. For more information on contributing to the Arctic Yearbook, or participating in the TN on Geopolitics and Security, contact the Editor, Lassi Heininen.

Acknowledgments

The Arctic Yearbook would like to acknowledge the Arctic Portal [http://arcticportal.org] for their generous technical support, especially Aevar Karl Karlsson; and the scholars who provided peer review of the academic articles. We would also like to thank the University of the Arctic for financial support of the cover design.

Arctic Yearbook 2018

Arctic Development: In Theory & In Practice

Table of Contents

Section IV: Research, Education & Arctic Development

Section V: Science Based Governance & Regulation of Arctic Energy Installations

Section VI: Russian Arctic Development & the Environment

Section VII: The Polar Silk Road & Arctic Maritime Development

Briefing Notes

Section I:
Front Matter

Preface

Arctic Development: In Theory & In Practice

Tero Vauraste, CEO Arctia Ltd. and Chairman, Arctic Economic Council

Mapping of the Arctic Sea started during the 15th century, as did efforts to trace various Arctic sea routes. A Finnish-born polar explorer, Adolf Nordenskiold, was the first to navigate the Northern Sea Route in 1878, successfully sailing from Norway through to the Pacific. Nordenskiold was made a baron but the Arctic was not ready for travel, trade and development. Livelihoods remained based upon traditional fishing and hunting.

Climate change impact in the Arctic area is very significant as the temperatures in the Arctic rise two to three times faster than the rest of the world. This is mostly due to human activity outside the Arctic.

The World Economic Forum has estimated that the Arctic investment potential is around one trillion USD. Approximately 20% of this investment opportunity lies in the Barents Euroarctic Area.

The energy sector is still considered to hold the greatest potential, but it's not just about hydrocarbons. The Arctic holds vast potential in renewables, including wind, hydro, geothermal, and solar. In the European Arctic, around half of the estimated economic potential is in the energy sector, divided 50/50 into hydrocarbons and renewables. Infrastructural potential is significant, too.

There are very big differences in productivity and significance of the Arctic areas in different countries. On one hand, the Russian Arctic provides more than 15% of the country's GDP, and Lapland's productivity in Finland is at a nationally high level. But in other areas the Arctic is still very poorly developed with weak or practically non-existing infrastructure. Unemployment rates

---

Tero Vauraste is President and CEO of Arctia, a Finnish polar maritime services company in icebreaking, research and oil spill response operating 11 icebreakers; and Chair of the Arctic Economic Council. He chairs the sub-committee of Maritime Issues of the Finland-China Innovation Committee. He has an MSc. in Risk, Crisis and Disaster Management from Leicester University. A Lieutenant-Commander, he has a Naval Officer's degree from the Finnish Naval Academy.

are higher and social problems more severe compared to the "Non-Arctic" areas of those countries.

For the Arctic's trillion-dollar potential to be realized, international financial value chains are a must. The cash is not going to come from Arctic taxpayers' pockets.

Several years ago, the Arctic Council Task Force recommended the establishment of the Arctic Economic Council and envisioned a "Pan-Arctic Free Trade Zone." Indeed, establishing strong market connections and ensuring market access within the region has become very important. As the international community works on outlining a model for Arctic development, this is more timely than ever; protectionism endangers sustainable development of the Arctic by inhibiting free exchange of the best-available technologies and services.

Free trade is not a threat to sovereignty, but protectionism is a threat to sustainability. Fortunately, there are exceptions to the trend – the EU-Canada Comprehensive Economic and Trade Agreement (CETA) and the EU-Japan Free Trade Agreements are important steps in this development.

The European Union launched its Arctic Policy in Winter 2016. There are three main areas in the policy: Climate Change and Safeguarding the Arctic Environment; Sustainable Development in and around the Arctic; and International Cooperation on Arctic Issues.

China similarly published its Arctic Policy Winter 2018 acknowledging the following goals: to understand, protect, develop and participate in the governance of the Arctic, safeguard the common interests of all countries and the international community, and promote sustainable development of the Arctic.

Both policies acknowledge the importance of international co-operation in decision making. This has become more and more important due to the recent unfortunate developments in international trade of new tariffs and other barriers.

The EU Arctic Policy notes that:

> The European part of the Arctic also has significant potential to support growth in the rest of Europe. However, as the EU does not currently have a complete north-south traffic connection, it could explore the merits of strengthening links to the Arctic through trans-European networks, for example from Finland to Norway, providing access to the Arctic Ocean.

Investment and business potential lie in the Arctic, at least theoretically. In practical terms there are many barriers, whereas the most significant one is protectionism. Challenging conditions, Indigenous rights and environmental aspects are important factors in economical and other decision making. The Arctic calls for decisionmakers' support in lowering barriers of trade for the best of sustainable export and import as well as tapping the investment potential of the Arctic.

Helsinki, 28 September 201

Arctic Yearbook 2018

Year in Review

Heather Exner-Pirot

2017/18

October 14, 2017 – Arctic Yearbook 2017 is launched in Reykjavik.

November 23 – The Inuit Circumpolar Council releases the recommendations of the Pikiakasorsuaq Commission calling for the creation of an Inuit-identified, Inuit-managed protected area between Canada and Greenland in the High Arctic.

November 30 – Arctic 5 + 5 agree to a fisheries accord. The *Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean* is formally signed October 3, 2018 in Greenland.

December 11 – Video of an emaciated polar bear goes viral after National Geographic posts it on their website. They later stated they went "too far" in conflating the bear's health condition with climate change.

January 26, 2018 – China releases its Arctic Policy through an official White Paper.

March 7 – The Arctic Council's Working Group on Emergency Prevention, Preparedness and Response (EPPR) runs a table top exercise on oil spill response in the Arctic in Oulu, Finland.

May 1-3 – Canada hosts the Arctic Security Forces Roundtable in Halifax – without Russia.

May 22-23 – Denmark and Greenland host a high-level meeting on the occasion of the 10 year anniversary of the Ilulissat Declaration.

May 23 – The Agreement on Enhancing International Arctic Scientific Cooperation, signed at the Arctic Council Ministerial in Fairbanks in May 2017, enters into force.

May 25 – The International Maritime Organization approves a joint proposal by the United States and the Russian Federation for safer ship routing in the Bering Strait and Bering Sea.

June 28 – U.S. President Donald Trump and Russian President Vladimir Putin meet in Helsinki; black carbon in the Arctic is referenced.

August 23 – Maersk sends its first container ship through the Northern Sea Route.

September 10 – *MV Xue Long II,* China's second research icebreaker, is launched.

September 15 – Canada's first Arctic Offshore and Patrol Vessel, *HMCS DeWOlf*, is launched.

October 11-12 – The Arctic Environment Ministers' Meeting is held in Rovaniemi, Finland.

October 25-26 – The 2nd Arctic Science Ministerial is held in Berlin, Germany.

November 1 – Arctic Yearbook 2018 is launched in Rovaniemi, Finland.

Introduction

Arctic Development, In Theory and In Practice

Heather Exner-Pirot & Lassi Heininen

Introduction

Few concepts are as contested as 'development'. It can have economic, political, or social implications, but in most cases connotes progress or improvement.

And then there is the concept of 'sustainable development', which has found substantial currency in the Arctic region, even consisting of one of the Arctic Council's two mandates. It adds an environmental caveat to the concept of development, contending that progress only happens if there isn't a permanent environmental cost to it.

Although Arctic governance, policy and social science is overwhelmingly concerned with development, it can be argued that the art and the science of it is poorly understood, though not for lack of effort. Arctic development is hard: tensions exist between industrial activity and environmental protection; and between Western and Indigenous perceptions of quality of life. Populations are sparse and remote, and so difficult to provide public services for. There is a widespread lack of labour and financial capital, affecting investment and prosperity. Infrastructure – roads, airports, ports, broadband, housing and hospitals - is expensive, where it exists at all. Southern or urban models of development don't usually apply, and even within the Arctic lessons learned do not always transfer across regions.

This year's Arctic Yearbook theme, "Arctic Development, In Theory and In Practice" is dedicated to better understanding development in the Arctic region: how can we improve the well-being and prosperity of the residents of the Arctic? What kind of development do we want, and how can it be practically achieved? Development is multifaceted; so too is the scholarly focus of the 2018 Arctic Yearbook. The articles in this volume approach these questions from a variety pf geographic, epistemological, and theoretical perspectives. As a whole, it continues discussions started in previous Arctic Yearbooks: on Change & Innovation (2017); Human Capital & Capacity (2014) and Governing & Governance (2015), addressing perennial questions of development.

Heather Exner-Pirot is the Managing Editor and Lassi Heininen is the Editor of the Arctic Yearbook.

Arctic Developments

Political

One bright spot in Arctic development has been political development. Few places in the world can claim to have assumed the level of innovation and ingenuity in political development as the Arctic since the 1970s, driven largely by Indigenous self-determination efforts at the local and sub-national levels; and by a proliferation at the regional level of international organizations such as the Arctic Council. While far from *terra nullius* before the Cold War period, the growth in formalized governance and legal structures in the region is remarkable.

At the same time political development in the Arctic is far from complete. There is an ongoing incongruity at the local level between ambitions for self-government and greater independence, and the tyranny of finances, whereby the tax base of northern polities is almost always inadequate to the need for public sector spending. Northern and Indigenous governments will not soon relinquish their dependence on resource revenues and/or southern capitals, though there are guidelines, such as the Circumpolar Inuit Declaration on Sovereignty in the Arctic and that on Resource Development Principles in Inuit Nunaat (in 2009), for economic self-sufficiency that redefine (state) sovereignty, including resource sovereignty.

At a regional level, the burgeoning constellation of environmental, marine and other regulations constitutes political progress. There remain concerns however that the global warming is causing the Arctic to change faster than governments can manage. The diversity of stakeholders – Indigenous and northern communities, scientists, industry, and environmental NGOs in addition to governments - likely means political development processes will continue to evolve and seek balance.

Social

Social elements of development are hard to define. While much of the world accepts the basic parameters of the UN Human Development Index – life expectancy, education and income per capita – it is considered inadequate in an Arctic context. Considerable effort has gone to quantifying Arctic social development, for example via the Arctic Social Indicators (ASI) and Survey of Living Conditions in the Arctic (SLiCA). Fate control and cultural vitality, for example, have a disproportionate importance in the Indigenous Arctic. And health encompasses much more than mortality, especially given the disproportionate burden of mental illness in the region, including substance abuse, depression, family violence and suicide, a result of colonialism and marginalization.

Having influence and control over education, health care, research; and the rate and nature of resource development; are essential elements to the quality of social development in the Arctic. So is meaningful occupation, whether in the form of wage employment, subsistence activities, school attendance or care giving. The transition from a traditional to a wage economy, and towards a globalized society, has disrupted social norms and ties. Arctic communities are seeking a new equilibrium in their social development, but there remains little consensus on what that should or will look like.

Economic

Economic development in the Arctic comes primarily in two very different shapes: industrial and local. Public discussions about Arctic development mostly focus on the former: oil & gas, large scale mineral development and global shipping. There is a reasonable amount of academic analyses on these topics, though they are often written from a commodities or markets-centred perspective, rather than an Arctic-specific one. Popular approaches to the subject often fall into a hype trap, assuming that Arctic commodities will be exploited based on conventional market forces without looking closely at the larger political, social, technical and environmental context dominated the aspect of centralization and controlled by states and their State-Owned Enterprises (SOEs), as well as Trans National Corporations (TNCs). Arctic resource development is highly subject to boom and bust periods, not only in exploration but in attention. The nuance and broader perspective provided by scholarly analyses is needed.

Local regional development in the Arctic remains a puzzle. We do not have a good handle on strategies to diversify economies, create jobs or attract investment in the rural Arctic beyond large scale resource development. This is exacerbated in the Indigenous territories of the North American and most of the Russian Arctic, where distances are vast, infrastructure is more limited, and a market-oriented culture has yet to develop. In the absence of a market economy, the public sector has flourished, but with the unintended consequence of making the development of small business a challenge in the North due to wage inflation, high costs and competition from government employers. Traditional economies – hunting, fishing, gathering and reindeer herding – remain important but often require participation in the wage economy to support the purchase of gasoline, snow machines/mobiles, rifles and other equipment. Tourism is often pointed to as a solution but is better seen as complementing, rather than leading, rural Arctic growth.

Despite the need, relatively little academic analysis has focused on regional economic development – at least not from an economics or business perspective (though tourism is proving an exception). The field is dominated by political scientists, anthropologists, geographers and sociologists; but has few economists. The results are predictable: economic development strategies that produce policies and recommendations divorced from basic economic principles.

Sustainable

The concept of sustainable development has an almost ethereal quality in the Arctic: the *raison d'être* of so many government policies and efforts. And yet it is essentially contested. If resource development is the basis of the Arctic economy, can it ever be truly sustainable? What happens when the two elements – sustainability and development – are at odds? Can you have political self-determination without economic development, and can you have economic development that is sustainable? If sustainable development consists of three elements: society, economics and the environment, can you have economic development that is sustainable without having clear, even strict, environmental regulations? In few places of the world is balance achieved; in the Arctic, the scales are arguably tipped in the direction of sustainability, as moratoria, regulations and protected areas dominate policy efforts. Efforts to promote entrepreneurship, small business development or the knowledge economy remain largely abstract.

The Arctic Council has as a mandate 'sustainable development' and a dedicated Working Group for the purpose. The Finnish Chairmanship has focused on making links between the United

Nations 2030 Sustainable Development Goals (SDGs) and the Arctic context. Furthermore, the question is if the SDGs, or the UN Global Compact 10 Principles, fit to the reality of Arctic local and regional actors, and reflect their priorities. But there is a sense that these have been imposed, or juxtaposed, on to the region. If everything is sustainable development, is anything sustainable development?

Arctic Yearbook 2018 Content

As an effort to address many of these questions and more, we are proud to publish here a comprehensive and diverse collection of articles all focused on solving a piece of the Arctic development puzzle.

The scholarly articles are divided into six sections addressing the issues of greatest contemporary interest in Arctic development.

Thinking About Arctic Development

A handful of articles provide some high level thinking on Arctic development history, character, and processes. Andrey N. Petrov, in his contribution entitled *Re-Tracing Development Paths: Exploring the Origins & Nature of the 20th Century's Northern Development Paradigms in Russia and Canada*, explores the history of the 20th century development 'projects' in Canada and Russia/USSR, focusing on the relationship between state-promoted modernization discourses, power, and development.

Maxwell C. McGrath-Horn & Ryan R. Uljua attempt to answer the question *Is the Arctic an Emerging Market?* in their article entitled the same. After discussing the prominent frameworks and assessing available data they find that by most customary metrics the Arctic is not a traditional emerging market, but rather a nascent transactional arena nestled inside of stable, highly developed economies where buyers and sellers nonetheless have difficulty in conducting transactions, particularly in capital markets.

Jessica Metuzals & Myra J. Hird examine the fundamental differences in approach between Western and Inuit epistemologies and development strategies using Areva's (now *Orano*), a uranium miner, efforts in Qamani'tuaq/Baker Lake in Nunavut, Canada, as a case study in their paper "*The Disease that Knowledge Must Cure"?: Sites of Uncertainty in Arctic Development*. The paper demonstrates how the differing approaches – with Areva seeking certainty and the Inuit community seeing uncertainty as a given, resulted in claims that were deeply contested and deconstructed when positioned against the contextual and relational knowledge of local residents.

Finding Sustainability in Development

Sustainable development is a hot topic, as well as a hotly debated topic. Several authors attempt to define and describe sustainable development in the Arctic and the efforts to advance it.

In his paper on *Indexing Arctic Urban Sustainable Development Planning Strategies: The Case of Russia*, Alexander Sergunin discusses possible indicators to evaluate the Sustainable Development Strategies (SDS) of the major industrial cities of the Russian Arctic, where efforts are ongoing to develop and implement the proper conceptual, legal and institutional settings.

Continuing the focus on cities, David Chapman, Kristina L. Nilsson, Agatino Rizzo and Agneta Larsson explore urban design principles for winter settlements in their article *Updating Winter: The*

Importance of Climate-Sensitive Urban Design for Winter Settlements. Winter communities have evolved lifestyles and means suited to living and working with local conditions and seasonal variation. However, climate change will cause changes in weather that will require adaptation in such communities.

Jørgen S. Søndergaard brings a more philosophical perspective on sustainable development, arguing about the importance of language in his article *When Words Matter: The Concept of "Sustainable Development" Derailed with Words Like "Economy,", "Social," & "Environment"*. The struggle for recognition of the cultural dimension as an integral part of sustainable development thus remains important in an Arctic context. Focusing on the main points of the Finnish Presidency's Arctic Council Program for the period 2017 - 2019, he concludes that the struggle to expand the understanding and definition of 'sustainable development' to include the cultural dimension - and thus go beyond "economy", "social" and "environment" - continues.

Naja Carina Steenholdt and Daniela Chimirri explore a case of local, sustainable development in the form of tourism in their article *Tourism & Quality of Life in Greenland: Exploration through farm Stays in South Greenlandic Settlements*. They explore how the developing tourism industry in South Greenland interrelates with resident quality of life in this area. By applying the bottom-up spillover theory as a theoretical frame, they investigate whether generated income from farm tourism can contribute to people's state of wellbeing, but find that there is more to wellbeing than "just" money.

Pierre-Louis Têtu, Jackie Dawson and Julia Olsen examine another aspect of Arctic tourism in *Navigating Governance Systems & Management Practices for Pleasure Craft Tourism in the Arctic*. Their study identifies practices regarding the management and governance of pleasure craft in Arctic regions, including inventorying national, regional and local regulations. Using data from secondary sources, statistical information, and Coast Guard reports, they discuss the diversity of management policies that exist throughout the Arctic that support and manage pleasure craft tourism, and conclude that harmonization of governance frameworks and improved reporting mechanisms among Arctic states could be beneficial.

Research, Education & Arctic Development

Perhaps more so than any other region, research is an integral aspect of Arctic development, for better and for worse. Who has the capacity to direct, conduct, and benefit from such research is a topic of debate. Samantha Darling, Aynslie Ogden and Gordon M. Hickey assess one aspect of this in their paper *Reviewing Northern Capacity for Enhancing Impact Assessment (IA) in Yukon Territory, Canada*. They explore the concept of 'capacity' in its various forms and considers its core relevance to ensuring effective IA processes associated with northern development. Through a literature review, they identify that ambiguity surrounding the concept of capacity requires careful policy attention to fully appreciate conditions that prompt appeals for increased northern research capacity and help minimize confusion amongst different actors and institutions working to build northern capacity.

Rapid development of digitization and replication technologies reveals a potential for empowering community heritage restoration and perpetuation, as well as strengthen abilities of distant stewardship institutions to improve access, improve community collaborations and enhance their capacity for cultural preservation. Medeia Csoba DeHass and Eric Hollinger address this

development potential for research in the Arctic in *3D Heritage Preservation & Indigenous Communities in the Circumpolar North.*

What role can education play in promoting development? A large network including Lau Øfjord Blaxekær, Martin Mohr Olsen, Hanne Thomasen, Maria Tammelin Gleerup, Sune Nordentoft Lauritsen, Anne Lise Kappel, Kristoffer Buch, Pål Simon Fernvall and Jay Friedlander describe one model in their paper *The Sustainable Development Goals & Student Entrepreneurship in the Arctic*. Their article analyses their joint project which sought to support the entrepreneurial potential among students to the benefit of the sustainable development of Arctic societies. The project built on two key frameworks: 1) The UN Sustainable Development Goals, and 2) The Abundance Cycle framework. By incorporating social, environmental as well as financial aspects, the internationally recognised Abundance Cycle framework provided an operational approach for working with sustainable entrepreneurship and a toolkit for incorporating sustainability thinking into teaching and entrepreneurial projects in higher education in the Arctic.

Mîtdlârak Lennert examines education from a grassroots perspective in *Coherence in the Greenlandic Education System? Educational Planning & Evaluation in Greenland from a Complexity Theory Perspective.* She analyzes Greenland's primary and lower secondary school governance system and how the central level design organizes and steers education systems across complex multilevel governance arrangements. How these central and decentralized levels interact and communicate, and how this affects trust, cooperation and negotiation of conflicts, and ultimately the outcomes of reform, is discussed using interviews with local officials and stakeholders, as well as field observation.

In another collaborative project, Kamilla Nørtoft, Sidse Carrol, Anu Siren, Peter Bjerregaard, Christina Viskum, Lytken Larsen, Merete Brædder, Lise Hounsgaard and Tenna Jensen discuss how collaboration between research and practice can be an important factor in sustainable development in *Enhancing Well-Being Among Older People in Greenland through Partnerships of Research, Practice & Civil Society*. In their project they study ageing policy, homecare, institutions, professional practices and the municipal administration of these as well as older people's health, well-being, everyday life and historical perceptions of the roles of older people in Greenland. Researchers and municipalities collaborate together to develop relevant and appropriate policies and initiatives.

Science Based Governance & Regulation of Arctic Energy Installations

This section provides an overview of the potential risks and impacts associated with the construction and operation of offshore installations in the Arctic, drawing on expertise from a range of disciplines including law, environmental science, management, and politics. The content of the special section has its roots in a network established with the support of the UK Arts and Humanities Research Council: The Science Based Governance and Regulation of Arctic Energy Installations Network (SciBAr Installations) and is guest edited by Elizabeth A. Kirk of Nottingham Trent University.

The papers give some indication of the range of relevant disciplines and issues to be addressed if we are to ensure a 360 degree review of the regulation of offshore energy installations in the Arctic. Thus Vinogradov & Azubuike take a traditional legal approach in assessing the current global and regional regulations relating to pollution from offshore petroleum operations in the Arctic and propose solutions to identified gaps in the existing Arctic regime in the form of a regional intergovernmental framework or an industry-wide compensation scheme. Kirk & Miller provide

an interdisciplinary analysis of the ways in which gaps in scientific understanding of the potential impacts from oil and gas installations on the marine environment may raise legal questions such as what "significant transboundary pollution" means in the Arctic context. Poppel's paper also directly links to oil and gas activities, but focuses more on the impacts or potential impacts on the political discourse in Greenland.

Two of the papers range slightly more widely, in that they address topics which encompass issues pertaining to Arctic offshore energy installations as well as broader issues. Thus Basaran's paper on civil liability for oil pollution has potential implications for the transit passage of oil tankers as well as pollution from shipping transporting oil from Arctic installations. Similarly, Andræsen, Borch & Ikonen's analysis of Arctic marine emergency response draws out how Arctic operational conditions add to inter-organizational coordination challenges in delivering emergency response to all maritime operations, not just those relating to offshore energy installations.

Russian Arctic Development & the Environment

Covering half the Arctic and with a majority of its inhabitants as well as its economic activity, there can be no discussion on Arctic development without addressing Russian Arctic development; and there is no addressing Russian Arctic development without discussing the environment.

Irina Chesnokova, Emma Likhacheva and Aleksandra Morozova look at the imminent environmental risks to the Russian Arctic in *Stable Development of the Natural Environment in the Arctic Region of the Russian Federation*. These dangers are associated with extreme climate conditions, the focal character of economic development, remoteness from major industrial centers, and low stability of ecological systems, which are susceptible even to minor climatic and anthropogenic impacts. Attention is paid to changing geocryological and geomorphological conditions, which lead to the activation of exogenous processes in the continental part of the Arctic zone.

Daryana Maximova considers the fundamental problem of ensuring sustainable development of the Arctic zone of the Russian Federation in her article *Sustainable Development of the Russian Arctic Zone: Challenges & Opportunities*. This paper examines the Russian Arctic's challenges and opportunities regarding sustainable development, including an analysis of the recent Russian plans in relation to the territorial development. These plans include the new edition of the Russian state program on the Arctic's socio-economic development, released in August 2017. The main idea of this document and the future law "On the Arctic Zone of the Russian Federation" is to create support zones which will be complex projects of social and economic development of the Arctic territories, with the Northern Sea Route as the main navigable artery and the central project.

Despite external perceptions, Russia has a notable, stewardly emphasis concerning the Arctic offshore environment. Troy J. Bouffard explains why in his article *Authoritarian Administration: An Environmental Paradox in the Russian Arctic*. He suggests that Russia not only enables deliberately different behaviors, but could also be setting conditions through its Arctic maritime environmental priorities in order to eventually leverage soft power for the purposes of contesting established international rules. In support of this examination, the use of authoritarian environmentalism provides the framework in which to view the evidence and perspectives.

In determining the economic efficiency, or rationale, for Russian Arctic oil and gas investment, purely commercial considerations are no longer sufficient due to high capital intensity, the use and

creation of special (innovative) materials, machinery and technologies, the lack of production infrastructure in most of the territories, and the increased sensitivity of the natural environment of the Arctic zone to man-caused stresses. Mansur H. Gazeev, Natalia A. Volynskaya and Anatoly B. Rybak develop a more realistic and comprehensive equation for investment in their article *Complex Efficiency Assessment of Development of Arctic Oil & Gas Resources in Russia.*

The Polar Silk Road & Arctic Maritime Development

The release this year of China's White Paper on Arctic policy, and their particular interest and potential for influence in polar shipping, led to a spate of analysis on the Polar Silk Road. Providing the context for this issue, Kong Soon Lim's article on *China's Arctic Policy & the Polar Silk Road Vision* considers three questions: (1) what are China's key interests in the Arctic, (2) what are the aims and basis of China's Arctic policy as outlined in the White Paper and (3) how does China's Arctic policy complement with its Polar Silk Road vision as an extension of its Belt and Road Initiative?

Examining this issue from a regional perspective is Lau Øfjord Blaxekær, Marc Lanteigne and Mingming Shi's*The Polar Silk Road & the West Nordic Region.* On the one hand, China's enhanced Arctic engagement and strategic collaboration with the Nordic region, which includes the Arctic, maritime economy, and bio-economy, seem very promising for West Nordic development. On the other hand, geo-political unease about Chinese investments in the Arctic raise questions about what happens when the large-scale geopolitics meet the micro-scale geopolitics of the West Nordic Region.

In *Arctic Blue Economic Corridor: China's Role in the Development of a New Connectivity Paradigm in the North*, Vasilii Erokhin, Gao Tianming and Zhang Xiuhua discuss the critical points in the implementation of China's paradigm of collaboration and connectivity in the Arctic. They further focus on the promotion of bilateral win-win investment and trade projects with the countries along the potential Arctic Blue Economic Corridor (ABEC). The authors conclude that the ABEC may be efficiently incorporated into China's Belt and Road network, but emphasize that specific technological and economic challenges have to be considered and met before a sustainable connectivity between the markets of Asia and Europe is established in the Arctic.

Derek Moscato examines how China's pursuits in the Arctic region are being perceived in *The Polar Silk Road in the Popular Press: Global Media Framing of China's 2018 Arctic Policy White Paper.* Drawing from media framing theory, his study establishes how three prominent media outlets from North America, Europe, and Asia covered China's high-profile Arctic publication. China's self-identification as a "Near-Arctic State" created an inevitable focal point for the press and subsequent dialogue highlighting the convergence of Chinese and Arctic affairs.

To conclude the section, Arctic Yearbook's Chair of its Editorial Board, Lawson Brigham, contributes his seventh straight commentary, this year focusing on *China's Polar Ships and Future Operations,* adding a dose of reality to the hyperbole one often finds in the Western media about Chinese capabilities in the Arctic.

Briefing Notes

Finally, as in previous volumes, the Arctic Yearbook 2018 contains a number of Briefing Notes – shorter, more analytical than theoretical pieces, on issues of current relevance.

Ashlee-Ann E. Pigford, Samantha Darling and Gordon M. Hickey describe the many expenses involved in contemporary, ethical Arctic research in *The Need to Better Unpack the Transaction Costs Associated with Northern Research in Canada.*

Afroja Khanam provides a much needed Global South perspective on the widespread impacts of global warming in her piece *On the Link between Climate Change and Forced Migration: The Impact of Climate Change in the Arctic and Global South – An Analysis in the Context of Bangladesh.*

Malgorzata Smieszek, Tahnee Prior and Olivia Matthews describe their exciting and increasingly influential initiative *Women of the Arctic: Bridging Policy, Research & Lived Experience.*

Stefan Brocza and Andreas Brocza offer their scepticism on the European Union's future involvement in the Arctic in their short article entitled *Less EU in the Arctic Region after 2020.*

Finally, Peter Kujawinski provides an eloquent summary of the *2018 Calotte Academy*, an annual travelling symposium crossing the Euro-Arctic which has been organised by Lassi Heininen for decades.

In addition, for the first time the Arctic Yearbook has published a separate Special Section, which we warmly welcome, on China & the Arctic, containing seven scholarly articles and one Briefing Note, and guest edited by Ane Bislev, Ulrik Pram Gad and Jesper Willaing Zeuthen. This timely collection, focusing on the recent Chinese White Paper on the Arctic, Chinese resource development, China's role in Arctic governance and politics, is available at: https://arcticyearbook.com/arctic-yearbook/2018/china-the-arctic.

Conclusion

Strategies for Arctic development remain a puzzle, despite, or perhaps because of, decades of state led efforts to grow economies, create jobs, improve health and wellness, and increase educational attainment. While investment and interest in Arctic scientific research has been growing over the past decade in the face of climate change, the academic research on Arctic development has largely stagnated, both intellectually and financially. This volume represents our effort to stimulate the field. Social science research cannot improve Arctic development outcomes in and of itself, but it is an essential component to finding smarter and more effective strategies that positively impact human wellbeing in the Circumpolar North.

Section II:

Thinking About Arctic Development

Re-Tracing Development Paths: Exploring the Origins and Nature of the 20th Century's Northern Development Paradigms in Russia and Canada

Andrey N. Petrov

This paper lays the ground for re-tracing and re-examining the 20th century discourses of regional development in the Russian and Canadian North. Comparing development paths of the two Norths in the 20th century, it is appropriate to ask whether these distinctions and commonalities stem from similarities and differences between development discourses in these regions. The paper explores the history of the 20th century development 'projects' in Canada and Russia/USSR focusing on the relationship between state-promoted modernization discourses, power, and development. In doing so, it also investigates the link between social construction and material production of the North. It argues that both development trajectories bear a considerable level of similarity attributable to the types of discourses that empowered the development policies in the 20th century. At the same time, it identifies differences which led to the divergence of development paths of the Canadian vs. Russian North.

Introduction

Public policies can be seen as institutionalized products of dominant discourses, empowered by regional development actors, e.g., state and corporations (Duhaime, 2010). In Jessop's terms (1990), discourses embraced by such 'hegemonic blocks' are societalized through societal structures and actor strategies, in which the state plays a central role. Therefore, when studying development policies, it is necessary to analyze the predominant discursive paradigms. Discourse is a socially embedded practice of obeying certain rules (Foucault, 1970). It is in possession of knowledge that is considered to be the 'truth', and it constructs a 'topic' (or a particular paradigm) by producing the objects of knowledge shared by people. A discourse of development is thus related to power, and through formal or informal means of regulating governs the behaviors of societal actors.

Andrey N. Petrov is Director the Arctic, Remote and Cold Territories Interdisciplinary Center (ARCTICenter), Department of Geography, University of Northern Iowa, USA.

This paper is an essay that attempts to lay the ground for re-tracing and re-examining the 20th century *discourses of regional development* in the Russian and Canadian Norths. Given both differences and similarities in regional development paths of the two Norths (Agranat, 1992; Barr & Bradshaw, 1983; Petrov, 2012), it is appropriate to ask whether they reflect distinctions and commonalities between development discourses in these regions. This paper sets up an argument that both development trajectories share a considerable level of similarities attributable to the types of discourses that empowered the (colonial) policies in the 20th century. At the same time, the study points to systemic differences that determined the divergence of the development paths of the Canadian vs. Russian Norths. Although the paper limits its analysis to a number of key texts and documents that most explicitly introduce and describe predominant discourses on northern development, the essay builds a case for further examination of archaeologies and genealogies of these discourses and their influence on development processes and outcomes in the Canadian and Russian Norths.

Northern Development in the Context of Global Development 'Projects'

In the 20th century, the northern frontier has been an object of discursive development policies and, in effect, has been a discursively constructed space (West, 1991). From the constructivist position, one may argue that the material being from the North and its development path is a reflection of discursive policies, empowered by social actors and societal institutions throughout the history of colonization. In order to unveil the nature of regional development regimes in the North, it is necessary to find out how development in the North has been socially produced. Therefore, one needs to contemplate the archaeologies and genealogies of hegemonic northern development discourses in Canada and Russia.

Any discussion of this matter, however, is impossible without placing development in the North into the global context of development projects that have been imposed around the "underdeveloped" world throughout the 20th century. Summarizing these experiences, Peet & Watts (1993) pointed out the existence of the dominant Western regional discursive formation of development that crosses political and geographic boundaries in shaping development doctrines. This formation (exposed and criticized in the postcolonial literature) presents an overarching framework for modernist discourses of development; a framework "calibrated around the relative weight attributed in its normative vision to the role of the state, the market, and civil institutions" (Peet & Watts, 1993: 233), all of which share a number of principal similarities. It is based on the normative views on development imported from the West (Escobar, 1995; Watts, 1993). Resting on assumptions and ideals invented by classical and neoclassical economists, equipped by the Western strategies of economic growth and enforced by the state or international organizations, the colonial development doctrine emphasizes industrialization, external aid and development planning. By emulating the Western economic success, development efforts were designed to fulfill a "civilizing mission" of colonialism and attempt to create "modernist utopias" (Scott, 1998), neither acknowledging economic differences nor appreciating cultural diversity around the world (Power, 2003). While the manifestation of the Western discourse of development are largely documented in the "Third World," the "internal colonies" within more developed countries have also been deeply affected (Sidaway, 2002).

Interpretation of development as a hegemonic discursive project (Radcliffe, 2005; Sidaway, 2007), applies to the Canadian and Russian Norths. The 'Western' discourse of development was intact in the northern frontier as much as it was in the 'developing' countries: "[t]he systemic exploitation and Othering of ethnically or spatially distinct populations" (Sidaway, 2002: 18-19) and the marginalization of internal colonies constituted the dynamics of the "settler capitalism" in Canada. As their counterparts in Asia, Latin America, and Africa, northern developers believed that "a majority of the people who live in the north want a change in present conditions which corresponds to what is generally understood as modernization" (Orvik, 1983: 11). Applied at the national scale, this development discourse juxtaposed the 'developed' mainland versus the 'underdeveloped' frontier; this justified the 'regime of truth', under which the superiority of 'developed' was unquestionable (Pretes, 1988). The assumption of the mainland's supremacy over the hinterland validated the state-led economic, political, and social intervention in the periphery.

The Canadian and Soviet development doctrines engaged the 'othering' of the North in order to separate the North from the South (just like the Orient from the Occident (Said, 1978)), to accentuate its dissimilarity and distinction through 'nordification' (West, 1991) and then to exploit and govern the North. Much like in other parts of the 'developing' world, 'othering' has been utilized and promoted by the state and corporations; this estrangement of the North is therefore used as a justification for commodification and means of governing it (see Watts, 2003 for a discussion of links between capitalism, governance and development). On the other hand, a 'dis-othering', i.e. the emulation of the Western (or, in the context of Russia and Canada, 'southern') development path, was the implicit objective of development policies. 'Dis-othering' through development served the task of making the North an exploitable and governable space.

The Canadian North

The invention of the "Canadian North" as a space of economic colonization is captured by Harold Innis's (1956) notion of a perpetual dichotomy between the North and the South ("mainland"). The "Innisian" hinterland discourse was a manifestation of the European colonial discourse, in which the alienation of the 'other' (e.g. the frontier, the North, the Orient) was a prerequisite for its subsequent exploitation by metropolis (Pretes, 1988). The 'staple theory' of Harold Innis continues to be one of the most powerful conceptualizations of the nature of the Canadian resource frontier (Barnes, 1993), and is considered foundational for understanding Canadian nordicity (Barnes, 1993; Evenden, 1999; Francis, 2003; Katerberg, 2003). For Innis "the economic history of Canada has been dominated by the discrepancy between the centre and the margin of western civilization" (Innis, 1956: 385). By this Innis favored the 'othering' of the North from the rest of Canada implying the alienation of the North from the South and subsequent exploitation of the former by the latter.

The Hudson's Bay Company that governed the Canadian North on behalf of the British government was engaged in exploiting the region, but never ventured to develop or settle it (Rich, 1958). Notably, this paradigm of colonization contrasted with the American 'Turnerism' practiced in colonizing the Great American West and the Canadian Prairies. The latter was a colonial discourse of acquisition and expropriation of the frontier (Francis, 2003), when the frontier has been deemed a continuation of the mainland, not its antipode (Wood, 2006). Although the immediate effect of both approaches was a subordination of colonized spaces and a 'cyclonic'

(using Innis's metaphor) nature of regional development (Barnes et al, 2001) in association with resource cycles and extreme instability of economies and population, the long-term differences emerged in the ability of regional systems to withstand the economic 'storms' and 'calms'.

However, by the early 1950s, the Canadian (or was it British?) discourse of development in the North underwent significant changes. The Canadian state found itself in a new political, economic and geographic environment, when the importance of northern resources and of the space itself increased (Pearson, 1946). In the emerging national consciousness with its mythical representation of Canada as a nation of the 'true North', the northern frontier has increasingly become "a resource and economic hinterland, which is simultaneously incorporated in a social spatialization as a mythic heartland" (Shields, 1991: 163). In addition, the country had to respond to the increasing demands of the resource-thirsty Fordism (Jensen, 1989) and to assert its political control over northlands. It also could no longer ignore critical social problems in the region and its socioeconomic backwardness, even compared to Alaska and Siberia (Rea, 1968).

The formal inauguration of the new discursive paradigm of developing the North came in the 1950s, when Canada's Prime Minister John Diefenbaker launched a new national policy for the North known as the Northern Vision. Diefenbaker's program emphasized the development of infrastructure and communication using public funds in order to facilitate access to resources and link staple regions with the south (Diefenbaker, 1958; Rea, 1976; Bone, 2003). Implicitly, this program aimed to make the North a more exploitable and governable space, a utopist land of modernization and prosperity. According to the new discursive paradigm, the federal and provincial governments assumed the responsibility for maintaining growth and welfare in the hinterland. They also implemented measures to facilitate Indigenous 'social modernization' (Hamilton, 1994). Development and planning were formally institutionalized through establishing and expanding responsible government agencies and passing regulatory legislation (e.g., "instant town" acts).

The Northern Vision was a manifestation of a new hegemonic discourse of northern development that may be termed 'Diefenbakerism'. Diefenbakerism brought about a doctrine of centrally-planned publicly-funded development and of shared responsibility between the state and monopolistic capital. It became a central component of the new development regime in the Canadian North. This regime, dominant in the 1950-1970s, secured the rapid expansion of resource exploitation through the ideologies of Fordism. Not entirely dis-alienating the frontier, Diefenbakerism moved closer to 'Turnerism' in its desire to make the North an integral part of the national territory and national identity. Not accidentally, Diefenbaker offered this metaphorical connection in his Northern Vision speech: "Sir John A. Macdonald … opened the West. He saw Canada from East to West. I see a new Canada - a Canada of the North" (Diefenbaker, 1958: 1).

Diefenbakerism was almost uncontested until the early 1970s, when alternative counter-discourses, propelled by environmentalism and Aboriginalism, began to emerge (Hayter, 2003). The adequacy of the industrialism (and "high modernism" as termed by Scott in 1998) for delivering viability to northern regions was boldly challenged. The 1972 Federal Government strategy of northern development demonstrated a shift towards mixed development, community viability, environmental issues and Aboriginal people. The policy studies by the Canadian Council on Rural Development (1974) and the Science Council (1977) advocated abandoning the objective of "industrial growth" by means of mega-projects in favor of "locally based development strategies"

and mixed development options (industrial and traditional sectors, non-renewable and renewable resources (Barrie, 1987: 97). Most vocally, the Diefenbakerist doctrine was confronted in the Berger's inquiry (1977) that disputed the legacy of resource mega-projects and emphasized the importance to Indigenous rights and institutions in regional development. In essence, these writings outlined a counter-discourse that rejected the idea of "opening and modernizing the North," i.e. the central premises of Diefenbakerism and the Western development discourse in general.

The Soviet North

The development regime in the Russian-Soviet North was based on different, although not completely opposite, approaches. Much like in Canada, the Soviet discourse of developing the North was based on 'othering' the North from the mainland and assigning a unique role to the region in the national mythology. If the Canadian northern development discourse could be traced to Harold Innis, the genealogy of the Soviet one points to Vladimir Lenin. However, Bolsheviks' views largely inherited the core components of the Russian Imperial discourse on Siberia. In the public consciousness of the Imperial Russia, Siberia has always been the 'other', but yet has been considered 'ours' (Weiss, 2007). Much like the American West, Siberia emerged as a mythical realm of future power and prosperity, therefore an exotic, yet, integral part of Russia.

After taking power, Lenin (1918) strongly promoted the idea of rapid exploration and development of the North. A new discourse of development fully emerged in the 1920s, when the Bolsheviks' government proposed an ambitious plan of economic and social development of the country, known as the State Commission for the Electrification of Russia (GOELRO) plan (Bandman & Chistobaev, 1990). The leitmotif of GOELRO, derived from the Marxist economic theory, was the "rationalization of allocation of productive forces" based on the geographic division of labor. GOELRO propagated the minimization of transportation costs by moving production closer to raw materials. In addition, GOELRO as a spatial planning document, advocated so called "complex" development (Granik, 1971). The regional economy was based on developing "not of one industry, not one factory, but of *a sum of all* economic relations, *sum of all* economic turnover" (Lenin, 1918 (1972), emph. orig.). The origins of the GOELRO strategy could be found in Marx's and more extensively in Engels's works, by whose writings Bolshevik's agenda was justified.

In *"Anti-Duhring"* Engels contended that "large scale industry has hereby to a considerable extent freed production from the restrictions of space…Society liberated from the barriers of capitalist production can go much further still" and reach "the most equal distribution possible of large scale industry over the whole country" (as cited in Hill & Gaddy, 2003). This 'Engels dictum' became a major discourse of the Soviet planning and economic geography. Laid upon Lenin's concept of complex economic and social development, the paradigm of the equalization of development across the county was seized as a goal of socialism. Not surprisingly, a great Soviet explorer and geographer Ivan Papanin called the development of the North "a ring in a chain of the great [socialist] transformation of the country" (Papanin, 1977: 141, translation *A.P.*).

Soviet planners fully embraced this discourse. The themes of "the conquest of the North" and "overcoming the nature" became quintessential for planning in the early Soviet period (e.g., Sergeev, 1949). Northern romanticism and desire to drastically transform the North were going hand-in-hand with policies of socialist collectivization and industrialization (McCannon, 1998),

which these planners designed. It is quite interesting that some romantic and development clichés were borrowed directly from the North American experience, specifically from the Turnerist practices of territorial acquisition by conquering and populating the hinterland.

For example, an article with an intriguing title "Canadianization of the Murmansk Railway" (Chirkin, 1923), published in one of the northern Russia local magazines in the early 1920s advocated using the Canadian Prairies experience to colonize the Russian North. (A Turnerist discourse was prevalent in the Canadian Prairies, but has not been 'extended' to the Canadian Far North (Wood, 2006)). Canadians, in this article author's opinion, introduced a successful system of attracting settlers and investment to areas along the newly built transcontinental railways that, he argued, should be adopted in Russia. In other literature sources of the time, the references to the "Canadian scheme" of development have also been made in relation to the settlement of peasants in Siberia (Voronov, 2006).

By accepting a more proactive modernization paradigm, the Soviet discourse and associated policy of northern development substantially diverged from the Canadian discourse of that time. In fact, it appears to be closer to Turnerism; it viewed the frontier as an extension and not an adversary of the core. The North was "true" and "purely" Soviet, just like the Great West was American (i.e., an extension of the U.S. eastern core). The Soviet discourse empowered ideas of *acquisition* and *expropriation* of the North-space and its resources. This fundamental difference is the ultimate reason for drastically more extensive development of the Soviet North.

The early Soviet discourse of the North was a discourse of romanticism and modernistic triumphalism. From heroic explorers (Papanin, 1977) to economic planners (Slavin, 1972) and the general public (see McCannon, 1998), there was a common belief in making the North a Soviet stronghold. Some geographers even argued that soon enough the North will shrink and eventually become an irrelevant concept, because it would be indistinguishable from the rest of the country (Sergeev, 1949). It is interesting to mention that the Russian/Soviet literature on the subject has always used the term '*osvoenie'* to describe the process of development in the northern frontier. *Osvoenie* literally means "making something your own". *Osvoenie*, implies not merely domestication, but expropriation and acquisition. In Russian texts, it is often conflated with modernization, settlement, and resource exploitation (Agranat, 1984; Bandman & Chistobaev, 1990; Slavin, 1972; Karpov, 1972).

The dominant discourse materialized in public policies. In 1932, the Soviet Government (State Committee for Planning or Gosplan) adopted the concept of northern development, which required including the North into the plans of 'rational [i.e., equalized or even] distribution of productive forces' (Letopis' Severa, 1979). It was argued that single-industry development was disadvantageous and against the principles of socialist political economy, which required balancing among economic sectors in each region (Egorov & Lischenok, 1987). It was believed that northern regions would ultimately become self-sufficient. At this point, the Soviet discourse of hinterland development substantially diverged from the Canadian colonial discourse of the pre-Diefenbaker times. The Soviet paradigm of 'conquering' the North magnified and empowered the Turnerist ideas of acquisition and expropriation of the frontier space and its' resources. Soviet regional planning was building upon the ideology of acquiring and remaking the North by expropriating its' riches for the Stalinist "mobilization economy" (Gregory, 2003; McCannon, 1998). The

economic ideology also served a geopolitical goal of Soviet planners to re-construct Soviet nation-space and make the USSR self-sufficient through the extraction of natural resources.

The orthodox paradigm of northern development was challenged by the Party's discontent with the slowing rates of economic growth and by the strengthening counter-discourse of development that demanded a quicker and less costly exploitation of northern resources. The adoption of the Third Program of the Communist Party cemented the shift. The new doctrine now advocated a "temporary" resource-reliant variant of regional development in the North: "in order to save time, first of all to use natural resources available for quick extraction and giving the largest economic effect" (Programma KPSS, 1961: 74). Thus, the Soviet discourse since has been focused on resource exploitation of the northern space, a paradigm inherited in the post-Soviet times. This shift is important to explain persisting economic marginality as well as sectoral and geographic disproportions in regional development in the Russian North.

Discourse, Power and Development: The State in the Norths

The role of the State in the formation and empowering of northern development discourses and policy in Canada and USSR/Russia deserves specific focus to fully grasp. Foucault argued that discourse and knowledge are related to power; the discourse is regulatory, and it legislates inclusions, exclusions, and criteria for acceptability. This may be expressed in forms of governmentality that sets 'rituals of truth' and creates a particular style of subjectivity with which one conforms to or resists (Foucault, 1970). The role of the State as a conveyer of governmentality is crucial for the production of the discourse of northern development. Capitalist and communist states both propagated northern development and modernization. The State, as an institution and societal structure, empowered through implementing governmentality, facilitated creating the 'regimes of truth' about the North suitable for its own interests, which were discursively understood in terms of recourse expansion and development. Certainly, the Soviet northern economic development policies are an outstanding example of the state-enforced ideological dogmatism (Hill & Gaddy, 2003); however, the northern planning in Canada was also heavily influenced by the government, which determined the allocation of a large share of research and development funding in the North (Barre, 1987).

In other words, the *State has controlled the state of the North* in both the USSR and Canada. Since in both countries the State has always been the central negotiator and actor in the 'hegemonic project' of developing the frontier, the history of regional development policy-making in the North can be well illustrated by the history of government interventions. Whereas the analysis of public development policies in the Canadian and Russian North is outside the scope of this paper, the bottom line here is that the evolution of development paradigms (propagated by the State) has always been followed by the transformation of public policies (enforced by the State).

From Social Construction to Material Production of the North

How did the discourses of northern development in the 20th century impact material production of the Norths? Table 1 attempts to associate selected characteristics of northern development, shared by the two development regimes, with their outcomes (elaborated from the framework proposed by Bourne (2000)). Given the previous discussion, it is not surprising that the strategies of development in Canada and Russia produced rather similar and disappointing outcomes, for

instance, in respect to relative economic prosperity (Glomsrød et al., 2015) and community well-being (Larsen & Fondahl, 2014; Larsen et al., 2015). The colonial developmentalist project in the North showed poor results — in the sense that it was unsuccessful in mitigating perpetual marginality and delivering sustainability to northern regions. Instead, it generally exacerbated the levels of marginality and worsened dependency and vulnerability of northern economies. This approach to development in the North was unsuccessful much like their counterparts in the Third World (Watts, 1993; Escobar, 1995; Scott, 1998).

Table 1. Selected similarities of Canadian and Soviet northern development and development outcomes

20th Century Development Policy Characteristics	**Development Outcomes**
• Modernist imperatives • Paternalism • Inadequate planning • Mega-projects • Political dependency • Neglect to Indigenous cultures • State intervention	• Marginalization of locals • Culture of dependency • Dependency on government, social marginalization, and high mobility • Environmental destruction & dislocation of people and resources • Powerlessness • Social marginalization • Bureaucratization

The fundamental reason for the lack of success of the 20th century development projects has been suggested by the 'postdevelopment' scholarship: the modernist normative premises of development (and of "high modernism" in economic planning), upon which the western development project was constructed in the 'developing' world, brought this effort to a devastating collapse (Escobar, 1995). Another fundamental problem, associated with both development regimes in the North is that discursive public policies were responsible for creating hegemonic inequities between the North and South and among northern regions (Petrov, 2012). This not only undermined the development of regional economic sovereignty and political power as well as deepened dependency of the North, but also placed northern communities in the midst of the conflict between various levels of government, different ministries, and corporations.

It is also important to convey that northern development projects in Russian and Canada exhibited considerable differences. Table 2 (below) summarizes some of them. Major dissimilarities stem from the origins of the discursive formations and their evolution in both countries, for example, the Innisian approach to development of the frontier vs. the Russian version of Turnerism dominated in the USSR.

Indeed, the development regimes in the North have not been completely unsuccessful. After all, resource extraction in the Norths has continued and expanded throughout many decades. In fact, resource economy worked well for some places and for some periods of time. Regions involved in mega-projects received enormous investments, drastically improved their infrastructure and population well-being (Agranat, 1992; Rea, 1976; Slavin, 1972).

Table 2. Selected differences of Canadian and Soviet northern development and development outcomes

Canada	USSR/Russia	Development Outcomes
Exploitation and 'othering' of the North ("Innisianism")	Expropriation and acquisition of the North ("Turnerism")	Greater exploitation of resources, grand scale of development, resettlement of millions to the Soviet North
Small/medium scale development	Very large scale development	Large cities, overpopulation, developed infrastructure, major extractive operations in the Soviet North
Slower tempo of development	High tempo of development	Planning lagged behind development, mismanagement of growth in the Soviet North
Relatively low level of national resource mobilization for development	Low level of national resource mobilization for development	Enormous financial, labor, social, infrastructure commitments in the Soviet North that was hard to maintain.

Workers in the northern wage sector were well paid and lived in state of the art industrial towns developed through urban planning and design (Stelter & Artibise, 1978). The material wellbeing and employment in Indigenous communities generally increased (Stabler & Howe, 1990), although the welfare gap has never been closed (Petrov et al., 2015) and negative impacts always accompany and often surpass the benefits. As powerful cyclones (Barnes et al., 2001), these development surges dissipated, often leaving ruins with intermittent miniscule successes behind (Hayter, 2003, Gaxinger et al., 2016).

As the result of the fundamental inadequacies of the 20th century development policies, both the Canadian and Russian North continue to share high levels of economic, political, and social marginality. Although some radical thinkers have questioned the very possibility to 'develop the North' (Pivovarov, 1997; Howard & Widdowson, 1999), it is certain that developmental projects in the North are far from being over. This optimistic view may be related to at least two considerations: a continuing (and increasing) importance of northern resources as the assets of the future and a surge of the post-developmentalist discourses of regional renewal (both globally and locally) aimed at bringing sustainable development to the northern peripheries. The emphasis on regional growth as endogenous and socially embedded it appears, perhaps may also be helpful in devising new northern policies (House, 2003; Southcott, 2015; Petrov, 2016).

Concluding Remarks

Being the products of the Western development discursive paradigm, the 20th century Soviet and Canadian northern development projects shared some principal commonalities. As in other parts of the 'developing' world, they included 'othering' and subordinating the North to the metropolis.

The normative development paradigm attempted to dis-other the North by emulating development paths of the 'South'. Whereas the ideological bases of the Canadian and Soviet development discourses were different, the idea of 'taking care' of the North by 'taking advantage' of its' resources was the key value that both countries embodied through their actions; as was the idea of State involvement and State intervention as a primary regulation mechanism. In congruence with other authors (Bolotova, 2004; Hill & Gaddy, 2003; Watts, 1993) we can observe that the common discursive elements of the development regimes in the Norths included: a teleological modernist approach to planning based on normative and discursively constructed set of goals, the conception of nature as an object of activity and as an inexhaustible storage of resources, the mythology of frontier as an empty space which ultimately devoid its own value and meaning, the ideology of 'othering' the North from the South, and the positioning of state as a primary actor and the leader in the developmentalist 'hegemonic block'. However, a many important questions remain unanswered. Among them how different are the current, 21st century's, development models of the North from its 20th century predecessors and have the lessons been learned and what do they mean under the new circumstances (such as globalization, climate change, Indigenous self-governance, post-colonialism, etc.)?

References

Agranat G. A., 192. *Vozmozhnisti i Real'nisti Osvoeniya Severa: Global'nye Uroki [Opportunities and Realities of Developing the North]*. (VNIITI, Moskva).

Agranat, G.A., 1984. Ispol'zovanie resursov i osvoenie zarubezhnogo Severa. Moscow.

Bandman M. K. and Chistobaev A. I., (Eds) 1990. *Territorial'no-proizvodstvennye Kompleksy: Opyt i Problemy Formirovanii`a.* (Nauka, Leningrad)

Barnes, T. 1993. Knowing where you stand: Harold Innis, Staple theory and local models. *Canadian Geographer*, 37, 357-360

Barnes, T., Hayter, R., Hay, E., 2001. "Stormy weather: Cyclones, Harold Innis, and Port Alberni, BC" *Environment and Planning, A* 33, 2127–2147.

Barr, B. M., Bradshaw M. J., 1983. "Canadian and Soviet Policies of Northern Development: A Comparative Analysis of Approaches to Remote Areas in Northern Canada and Soviet Siberia" *The Albertan Geographer,* 19, 1-16.

Barre de la, K., 1987. "Strategies in Northern development in Canada since the late 1960s" *Acta Borealia,* 1-2, 91-118.

Berger, T., 1977. *Northern Frontier – Northern Homeland. Mackenzie Valley Pipeline Inquiry Report*: Ottawa.

Bolotova, A., 2004. Colonization of nature in the Soviet Union. State ideology, public discourse, and the experience of geologists. *Historical Social Research/Historische Sozialforschung*, 104-123.

Bone, R. M., 2003. *The Geography of the Canadian North: Issues and Challenges* (Oxford University Press, Toronto)

Bourne, L. S., 2000. "Living on the edge: Conditions of marginality in the Canadian urban system" in *Developing frontier cities. Global perspective – Regional contexts* (Eds). H. Lithwick, Y. Gradus. Kulwer Academic Publishers, Boston. USA.

Careless, J. M. S., 1989. *Frontier and Metropolis: Regions, Cities, and Identity in Canada before 1914.* University of Toronto Press: Toronto.

Canadian Council on Rural Development. 1976. *A Development Strategy for the Mid-North of Canada* Ottawa.

Chirkin, G. 1923. "Kanadizatsiya" Murmanskoi Zheleznoi dorogi, Vestnik Murmanskoi Zheleznoi Dorogi, 1, 2-4 and 2, 1-2.

Diefenbaker, J., 1958. A *New Vision. A speech at the Civic Auditorium*, Winnipeg, 12 February 1958. Retrieved from, http://www.canadahistory.com/sections/documents/Primeministers/diefenbaker/docs-thenorthernvision.htm, March 12th, 2010.

Duhaime, G., 2010. "Theoretical foundations for the study of Arctic development models" In Winther, G (Ed.), *The Political Economy of Northern Regional Development Vol. 1* (Copenhagen: Nordic Council of Ministers), 41-54.

Egorov, E. G. and Lischenok, S. N., 1987. Metodologicheskie aspekty issledovanii ekonomiki Severa. Nauka, Novosibirsk.

Escobar, A., 1995. *Encountering Development: The Making and Unmaking of the Third World* (Princeton University Press, Princeton, NJ)

Evenden, M. 1999. The Northern Vision of Harold Innis. *Journal of Canadian studies*, 34(3), 162-186.

Foucault, M., 1970. The *Archaeology of Knowledge and the Discourse on Language* (Pantheon books, New York).

Francis, R. D., 2003 "Turner versus Innis: Bridging the gap" *The American Review of Canadian Studies* 33(4), 473-485.

Granik, G. I., 1971. *Ekonomicheskie Problemy Razvitiia i Razmeshcheniia Proizvoditel'nykh Sil Evropeyiskogo Severa SSSR,* Nauka, Moskva.

Gregory, P., 2003. *Political Economy of Stalinism* (Cambridge University Press, Cambridge)

Hamilton, J. D., 1994. *Arctic Revolution: Social Change in the NWT 1935-1994,* Dundurn Press, Toronto, Canada.

Glomsrod, S., Duhaime, G. and Aslaksen, I., (2015). The Economy of the North 2015 *(ECONOR III)*. Statistics Norway.

Hayter, R. 2003. "The War in the Woods": Post-Fordist Restructuring, Globalization, and the Contested Remapping of British Columbia's Forest Economy" *Annals of the Association of American Geographers,* 93(3), 706-729.

Hill, F. and Gaddy, C., 2003. Siberian curse. How communist planners left Russia out in the cold. Brookings Inst. Press: Washington, DC.

House, J. D., 1993. "Knowledge-based Development in the North: New Approaches to Sustainable Development" In *Politics and Sustainable Growth in the Arctic* Ed J Käkönen (Aldershot: Dartmouth) (pp 81-91).

Howard, A., and F. Widdowson. 1999. "The disaster of Nunavut" *Policy Options*. Jul-Aug., 58-61.

Innis, H., 1956. *The Fur Trade in Canada: An Introduction to Canadian Economic History*, University of Toronto Press, Toronto.

Jenson, J. 1989. "Different but Not Exceptional: Canada's Permeable Fordism," *Canadian Review of Sociology and Anthropology,* 26, 69–94

Jessop, B., 1990. *State Theory: Putting Capitalist States in Their Place,* Blackwell, Oxford.

Karpov, L. N., 1972. Novie raiony v ekonomike razvitykh kapitalisticheskikh stran. Nauka. Moskva.

Katerberg, W., 2003 "A Northern Vision: Frontiers and the West in the Canadian and American Imagination" *American Review of Canadian Studies*, 33, 4, 543-563

Larsen, J. N., & Fondahl, G. (Eds.). (2014). Arctic human development report: Regional processes and global linkages. Nordic Council of Ministers.

Larsen, J. N., Schweitzer, P., & Petrov, A., (Eds.). (2015). Arctic Social Indicators: ASI II: Implementation. Nordic Council of Ministers.

Lenin, V.I., 1918. Draft Plan of Scientific and Technical Work. Collected Works, 4th English Ed., Progress Publishers: Moscow, 1972, Vol. 27, 314-317.

Letopis' Severa, 1979. Volume 9, Mysl', Moskva (pp. 92-107).

McCannon, J., 1998. *Red Arctic: Polar Exploration and the Myth of the North in the Soviet Union*, 1932-1939, Oxford University Press, New York.

Orvik, N., 1983. *Northern development, northern security*, Queens University Press, Kingston, Canada.

Papanin, I. D., 1977. *Zhizn na Ldine./ Papanin and. D. Life on the Ice*., Leningrad.

Pearson, L. B.,1946. "Canada looks down north" *Foreign Affairs,* 24, 638-47.

Peet, R., Watts, M., 1993. "Introduction: Development Theory and Environment in an Age of Market Triumphalism," *Economic Geography,* 69(3), 227-253.

Petrov, A., 2012. "Redrawing the Margin: Re-examining Regional Multichotomies and Conditions of Marginality in Canada, Russia and their Northern Frontiers," *Regional Studies*, 46, 1, 59-81.

Petrov, A., King. L. and Cavin. P., 2015. Northwest Territories. In *Arctic Social Indicators*. TemaNord.

Petrov, A. N., (2016). Exploring the Arctic's "other economies": knowledge, creativity and the new frontier. *The Polar Journal*, 6(1), 51-68.

Pivovarov, Yu L., 1997. "Szhatie intensivno ispol'zuemogo prostranstva: Koncepciya makroregional'nogo razvitiya Rossii" *Izvestiya Rossiiskoi Akademii Nauk. Seriya geograficheskaya,* 5, 114-124.

Power, M., 2003. *Rethinking Development Geographies*. Routledge: London.

Pretes, M., 1988. "Underdevelopment in two Norths: Brazilian Amazon and Canadian Arctic" *Arctic,* 41(2), 109-116.

Programma. KPSS. 1961. (Moscow).

Radcliffe, S., 2005. "Development and geography: towards a postcolonial development geography?" *Progress in Human Geography,* 29(3), 291-298.

Rea, K. J., 1968. *The Political Economy of the Canadian North. An Interpretation of the Course of Development in the Northern Territories of Canada to the Early 1960s,* University of Toronto Press, Toronto, Canada.

_____ 1976 *The Political Economy of Northern Development,* Science Council of Canada, Ottawa.

Rich, E., 1958. *The History of the Hudson's Bay Company 1670-1870*, Hudson's Bay Record Society, London, England.

Said, E. 1978. *Orientalism*. Vintage Press, New York.

Saxinger, G., Petrov, A., Krasnoshtanova, N., Kuklina, V., & Carson, D. A., (2016). Boom back or blow back? Growth strategies in mono-industrial resource towns–'east'and 'west'. In *Settlements at the Edge: Remote Human Settlements in Developed Nations*. Edward Elgar Publishing Cheltenham.

Science Council of Canada. 1977. *North -ward Looking A Strategy and a Science Policy for Northern Developmen*t, Report No. 26, Ottawa.

Scott, J. 1998. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*, New Haven: Yale University Press.

Sergeev, M.A., 1949. On the use of the "Extreme North". *Letopis' Severa.* Vol 1, 189-208.

Sidaway, J. D,, 2002. "Postcolonial geogaphies: survey –explore – review" *In Postcolonial Geographies,* A. Blunt and C. McEwan (Eds.). Continuum New York: Continuum. (pp. 11–28).

Sidaway, J. D., 2007. "Spaces of postdevelopment," *Progress in Human Geography,* 31(3), 345–361.

Shields, R. 1991. *"The true North strong and free:" Places on the Margin: Alternative geographies of modernity*, London: Routledge. (pp. 162-206).

Slavin, S. V., 1972. *The Soviet North: Present Development and Prospects*. Progress Publishers, Moscow.

Southcott, C. (Ed.). 2015. *Northern Communities Working Together: The Social Economy of Canada's North*. University of Toronto Press, Canada.

Stabler, J. C., Howe, E. 1990. "Native participation in Northern development: the impending crisis in the NWT Canadian," *Public Policy,* 16(3), 262-283.

Stelter, G. A., Artibise, A. F. J., 1978. "Canadian resource towns in historical perspective," *Plan Canada,* 18(2), 7-16.

Watts, M., 1993. "Development I: Power, knowledge, discursive practice," *Progress in Human Geography,* 17(2), 257-72.

Watts, M. J., 2003. Development and Governmentality, *Singapore Journal of Tropical Geography,* 24(1). 6-34.

Weiss, C., 2007. "Representing the Empire: The Meaning of Siberia for Russian Imperial Identity," *Nationalities Papers.* 35(3), 439-456.

West, D., 1991. An introduction to the Canadian Northern discourse, *Journal of Canadian Studies,* 26(2), 108-119.

Wood, J. D., (2006). 'The last frontier': rationalizing the spread of farming into the boreal woods of Canada, c. 1910–1940. *The Canadian Geographer/Le Géographe canadien*, 50(1), 38-55.

Voronov, I. P., 2006. Siberians Sitting on Their Suitcases. *Problems of Economic Transition,* 48, 11: 55-70

Is the Arctic an Emerging Market?

Maxwell C. McGrath-Horn & Ryan R. Uljua

For the last decade, while annual sea-ice has declined and economic activity has increased, many observers have eagerly described the Arctic as the world's next "emerging market." While emotively compelling, this popular claim is founded neither in theory nor quantitative analysis. In this paper, we attempt to more thoroughly answer the question "is the Arctic an emerging market?" After discussing the prominent frameworks and assessing available data we find that by most customary metrics the Arctic is not a traditional emerging market. However, using a new framework put forward by emerging market theorists Khanna and Palepu of Harvard University, which describes an emerging market as a transactional arena characterized by institutional voids which inhibit buyers and sellers from easily coming together, we argue that the Arctic can *in many ways be considered an emerging market (Khanna & Palepu, 2010). Ultimately, we propose a new way to think of the 'Arctic economy' in the global context: as a nascent transactional arena largely nestled inside of stable, highly developed economies where buyers and sellers nonetheless have difficulty in conducting transactions, particularly in capital markets.*

Introduction

The opening Arctic and its wealth of resources inspire sweeping claims that the region represents a new emerging market. However catchy, these claims are not backed by data nor based in theory regarding what constitutes an emerging market. In one basic sense, the term 'emerging' emotively fits the changing dynamics of the region: as ice retreats, untapped resources emerge from beneath it. Just as the ice recedes and the resources beneath it are uncovered, so too is the Arctic *emerging* into investors' collective consciousness—and therefore intuitively the Arctic *feels* like an emerging market.

Over the past decade, analysts, observers, and journalists have been quick to describe the region as the world's next, or even *last*, emerging market. A quick Google search returns the following headlines:

- *"Is the Arctic the Next Emerging Market?"* (Karlsson & Smith, 2013)
- *"The Arctic as an Emerging Market"* (Larsen, 2014)

Maxwell C. McGrath-Horn is Partner, Arctic Tern Consulting & NSF Arctic-FROST Fellow. Ryan R. Uljua is Senior Fellow, The Arctic Institute & Partner, Arctic Tern Consulting.

- *"Climate Change: The Arctic as an Emerging Market"* (Harris, 2012)
- *"The Arctic: the next emerging economy"* (Henriksen, 2014)
- *"The Arctic as an Emerging Market"* (Jones, 2012)
- *"Should we be considering the Arctic as the next emerging economy?"* (Aplin, 2015)
- *"The Arctic is an emerging market..."* (Emmerson, 2012)
- *"The Emerging Arctic Market"* (Klein, 2017)

The problem of defining what is—and what is not—an emerging market (EM) goes well beyond the Arctic. Traditional definitions of EMs, which are discussed below, tend to coalesce around measurements of poverty, national capital market openness, and a country's growth potential. There are more than a dozen definitions of what constitutes an EM, but no single framework is widely accepted by economists, statisticians, and investors. Worse, many EM classifications are qualitative or based on 'gut calls' and do not adhere to or carry out rigorous economic analysis.

Perhaps the most significant challenge in determining whether the 'emerging market' label should be applied to the Arctic is that traditionally the smallest jurisdictional unit for EM classification is found at the country level, whereas the Arctic is a collection of sub-regions spread across eight nations. We propose that emerging markets do not necessarily exist exclusively at the national-level in developing nations but can also be found at the subnational level within jurisdictions of developed countries. In doing so, we also note that the Arctic 'market' is not a monolith but can instead be considered as three distinct sub-markets: the North American, European, and Russian Arctic.[1]

In this study, we first survey the existing ecosystem of EM definitions and classifications and assess whether they describe the economic conditions found in the Arctic. We determine which EM definitions hold up when applied to the Arctic, and which do not. We then argue that the Arctic can in fact be considered an EM by using a novel EM definition that we propose is more germane to the Arctic than traditional frameworks. With this proposed definition in mind, we conclude by discussing mechanisms that can better facilitate the flow of investment capital to the Arctic.

Existing EM Definitions and How they Apply to the Arctic

There are many ways to define emerging markets, and investors, researchers, and financial service providers have found myriad ways to classify, categorize, and package them. Traditionally, EMs have been considered low- or middle-income countries with low average standards of living, where capital markets are underdeveloped, and a process of economic liberalization is taking root or expected (Mody, 2004).

The term 'emerging market' was first coined by Antoine Van Agtmael and a team of economists at the International Finance Corporation (IFC), a World Bank organization, in 1981 (IMF, 2017). The group was trying to sell investors on a "Third World mutual fund" but needed a more aspirational and attention-grabbing term and came up with "emerging markets" ("Establishing Emerging Markets"). Since then, economists, financial firms, development organizations, governments, and news agencies have developed their own definitions and classifications of which countries deserve the EM designation.

Below we examine three of the most prominent frameworks and assess whether they would consider the Arctic an EM. Here we define the Arctic as the 25 sub-national jurisdictions found in

the eight Arctic states that are located either partially or entirely above of the 66th parallel north.[2] In all following work we endeavor to use 2010-2015 as our study period due to the lag in national and regional statistical bureaus reporting of key indicators.

International Monetary Fund (IMF)

The International Monetary Fund's biannual World Economic Outlook (WEO) classifies countries as being advanced economies, emerging markets, or low-income developing countries (LIDCs). The IMF deems an economy an emerging market if it does not meet its definitions of an advanced economy or a LIDC, which makes it one of the more inclusive EM definitions. As of June 2018, the IMF categorized 39 countries as advanced economies and 59 countries as LIDCs, leaving 95 EMs (IMF, 2018). The IMF distinguishes between advanced economies, EMs, and LIDCs based on (1) per capita income levels, (2) export diversification, and (3) degree of integration into the global financial system.

Per Capita Income Levels

In order to compare how the Arctic fits into the IMF's classification system, a few assumptions are necessary. First, statistical bureaus generally do not track gross national income (GNI) at the regional level (which would be gross regional income (GRI)), thus making a comparison between subnational Arctic jurisdictions and countries based on these metrics difficult. In the absence of these data, we use per capita gross domestic product (GDP) and per capita gross regional product (GRP) as proxies for "per capita income levels" as the IMF uses in its national classification system.

The IMF defines LIDCs as having annual per capita income levels below 2,700 USD (in 2016 as measured by the World Bank's Atlas method), as well as structural features consistent with limited development, and linkages to external financial systems that are insufficient to be considered emerging market economies (IMF Fiscal Monitor, 2018: 95). The IMF does not, however, provide a similar statistical income cutoff to distinguish between advanced economies and EMs. In the absence of a clear per capita income threshold separating advanced economies from EMs, we use the average of the five lowest per capita GDPs (in USD-PPP) among the IMF's advanced economies to estimate the income cutoff between advanced economies and EMs.

The average of the five lowest per capita GDPs among the IMF's advanced economies in 2016 was 26,839 USD. As Table 1 shows, the average per capita GDP for all advanced economies was 42,750 USD. Meanwhile the IMF's 96 emerging economies' average per capita GDP was 17,215 USD. The BRICS average per capita GDP was 13,776 USD.[3]

Between 2010 and 2015 average pan-Arctic GRP per capita was 35,735 USD, with a low of 13,453 USD (Arkhangelsk) and a high of 214,647 USD (Nenets Autonomous Okrug). Of the three sub-regions of the Arctic, the Russian Arctic has the lowest average per capita GRP (29,977 USD), although it is still higher than the lowest advanced economy—Latvia—which has a per capita GDP of 21,006 USD. See Appendix 1 for a full breakdown of average per capita GRP 2010-2015 for all 25 Arctic jurisdictions.

Based on the IMF's per capita income definition, the Arctic is considered an Advanced Economy, not an EM. It is important to note that there are shortcomings in using per capita GRP in the Arctic to measure economic activity and output. These issues are discussed in further details in the section titled "Shortcomings of GRP in the Arctic."

Table 1

Average per capita GRP, 2010-2015 (PPP)	
Region/Country	GRP/GDP per capita (USD)
The Arctic	**$35,735**
North American Arctic	$73,897
European Arctic	$43,955
Russian Arctic	$29,977
Reference Markets	
Norway	$63,515
United States	$50,885
Advanced Economies (IMF) (avg)	$42,750
Russian Federation	$24,796
Emerging Markets (IMF) (avg)	$17,218
BRICS	$13,779
China	$11,457
India	$5,121

Export Diversification

The IMF does not use per capita income alone to determine a country's classification. The IMF also evaluates markets based on export diversification, a metric devised primarily to prevent oil exporters that have high per capita GDP from entering the advanced economy classification. The IMF does not publish a standard threshold for export diversification, instead using it as a qualitative measure.

In the Arctic, data related to export diversification is scarce. The last major study of export diversification in the region was conducted in 2005. The study found that petroleum and mining accounted for 33.2% of GRP in Alaska, 27.7% in Canada, and 56.9% in Russia (Huskey, Mäenpää & Pelyasov, 2014: 165). Furthermore, qualitative evidence since 2005 suggests that the share of GRP derived from these sources has increased (Forbes, 2005). For instance, 88% of Greenland's exports are from the seafood industry (Government of Greenland, 2018). Meanwhile, the European Arctic as a whole did not have any single export sector account for greater than 7% of GRP (Huskey, Mäenpää & Pelyasov, 2014).

On this measure the pan-, North American, and Russian Arctic all exhibit poor export diversification, which is typically associated with EMs and not advanced economies (IMF, 2014) (Agosin, 2007).

Degree of Integration into the Global Financial System

The IMF describes the "degree of integration into the global financial system" primarily as capital account openness, particularly the degree to which foreign investors can engage in an economy's capital markets (IMF, 2016). If there are little to no restrictions on foreign engagement in a country's capital markets, then it is classified as a developed economy by this metric. Meanwhile, if there are restrictions on foreign participation in a country's stock, debt, or derivatives markets, the country warrants an EM classification according to this dimension of the IMF framework. If

restrictions on foreign involvement in a country's capital markets are severe, the market could be designated a frontier market (IMF, 2017).

In order to quantify the Arctic's degree of integration into the global financial system, we must use a proxy measure. Here, we use the country classifications issued by MSCI, a financial indexing company that produces indices covering hundreds of market segments including emerging markets. MSCI primarily classifies countries as developed, emerging, or frontier based on nine measurements of a country's capital market openness. Of the eight Arctic states, MSCI classifies seven as developed and only one, Russia, as emerging (MSCI, 2017).

IMF Definition in Review

Overall, we find that the pan-Arctic, as well as the three Arctic sub-regions, meet very few of the IMF's emerging market criteria.

Table 2

The Arctic and the IMF's EM Definition			
	Per capita income levels	**Export diversification**	**Integration with global financial markets**
Pan-Arctic	**X**	✓	**?**
North American Arctic	**X**	✓	**X**
European Arctic	**X**	**X**	**X**
Russian Arctic	**X**	✓	✓

✓ = meets definition **X** = does not meet definition **?** = unknown or unclear

The World Bank

The World Bank's criteria to define EMs differs slightly from the framework used by the IMF. The World Bank defines emerging markets as having (1) lower-than-average per capita GDP, (2) rapid growth, (3) high volatility, (4) immature capital markets, and (5) higher-than-average returns for investors (World Bank).

Lower-than-Average per capita GDP

Like the IMF, the World Bank employs a per capita GDP measurement to classify EMs. However, the World Bank does not elaborate what specific per capita GDP threshold is necessary to be considered an EM beyond "lower-than-average." For the period 2010-2015, the World Bank assessed that global average per capita GDP was 14,350 USD. In both Table 1 and Appendix 1 we note that the pan-Arctic, as well as all 25 Arctic jurisdictions in our study, have a per capita GRP higher than the world average. Once again, on this metric the Arctic does not qualify as an EM.

Rapid Growth

From 2011 to 2015, the Arctic averaged 2.9% annual growth on a per capita GRP basis, driven by a 3.38% average growth rate in the Russian Arctic (see Table 3). Notably, over this period the North American Arctic experienced negative average growth rates while the European Arctic averaged 1% annual growth.

The World Bank does not provide further clarification on what constitutes 'rapid growth' in order to be considered an EM. Therefore, we must infer reference growth rates from other markets. Of the BRICS countries, the total Arctic growth rate was higher than that of Russia, South Africa, and Brazil and only trails annual growth rates in China and India over this period. Similarly, the average growth rate for the pan-Arctic area outpaced growth in the United States (1.44%) and the European Union (0.91%). It is worth noting that when we expand the time series to include the period 2002 to 2015, the pan-Arctic has an average annual growth rate in GRP per capita of 5.28%.

Table 3

Arctic per capita GRP growth, 2010-2015						
	2011	**2012**	**2013**	**2014**	**2015**	**Average**
Pan-Arctic[4]	**6.74%**	**2.39%**	**1.87%**	**1.79%**	**1.73%**	**2.90%**
North American Arctic	0.12%	-1.80%	-0.67%	0.06%	-2.81%	-1.02%
European Arctic	1.42%	-0.78%	1.36%	1.24%	1.71%	0.99%
Russian Arctic	6.99%	0.26%	1.02%	2.69%	5.95%	3.38%
Reference Markets (World Bank)						
China	9.01%	7.33%	7.23%	6.76%	6.36%	7.34%
India	5.25%	4.13%	5.10%	6.23%	6.76%	5.49%
United States	0.85%	1.46%	0.97%	1.81%	2.11%	1.44%
Russian Federation	5.20%	3.48%	1.57%	-1.04%	-3.04%	1.23%
European Union	1.78%	-0.65%	-0.04%	1.43%	2.01%	0.91%
South Africa	1.94%	0.80%	1.02%	0.26%	-0.08%	0.79%
Brazil	2.99%	0.97%	2.06%	-0.38%	-4.59%	0.21%
World Average	**1.97%**	**1.23%**	**1.41%**	**1.65%**	**1.63%**	**1.58%**

Based primarily on growth rates in the Russian Arctic in comparison to our reference markets, we assess that both the Russian Arctic (3.38%) and the pan-Arctic (2.9%) display rapid growth characteristics consistent with EMs.

High Volatility

The World Bank does not provide a standard definition of volatility, or what it considers to be "high." In order to test this criterion, we use the volatility of annual GRP growth rates in the Arctic, as measured by standard deviation. Volatility is measured as the standard deviation of growth rates for each of the above definitions of growth rates (Chatterjee & Shukayev, 2006). Due to sample size concerns, we expand the time series to include the period from 2002 to 2015.

Table 4

Average GRP/GDP Growth & Volatility, 2002-2015[5]		
	Avg. Annual Growth	Volatility (std deviation)
Pan-Arctic[6]	**5.28%**	**4.15**
North American Arctic	2.70%	6.34
European Arctic	1.93%	2.87
Russian Arctic	7.66%	5.61
Reference Markets (World Bank)		
Russian Federation	3.76%	4.65
Brazil	1.87%	2.84
sIndia	5.94%	2.01
China	9.17%	1.96
South Africa	1.79%	1.91
European Union	0.96%	1.91
United States	1.04%	1.66
World	**1.63%**	**1.57**

In the 14-year study period the pan-Arctic exhibits a volatility in GRP growth rates (4.15) that is higher than all reference markets other than Russia (4.65). We find that the North American Arctic exhibits the highest volatility in growth rates among Arctic regions (6.34) during this period, likely due to its reliance on commodity exports, which exposes it to global commodity price fluctuations.

Immature Capital Markets

The World Bank definition of "immature capital markets" is similar to the IMF's definition of capital market integration discussed previously. We can again use MSCI's Emerging Market classification system to infer that seven of the eight Arctic states have developed capital markets while Russia is an EM by this dimension.

Higher-than-Average Returns for Investors

Quantifying investor returns in the Arctic is difficult due to a lack of publicly available data. As yet, no financial indices of public equities with operations in the Arctic have been published that could serve as proxies for total expected returns. Furthermore, whether the North American Arctic, for example, provides higher-than-average returns compared to the Russian Arctic is similarly difficult to observe in the absence of regional Arctic equities indices. In the private investment space, including private equity investments, returns data are proprietary and generally not made publicly available.

World Bank Definition in Review

Overall the pan-Arctic and its three sub-regions meet some, but not all, of the features of an EM according to the World Bank. The Russian Arctic exhibits the most EM criteria given its high growth rates and immature capital markets.

Table 5

The Arctic and the World Bank's Emerging Market Definition					
	Lower-than-average per-capita GDP	Rapid growth	High volatility	Immature capital markets	Higher-than-average returns for investors
Pan-Arctic	**X**	✓	✓	**?**	**?**
North American Arctic	**X**	**X**	✓	**X**	**?**
European Arctic	**X**	**X**	✓	**X**	**?**
Russian Arctic	**X**	✓	✓	✓	**?**

✓ = meets definition **X** = does not meet definition **?** = unknown/unclear

Financial Index Providers

A third major classifier of the state of national economies is the financial indexing industry. For many in the financial community these classifications are among the most commonly used definitions of emerging markets. However, the methodology that financial index providers use to judge whether a market is emerging is imperfect when applied to the Arctic.

As of June 2018, leading index provider MSCI identified 24 EM countries for its Emerging Markets Index, which has more than 1.6 trillion USD in assets benchmarked to it (MSCI, 2018). Like the IMF and World Bank, MSCI sets a minimum income threshold in order to be considered a developed economy rather than an EM. As of June 2018, MSCI used a minimum per capita GNI of 12,476 USD in order to qualify as a developed economy (MSCI, 2017). Based on the above data, the pan-Arctic, as well as all 25 sub-jurisdictions, exceed this threshold on a GRP basis and would be considered developed—not emerging—economies. In addition to per capita income, MSCI evaluates markets on nine other dimensions to determine whether they are developed, emerging, or frontier markets. However, these nine other dimensions are all related to the nature of a country's *national* stock market, including size of publicly traded companies, stock market liquidity, openness to foreign ownership, and trade settlement procedures. These requirements of a country's national stock market size and openness are not applicable to the pan-Arctic, but rather apply only at the national level among the eight Arctic states.

As of June 2018, MSCI defined seven of the eight Arctic states as developed markets, with Russia classified as an EM. Other index providers, including FTSE Group, S&P, Dow Jones, and STOXX have each developed their own market classification criteria that, like MSCI, are primarily based on national capital market regulations, integration, and openness. See Table 6 for a full breakdown of how these financial index providers assess the eight Arctic states.

Due to the nature of the methodologies employed, it is difficult to apply the financial indexers' classification systems to the Arctic to help answer the question "is the Arctic an emerging market?" Indexers like MSCI assess where each country's *national capital markets* fall on the frontier-emerging-developed spectrum. In the Arctic, we are assessing sub-national jurisdictions. There is no "Yellowknife Stock Exchange," for example, on which shares of Northwest Territories companies are traded, so we cannot apply the indexers' methodologies to assess the hypothetical Yellowknife

Stock Exchange's rules and regulations regarding settlement methods or foreign ownership limits, and other metrics that the index providers use to measure markets. Nonetheless, it is useful to keep in mind where the Arctic nations as a whole are on the index providers' spectrum.

Table 6

Classification of Arctic States by Indexing Company, April 2018				
	MSCI	**FTSE**	**S&P Dow Jones**	**STOXX**
Canada	Developed	Developed	Developed	Developed
Denmark	Developed	Developed	Developed	Developed
Finland	Developed	Developed	Developed	Developed
Iceland	Developed	Not Classified (FTSE, 2018)[7]	Not Classified	Not Classified
Norway	Developed	Developed	Developed	Developed
Russian Federation	Emerging	Secondary Emerging	Emerging	Emerging
Sweden	Developed	Developed	Developed	Developed
United States	Developed	Developed	Developed	Developed

Shortcomings of GRP in the Arctic

In the above EM definitions, per capita income and per capita production feature prominently. However, there are well-known shortcomings to using GDP (or GRP) to evaluate economies, particularly in a sparsely populated, resource-rich geography like the Arctic. In particular, shortcomings include issues related to residency, government assistance, and subsistence activities.

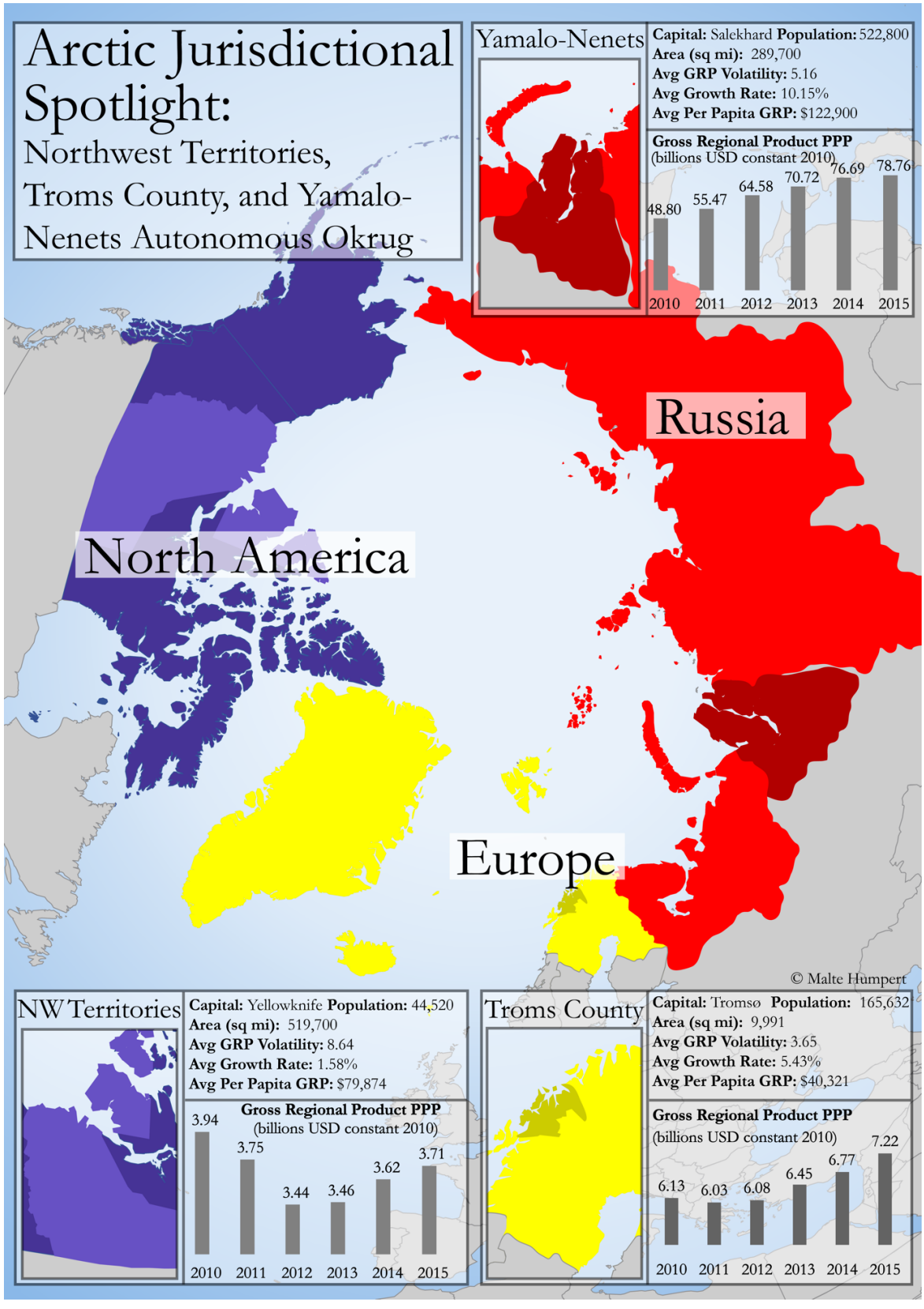
Residency

In the Arctic, particularly in the extractive industries, a significant portion of the workforce can be composed of non-resident seasonal workers. For instance, in the Yamalo-Nenets Autonomous Okrug, which ranks third highest of the 25 Arctic sub-national jurisdictions by GRP per capita, 15% of the workforce is non-resident (Nalimov & Rudenko, 2015). Similarly, physical capital and profits from these activities can be controlled by owners outside of the region. A recent study found that this region, while among Russia's richest by GRP per capita, presents some of the country's lowest social and income equality measures (Nalimov & Rudenko, 2015). Much of the income produced in the Arctic leaves the region through rents, taxes, and wages paid to owners of resources and extraction processes who are located in non-Arctic regions. These residency issues would cause Arctic residents' actual per capita *incomes* to be lower than per capita *production* as stated by GRP (Glomsrød, Goldsmith, Mäenpää & Wei, 2017).

Government Assistance & Transfers

Similar to issues related to residency, government transfers to Arctic jurisdictions in the form of public assistance and subsidies may similarly skew Arctic GRP figures. Rural jurisdictions in the Arctic, particularly in the North American Arctic, often do not generate sufficient tax revenue to pay for all public services needed in the region, requiring central governments to provide assistance. GRP includes government spending, which in jurisdictions in the North American and

European Arctic can account for approximately 30% of total GRP, including up to 40% in northern Norway (Huskey, Mäenpää & Pelyason, 2014). GRP does not include direct transfers such as welfare (Lounsbury, 2010).



Graphic design: Malte Humpert, The Arctic Institute

Subsistence Activities

A portion of the Arctic's population, both Indigenous and non-Indigenous, engage in forms of production that are not included in traditional measures of economic activity, particularly hunting and other subsistence activities. In the United States, for example, these activities are not included in GRP. Although these activities are culturally significant in many parts of the Arctic, and many small communities rely on them for food security, they are not estimated to be a significant contribution to Arctic economies (Larsen, Schweitzer & Petrov, 2015).

Cost of Goods and Services

The costs of goods and services in the Arctic are typically higher than in southern regions of Arctic states (Poppel, Kruse, Duhaime & Abryutina, 2007). This means Arctic residents' purchasing power is in most cases lower than the purchasing power of non-Arctic residents in the same nations (Larsen, Schweitzer, & Petrov, 2014). Consequently, the per-capita GRP figures featured in this study are inflated in comparison to their relative purchasing power. The authors of the Arctic Social Indicators II report addressed this issue in their case study on Alaska by applying the Anchorage Consumer Price Index (Larsen, Schweitzer & Petrov, 2014). Such indices exist for certain Arctic regions and are lacking in others. In our study we concluded that using price adjusting indices where available would distort the data on a pan-Arctic level and introduce new and unknown data reliability issues. To keep data comparable, we use national level PPP conversions provided by the OECD.

An Emerging Market Framework for the Arctic

To this point, we've surveyed the traditional definitions of 'emerging markets' put forth by the IMF, the World Bank, and financial indexing companies and we've examined how the Arctic stacks up against these frameworks. Overall, the results are mixed: neither the pan-Arctic nor the three sub-regions of the Arctic meet all the definitions of an EM. We've also highlighted some of the unique challenges of using per capita GRP as a measure of economic activity in the Arctic. While the exercise of comparing Arctic metrics to global standards and frameworks offers insights into the nature of economic activity in the various regions of the Arctic, no single definition we've examined fully encapsulates the region to a satisfactory degree.

We propose that a definition of EMs more germane to the Arctic comes not from the standard definitions issued by large intergovernmental organizations or financial service providers, but from the literature of international business management and strategy. Specifically, we argue that the EM definition that best fits the Arctic comes from the work of Tarun Khanna and Krishna Palepu of the Harvard Business School, who propose that "emerging markets reflect those transactional arenas where buyers and sellers are not easily or efficiently able to come together" (Khanna and Palepu, 2010: 6).

The concept introduced by Khanna and Palepu offers a number of advantages over traditional EM definitions when applied to the Arctic. First, it avoids defining EMs strictly at the nation-state level, and instead focuses on *transactional arenas*. This distinction allows us to better apply the framework to a collection of sub-national jurisdictions spread across eight nations, as is the case in the Arctic. Second, it is not bounded by the application of metrics such as economic size, growth rate, or length of time since emergence into the global economy. Instead, Khanna and Palepu

emphasize that the most fundamental characteristic of an EM is the degree of difficulty buyers and sellers have in conducting transactions in the product, labor, and capital markets (Khanna & Palepu, 2010).

Finally, this definition captures the realities and difficulties of working and investing in the Arctic, particularly for companies and portfolio managers from outside the area with little or no experience operating in the region. Khanna and Palepu cite two specific symptoms of buyers and sellers having difficulty coming together in EMs: (1) high transaction costs and (2) insufficient market intermediaries (Khanna & Palepu, 2010: 56).

High Transaction Costs

Transaction costs are simply defined as the costs of participating in a market, which in the Arctic can be extraordinarily high due to the region's unique operating challenges.

Transaction costs unique to the Arctic include challenges related to physical access, including a lack of infrastructure in comparison to the natural resources present. Challenges related to physical access are manifested in the need for specialized equipment at higher cost. Among the most notable examples of this phenomena include Shell's failed drilling efforts in the Chukchi and Beaufort seas, which required the company to build a specialized light icebreaker at a cost of 200 million USD (Uljua, 2018). Other examples of transaction costs in the Arctic include salary premiums, communications infrastructure challenges, licensing and environmental issues, indigenous and First Nations relationship management, icebreaker fees along the Northern Sea Route, reputational costs, requirements for equipment resilience in harsh weather, and, in the case of the Russian Arctic, sanctions risk (Andersson & Lundström, 2007: 4). Reducing transaction costs for businesses, investors, and residents of the Arctic will result in improved living and economic conditions as well as greater ease of doing business (Andreassen, 2018: 21) (Len, 2016).

Insufficient Financial Intermediaries

Khanna and Palepu argue that in EMs the dual symptoms of high transaction costs and a lack of financial intermediaries are largely the result of *institutional voids* in the labor, product, and capital markets (Khanna & Palepu, 2010: 6). In the case of Arctic capital markets, we argue that the most glaring *institutional void* is a lack of financial intermediaries.

A financial intermediary is an entity that acts as middleman between two parties to facilitate a transaction. In emerging markets, Khanna and Palepu find that intermediaries that are usually lacking include market research firms, financial analysts, mutual funds, private equity funds, and venture capital firms (Khanna & Palepu, 2010: 57).

In July 2011 David Rubenstein, co-founder of the 200 billion USD money manager Carlyle Group, assessed that the Arctic would need an increase in financial intermediaries in the coming decades to better facilitate the flow of capital through the Arctic (Rubenstein, 2011). Mr. Rubenstein called for Arctic-focused investment funds, including private equity funds and vehicles for institutional investors to gain exposure to the Arctic. Mr. Rubenstein offered a forecast: such firms and funds would proliferate in the Arctic in the next five to ten years to fill this institutional void. Seven years later, Mr. Rubenstein's call for Arctic financial intermediaries has not yet fully materialized.

Despite hinting at the creation of an Arctic infrastructure investment vehicle since 2011, Guggenheim Partners Investment Management, a large manager of institutional wealth, has yet to

invest in the region (Hickman, 2011). PT Capital, a small, Alaska-based boutique private equity firm focused exclusively on the Arctic, was only founded in 2015. There are a handful of regional funds that invest in bonds and equities in the Nordic region, but these vehicles do not focus specifically on the European Arctic. Beyond that, few other financial intermediaries exist in the Arctic.

The lack of financial intermediaries in the region is compounded by difficulties in securing traditional financing for Arctic business activities. The *2018 Business Index North (BIN)*, a publication that tracks business activity in the European Arctic and parts of the Russian Arctic, found:

> Companies [in the Arctic] find it difficult to grow organically because of lack of financing. In countries like Germany and Japan companies are supported to a greater extent by banks. Many banks in the [European and Russian Arctic] area, however, are reluctant and have fewer opportunities to support businesses. Investors are therefore crucial to support any business...Therefore, more knowledge is needed to develop an awareness of companies which operate far from the known capital markets (Bullvåg et al, 2018: 95).

It should be noted that in addition to capital and financial markets, firms operating in the Arctic also struggle in the labor market, where growth is stifled by a lack of access to human resources, as well as the product market, as non-commodities face severe challenges in entering global markets (Bullvåg et al, 2018: 6).

Overcoming the Arctic's Institutional Voids

The dual problems of high transaction costs and a lack of financial intermediaries in the Arctic are inherently linked: in frontier and emerging markets worldwide, transaction costs are reduced through the introduction of increasingly sophisticated intermediaries (Kababi, 2014). From a capital markets standpoint, in order to channel funds to attractive investment opportunities and facilitate access to capital for Arctic entrepreneurs and established companies, an increase in the size and innovative capacity of intermediaries is necessary. Intermediaries needed include Arctic-focused private equity, venture capital, commercial banks, mutual funds, and insurance companies. Given the operating and investing challenges unique to the Arctic, creative, unique solutions will be needed. One example of a unique financial mechanism to reduce transaction costs in the Arctic is the Arctic Council's Project Support Instrument (PSI) (Arctic Council). The PSI, which launched in March 2014, provides Arctic projects with additional financing in order to reduce costs of pollution mitigation programs.

Furthermore, the Arctic has certain unique financial institutions including Norway's sovereign wealth fund, the Alaska Permanent Fund, and Alaskan and Canadian Indigenous corporations and land claim organizations. What role these institutions play in Arctic economies, and how they could fill or exacerbate institutional voids, warrants further academic research.

Despite the challenges in developing business and investing activity in the Arctic, we believe there is reason to be optimistic about the future development of such intermediaries in the region. In the process of financial innovation in EMs, a key factor in capital markets is the presence of financial regulatory bodies and central banks, which reduce risk for investors and thereby lower the cost of capital for entrepreneurs and capital-needy companies. In most emerging markets, these government and regulatory institutions are absent or slow to develop, often lagging behind the development of financial intermediaries. Fortunately, in the Arctic, particularly in the North

American and European Arctic, the opposite is true: regulatory infrastructure on the national-level is among the most highly developed in the world, and only the Arctic-focused intermediaries are lagging behind.

A Framework for Placing Arctic Economies in the Global Context

The Arctic is physically emerging due to climate change, technological improvements, and geo-economic shifts. Despite intuitively feeling like the Arctic, with its trove of untapped resources and valuable geopolitical position, should be considered an emerging market, the region itself does not meet many of the traditional, albeit stale, definitions of an EM. Based on the quantitative analysis performed in the beginning of this study, we concluded that the Arctic is not a EM by traditional standards. However, based on the qualitative analysis in the second part of this study, which looks at the Arctic through the lens of institutional voids, we do believe that the Arctic can be considered an EM. This inherent contradiction prompts the recommendation of a new framework for evaluating the Arctic economy, which borrows from both the traditional and the alternative methods of evaluation.

We propose that the Arctic should be thought of as a nascent transactional arena nestled inside of stable, highly developed economies where buyers and sellers nonetheless have difficulty coming together to conduct transactions, particularly in capital markets. In this sense, the Arctic *is* an emerging market, at least until the high transaction costs of investing and conducting business in the region are reduced. The introduction of new, more sophisticated market intermediaries, derivatives, and investment vehicles tailored for the Arctic will be key.

Notes

1. We group the 25 Arctic jurisdictions as follows: *North American Arctic* [Alaska (USA); Yukon, the Northwest Territories, and Nunavut (Canada)]; *European Arctic* [Nordland, Troms, and Finnmark (Norway); Norrbotten and Västerbotten (Sweden); Lapland, Kainuu, and Northern Ostrobothnia (Finland); Iceland; Faroe Islands and Greenland (Denmark)]; *Russian Arctic* [Chukotka, Murmansk, Nenets Autonomous Okrug, Republic of Karelia, Arkhangelsk, Komi Republic, Yamalo-Nenets Autonomous District, Krasnoyarsk Krai, Sakha Republic, and Magadan].
2. Due to government reporting practices, we include five Russian sub-national jurisdictions that are only partly located in the Arctic: Magadan, Komi Republic, Karelia Republic, Krasnoyarsk Krai, and Sakha Republic. Determining gross regional product at more finite jurisdictional level (ie solely including towns / municipalities / counties located within the Arctic) is not possible with government-reported data. Other regions that are excluded due to inadequate data coverage include Nunavik (Canada) and Svalbard (Norway).
3. BRICS: Brazil, Russia, India, China, South Africa.
4. Source: authors.
5. Note: Study period is 2002-2015; longer than the 2010-2015 period referenced in the prior table.

6. Source: authors.
7. Note: As of April 2018, Iceland was under review for possible inclusion in September 2018 as a frontier market due to easing of capital controls following the 2008/2009 banking crisis.
8. Source: See Appendix 2.

References

Agkyridou, N. (2013, November 27). Greece's Emerging Market Status: Good News Really? Retrieved March 21, 2018, from https://www.cnbc.com/2013/11/27/greeces-emerging-market-status-good-news-really.html.

Agosin, M. R. (2007). *Export Diversification and Growth in Emerging Economies* (Working paper No. 233). Santiago: University of Chile.

Andreassen, N. (2018). Energy in a Changing North. *The Circle*. World Wildlife Foundation (1.2018). Retrieved from http://awsassets.panda.org/downloads/TheCircle0118_WEB.pdf.

Andersson, C. & Lundström, F. (2007). *Evaluating Emerging Markets: Swedish MNCs and their Evaluation Behavior* (dissertation). Uppsala University, Uppsala, Sweden.

Aplin, J. (2015, August 21). What Future for the Arctic? [Web log post]. Retrieved March 18, 2018, from https://thefuturescentre.org/articles/4182/what-future-arctic.

Bullvåg, E. et al. (2018). Business Index North. Issue #02, p. 95. Retrieved from http://businessindexnorth.com/sites/b/businessindexnorth.com/files/0417_bin_long_version_hq_web.pdf.

Burnham, T. C., Gakidis, H., & Wurgler, J. (2017). Investing in the Presence of Massive Flows: The Case of MSCI Country Reclassifications. *The National Bureau of Economic Research,*23557th ser. Retrieved March 21, 2018, from http://www.nber.org/papers/w23557.

Capitalizing on Good Times (Publication No. 0258-7440). (2018). Washington, D.C.: International Monetary Fund.

Chatterjee, P., & Shukayev, M. (2006). *Are Average Growth Rate and Volatility Related?* (Working paper No. 2006-24). Bank of Canada.

Conley, H., Deemer, P., Antrim, C., Sun, K., & Klein, Z. N. (2018, March 18). *The Emerging Arctic Market: New Trends, Key Players, and Why It Matters to Everyone South of the North Pole*. Lecture. Retrieved March 18, 2018, from https://shop.americanbar.org/ebus/ABAEventsCalendar/EventDetails.aspx?productId=285803349.

Country & Regional Classification. (2017, September 18). Retrieved March 20, 2018, from https://www.stoxx.com/document/Resources/Methodology/Country_Classification/stoxx_regional_classification_20170918.pdf.

Economy and Industry in Greenland. (n.d.). Retrieved April 27, 2018, from http://naalakkersuisut.gl/en/About-government-of-greenland/About-Greenland/Economy-and-Industry-in-Greenland.

Emerging Markets Brochure [Brochure]. Author. Retrieved April 18, 2018, from https://www.msci.com/documents/1296102/1362201/MSCI-Emerging-Markets-Brochure-April-2018.pdf/9e532b6f-5281-4e36-bdae-045328a2f8ac.

Emmerson, C., & Lahn, G. (2012). *Arctic Opening: Opportunity and Risk in the High North* (Publication). Lloyd's of London and Chatham House.

Establishing Emerging Markets. (n.d.). Retrieved from https://www.ifc.org/wps/wcm/connect/corp_ext_content/ifc_external_corporate_site/about%20ifc_new/ifc%20history/establishing-emerging-markets.

Eyraud, L., Singh, D., & Sutton, B. (2017). *Benefits of Global and Regional Financial Integration in Latin America* (Working paper No. 17/1). Washington, D.C.: International Monetary Fund.

Forbes, B. C. (2005). Impacts of Energy Development in Polar Regions. *Encyclopedia of Energy,* 93-105. Retrieved March 23, 2018.

FTSE Russell (2018, March). FTSE Country Classification – March 2018 Interim Update. London. Retrieved from www.ftse.com/products/downloads/FTSE_Interim_Country_Classification_Review_2018.pdf.

Global Financial Stability Report, April 2016: Potent Policies for a Successful Normalization(Rep.). (2016). Washington, D.C.: International Monetary Fund.

Glomsrød, S, Goldsmith, S., Mäenpää, I., & Wei, T. (2017). Comparative analysis of Arctic economies at macro level (Box II). In Askksen, I., Duhaime, G., Glomsrød, S. (Eds.), *The Economy of the North 2015*. Retrieved from http://www.sdwg.org/wp-content/uploads/2017/04/ECONOR-III-2015-Final-Report.pdf. [ECONOR III]

Hall, C. (2013, June 12). UAE and Qatar Gain Upgrade to EM Status. *Financial Times*. Retrieved March 18, 2018, from https://www.ft.com/content/3da7e2c0-d342-11e2-b3ff-00144feab7de.

Harris, R. (2018, March 18). *Climate Change: The Arctic as an Emerging Market*. Lecture presented at Global Challenges 2012 in D.C., Washington.

Henriksen, S. (2014, December 3). The Arctic: The Next Emerging Economy [Interview by I. Turner]. *Dialogue Review*. Retrieved March 18, 2018, from http://dialoguereview.com/arctic-next-emerging-economy/.

Hickman, L. (2011, November 16). Guggenheim Partners announces Arctic investment fund. *The Guardian*. Retrieved from https://www.theguardian.com/environment/2011/nov/16/guggenheim-partners-arctic-investment-fund.

Huskey, L., Mäenpää, I., & Pelyason, A. (2014). Economic systems. In J. N. Larsen & G. Fondahl (Eds.), *Arctic human development report. Regional processes and global linkages*. TemaNord (567). Copenhagen: Nordic Council of Ministers.

Jones, B. (2012, June 29). The Arctic as an Emerging Market [Audio blog post]. Retrieved March 18, 2018, from https://www.brookings.edu/podcast-episode/brookings-podcast-the-arctic-as-an-emerging-market/.

Kababi, A. (2014, November). "OPIC Support for Innovative Financial Intermediaries in Emerging Markets." Overseas Private Investment Corporation. Retrieved from www.aaaim.org/wp-content/uploads/2015/01/OPIC-Pres-Crnr.pdf.

Karlsson, P., & Smith, L. C. (2013). Is the Arctic the Next Emerging Market? *Strategy Business,* (72). Retrieved March 18, 2018, from https://www.strategy-business.com/article/00205?gko=c6720.

Khanna, T. & Palepu, K.G. (2010). *Winning in Emerging Markets: A Road Map for Strategy and Execution* (pp. 6). Boston: Harvard Business Press.

Larsen, N. (2014, October 9). The Arctic as an Emerging Market. *Scenario Magazine*.

Larsen, J. N., Schweitzer, P. & Petrov, A. (Eds.). (2015). *Arctic Social Indicators: ASI II: Implementation*. Nordic Council of Ministers.

Len, C. (2016). Facilitating Remote Energy Access in the Arctic and Southeast Asia: Key Conditions and Initiatives. Policy brief. *Energy Studies Institute*. Singapore. Retrieved from http://esi.nus.edu.sg/docs/default-source/esi-policy-briefs/Facilitating-Remote-Energy-Access-in-The-Arctic-And-Southeast-Asia---?sfvrsn=14.

Lounsbury, J. (2010, December 27). A Look at Personal Transfer Payments and GDP. Retrieved March 19, 2018, from https://seekingalpha.com/article/243760-a-look-at-personal-transfer-payments-and-gdp.

Macroeconomic Developments and Prospects in Low-Income Developing Countries. (2018). International Monetary Fund.

Market Classification Framework. (2017, June). Retrieved April 18, 2017, from https://www.msci.com/documents/1296102/1330218/MSCI_Market_Classification_Framework%202017.pdf/21f360a0-930c-4ca6-9864-d981820dfa0a.

Mody, A. (2004, September). What is an Emerging Market? *IMF Research Department*. Washington, D.C.: International Monetary Fund.

Nalimov, P., & Rudenko, D. (2015). Socio-economic problems of the Yamal-Nenets Autonomous Okrug development. *Procedia Economics and Finance*, 24, 543-549.

Poppel, B, Kruse, J., Duhaime, G., & Abryutina, L. (2007). Survey of Living Conditions in the Arctic Results. *Institute of Social and Economic Research*, University of Alaska Anchorage.

Rubenstein, D. (2011, June). *The Arctic: The World's Last Emerging Market*. Lecture at the Arctic Imperative Conference, Girdwood, Alaska. Retrieved from https://vimeo.com/49080041.

Sustaining Long-Run Growth and Macroeconomic Stability in Low-Income Countries: The Role of Structural Transformation and Diversification (Rep.). (2014). Washington, D.C.: International Monetary Fund.

Tett, G. (2010, January 15). The Story of the Brics. *The Financial Times*. Retrieved March 19, 2018, from https://www.ft.com/content/112ca932-00ab-11df-ae8d-00144feabdc0.

Uljua, R. (2018, April 17) Don't stop with Puerto Rico, Trump should waive the Jones Act for Alaska too. *Anchorage Daily News*. Retrieved from https://www.adn.com/opinions/2018/04/17/dont-stop-with-puerto-rico-trump-should-waive-the-jones-act-for-alaska-too/.

What's in a Name? Defining Emerging Markets. (2017, October 7). Retrieved March 21, 2018, from https://www.economist.com/news/special-report/21729866-self-fulfilling-prophecy-defining-emerging-markets.

Wheatley, J. (2015, August 3). Q&A: What is an Emerging Market? *Financial Times*. Retrieved March 18, 2018, from https://www.ft.com/content/8a393522-39bf-11e5-bbd1-b37bc06f590c.

World Bank. How Does the World Bank Classify Countries? (n.d.). Retrieved March 28, 2018, from https://datahelpdesk.worldbank.org/knowledgebase/articles/378834-how-does-the-world-bank-classify-countries.

World Bank National Accounts Data: GDP Per Capita Growth (Annual %). (n.d.). Retrieved March 19, 2018, from https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG.

Appendix 1: Arctic per capita Gross Regional Product (GRP) Data[8]

GRP PER CAPITA, adjusted for PPP (constant, 2010)	
Arctic Jurisdiction	**Average (2010-2015)**
Arkhangelsk	$13,453
Republic of Karelia	$13,602
Murmansk	$19,820
Krasnoyarsk Krai	$23,580
Komi Republic	$27,127
Kainuu	$28,822
Magadan	$29,208
RUSSIAN ARCTIC	**$29,977**
Sakha Republic	$30,439
Lapland	$33,408
Greenland	$33,511
TOTAL	**$35,735**
Västerbotten	$36,567
Nordland	$38,654
Finnmark	$39,111
Iceland	$40,231
Troms	$40,321
Faroe Islands	$40,685
EUROPEAN ARCTIC	**$43,955**
Norrbotten	$44,371
Nunavut	$48,931
Chukotka	$51,538
Yukon	$55,572
NORTH AMERICAN ARCTIC	**$73,897**
Alaska	$75,413
NWT	$83,605
Yamalo-Nenets Autonomous District	$122,900
Northern Ostrobothnia	$142,109
Nenets Autonomous Okrug	$214,647

Appendix 2: Arctic GRP (see Appendix 3 for sources and methodology)

Gross Regional Product of Arctic Jurisdictions 2001 – 2015 adjusted for PPP (billions USD constant 2010)

Jurisdiction	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Nordland	$7.88	$8.18	$8.55	$8.44	$8.14	$8.29	$8.35	$8.38	$8.88	$9.10	$8.63	$8.72	$9.06	$9.67	$10.27
Troms	$5.32	$5.73	$5.80	$5.75	$5.45	$5.41	$5.32	$5.34	$6.18	$6.13	$6.03	$6.08	$6.45	$6.77	$7.22
Finnmark	$2.20	$2.34	$2.32	$2.30	$2.34	$2.30	$2.33	$2.34	$2.67	$2.78	$2.77	$2.77	$2.82	$3.01	$3.28
Västerbotten	$7.74	$7.87	$8.20	$8.75	$8.98	$9.63	$9.31	$9.31	$8.68	$9.40	$9.44	$9.59	$9.44	$9.47	$9.91
Norrbotten	$8.36	$8.51	$8.63	$9.14	$9.65	$10.44	$10.23	$10.89	$8.89	$11.47	$11.57	$11.12	$10.93	$10.71	$10.52
Lapland	$5.33	$5.36	$5.43	$5.71	$5.66	$6.37	$6.10	$6.11	$5.53	$5.85	$5.95	$6.09	$6.23	$6.16	$6.29
Kainuu	$2.12	$2.12	$2.13	$2.21	$2.17	$2.32	$2.35	$2.41	$2.08	$2.27	$2.36	$2.30	$2.13	$2.18	$2.09
Northern Ostrobothnia	$10.83	$12.24	$12.95	$13.51	$13.79	$13.69	$14.65	$14.75	$12.85	$13.40	$13.45	$13.34	$13.24	$12.88	$12.38
Nunavut	$0.94	$1.02	$0.99	$1.05	$1.05	$1.10	$1.13	$1.29	$1.29	$1.57	$1.61	$1.72	$1.77	$1.80	$1.83
NWT	$3.19	$3.20	$3.77	$4.23	$4.04	$3.93	$4.00	$4.14	$3.38	$3.94	$3.75	$3.44	$3.46	$3.62	$3.71
Yukon	$1.35	$1.31	$1.31	$1.37	$1.43	$1.50	$1.55	$1.68	$1.80	$1.89	$1.98	$2.00	$2.04	$2.08	$2.04
Iceland	$9.84	$9.87	$10.11	$10.93	$11.67	$12.25	$13.40	$13.60	$12.66	$12.20	$12.45	$12.60	$13.15	$13.41	$13.96
Greenland	$1.03	$1.08	$1.07	$1.15	$1.16	$1.30	$1.36	$1.48	$1.61	$1.71	$1.90	$1.84	$1.90	$1.95	$2.04
Faroe Islands	$1.09	$1.17	$1.13	$1.19	$1.21	$1.41	$1.52	$1.55	$1.57	$1.71	$1.86	$1.80	$2.00	$2.15	$2.28
Alaska	$34.51	$35.43	$37.39	$39.97	$44.08	$47.70	$51.16	$56.56	$51.08	$54.13	$57.57	$58.58	$56.62	$54.13	$49.05
Republic of Karelia	$4.09	$4.49	$4.87	$4.84	$5.99	$6.85	$7.48	$8.17	$7.58	$8.07	$8.24	$8.78	$9.06	$8.83	$9.17
Republic of Komi	$10.77	$10.05	$11.50	$12.22	$13.58	$16.80	$17.33	$20.61	$21.50	$22.28	$25.01	$26.04	$25.27	$22.88	$22.72
Arkhangelsk Region	$6.66	$7.33	$8.35	$9.64	$9.88	$11.64	$13.48	$14.41	$13.75	$13.28	$15.78	$16.52	$17.54	$16.96	$17.35
Nenets Autonomous Area	$1.52	$1.80	$2.55	$3.67	$3.50	$4.72	$7.04	$6.38	$9.29	$9.22	$9.59	$8.87	$8.85	$8.74	$9.45
Murmansk Region	$7.08	$7.33	$8.27	$10.23	$11.14	$12.38	$13.74	$15.05	$14.39	$14.84	$15.01	$15.18	$15.83	$15.24	$16.96
Yamalo-Nenetsky	$22.46	$30.13	$33.07	$36.44	$35.00	$43.08	$44.53	$49.69	$46.50	$48.80	$55.47	$64.58	$70.72	$76.69	$78.76
Krasnoyarsk Krai	$28.62	$25.45	$28.63	$32.93	$34.70	$46.44	$52.52	$51.61	$53.39	$66.41	$68.53	$64.60	$64.71	$67.73	$70.28

Republic of Sakha	$12.03	$12.39	$13.49	$14.22	$14.54	$16.31	$17.63	$21.27	$23.52	$24.33	$27.85	$29.27	$29.30	$31.41	$32.57
Magadan Region	$1.88	$2.26	$2.33	$2.05	$2.03	$2.37	$2.53	$2.92	$3.43	$3.68	$4.33	$4.17	$4.56	$4.62	$5.41
Chukotka	$0.94	$0.84	$1.86	$1.31	$1.01	$1.16	$1.52	$2.14	$3.24	$2.66	$2.58	$2.64	$2.42	$2.69	$2.78
Pan-Arctic	$197.7	$207.4	$224.7	$243.2	$252.2	$289.4	$310.5	$332.1	$325.7	$351.1	$373.7	$382.6	$389.5	$395.8	$402.3

Appendix 3: GRP data sources and methodology

Territory	Data Source	Manipulation
Alaska	OECD	Converted from millions of USD to billions
Nordland	OECD	Converted from millions of USD to billions
Troms	OECD	Converted from millions of USD to billions
Finnmark	OECD	Converted from millions of USD to billions
Nunavut	OECD	Converted from millions of USD to billions
NWT	OECD	Converted from millions of USD to billions
Yukon	OECD	Converted from millions of USD to billions
Greenland	World Bank	Reported in current USD. Converted to DKK using current year xrate as reported by WB. Converted to current USD using PPP rate for DK.
Faroe Islands	World Bank	Reported in current USD. Converted to DKK using current year xrate as reported by WB. Converted to current USD using PPP rate for DK.
Chukotka	ROSSTAT	Reported in current basic prices, billions of rubles. Converted to USD by dividing by Russian OECD PPP for corresponding year.
Murmansk	ROSSTAT	Reported in current basic prices, billions of rubles. Converted to USD by dividing by Russian OECD PPP for corresponding year.
Nenets Autonomous Okrug	ROSSTAT	Reported in current basic prices, billions of rubles. Converted to USD by dividing by Russian OECD PPP for corresponding year.
Republic of Karelia	ROSSTAT	Reported in current basic prices, billions of rubles. Converted to USD by dividing by Russian OECD PPP for corresponding year.
Arkhangelsk	ROSSTAT	Reported in current basic prices, billions of rubles. Converted to USD by dividing by Russian OECD PPP for corresponding year.

Komi Republic	ROSSTAT	Reported in current basic prices, billions of rubles. Converted to USD by dividing by Russian OECD PPP for corresponding year.
Yamalo-Nenets Autonomous District	ROSSTAT	Reported in current basic prices, billions of rubles. Converted to USD by dividing by Russian OECD PPP for corresponding year.
Krasnoyarsk Krai	ROSSTAT	Reported in current basic prices, billions of rubles. Converted to USD by dividing by Russian OECD PPP for corresponding year.
Sakha Republic	ROSSTAT	Reported in current basic prices, billions of rubles. Converted to USD by dividing by Russian OECD PPP for corresponding year.
Magadan	ROSSTAT	Reported in current basic prices, billions of rubles. Converted to USD by dividing by Russian OECD PPP for corresponding year.
Iceland	OECD	Converted from millions of USD to billions
Norrbotten	OECD	Converted from millions of USD to billions
Västerbotten	OECD	Converted from millions of USD to billions
Lapland	OECD	Converted from millions of USD to billions
Kainuu	OECD	Converted from millions of USD to billions
Northern Ostrobothnia	OECD	Converted from millions of USD to billions

"The Disease that Knowledge Must Cure"?: Sites of Uncertainty in Arctic Development

Jessica Metuzals & Myra J. Hird

After nearly eight years of formal environmental review, in July 2016, the Canadian federal government rejected the French multinational AREVA's proposal to construct a uranium mine 80 kilometers west of Qamani'tuaq/Baker Lake, a small inland and mainly Inuit hamlet in the Kivalliq region of Nunavut. The decision not to grant a license for resource development based on a technical uncertainty (AREVA was not able to provide a start-date for the mining project due to a depressed uranium market) underlies a far more complex and ongoing negotiation with uncertainty. Sites of uncertainty are spaces — physical, temporal, emotional, material, discursive and so on—that are occupied by a state of not knowing. Based on recent qualitative fieldwork in Baker Lake, this paper will identify key sites of uncertainty where AREVA, government officials, Inuit organizations, and community residents constructed, negotiated, expressed, transformed, experienced, and responded to uranium mining as a resource development controversy. Our analysis reveals how AREVA understood uncertainty as the "disease that knowledge must cure", that is, the view that uncertainty is something to be reduced through the acquisition of increased expertise (Jasanoff, 2007: 33). This paper will demonstrate how this epistemological approach resulted in claims to certainty that were deeply contested and deconstructed when positioned against the contextual and relational knowledge of local residents. It will conclude by detailing how local residents' calls for improvements in education can be understood as a strategic intervention, one that is reflective of an intermeshing of Inuit and western epistemologies.

Introduction

> You affect the land, the people, you affect everything, and at the same time it's not just the start-up of the mine it's what happens to the mine with the decommissioning, where they are being decommissioned… Once AREVA leaves it [is] not like we can go down the road and talk to them, once they are gone they are gone, so AREVA can't help us in that area, the government can't help us in that area, there are so many unknowns, so many more unknowns in Nunavut because nobody can say exactly what the answer is, we know exactly how to contain everything, it's never been done how could they say that? (Inuit Interviewee, December 12th, 2016, Baker Lake).

On July 15th 2016, the Honorable Carolyn Bennett, Minister of Indigenous and Northern Affairs Canada[1], rejected French mining conglomerate AREVA's proposal (known as the Kiggavik

Jessica Metuzals is a Master's candidate in the School of Environmental Studies at Queen's University in Kingston, Ontario, Canada. Myra J. Hird is a Professor in the School of Environmental Studies at Queen's University in Kingston, Ontario, Canada.

Project), to develop a uranium mine 80 kilometers west of Qamani'tuaq[2]/Baker Lake. The decision aligned with the Nunavut Impact Review Board[3] (NIRB)'s recommendation that the Kiggavik Project not proceed at the time. The recommendation pivoted on what might appear to be a technicality: prior to the NIRB's Final Hearings, AREVA stated that, due to the depressed uranium market[4], the Kiggavik Project was not currently economically viable. As a result, AREVA was not able to provide a specific start date or development schedule during the final review process. The NIRB contended that this served to amplify existing knowledge uncertainties in the assessment, stemming from current limitations in scientific data related to the impacts on caribou, fish, and marine wildlife (NIRB, 2015a). This said, the NIRB explicitly stated that its recommendation did not preclude future approval, as AREVA may resubmit their proposal once they are able to provide a start date.

In this paper, we will argue that the Kiggavik Project deliberations, hotly contested and at times acrimonious, demonstrate diverging engagements with uncertainty. It will explore how AREVA's understanding of uncertainty as the "disease that knowledge must cure", that is, the view that uncertainty is something to be reduced through the acquisition of increased expertise (Jasanoff, 2007: 33), resulted in claims to certainty that were deeply contested when positioned against the contextual and relational knowledge of local residents. Studies in Baker Lake have focused on exploring the diverse, heterogeneous, and conflicting socio-economic and socio-cultural impacts related to relatively recent experiences with the mineral economy, and more specifically focused on the development of the Meadowbank Mine (Czyzewski et al. 2014; Makisimowski, 2014; Nightingale et al. 2017; Peterson, 2012; Rixen and Blangley, 2016). While these studies have identified a key disconnect between community concerns related to resource development and what is addressed and captured in formal review processes (Jones & Bradshaw, 2015; Bernauer, 2016), our paper focuses on what we term *sites of uncertainty*, which are spaces occupied by a "state of not knowing" (Cameron, 2015: 34). This theoretical framework will enable an exploration of diverging engagements with, and responses to, uncertainty in the context of resource development conflicts. Our empirical study employed qualitative research methods, including archival research[5], participant observation, and semi-structured interviews. This paper draws on fieldwork conducted in Baker Lake during November and December of 2016. This study consisted of 22 interviews. All interviewees were Baker Lake residents, 19 identified as Inuit and three identified as Qablunaat.[6] The sites of uncertainty framework acted as a point of entry into the controversy. While uncertainty and not knowing guided the research process, data analysis was performed in an inductive thematic manner; themes and issues "emerged" from the data (Reeves et al. 2008), yet always within the scope of this framework.[7]

We begin by situating the controversy within its historical context. Following this, we introduce the concept of sites of uncertainty. Drawing on this theoretical framework, we then outline AREVA's approach to uncertainty and explain how local residents contested and deconstructed AREVA's knowledge claims. We conclude by exploring how local residents' calls for improvements in education can be understood as a strategic intervention with uncertainty, one that served to deflect the decision into the future.

Uranium Mining Proposals and Baker Lake

Baker Lake is a small inland and mainly Inuit community in the Kivalliq region of Nunavut. Nunavut is the largest northern territory in Canada. Baker Lake is located close to the geographic centre of Canada and has a population of fewer than 2,000 people (Ladik, 2013). As an inland community, local residents rely heavily on terrestrial wildlife including barren-ground caribou and to a lesser extent muskox, as well as Arctic char, lake trout, and other fish from Baker Lake (Scottie, 1992).

Baker Lake shares with other communities in Canada's Arctic a colonial heritage as profound as it is recent. Between 1913 and 1931, a Hudson's Bay trading post, Anglican and Catholic missions, and a permanent Royal Canadian Mounted Police (RCMP) station established European trading in Baker Lake (Bernauer, 2011; Dana and Anderson, 2014). The introduction of the fur trade initiated a relationship of economic dependence by transforming the prevailing subsistence hunting economy into a mixed subsistence-trading economy (Bernauer, 2015; Légaré, 2008; Hird 2016; Hird & Zahara 2017; Zahara & Hird 2015). However, it was not until after the Second World War that Inuit experienced intensive Canadian government interest, control, and governance. By the end of the 1960s, most Inuit in the Kivalliq region had relocated into settlements in large part because of the forced settler colonial education of their children (Bernauer, 2011; McGregor, 2010). Increased dependency on government economic support, cultural and economic transformation, and loss of political autonomy, land and resource control has had acute and ongoing economic, social and cultural implications. Many Inuit communities, including Baker Lake, now face severe challenges such as marginal access to health services, overcrowded housing, and high rates of food insecurity, unemployment, substance abuse, and suicide (Billson, 2001).

The difficult path to some degree of Inuit self-determination is too lengthy to describe here (but see Hicks & White 2000; Ritsema et al., 2015). Yet, its entanglement with mineral exploration activities, caribou habitat, and the Kivalliq region is particularly relevant for contextualizing the Kiggavik Project controversy. Since the late 1960s the region has experienced extensive and ongoing uranium exploration, which has resulted in the identification of multiple high-grade uranium deposits beneath sensitive caribou habitat (McPherson, 2003). Opposition to mineral exploration began in the early 1970s, mostly out of concern that these activities were adversely impacting caribou herds. In 1978, the Hamlet of Baker Lake, the Baker Lake Hunters and Trappers Association, and many local residents launched a court case to halt mineral exploration on Inuit hunting grounds, based on the claim that exploration was infringing on Aboriginal rights, including the right to hunt, fish, and move freely on traditional Inuit land (Bernauer, 2015; Elliot, 1983). While this court case recognized Aboriginal title, setting the stage for future land claim negotiations, it highlighted that unless Inuit could prove that their rights were being infringed upon, they had little control over land use management in the region: mineral exploration continued in the Baker Lake area (Bernauer, 2015; McPherson, 2003). After years of negotiations between Inuit organizations and the federal government, the Nunavut Land Claims Agreement (NLCA), the largest land claims agreement settled in Canada to date, was signed in 1993 (Légaré, 2008). The Agreement stipulates that Inuit organizations receive defined rights and benefits in exchange for the abolishment of their Aboriginal title. These rights and benefits include 1.14 billion CAD in capital transfers, ongoing royalties, ownership of just over 353,000 square kilometers of land (18% of surface rights), and mineral rights to 36,000 square km of that land (2% of mineral

rights) (Légaré, 2008; Price, 2000). The Agreement further outlines protocols for rights concerning non-Inuit lands, resource development environmental assessments, and land-use planning (Cameron, 2015).

It is in this compromised social and economic context that Baker Lake residents have repeatedly found themselves at the centre of multinational extraction industry attention. Globally, Canada is the second largest producer of uranium. Currently, Canada's only operational uranium mines are located in the resource-rich area of northern Saskatchewan where the French multinational AREVA corporation has been actively involved in uranium extraction and processing (World Nuclear Association, 2016), and up until recently intense international industry interest was focused on exploiting and discovering new deposits. Historically, uranium mining proposals have been met with resistance from Baker Lake residents. In 1989, the German company Urangesellschaft (UG) proposed the construction of two open-pit uranium mines, a transportation corridor, a work camp, and a two-kilometer-long airstrip (McPherson, 2003). The proposal met overwhelming opposition from local residents, over 90% of whom voted against the proposed project (ibid). Shortly afterwards, UG abandoned their proposal and sold the property, which was eventually acquired by AREVA.8 While resistance to uranium mining is still very vocal in Baker Lake, local residents' perceptions of risks related to uranium mining are increasingly divided (Bernauer, 2011; Ladik, 2013). This shift has in part been attributed to increases in employment opportunities from Agnico Eagle's Meadowbank Mine as well as provisions outlined in the NLCA that intend to create opportunities for Inuit to exert more control over extractive projects (Bernauer, 2011).

In 2008, AREVA submitted a proposal (the Kiggavik Project) to develop Nunavut's first uranium mine 80 kilometers west of Baker Lake. On two separate sites, the Kiggavik Project proposed to develop four open-pit mines and one underground mine. Had it been approved, the Project would have extracted and processed approximately 44,000 tonnes of uranium, consumed 1.4 billion tonnes of water per annum of operations, and produced a total of 11.5 million tonnes of tailings solids as waste, which would have remained on-site. All of this would have occurred in a permafrost environment with extremely high winds, which undermines the stability of long-term tailings storage and facilitates the rapid dispersion of contaminants if an accident were to occur. Moreover, the proposed site was located in close proximity to sensitive caribou habitat and the Thelon River, which flows directly into the community's drinking water source (AREVA, 2008; NIRB, 2015a).

The federal government's rejection of the proposal pivoted on AREVA's unwillingness to provide a start date for the mine's development, which AREVA claimed it was unable to specify due to the depressed uranium market. Essentially, AREVA wanted to secure extraction and long-term uranium tailings storage rights indefinitely and begin its operations in a more economically profitable climate. In the lead up to the federal government's rejection in 2016, the Kiggavik Project was highly contentious, uncertain, and faced significant community opposition. As this paper will demonstrate, this controversy underlies a complex and ongoing negotiation with uncertainty, one that calls for a cautionary and reflexive approach to claiming knowledge about the future.

Sites of Uncertainty

The federal government's decision regarding the Kiggavik Project is an outcome of what Callon, Lascoumes and Barthe refer to as a socio-technical controversy, which focuses on "situations of uncertainty" (2009: 21). These are situations in which:

> We cannot anticipate the consequences of decisions that are likely to be made; we do not have sufficiently precise knowledge of the conceivable options, the description of the constitution of possible worlds comes up against resistant cores of ignorance, and the behavior and interactions of the entities making them up remain enigmatic. The conditions required for it to be relevant to talk of risk are not met. *We know that we don't know, but that is almost all we know: there is no better definition of uncertainty* (p.21 (emphasis added)).

As Callon et al. (ibid) note, socio-technical controversies are engendered by both technical and social uncertainties whereby even the differentiation between what is technical and what is social may become the subject of controversy. Indeed, it is these shifting boundaries that drive the 'fluctuations' in the controversy depending on which actors enter the debate, what alliances are formed, what technological options are eliminated or revealed, and what type of information is being circulated. As such, the direction in which these controversies unfold is largely unknown and unpredictable; it depends not only on the nature and degree of these uncertainties, but also how some uncertainties are resolved through political, economic, social and/or cultural means (ibid).

Drawing on Callon et al.'s 'situations of uncertainty', in this paper we develop the concept of *sites of uncertainty* as an analytic framework with which to better understand the Kiggavik Project controversy. A site of uncertainty is a space—physical, temporal, emotional, material, relational, discursive and so on—that is occupied by a "state of not knowing" (Cameron, 2015: 34). As Cameron (2015) emphasizes, there are different ways of engaging with and relating to the 'unknown'; it is precisely these differences as well as their implications that will be explored through the sites of uncertainty framework. Indeed, this framework helps to reveal the unique and diverse dimensions of uncertainty that constitute these spaces and so too the controversy. More importantly, it helps us to trace the dimensions of uncertainty that are of interest (or not) to different actors and why.

In the following sections, we further refine this framework through an exploration of two key sites of uncertainty: the environmental impacts of the proposed project and its socio-economic costs and benefits. Through our empirical analysis, we identified these two sites as key areas of concern both at the community-level and during the environmental review process. We will investigate the various ways through which AREVA, government officials, Inuit organizations, and community residents negotiated, expressed, transformed, experienced, and responded to uncertainty at these sites. Our analysis contrasts two epistemological approaches to knowledge that were embedded in these sites: a western epistemology anchored by certainty gained through reason provisioned by a stable and unchanging environment, and an Inuit epistemology that forefronts provisional actions within the context of a constantly changing environment. First, we demonstrate how AREVA attempted to maintain a consistent western epistemological approach to uncertainty. Secondly, we explain how local residents' concerns revealed a complex and contradictory composite of western and Indigenous epistemological responses to uncertainty, as a consequence of a profound and recent history of settler colonialism. Lastly, we argue that local residents resolved this entangled

response by *further* knotting together western and Inuit epistemologies – through calls for increased education – rather than by simply rejecting one or the other approach to knowledge.

"The Disease that Knowledge Must Cure": AREVA's Response to Uncertainty

Western cosmologies claim that uncertainty stems from the absence of human intervention and that the environment responds to human will (Qitsualik, 2013). This anthropocentric worldview considers nature to be both separate from humans and ultimately amenable to human intervention and control (Klein, 2000). In western epistemologies, not knowing tends to refer to an absence, lack, or failure of knowledge (Cameron, 2015). Therefore, the response to uncertainty is to enhance the quality and scope of the knowledge base, as Shelia Jasanoff (2007) emphasizes:

> The great mystery of modernity is that we think of certainty as an attainable state. Uncertainty has become the threat to collective action, *the disease that knowledge must cure*. It is the condition that poses cruel dilemmas for decision-makers; that must be reduced at any cost; that is tamed with scenarios and assessments; and that feeds the frenzy for new knowledge, much of it scientific (2007: 33, emphasis added).

Uncertainty is understood to be both a threat and a barrier to rational decision-making and effective action. As such, predictive methods, such as those used by the extractive industry, have been developed to manage, control, and ultimately reduce what is deemed to be uncertain (Jasanoff, 2003). Yet, as Callon et al. (2009) note, in the context of socio-technical controversies, predictive methods may intend to reduce technical uncertainties, but as new actors and information enters a controversy, uncertainties often amplify. Predictive methods are valuable insofar as they can quantify, organize and conceptualize what, from an industry, government and/or community perspective, is known and unknown, but these methods suffer from significant limitations (Jasanoff, 1999). For instance, the approaches are overly fixated on what can be known, and, consequently, downplay uncertainties that escape prediction and calculation (Jasanoff, 1999, 2003). As such, these methods fail to address and adequately respond to uncertainties that exist outside of their explicit as well as tacit framing assumptions (Jasanoff, 2003).

According to AREVA (2014), its framework for environmental protection and management was based on the view that inadequate control over environmental uncertainties is largely related to knowledge inadequacies, and, consequently, focuses on increasing that knowledge (i.e. through predictive methods, follow-up programs, and monitoring schemes) (Wynne, 1992). For example, during the Final Hearings, AREVA did acknowledge the uncertainty contained within their assessment of the potential impacts on caribou populations:

> We're uncertain about the overall effect on mortality of animals, because, again, our effects assessment and the cumulative impact on mortality is based on hunter access and how many caribou those hunters will take and the redistribution of harvest. We don't know exactly how that's going to happen. We don't know exactly what's going to happen to caribou movement. Again, we've learned that through our baseline studies and through the community and members of the HTO telling us that caribou movement is variable within the year, year to year, over the long term. So, again, we don't have strong confidence in exactly how the caribou are going to behave in the future. (NIRB, 2015b: 223-224)

AREVA attributed this state of not knowing to "information uncertainties" (NIRB, 2015b: 194), reflecting a western representation of uncertainty as a state that can be rectified with more information. In order to address this (temporary) state of not knowing, AREVA represented

uncertainty in such a way that it is amenable to reduction, control, and management through the acquisition of more and better knowledge, or as Jasanoff puts it, "the disease that knowledge must cure" (2007: 33). Brian Wynne (2007) contends that this "artificial reduction of uncertainties" results in the "externalization of unknowns" (7). For instance, AREVA represented uncertainty in a way that shifted the responsibility for the uncertainties onto other actors (Shackley & Wynne, 1996). Specifically, AREVA displaced the uncertainties concerning the effects on caribou mortality and movement onto the harvesting practices of local residents and the variability in caribou migration patterns. Paradoxically, while this externalizing technique meant that AREVA necessarily acknowledged (ongoing) uncertainty, it also determined that the Kiggavik Project would not have significant impacts on caribou herds. For instance, in the impact assessment's Final Hearings, AREVA stated:

> That's how we come up with our conclusion of not significant, presuming that mitigation will work, because *it's proven to have worked in other areas*, and *we have faith* that it will work here as well too and that people will collaborate (NIRB, 2015b: 225).

What is so interesting about AREVA's statement is its dependence upon non-rational measures: experience and faith. This invocation of reason *and* faith amounts to what Wynne argues is an "implicit projection of an exaggerated degree of control" (2007: 7) over both humans and nature. Here, AREVA's conclusion that their proposal would not have significant impacts on caribou herds relies heavily on their ability (and confidence) to 'manage' any adverse effects through ongoing collaboration and mitigation.

AREVA's response to the socio-economic uncertainties of their proposal focused on establishing certainty between the proposed project and potential benefits, while again externalizing the unpredictable and uncontrollable uncertainties onto a catch-all category of "other forces of change" (NIRB, 2015c: 456). In the Final Hearings, an AREVA representative recognized the complex nature of the socio-economic environment:

> Socioeconomic change is ongoing. It is the result not only of a given project, but of the interaction of that project with the broader, continuously evolving economic, social, and cultural environment. Other projects, government initiatives, improved technologies, and other factors continuously influence the socioeconomic environment. It is important to recognize that any future changes in the socioeconomic environment will not be the result only of the project but also of other forces of change (in NIRB, 2015c: 455-456).

While this statement appears to recognize the difficulty in establishing causal relationships between the proposed project and socio-economic impacts, AREVA was nevertheless confident in their determination that the project would have overall positive and significant socio-economic impacts. AREVA contended that this determination was based on their assessment of positive and significant effects within the following major socio-economic components: community economies; community well-being; public infrastructure and services; non-traditional land use and land use planning; and the economy of Nunavut (ibid). And although AREVA noted that Inuit traditional culture would be negatively affected by the Project, it nonetheless argued that this negative impact would be outweighed by local residents' increased opportunities to participate in the (settler colonial) wage economy (NIRB, 2015c).

The positive and significant impacts attributed to community economies were related to predicted (which became certain) increases in employment, income, contracting, education and training opportunities (AREVA, 2014). AREVA (2014) contended that the Kiggavik Project's "primary

effect is the creation of economic opportunities for Kivalliq labour and businesses" (131); the company emphasized how these "direct benefits" would have ripple effects throughout the regional economy (ibid). This strategy attempts to create certainty surrounding the positive benefits, specifically employment and the consequential increases in income. This certainty permeated AREVA's determination that the proposed project would have significantly positive effects on local resident well-being. In the Final Hearings, an AREVA representative expanded upon their determinants of well-being:

> The effects on well-being were predicted to be overall positive and significant. The negative effects on culture may erode well-being for some people but broadening choices and opportunities for livelihoods are counteracting factors. Generally, reductions in income poverty are associated with improved well-being. Well-being is influenced by many factors including culture, employment, education, personal-health habitats, but socioeconomic status is generally agreed to be the most important determinant to well-being (NIRB, 2015c: 457).

As such, AREVA conceptualized well-being in a way that emphasizes the importance of employment, while minimizing the importance of culture, enabling AREVA to determine that the project would have overall positive and significant effects on community well-being. It is important to note that AREVA's assessment of community economies did not include harvesting activities, which along with food security were assessed under traditional culture. This demonstrates how AREVA's claims to certainty were highly selective and deeply embedded with cultural biases.

Deconstructing Certainty: Contextual and Relational Sites of Uncertainty

In Inuktitut, Nunavut means "Our Land" or "Our Home" (Kusugak, 2000). Inuit have lived in the Arctic for thousands of years and have developed practices that support an intimate relationship with a changing environment (Kuptana, 1993). Jose Kusugak emphasizes how Inuit cosmologies do not view humans and nature as separate entities:

> The Arctic has sustained us and defined us. We are part of the Arctic landscape and seascape and the Arctic landscape are a part of us (2000: 20).

As such, Inuit cosmology reflects an awareness of "the impossibility of actual independence" (Qitsualik, 2013: 24) between humans and other living and non-living entities; an inextricable connection and deep respect for the land, weather, and wildlife (Price, 2007). The epistemological approach that follows characterizes the environment as constantly changing, which requires ongoing human adaptation. Knowledge (of the land, of living) is always, therefore, provisional and based on experience. The Inuktitut word *qaujimanngit* aligns closely with the western understanding of lack of knowledge. But *nalunaq* refers to not knowing; it signifies a "relationship with an uncertain state" (Cameron, 2015: 31). According to Emilie Cameron, the appropriate response to (or interaction with) this perennial state of uncertainty is to take time:

> First, to acknowledge the way things are. It is foolhardy to pretend to know or understand when one does not. Similarly, to act quickly without understanding a situation is to risk a great danger; acting without keen knowledge and understanding is worse than doing nothing at all…it is to remain open, attentive, and prepared to respond to the moment. Importantly, there is no value attached to being in a state of not knowing. It simply is, and one simply responds to the situation (ibid: 34).

As such, what is certain ("the ways things are") is that knowledge is uncertain. Cameron emphasizes that responding to uncertainty in this way is based on an epistemology that does not imply a need to master a set of circumstances. Rather, it reflects a patient engagement with the

future and an acceptance of the confusion, and limits that necessarily accompanies living within, and as part of, permanently changing (and therefore uncertain) environments (ibid).

Traditional Inuit knowledge has not, of course, evaded settler colonial influence and erasure. Inuit ways of knowing (which means acknowledging and working with uncertainty) have been threatened by globalization, neoliberal policies, capitalist modes of production, and Inuit communities' profound experience of settler colonialization (failure to implement the NLCA; the introduction of lethal diseases, and so on). In contemporary Nunavut, these two diverging epistemologies have, and continue to, operate in uneasy and often conflicted parallel (Zahara & Hird, 2015).

Uncertainties Concerning Caribou Harvesting and Inuit Ways of Living

Thus, while AREVA's assessment of its proposed project's impact on caribou populations was isolated from the effects on those who harvest caribou (AREVA, 2014), local organizations and residents of Baker Lake were attentive to the complexity and interconnected nature of these potential impacts not only in the short- but also the long-term. In the Final Hearings, the Government of Nunavut, the Beverly Qamanirjuaq Caribou Management Board, and the Baker Lake Hunters and Trappers Organization noted that changes in movement, both seasonal migration and localized movement, would constitute a significant impact for many Nunavummiut in the region (NIRB, 2015a). Critically analyzing AREVA's own in-house scientific reports, and drawing on their own inter-generational experience of caribou hunting and migration patterns, two interviewees noted:

> Also, a big thing, is caribou migration patterns, they've studied where the caribou migrate through and it's quite close to where the mines would open and so the mining companies themselves have stated that if anything the impact that the migration pattern would go further away from the community to avoid, to avoid the noise or you know activity that is happening in the area, and that would directly impact our community too (Female Inuit Interviewee, November 27th, 2016, Baker Lake).

> The Kiggavik proposed mine was in a major migration route and we depend on caribou even if we are not fulltime hunters, that's our normal diet, its caribou, so that was the biggest thing (Male Inuit Interviewee, December 12th, 2016, Baker Lake).

Local residents and organizations noted that AREVA's determination did not include information related to caribou movement: rather this determination was based on the long-term viability of the caribou population and delay to its recovery (NIRB, 2015a). AREVA did not include information related to caribou movement because, from a western perspective, this information would necessarily be provisional, and AREVA was interested in making statements of certainty. For their part, local residents contested AREVA's projected impacts, which residents saw contextually and relationally situated, not as separate and discrete biophysical impacts amenable to certain control. Moreover, for Baker Lake residents, caribou are intimately embedded in Inuit culture, traditions, and social relationships. One Inuit interviewee elaborated on the importance of caribou to the community:

> I guess the biggest impact to me, in my opinion, is via the caribou, we are so dependent on it as a people, and I think it will directly affect our caribou from what I have read, from what I understood from the Environmental Impact Statement, and having been a part of the process, I think it will directly affect our caribou and I think that will be the biggest impact, because our food is very much our culture in that many of our family members make garments out of it, we eat it, we love getting together as a family, all our family functions really surround the eating of

> caribou. That would be the biggest impact (Inuit Interviewee, November 27th, 2016, Baker Lake).

In Baker Lake, harvesting caribou represents a key point of intersection between Inuit culture, well-being, self-sufficiency, social cohesion, and the biophysical environment. The land is a site of cultural memory and collective identity; it is a source of Inuit history, knowledge, values, cultural practices, and language (Kushwaha, 2013). For many Inuit, well-being is intimately tied to the land (Kral et al. 2011) as it is "imbued with and provides for cultural connectivity" (Jones & Bradshaw, 2015: 89). Many interviewees described how land-based activities such as hunting, camping, drying caribou meat at one's cabin, and simply just "being out on the land" brought peace and ease to their lives. For instance:

> Being out on the land it's very peaceful, and there's family staying close together, spending a lot of time with each other, and learning how to hunt and fish and all the survival skills (Inuit Interviewee, December 5th, 2016, Baker Lake).

> So it's home, out there. If I didn't have to make money I would be out there all the time (Inuit Interviewee, December 12th, 2016, Baker Lake).

Thus while AREVA sought to isolate the impacts on caribou populations from myriad other issues, (as a technique used to increase certainty), for Inuit and other local residents, the uncertainty concerning caribou hunting – which is taken for granted within Inuit epistemology – is necessarily implicated in other issues including Inuit cultural traditions, food security, social connections as well as well-being, self-sufficiency, and identity.

Uncertainties Concerning Socio-economic Benefits

Thus, the local organizations questioning AREVA's certainty with regard to socio-economic benefits to the Baker Lake community focused on the necessarily provisional status of AREVA's claims. Makita (2012) emphasized that AREVA's determination that the proposed project would result in significant positive impacts on community well-being was isolated from their determination that the project would have significant negative impacts on Inuit traditional culture. In other words, local residents expressed concern that AREVA's presentation of the certainty of socio-economic benefits failed to capture the complex, diverse, and dynamic nature of Inuit well-being as well as the entanglement of values and modes of self-sufficiency experienced in contemporary Inuit society. For instance, interviewees describe the conflicted space that characterizes the controversy at the community-level:

> The fact that employment for families is very important and also full-time hunters need to be able to harvest their traditional diet, so that's where we are today we are caught in the middle of something like this...I wish we were able to have the best of both worlds where we can have a mining production open and traditional harvesting happening at the same time with no effects on the other (Inuit Interviewee, December 5th 2016, Baker Lake).

> People that are working at the mine [Meadowbank] because they have to feed their family, to live, but they also don't want the caribou or the wildlife to be harmed, and so they are, they're stressed about it. They know that mining is playing a part in it, the mining industry, and it's also affecting the caribou and they are, they are stuck. They need the job to feed their family, but they also don't want to lose caribou or the fish. (Inuit Interviewee, December 4th 2016, Baker Lake)

Community residents repeatedly expressed that they felt torn between two ways of life, or "caught between two cultures" (Kral et al., 2011: 432).

For local residents, even AREVA's narrowly defined category of socio-economic well-being proved problematic. While employment opportunities were important to local residents, the degree to which they would actually be realized by Inuit (and contribute to well-being) was questioned. Specifically, AREVA's Inuit employment target of 50% for later years of operations was highly contested during the Final Hearings. Inuit organizations and the territorial government were skeptical about this target, referring to experiences with other mines[9], the current labour shortage, turnover rates, and the all too common trend of southern labour filling these positions (NIRB, 2015a). These limitations, compounded with the lack of start date and the expansion of Agnico Eagles operations[10], made it difficult to predict whether or not the Kiggavik Project would compete with Agnico Eagle for human resources or result in staggered development. Baker Lake residents, referring to Meadowbank, stated:

> They have trained everybody in Baker Lake, like literally everybody that wanted a job up there had it (Baker Lake Resident, November 25th, 2016, Baker Lake).

> What we are seeing right now is almost a total saturation of the workforce…You are going to have a whole bunch of people from Baker Lake already employed there, so if there was a uranium mine you would see proportionally there would be less, less beneficiaries working in those roles because you would have essentially competition for human resources across you know two locations, so if there was going to be a uranium mine, thinking from a human resources perspective, I think it would need to be a staggered (Inuit Interviewee, December 4th, 2016, Baker Lake).

These statements question the extent to which Baker Lake residents would truly benefit from additional employment opportunities in the mineral sector, further challenging AREVA's claims to certainty.

Improving Education, Slowing Things Down

Faced with competing claims regarding the certainty of the projected benefits and harms to the people of Baker Lake and their environment, local residents developed a nuanced strategic response. This strategy consisted of calling for *improvements in education*. Education was mentioned by 17 of the 22 interviewees and 13 of the 17 Inuit interviewees. These interviewees referred to education in a decidedly western way, that is, they emphasized positive attributes of both increases in education in general and the southern Canadian school system. Moreover, interviewees problematized Inuit education and positioned it in a state of deficit. For instance:

> We are not educated...We need to get educated (Inuit Interviewee, December 12th, 2016, Baker Lake).

> I think that our community and every community can do a lot better encouraging our youth to get educated, that's bottom line (Inuit Interviewee, December 8th, 2016, Baker Lake).

Baker Lake residents noted that improving education would enhance the community's ability to capitalize on employment opportunities at all levels, not just non-skilled or semi-skilled positions. Additionally, this response was understood as a way to enhance the community's understanding of the potential impacts of uranium mining, and, through this acquisition of knowledge, enable them to make a more 'informed' decision.

> We need to be educated to understand the whole process, and the people at the hearing, the first round of interveners, there were no Inuit there, there were experts at the table and I said that maybe once we are ready and we have Inuit at all those levels of expertise then its time to make a decision about that (Inuit Interviewee, December 4th, 2016, Baker Lake).

> We as Inuit aren't prepared for in the way to have all the different types of jobs, not just the lower rung jobs, but the higher rung jobs like mechanical engineers, tailing pit management engineers, understanding the chemistry and the physics of uranium processing, extraction, a whole gamut of understanding uranium, I don't believe we as a people understand it yet (Inuit Interviewee, December 4th, 2016, Baker Lake).

> Hopefully in the future they will have of [sic] solved some of the issues we have in terms of the migration of caribou, what effect it has on the stocks we have in terms of fish, and you know people who have better education/are better educated to be able to work in the mine and understand what uranium mining really is and how it affects people and the environment (Inuit Interviewee, November 22nd 2016, Baker Lake).

Yet, while this response to uncertainty may well appear to conform to a western epistemology (that is, the "disease the knowledge must cure"), it simultaneously grounds an Inuit engagement with the future, one that is underpinned by patience and a cautionary relationship towards claiming knowledge in uncertain situations. In other words, calling for increased education was a way for the Baker Lake community to *slow the process down* in order to gain valuable time to further reflect, observe and experience a changing (uncertain) environment:

> The resource that is increasing rapidly within our territory is people, we have a young population and so we need to make sure we are educated in both English and Inuktitut to be able to get ahead. Otherwise I just felt that we were rushing into this game a little too soon, without really understanding what we were getting into…We are not ready, as people, educationally to be there, we don't need to just only have the mining jobs, the housekeeping jobs, and I said to the community that they need to wake their children up, have them go to school, finish their homework, keep on top of their education, and make sure they can be doing the best that they can do. Invest in our resource that is growing (Inuit Interviewee, December 4th 2016, Baker Lake).

> Wait another generation or so. Let these kids decide, today's kids decide, what they think…wait until we have 100 more college graduates, or 100 more college or university graduates, just wait for another few thousands in post-secondary, maybe they will have a better understanding on [sic] the environment. Since we are getting better every generation at voicing concerns, and life generally up here. I can't answer that right now (Inuit Interviewee, November 24th 2016, Baker Lake).

As such, this highly creative response reflects a contemporary Inuit engagement with the future, one that connects Inuit and western worldviews and as such strategically responds to both industry and Canadian government (intense) pressures at the same time that it slows the whole mining approval process down, thereby benefiting from an Inuit epistemology that forefronts provisionality, caution, and long-term experience in living with the environment. While our Inuit interviewees emphasized the importance of education in terms of engagement in the wage economy and enhancing the community's knowledge related to uranium mining, using wording such as "rushing into this game", "we are not ready", "wait another generation", and "I can't answer that right now" suggest a response that is far more intentional than simply complying with settler colonial priorities. Insisting that current and future Baker Lake residents require 'more

information' effectively stalls any assumption on the part of AREVA, other extraction industries, and/or the Canadian government that the Baker Lake community will accede to their priorities.

Conclusions

Sites of uncertainty developed in this paper provides a useful framework for the divergent ways in which AREVA, government officials, Inuit organizations, and local residents expressed, transformed, experienced, and responded to uncertainty during the Kiggavik controversy. In this paper, we have argued that AREVA represented uncertainty in a way that aligns with western epistemologies, that is as "the disease that knowledge must cure", and consequently focused on establishing certainty through techniques of control, prediction, management, externalization, and isolation. We have shown how these claims of certainty were deeply contested and deconstructed when positioned against local residents' relational and contextual knowledge, and failed to capture the complex, diverse, and dynamic nature of Inuit well-being, self-sufficiency, and identity. Indeed, local residents' concerns revealed a composite of Inuit and western epistemological responses to uncertainty. Local residents' calls for improvements in education is, we argue, a strategic intervention, one that reflects a contemporary Inuit engagement with the world. Advocating for more education and increased knowledge strongly resonated with AREVA's (and the Canadian government's) emphasis on educating local residents (using a deficit model approach) as a way of increasing local support for the proposal. Local residents endorsed this solution because it also necessarily slowed the whole process, giving local residents time to reflect, deliberate, and imagine their future in ways that respect Inuit ways of understanding.

It might be argued that this strategy reflects Audre Lorde's contention that "the master's tools will never dismantle the master's house" (1984: 112). That is, we may view Inuit calls for more (settler colonial) education as validating the very system that continues to limit their own self-determination. However, this, as Lorde also points out, assumes that settler colonial knowledge is the only option, which the Baker Lake residents have proven to be unfounded through their successful opposition to the Kiggavik Proposal. Calling for improvements in education draws on other sources of support, including Inuit ways of knowing and being that have persisted, flourished, and creatively adapted to contemporary resource development.

Notes

1. The Honourable Carolyn Bennett was previously the Minister of Indigenous and Northern Affairs Canada. In August 2017, the department of Indigenous and Northern Affairs Canada was dissolved, and replaced by two new departments: The Department of Crown-Indigenous Relations and Northern Affairs and the Department of Indigenous Services. Carolyn Bennett is now the Minister of Crown-Indigenous Relations and Northern Affairs.
2. In Inuktitut, Qamani'tuaq means "where the river widens", referring to the mouth of the Thelon River, which ultimately drains into Hudson's Bay.

3. The NIRB is the institution of public government responsible for assessing, using both traditional knowledge and scientific methods, the potential biophysical and socio-economic impacts of proposed development in Nunavut, Canada (NIRB, 2015a).
4. In 2007, the price of uranium hit a high of just above US$135 per pound, however with the 2008 financial crisis prices fell to US$40 in 2009. While prices recovered to just above US$70 by 2011, the Fukushima Daiichi accident resulted in the shutdown of many nuclear reactors. This, combined with huge stockpiles of uranium and the long-production cycle, has resulted in a decrease in demand and consequently spot price (2018 prices are just above US$20 per pound) (De Clercq, 2016; UxC, 2018).
5. Transcripts from the Kiggavik Project's Final Hearings (accessed through the NIRB's public registry) as well as the *NIRB's Final Hearing Report on the Kiggavik Uranium Mine Project*, and AREVA's Kiggavik Project Proposal and Draft and Final Environmental Impact Statements were key archival sources as they provided insight into how the contemporary uranium mining controversy unfolded. Additionally, media reports, mainly from Nunastiaqonline, Northern News Service Ltd., and CBC North were critical to understanding the variety of viewpoints embedded in this controversy.
   Lastly, non-governmental organizations that were involved in the controversy such as Makita, Mining Watch, and World Wildlife Foundation webpages also provided valuable contextual and positional information.
6. The term Qablunaat (singular Qablunaaq) refers to a "white" or "white person", more specifically it refers to non-Inuit, non-Indigenous, settlers; Cameron (2015) emphasizes how this is a relational term that is embedded in racialized, hierarchical power structures.
7. For more information see Metuzals (forthcoming).
8. In 1993, the property was acquired by AREVA, previously COGEMA (AREVA, 2008).
9. For comparison, in 2015, Meadowbank's Inuit employment rate was 37% (Stratos, 2016)
10. Meadowbank was expected to close in 2018, however with the discovery of the Amaruq satellite deposit, located 55 kilometers northwest of Meadowbank, in 2013, the life of Meadowbank has been extended by an additional seven years (Agnico Eagle, 2017). Additionally, Agnico Eagle's Meliadine Project, located just outside of Rankin Inlet in the Kivalliq region, commenced construction in 2017 (ibid).

References

AREVA. (2008). *The Kiggavik Project: Project Proposal.*

AREVA. (2016). AREVA: Kiggavik. Retrieved from http://kiggavik.ca/areva/

Agnico Eagle. (2017). Amaruq. Retrieved from: https://www.agnicoeagle.com/English/operations-and-development-projects/development-projects/amaruq/default.aspx

Bernauer, W. (2011). Uranium mining, primitive accumulation and resistance in Baker Lake, Nunavut: Recent changes in community perspectives. (master's thesis). University of Manitoba. Winnipeg, Manitoba.

Bernauer, W. (2015). The Nunavut Land Claims Agreement and caribou habitat management. *The Canadian Journal of Native Studies, 35*(1), 5.

Bernauer, W. (2016, April). Politics and anti-politics in environmental assessment in Nunavut. Paper presented at: American Association of Geographers Annual Meeting. San Francisco, CA.

Billson, J. M. (2001). Inuit dreams, Inuit realities: Shattering the bonds of dependency. *American Review of Canadian Studies,* 31(1-2), 283.

Bridge, G. (2004). Contested terrain: Mining and the environment. *Annual Review of Environment and Resources, 29*(1), 205-259.

Callon, M., Lascoumes, P., & Barthe, Y. (2009). *Acting in an uncertain world: An essay on technical democracy*. Cambridge, Mass: MIT Press.

Cameron, E. (2015). *Far off metal river: Inuit lands, settler stories, and the makings of the contemporary arctic*. Vancouver, BC: UBC Press.

Cruikshank, J. (2005). *Do glaciers listen?: Local knowledge, colonial encounters, and social imagination*. Seattle; Vancouver: UBC Press.

Czyzewski, K., Tester, F., Pauktuutit: Inuit Women of Canada, Aaruaq, N., and Blangy, S. (2014). *The Impact of Resource Extraction on Inuit Women and Families in Qamani'tuaq, Nunavut Territory: A Qualitative Assessment, Report*. Ottawa, ON: Pauktuutit.

Dana, L. P., & Anderson R. (2014) Mining and communities in the Arctic: Lessons from Baker Lake, Canada. *International Journal of Entrepreneurship and Small Business 22(3),* 343-36.

Elliott, D. W. (1980). Baker Lake and the concept of Aboriginal title. *Osgoode Hall Law Journal, 18*(4), 653.

Hird, M.J. (2016) Waste Legacies: Land, Waste, and Canada's DEW Line. *Northern Research*, 42: 173-195.

Hird, M.J. & Zahara, A. (2017) The Arctic Wastes. in Grusin, R. (ed) *Anthropocene Feminism.* University of Minnesota Press, pp.121-145.

Jasanoff, S. (2003). Technologies of humility: Citizen participation in governing science. *Minerva, 41*(3), 223-244.

Jasanoff, S. (2007). Technologies of humility. *Nature, 450*(7166), 33-33.

Jones, J., & Bradshaw, B. (2015). Addressing historical impacts through impact and benefit agreements and health impact assessment: Why it matters for Indigenous well-being. *Northern Review,* (41), 81.

Kral, M. J., Idlout, L., Minore, J. B., Dyck, R. J., & Kirmayer, L. J. (2011). Unikkaartuit: Meanings of well-being, unhappiness, health, and community change among Inuit in Nunavut, Canada. *American Journal of Community Psychology, 48*(3), 426-438.

Kulchyski, P., & Bernauer, W. (2014). Modern treaties, extraction, and imperialism in Canada's indigenous north: Two case studies. *Studies in Political Economy, 93*, 1.

Ladik, S. (2013). Despite the lure of jobs, uranium remains a tough sell-communities still split entering final stages of environmental review process. *Nunavut Mining- Nunavut News/North* 1: 7.

Légaré, A. (2008). Inuit identity and regionalization in the Canadian central and eastern arctic: A survey of writings about Nunavut. *Polar Geography, 31*(3-4), 99-118.

Lorde, A. (1984). The Master's tools will never dismantle the Master's house. *Sister Outsider: Essays and Speeches*. Ed. Berkeley, CA: Crossing Press.

Makita. (2012). Discussion paper: Kiggavik draft socioeconomic impact statement. Retrieved from: https://makitanunavut.files.wordpress.com/.../makita-socioeconomic-discussion-paper.pdf

Maksimowski, S. (2014). Well-being and mining in Baker Lake, Nunavut: Inuit values, practice and strategies in the transition to an industrial economy (master's thesis). University of Guelph. Guelph, Ontario.

Metuzals, J. (2018). "The disease that knowledge must cure"? Sites of uncertainty and imagined futures of Baker Lake, Nunavut (master's thesis). Queen's University. Kingston, Ontario. (forthcoming)

McGregor, H.E. (2010). Inuit education and schools in the Eastern Arctic. Vancouver: UBC Press.

McPherson, R. (2003). *New owners in their own land: Minerals and Inuit land claims*. Calgary: University of Calgary Press.

Nightingale, E., Czyzewski, K., Tester, F., & Aaruaq, N. (2017). The effects of resource extraction on Inuit women and their families: Evidence from canada. *Gender & Development, 25*(3), 367.

Nunavut Impact Review Board. (2015a). *Nunavut Impact Review Board Final Hearing Report Kiggavik Uranium Mine Project AREVA Resources Canada Incorporated NIRB File No. 09MN003*. Cambridge Bay, Nunavut: NIRB

Nunavut Impact Review Board. (2015b). *Nunavut Impact Review Board's Hearing Regarding the Review of AREVA Resources Canada Incorporated's Kiggavik Uranium Mine Project. File No. 09MN003. Final Hearing Transcript, Volume 2, March 4th, 2015*. Baker Lake, Nunavut: NIRB.

Nunavut Impact Review Board. (2015c). *Nunavut Impact Review Board's Hearing Regarding the Review of AREVA Resources Canada Incorporated's Kiggavik Uranium Mine Project. File No. 09MN003. Final Hearing Transcript, Volume 2, March 4th, 2015*. Baker Lake, Nunavut: NIRB.

Peterson, K. (2012). Community experiences of mining in Baker Lake, Nunavut. (master's thesis). University of Guelph. Guelph, Ontario.

Price, J. (2007). *Tukisivallialiqtakka*: The things I have now begun to understand: Inuit governance, Nunavut and the Kitchen Consultation Model. (master's thesis). University of Victoria. Victoria, British Columbia.

Qitsualik, R.A. (2013). Innummarik: Self- Sovereignty in Classic Inuit Thought. In Nickels, S., Kelley K., Grable C., Lougheed M., & Kuptana, J. *Nilliajut: Inuit Perspectives on Security, Patriotism and Sovereignty* (23-34) Ottawa, ON: Inuit Tapiriit Kanatami

Reeves, S., Kuper, A., & Hodges, B. D. (2008). Qualitative research methodologies: Ethnography. *British Medical Journal, 337(7668), 512-514*.

Rixen, A., & Blangy, S. (2016). Life after Meadowbank: Exploring gold mine closure scenarios with the residents of Qamini'tuaq (Baker Lake), Nunavut. *The Extractive Industries and Society, 3*(2), 297-312.

Ritsema, R., Dawson, J., Jorgensen, M., & Macdougall, B. (2015). "Steering our own ship?" An assessment of self-determination and self-governance for community development in Nunavut. *Northern Review,* (41), 157.

Rodon, T., & Lévesque, F. (2015). Understanding the Social and Economic Impacts of Mining Development in Inuit Communities: Experiences with Past and Present Mines in Inuit Nunangat. *Northern Review* (41).

Scottie, J. (1992). Presentation to the World Uranium Hearing. Salzburg, Austria.

Shackley, S., & Wynne, B. (1996). Representing uncertainty in global climate change science and policy: Boundary-ordering devices and authority. *Science, Technology, & Human Values, 21*(3), 275-302.

Stratos. (2016). *Meadowbank gold mine 2015 socio-economic monitoring report*. Ottawa, ON: Stratos

World Nuclear Association. (2016). Uranium in Canada: Canadian Uranium Production - World Nuclear Association. Retrieved from http://www.world-nuclear.org/information-library/country-profiles/countries-a-f/canada-uranium.aspx

Wynne, B. (1992). Uncertainty and environmental learning: reconceiving science and policy in the preventive paradigm. *Global Environmental Change*, *2*(2), 111–127.

Wynne, B. (2007). Indigenous knowledge and modern science as ways of knowing and living nature: The contexts and limits of biosafety risk assessment. In Traavik, T. & Lim, L.C. (eds.) *Biosafety First*. Trondheim, NO: Tapir Academic Publishers

Zahara, A. & Hird, M.J. (2015) 'Raven, Dog, Human: Inhuman Colonialism and Unsettling Cosmologies', 'Learning How to Inherit in Colonized and Ecologically Challenged Lifeworlds' special issue of *Environmental Humanities*, 7: 169-190.

Section III:

Finding Sustainability in Development

Indexing Arctic Urban Sustainable Development Planning Strategies: The Case of Russia

Alexander Sergunin

Russian Arctic cities acknowledge the need to build sustainable development strategies (SDSs) to ensure their long-term socioeconomic and ecological viability. They try to create proper conceptual, legal and institutional settings for the development and implementation of such strategies. First and foremost the Arctic cities aim to create and develop an efficient strategy planning system which is seen as a necessary precondition for successful urban SDS. This paper aims to discuss possible indicators to evaluate the SDS planning process in the major industrial cities of the Russian Arctic). The following indicators will be discussed:

- *Ability to acknowledge the need for SDS planning.*
- *Integrated/comprehensive nature of planning.*
- *The existence/non-existence of a planning office in the city.*
- *Clearly defined goals, outcomes/expectations, implementation strategies, including indicators and benchmarks.*
- *Quality and accuracy of assessments (whether it is based on science or wishful thinking).*
- *Coordination with the regional and federal SDS.*
- *Transparency of the planning process.*
- *Public input/community engagement (opinion polls, public discussions in the media, hearings in the public chambers, NGO's role).*
- *Ability to take into account private and public interests.*
- *Centralized or indicative planning.*

Introduction

The Russian Arctic municipalities view the need to build sustainable development strategies (SDS) as an important policy priority for themselves. They try to create proper conceptual, legal and institutional settings for the development and implementation of such strategies. First and

Alexander Sergunin is a Professor at the St. Petersburg State University and Nizhny Novgorod State University, Russia.

foremost the Arctic cities aim to create and develop an efficient strategy planning system which is seen as a necessary precondition for successful urban SDS.

Planning is an integral part of any urban development strategy, including for Russian Arctic cities and towns. City administrators understand that planning gives more power over the future. Planning is deciding in advance what to do, how to do it, when to do it, and who should do it. This bridges the gap from where the city is, to where it wants to be. The planning function involves establishing goals and arranging them in logical order. A well-planned city achieves goals faster than the ones that don't plan before implementation.

Planning is especially important for designing a proper urban sustainable development (SD) strategy because the latter requires an integrated approach to the developmental policies where all aspects of such strategy – economic, social and environmental - should be harmonized and coordinated. Planning for urban sustainability is also important because all potential stakeholders – municipal, regional and federal authorities, companies, universities and civil society institutions/NGOs – should be involved in the SD strategy formulation and implementation.

This paper aims to discuss possible indicators to evaluate the SDS planning process in the major industrial cities of the Arctic Zone of the Russian Federation (AZRF), including Arkhangelsk, Murmansk, Nickel, Norilsk, Salekhard, Severodvinsk and Vorkuta.

Data and Method

The data for this study are drawn from the following sources:

- Regional and municipal development and action plans;
- Regional/local government reports;
- Position/background papers;
- Analytical reports produced by research centers and NGOs; and
- Media reports.

As with any study of sensitive political issues, it's difficult to compile a set of reliable data. Information is often contradictory, misleading or not fully reported. Research is also complicated by differences of opinion between scholars as regards methods of assessment and interpretation of sources. Moreover, research techniques and terminology vary. Therefore, the exercise of judgment and comparing of sources are important elements in compiling the database.

Since the study does not just entail data collection but also data assessment three main principles are implemented with regard to selecting and interpreting sources:

- *Validity*. Data should represent most important and typical trends rather than occasional or irregular developments in the AZRF cities' SD policies.
- *Informativeness*. Sources that provide valuable and timely information are given priority.
- *Innovativeness*. Sources that offer original data, fresh ideas and non-traditional approaches are preferable.

These research techniques help to overcome the limitations of the sources and compile substantial

and sufficient data for this study.

The Russian Urban Development Planning: Conceptual and Legal Aspects

Given the highly centralized nature of Russian political and administrative systems, the AZRF municipal SD strategies are dependent on and interlinked to federal policies in this area. Municipal strategies are based on numerous conceptual and normative documents issued by Moscow, although the federal centre encourages subnational units to take into account local peculiarities and suggest solutions to the specific problems of the AZRF. That's why it is important to understand what kind of conceptual/doctrinal and legal basis for SD strategies exists on the federal level.

It should be noted that conceptually the Russian (then Soviet) SD national strategies (in their environmental form) date back to Mikhail Gorbachev's 1987 Murmansk speech, which included a section on the ecological problems of the Arctic. That speech was well received by the Nordic countries and led to various environmental initiatives, such as Finland's 1989 initiative on Arctic environmental protection cooperation, which resulted in a number of technical and scientific reports between 1989 and 1991. This ultimately led to the development of the Arctic Environment Protection Strategy (AEPS) in 1991 and the establishment of the Arctic Council in 1996 (Heininen, 2004: 208-209).

In the social sphere, Moscow's policies aim to foster favorable conditions for the sustainable development of Indigenous peoples. For example, in 2009, the Russian government approved the concept of sustainable development for the Indigenous small-numbered peoples of the North, Siberia, and the Far East (Putin, 2009). Among other things, the concept set forth the general task of raising the quality of life in these regions to the Russian average and the specific task of halving the infant mortality rate (as of 2007) by 2025. However, these policies have still not come close to their targets and are harshly criticized by Russia's Indigenous peoples and national and international human rights organizations (Rohr, 2014).

Moscow actively partook in developing the UN Sustainable Development Goals (2015) and accepted them as a conceptual basis for its national strategy.

As far as legal aspects of Russia's SD strategies are concerned Moscow signed and ratified the most important international agreements on environment protection and SD: the UN Convention on the Law of the Sea (1982); Convention on Biodiversity (1992); International Convention for the Regulation of Whaling (1946); Fish Stocks Agreement (1995); the UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage (1972); Convention on the Conservation of Migratory Species of Wild Animals (1979); Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973); Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matters (1972); International Convention on Oil Pollution Preparedness, Response, and Cooperation (1990); Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic (2013); the International Maritime Organization's Polar Code (November 2014 and May 2015); and the 2015 Paris Agreement under the UN Framework Convention on Climate Change.

To date, Russia has a reputation as a responsible regional player that duly implemented the above international agreements.

Moscow made great strides to internalize these international documents and make them an integral part of its national legislation. The Russian national legislation on environment protection includes the following legal acts: Federal Law on Environment Protection (2002), Water Code of the Russian Federation (2006), Federal Law on Internal Marine Waters and Territorial Sea (1998), Federal Law on the Continental Shelf (1995), Federal Law on Fauna (1995), Russian Federal Law on the Ratification of the Convention on Biodiversity (1995), and Federal Law on the Northern Sea Route (2012). This legislation constitutes an integral part of the international governance system in the Arctic region.

In addition to the SD/environmental legislation, the Kremlin managed to develop the normative basis for strategic planning. In June 2014, President Putin (2014) signed a federal law on strategic planning that prescribed for all levels of government – national, regional and municipal – having three types of strategic documents: a strategy for socioeconomic development, a forecast of socioeconomic development and specific programs to implement the two former documents. According to this law, the municipalities should define strategic objectives for socioeconomic development and organize monitoring and control over strategic plans implementation. The law also established major principles of strategic planning, such as coherence and integrity; delimitation of powers between various levels of government; sustainability and continuity; balanced nature of the planning system; result-oriented approach and efficiency; clear responsibilities of managers; transparency of the planning process; feasibility and realistic approach; resource-based approach; measurability; relevance of indicators to objectives and program-targeted principles.

The law on strategic planning has become a legal basis for the development of various normative documents regulating the planning process at the regional and municipal levels. For example, in 2012 the Russian Agency for Strategic Initiatives (ASI) has launched an Investment Standard (Standard 1.0) to improve the business climate in the Russian regions and increase their investment attractiveness (see http://asi.ru/investclimate/standard/). Having started as a pilot project in eleven Russian regions, the Standard 1.0 became a mandatory instrument for assessment of a region's efficiency in the investment sphere since 2013.

The similar investment standard (Standard 2.0) was developed for municipalities as well. The focus was made on creation of planning and managerial structures in the city/town administrations, including the so-called investment boards; identification of proper objects for investment; building infrastructure for investment projects; training municipal officials, etc.

Initially, it was planned to launch the Standard 2.0 implementation in 2014. However, only a limited number of Russian cities and towns were able to do it. Currently, this standard is being introduced only on a voluntary basis and mainly in the regions that successfully implemented the Standard 1.0 (Emelyanova, 2014).

Although both standards were heavily criticized for their technocratic character and ignorance of local realities (especially in Russia's remote regions), it was a rather useful exercise in strategic planning which can bring some fruit in a foreseeable future.

Measuring Sustainable Development Planning in Russia's Arctic Industrial Centers

When indexing the progress in planning the AZRF SD strategies the following indicators should be taken into account.

First and foremost it is important to find out whether the Russian Arctic cities aim to create and develop an efficient strategy planning system. To make judgments on the administrative/management mechanism's efficiency it is necessary to examine whether the city leadership is able to acknowledge *the need for SD strategy planning* or not. As municipal documents show, the AZRF local governments understand the importance of having a sort of SD strategy. None of the AZRF industrial cities has a special SD strategy but there are sections in the city development plans/strategies that are relevant to this problematique. These sections can be titled differently, such as, for example, "Human/social capital development", "Sustainable socio-economic development", "Sustainable ecological development", etc.

It is also important to know whether city planning is of an *integrated/comprehensive nature* or addresses specific SD-related challenges. It should be noted that only large (by Arctic standards) cities have development strategies of their own. Relatively small urban settlements usually have the so-called 'target programs' related to the SD problematique. For example, Nickel (the Murmansk Region) has a municipal program on provision of urban amenities and urban development but lacks an integrated development plan (see http://admnickel.ru/celevye-programmy.html). Interestingly, Severodvinsk, which is a rather large city with a population of some 185,000, stopped adopting complex and long-term plans of socio-economic development and replaced them with some three-year forecasts/indicative plans and targeted programs (see http://severodvinsk.info/?idmenu=48 http://severodvinsk.info/?idmenu=48).

It is also important to know whether a *special strategy planning office* exists in an Arctic city or not. Most AZRF municipalities prefer to charge their economic departments with planning functions rather than involve units responsible with environmental or social policies. This brings a certain "economic bias" to their development programs at the expense of social/humanitarian and environmental dimensions of their SD strategies. This also may challenge the integrated/comprehensive nature of planning and give the local development plans a sectoral/single-issue character. For example, the Murmansk (Murmansk City Government, 2013) and Severodvinsk (Severodvinsk City Government, 2010) development plans include almost all aspects of the SD strategy (except food security). However, the Arkhangelsk development strategy (Arkhangelsk City Government, 2008) prioritizes only sectors, such as transport infrastructure, health care, education and cultural heritage preservation and almost completely ignores food, environmental, community, personal and political security.

Planning units are very small and normally consist of several managers even in the largest AZRF cities, such as Arkhangelsk, Murmansk and Norilsk. For this reason, these units are often unable to fully comply with all classical requirements of the planning management algorithm, including strategy formulation and implementation. It is also very difficult for them to properly coordinate their activities with other city administration units which are also involved in the planning and implementation process. For the same reason, it is uneasy to 'mainstream' urban sustainability plans in the sense that all parts of the government have some stake in achieving the goals.

One more indicator of successful SD city planning policy is whether it has *clearly defined goals, outcomes, expectations and implementation strategies*. It appears that most city development programs have clearly defined objectives, outcomes and implementation strategies, including indicators and benchmarks. However, they may differ by specific details. For example, while the Murmansk (2013), Norilsk (2012), Severodvinsk (2010) and Vorkuta (2014) strategies have a detailed description of the implementation mechanisms and indicator systems, the Arkhangelsk (2008) and Salekhard (2007) ones limit themselves to depicting specific project management procedures and setting some general indicators.

It is also useful to know what *quality and accuracy of assessments* are inherent to the policy planning process? In other words, whether planning is based on science or wishful thinking? It should be noted that strategy planning documents of the AZRF municipalities are based on empirical data and research produced either by analytical units of city administrations or research/educational organizations – local or from other Russian regions. Among the latter the Moscow-based ASI, Institute for Urban Economics, Council for the Study of Productive Forces (Russian Foreign Trade Academy), as well as the St. Petersburg-based Leontief Center, Russian State Research Institute for Urban Studies, etc. should be mentioned.

To shape efficient SD strategies the AZRF municipalities should *effectively coordinate their policies with regional and federal authorities*. The AZRF municipalities aim to develop a proper legal basis for SD strategies, including power-sharing with the federal and regional governments. As mentioned above, by federal law, the Russian municipalities must coordinate their development plans/programs with the regional and federal SD strategies. However, this is done by the AZRF cities in different ways. For example, in the Murmansk development plan each strategic priority is linked to the specific regional and federal programs (Murmansk City Government, 2013: 108-169). On the contrary, the Arkhangelsk, Norilsk, Salekhard and Vorkuta development strategies mention the need to coordinate it with the higher levels of governments *in passim* (Arkhangelsk City Government, 2008: 51-52; Norilsk City Government, 2012: 105-107; 170; Salekhard City Government, 2007: 32-33; Vorkuta City Government, 2014: 84).

The AZRF municipalities are rather cautious about any federal initiatives in the field of strategic planning. For example, Moscow's efforts to introduce the Standard 2.0 got a cold shoulder in the northern cities. In 2014, about 80 municipalities across the country were selected to implement the project. However, in the AZRF, only the Murmansk region, where the Standard 1.0 was fully implemented, participates in the experiment with the Standard 2.0. Four municipalities are considered pilot ones (Pechenga and Kola districts, Monchegorsk and Murmansk); other municipalities (Polyarnye Zori, Apatity, Kirovsk, Olenegorsk, and Kovdorsky, Lovozersky, Tersky and Kandalaksha districts) implement only certain elements of the Standard 2.0. The only municipality that has fully implemented all elements of the Standard 2.0 is Murmansk itself. This can be explained by the fact that it is a capital of the region that has larger financial and human resources than other municipalities (Emelyanova, 2014).

To provide SD strategies with a proper societal setting/support *transparency of the planning process* as well as *public input/community engagement* should be ensured. These indicators are also important for a proper assessment of the planning process' quality. Theoretically, the Russian Arctic municipalities have several instruments to organize the planning and implementation process in an open/democratic way: regular opinion polls, public discussions in the media, regular hearings

in the so-called public chambers, dialogue with NGOs, etc. However, only Severodvinsk has a special municipal program to facilitate the local NGOs' development (Severodvinsk City Government, 2016). The Murmansk and Vorkuta development plans hardly mention the need for a dialogue with civil society institutions; other AZRF cities simply ignore this issue resting the SD strategy planning process entirely within governmental structures.

Ability to take into account private and public interests is one more indicator of a strategy planning's efficiency. In principle, all AZRF city development plans acknowledge the need to build a proper public-private partnership. However, in reality few Arctic municipalities (e.g. Salekhard) are able to harmonize public interests with those of business communities which often behave in a rather self-willing and selfish way.

One more important question is about the nature of planning. In the Soviet era, the centralized planning and control system prevailed both in Russia's Arctic and in the country at large. In the post-Soviet period, new modes of decentralized planning and control that are more sensitive to the dynamic AZRF realities have emerged. For example, 'indicative planning' loosens up the planning process: instead of setting taut and unchanging targets, it merely points in certain desired directions and recalibrates future targets in light of what past practice has shown to be realistic aspirations. More generally, the present-day Russian policy makers can rely more heavily on 'loose'/'soft' laws and regulations. Instead of tightly specifying exact performance requirements, the laws and regulations can be written in more general and vaguely aspirational terms (Goodin, 2006: 18). It should be noted that most of the AZRF urban development strategies are written in the spirit of indicative planning rather than in a centralized, Soviet-type way.

As far as the environmental aspect of the SD strategies is concerned, the AZRF municipalities have the following priorities:

- Now the Arctic cities focus on prevention and reduction of pollution rather than on cleaning up the environmental mess as was the case before.
- Rehabilitation of damaged natural environmental systems (damage assessment, targeting the priority areas, clean-up programs, monitoring).
- Solid and liquid waste treatment.
- Targeted programs to protect endangered species.
- Development of public-private partnerships in the environment protection sphere.
- Encouraging environmental research (support for the local universities and research centers).
- Developing environmental education and culture.
- Cooperation with the local environmental NGOs and mass media to promote "green" projects and culture.
- Development of monitoring system in various areas (prevention of natural and man-made disasters; air and water pollution; endangered species, etc.).

It should be noted that the AZRF cities differ by their views on the significance of environmental problems in the SD strategies. While for some municipalities, such as Arkhangelsk, Murmansk,

and Salekhard, environmental issues are one of several policy priorities, for Monchegorsk, Nickel, Norilsk, and Severodvinsk, where the ecological situation is rather grave, the need to solve the environmental problems is really critical.

Map 1. Impact zones in the Russian Arctic. Source: redesigned from Dushkova & Evseev 2011: 2.

These cities are traditional centers of metallurgical production, machine- and ship-building industries and for this reason are heavily polluted and pose serious health hazards. Russian scientists identified 27 so-called impact zones where pollution has led to environmental degradation and increased morbidity among the local population (see Map 1). The main impact zones include the Murmansk Region (10% of total pollutants in the 27 impact zones), Norilsk urban agglomeration (more than 30%), West Siberian oil and gas fields (more than 30%) and the Arkhangelsk Region (around 5%) (Dushkova & Evseev 2011; Ekologicheskoe Sostoyanie Impactnykh Raionov, 2012). In sum, about 15% of the AZRF territory is polluted or contaminated (Kochemasov et al., 2009).

As mentioned above, the AZRF cities pay little attention to the purely human security problematique preferring to focus on the economic and environmental issues. The "human dimension" of the SD strategies is mostly represented by the municipal programs on civil defense (Murmansk City Government, 2013; Severodvinsk City Government, 2010; Vorkuta City Government, 2014) to protect the local population from natural and man-made catastrophes.

Some development plans (Murmansk City Government, 2013; Severodvinsk City Government, 2010) also have sections on personal security, including the need to fight street violence.

Almost all city development plans mention the need for international cooperation, including venues such as the Arctic Council, Barents Euro-Arctic Council, International Polar Year, Intergovernmental Panel on Climate Change, UNDEP and UNESCO programs, country-to-country, region-to-region, town-to-town collaboration, etc.

Conclusions

To sum up, the Russian Arctic municipalities have familiarized themselves with the concept of sustainable development. To some extent, this concept was embedded in municipal development plans/strategies, although the AZRF cities lack special SD strategic documents, and, quite often, economic, ecological, and social dimensions are not properly harmonized with one another. The Arctic municipalities view the development of sound urban planning strategies as an important policy priority for themselves. They have tried to create proper legal and institutional settings for the development and implementation of such strategies. They also tried to cooperate with regional and federal authorities in the field of strategic planning and solving concrete socioeconomic and ecological problems

They have made great strides in implementing some SD-related (mostly economic and environmental) projects over the last 10 to 15 years. There was a clear shift from survival/reactive to capacity-building/proactive SD strategies. These efforts resulted in some success stories albeit rather modest ones.

However, there is still a long way to go, in terms of both the development of adequate policies and their effective implementation. The main problem is how to solve the "words and deeds" problem because many of the SD projects still remain on paper and have never been implemented. In other words, the gap between strategy formulation and implementation still exists.

The weak points of the AZRF urban development strategies include a lack of transparency in the policy planning process and a lack of cooperation with and involvement of civil society institutions. To a large extent, the policy planning and implementation process is still of the top-down rather than bottom-up nature. Moreover, not all issue areas of the SD problematique are addressed, and different strategic approaches are not properly harmonized/synchronized with one another. Finally, quite often, municipal SD programs and projects are understaffed, underfunded and not supported by regional and federal authorities. Hence, larger staff and funding as well as better coordination of SD strategies between different levels of government are badly needed.

To conclude, despite the above problems and shortcomings, the total "balance sheet" of the Arctic cities' SD strategies and general dynamics is rather positive. The AZRF municipalities are serious about solving numerous socioeconomic and environmental problems and making these urban areas better and more comfortable places to live in.

Acknowledgments

This work was supported by the National Science Foundation under the PIRE project, ERA.Net RUS Plus/RBRF no. 18-55-76003 project and Russian Science Foundation (grant number 16-18-10315).

References

2012. Ekologicheskoe Sostoyanie Impactnykh Raionov Sushi Arkticheskoi Zony Rossiyskoi Federatsii [The Environmental Situation in the Impact Zones of the Terrestrial Parts of the Arctic Zone of the Russian Federation]. http://www.arctic-online.ru/ekologiya/ (in Russian).

Arkhangelsk City Government. 2008. *Strategiya sotsial'no-ekonomicheskogo razvitiya munitsipal'nogo obrazovaniya 'Gorod Arkhangelsk' na period do 2020 goda* [The strategy for the socio-economic development of the municipal entity 'City of Murmansk' for the period up to 2020]. http://www.arhcity.ru/data/387/strategy.doc (in Russian).

Dushkova, D., and A. Evseev. "Analiz Techogennogo Vozdeistviyana Geosistemy Evropeiskogo Severa Rossii." [Analisys of Technogenic Impact on Geosystems of the European Russian North]. *Arktika i Sever* [The Arctic and the North], no. 4 (2011): 1–34. http://narfu.ru/upload/iblock/673/16.pdf (in Russian).

Emelyanova, E.E. 2014. 'Finansovaya Osnova Munitsipal'noi Investitsionnoi Politiki v Gorodakh Krainego Severa' [Financial Basis of the Municipal Investment Policy in the High North Cities], *Arktika i Sever* [The Arctic and the North], no. 15, pp. 15–34. URL: http://narfu.ru/aan/article_index_years.php?SECTION_ID=6231 (in Russian).

Goodin, R. 2006. *The Oxford Handbook of Public Policy*. Oxford New York: Oxford University Press.

Heininen, L. 2004. 'Circumpolar International Relations and Geopolitics', *Arctic Human Development Report*. Akureyri: Stefansson Arctic Institute, pp. 207-225.

Kochemasov, Y.V., B.A. Morgunov, and V.I. Solomatin. *Ekologo-Ekonomicheskaya Otsenka Perspectivy Razvitiya Arktiki* [Ecological-Economic Assessment of Perspectives of the Arctic's Development] (2009). http://www.ecoenergy.ru/Article54.html (in Russian).

Murmansk City Government. 2013. *Strategicheskiy plan sotsial'no-ekonomicheskogo razvitiya goroda Murmanska do 2020 goda* [Strategic plan for the socio-economic development of the City of Murmansk up to 2020]. http://citymurmansk.ru/img/all/175_strategicheskiy_plan__akt__s_izm__ot_01_04_2013.doc (in Russian).

Norilsk City Government. 2012. *Programma sotsial'no-ekonomicheskogo razvitiya munitsipal'nogo obrazovaniya 'Gorod Arkhangelsk' do 2020 goda* [The program of socio-economic development of the municipal entity 'City of Murmansk' up to 2020]. http://norilsk-city.ru/files/92/22661/PSER_-_12.05.2012.rar (in Russian).

Putin, V. 2009. *Kontseptsiya Ustoychivogo Razvitiya Korennykh Malochislennykh Narodov Severa, Sibiri i Dal'nego Vostoka Rossiyskoi Federatsii* [The Concept for the Sustainable Development of Small

Indigenous Population Groups of the North, Siberia and the Far East of the Russian Federation]. 4 February 2009. http://docs.cntd.ru/document/902142304 (in Russian).

Putin, V. 2014. Federal'ny Zakon ot 28 iunya 2014 g. No. 172-FZ "O Strategicheskom Planirovanii v Rossiyskoi Federatsii" [The Federal Law, June 28, 2014, no. 172-FL "On Strategic Planning in the Russian Federation"], *Rossiyskaya Gazeta,* 28 Jine. https://rg.ru/2014/07/03/strategia-dok.html (in Russian).

Rohr, J. 2014. *Indigenous Peoples in the Russian Federation.* Copenhagen: International Work Group for Indigenous Affairs. http://www.iwgia.org/iwgia_files_publications_files/0695_HumanRights_report_18_Russia.pdf.

Salekhard City Administration. 2007. *Reshenie ob utverzhdenii strategii sotsial'no-economicheskogo razvitiya goroda Salekharda – administrativnogo tsentra Yamalo-Nenetskogo avtonomnogo okruga na 2007-2012 gody i do 2020 goda* [The decision on the approval of the strategy for the socio-economic development of Salekhard – the administrative center of the Yamal-Nenets Autonomous Area for 2007-2012 and up to 2020]. http://www.salekhard.org/upload/medialibrary/8ba/8ba43d95c5fc43a137bc05248f26a89b.pdf (in Russian).

Severodvinsk City Government. 2010. Programma kompleksnogo sotsial'no-ekonomicheskogo razvitiya munitsipal'nogo obrazovaniya 'Severodvinsk' na 2010-2012 gody [The program of complex socio-economic development of the municipal entity 'Severodvinsk' for 2010-2010]. *Vpolne Ofitsial'no,* no. 25 (5 June). http://severodvinsk.info/docs/vo/2010/2010.07.05(25).pdf (in Russian).

Severodvinsk City Government. 2016. *Munitsipal'naya programma "Sodeistvie razvitiyu institutov grazhdanskogo obshestva i podderzhka sotsial'no orientirovannykh nekommercheskikh organizatsiy v munitsipal'nom obrazovanii "Severodvinsk" na 2016-2021 gody"* [The municipal program "Support for the civil society institutions and socially-oriented non-profit organizations in the municipal entity "Severodvinsk" for 2016-2021"]. http://severodvinsk.info/?idmenu=48 (in Russian).

Vorkuta City Government. 2014. Strategiya sotsial'no-ekonomicheskogo razvitiya munitsipal'nogo obrazovaniya gorodskogo okruga "Vorkuta" na period do 2020 goda [The strategy of the socio-economic development of the municipal entity "Vorkuta" for the period up to 2020]. http://www.воркута.рф/upload/iblock/0e1/korrektirovkastrategii.pdf (in Russian).

Updating Winter: The Importance of Climate-Sensitive Urban Design for Winter Settlements

David Chapman, Kristina L. Nilsson, Agatino Rizzo & Agneta Larsson

This study explores urban design principles for winter settlements to identify climate-related conditions that affect soft mobility (walking and cycling) in these communities. Winter communities have evolved lifestyles and means suited to living and working with local conditions and seasonal variation. However, climate change will cause changes in weather that will require adaptation in such communities. These changes may present new risks and unexpected challenges to outdoor soft mobility in the community. Physical inactivity has emerged as a major focus of concern in public health policy. Winter weather has always limited outdoor soft mobility in winter settlements. In particular, outdoor activity in winter can be reduced by inclement weather and fear of accidents. People's understanding of the barriers to and enablers of soft mobility are also often based on experience and ability to detect environmental clues. To help winter communities maximise the opportunities for outdoor soft mobility and the associated wellbeing benefits, built environments must be designed with an understanding of climate change.

This study explores barriers to and enablers of soft mobility in winter and discusses them in light of climate change and human wellbeing. It is argued that established principles of urban design may require re-evaluation if we want to increase outdoor soft mobility in winter. Increases in physical activity could help reduce costs and pressures on health services by creating safer and more walkable communities. The paper concludes by suggesting that communities should focus on more context-based winter urban design principles that account for ongoing climate change.

Introduction

All over the world, the form of the built environment plays a key role as an enabler or inhibitor of urban outdoor activities such as soft mobility. The public realm can make it more attractive for people to be mobile outdoors and to participate in public life, or it can put people off venturing outside. A key urban design challenge in winter cities is to create environments that encourage outdoor activity in both the winter and the summer. A closely related challenge is to understand how changes in weather due to climate change will influence *people's soft mobility choices*.

The reason for studying this is the importance of understanding how the relationship between urban form, weather, seasonal variations, and climate change influences human outdoor activity.

David Chapman is a researcher in the Architecture Group at Luleå University of Technology. Kristina L. Nilsson is Professor in the Architecture Group at Luleå University of Technology. Agatino Rizzo is an Associate Professor in the Architecture Group at Luleå University of Technology. Agneta Larsson is a Doctor in the Health Sciences Department of Luleå University of Technology.

In this study, the focus on outdoor activity is problematised around the concern that people spend a low percentage of their time outdoors in winter conditions.

To explore this issue, the study focuses on the question: What is the current state of knowledge and practice relating to the urban design of winter cities? For the purposes of this work, winter settlements are defined as places with significant seasonal climate variation, temperatures that are normally below zero, precipitation that is mainly in the form of snow, and limited hours of sunshine & daylight (Pressman, 1989). Many of these settlements are sub-Arctic; notable examples include Luleå (Sweden), Tromsø (Norway), Arkhangelsk, (Russia), and Yellowknife (Canada).

Figure 1: Seasonal variation in Luleå, Sweden. Photographs taken at the same location in winter and summer.

The rationale for this study is the proposition that while urban design should support outdoor activity (Boverket, 2012; CABE, 2009; Carmona, Punter, & Chapman, 2002; Cowan, Adams, & Chapman, 2010; Eriksson, 2013), the urban design principles for Winter settlements may not account for evolving Winter barriers to outdoor soft mobility and the associated impacts on human wellbeing (Chapman & Larsson, 2018; Chapman, Nilsson, Larsson & Rizzo, 2017; Koivurova & Kähkönen, 2018).

While the study was not limited to any particular location or type or scale of winter city, most of the analysed guidance emanated from northern Europe and North America. The documentation also focused on places large enough to be settlements with some form of facilities, rather than groupings of individual buildings. As such, the research is primarily oriented towards more urban winter communities.

Climate Change

Global warming is changing sub-Arctic seasons and winter (Chen & Chen, 2013). Consequently, average temperatures and levels of precipitation in the sub-arctic are expected to rise between now and 2100.

In light of environmental concerns, the Intergovernmental Panel on Climate Change (IPCC) was set up in 1988 by the World Meteorological Organization (WMO) and United Nations Environment Programme (UNEP). Reports issued by the IPCC in 1990, 1992 and 1995 highlighted the risks of substantially reduced snow cover with impacts on ecosystems and social & economic activity. Later assessments in 2001 (IPCC) concluded that the proportion of winter precipitation falling as rain will increase and that snow conditions will become less reliable, affecting tourism.

The IPCC's 2007 report continued this theme, highlighting the impact of snow and glacier melt runoff on drinking water and the likelihood of extensive species lose in mountainous areas. The latest *Climate Change 2014, Synthesis Report* reinforces these conclusions and presents climatic trajectories suggesting that the northern hemisphere's spring snow cover may have fallen by between 7 and 25% by the end of the 21st Century (IPCC).

At the national level, Finland's environmental administration has concluded that climate change may result in winters that are more humid and cloudier, with diminished snow cover and increased rainfall (Vaccia, 2014). The County Administration Board of Norrbotten, Sweden (Länsstyrelsen i Norrbottens län, 2012) concluded that by 2100, annual average temperatures will have increased by 4-6 °C, annual precipitation will have increased by 15-50%, snowfall will have declined, and the snow cover period will be more than a month shorter than it presently is across the country (Gustavsson, 2011).

Figure 2: The changing face of winter – the E4 motorway, Sweden, during a rainstorm in December 2017.

The Norwegian Environmental Agency, Miljødirektoratet, predicts that by 2100, annual temperatures will have increased by around 4.5 °C and precipitation by about 18%, with more frequent and intense rainfall (Hanssen-Bauer et al., 2017). The 2007 (Updated 2015) 'Final Report' from the Swedish Commission on Climate and Vulnerability notes that Sweden will be strongly

affected by climate change, stressing the risks of flooding and adverse impacts on water (Swedish Commission on Climate and Vulnerability, 2007).

Research from international and national agencies sets out the environmental context of this study by illustrating that annual average temperatures are generally rising and precipitation as rain is increasing, while snowfall and snow cover are decreasing. Put simply, they suggest that winter settlements are getting warmer and will have more rain and less snow. This is important when discussing soft mobility in winter settlements because the weathers associated with warmer winters may influence people's choices and ability to be outdoors and active in winter. In this study, soft mobility is seen as a type of everyday physical activity and is defined as human-powered, non-motorized ways of getting around that have relatively little environmental impact, such as walking, cycling, rollerblading, or skiing.

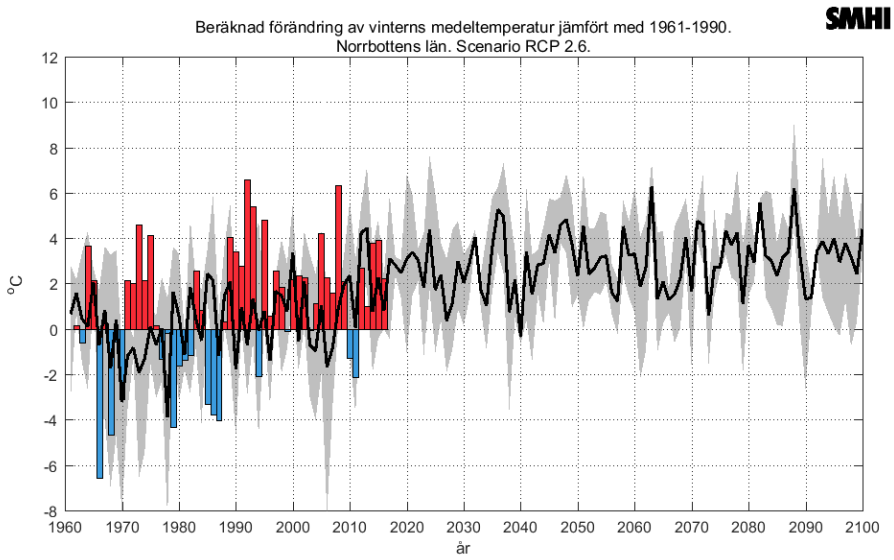


Figure 3: Historical and predicted mean winter temperatures in Norrbottens län, Sweden, under Scenario RCP2.6, showing that mean winter temperatures are projected to exceed 0 °C. Generated using SMHI's Climate scenarios tool: https://www.smhi.se/en/climate/climate-scenarios/haag_en.html

Urban Health

Koln et al (2012) cite physical inactivity as the fourth leading cause of death worldwide, and note that 31% of the world's population do not achieve the minimum recommended level of physical activity. Similarly, Murray et al (2013) identified physical inactivity and low physical activity as the risk factor with the fourth highest attributable burden of disease in the UK; together, diet and physical inactivity accounted for 14.3% of the UK's disability-adjusted life-years in 2010. The U.S. Surgeon General links health directly to activity, highlighting physical activity as one of the most important steps to improving health at all ages (U.S. Department of Health and Human Services, 2015).

The U.S. Center for Disease Control (1999) estimates that $1 invested in measures that encourage physical activity leads to medical cost savings of $3.20 (WHO, 2002). The WHO classifies measures to improve 'diet and physical activity' as 'best buys' - high impact, cost-effective programmes that can be delivered with constrained resources (WHO, 2014). In 2015, the WHO

estimated that the additional healthcare costs attributable to physical inactivity in a population of 10 million people (roughly the population of Sweden) of whom 50% are insufficiently physically active would be 910 million EUR per annum (WHO, 2015).

Outdoor soft mobility in winter communities can be hindered by inclement weather. It has been estimated that people spend 90% of their lives indoors (Evans & McCoy, 1998), and Winter-related reductions in physical activity have been found in various countries (Chan & Ryan, 2009). In Finland, for example, population-based studies showed that people spend only 4% of their total time exposed to cold outdoor climates, with most of this exposure occurring during their leisure time (Mäkinen et al., 2006).

If this is even close to correct, it indicates that the winter can reduce outdoor activity in general, resulting in lower levels of physical activity. Therefore, actions to enable soft mobility and make it easier and more practical for people to regularly use soft mobility modes of transport could increase physical activity, energy expenditure (metabolic rate), and physical capacity. All of these are known to improve human health and reduce health care costs (U.S. Department of Health and Human Services, 2015; House of Lords, 2016; WHO, 2018).

To develop successful winter communities, it is important to facilitate year-round outdoor soft mobility in a way that accounts for and accommodates changing climatic conditions. Because around 100 million people live in sub-Arctic regions, this is an important focus for both winter settlement planning and public health policy.

Figure 4: Examples of outdoor winter activities.

Methods

The objective of this study is to explore winter settlement urban design principles to identify climate-related conditions that affect opportunities for soft mobility in winter communities.

A literature search was performed using the keywords 'winter cities', 'urban design', and 'health' in the Scopus and Web of Science databases. The number of hits obtained ranged from 233 (for searches using the keywords 'winter cities' and 'urban design' individually) to six when all keywords were used together. After an initial review of the 233 documents, 13 documents relevant to the urban design of winter settlements were identified. Further literature searches were undertaken using the reference lists included in these documents. This revealed 22 additional relevant documents. This review is thus based on a total of 35 documents (22 journal articles, 9 books, 2 citywide urban design guides and 2 academic theses) covering various aspects of Winter urban design.

A deductive content analysis (Patton, 2002) of the literature was performed (Fig. 9) to identify relevant knowledge and information on winter conditions in relation to the built environment. Winter settlement urban design considerations in the literature were then used to populate a matrix that juxtaposed aspects of urban form (siting & layout, height & massing, façade & interface, and public realm & landscape) with Winter conditions (solar access, wind, snow, rain, cold, darkness, and the presence of snow- and ice-covered surfaces). The literature coverage of each aspect of urban form in relation to each winter condition was then ranked using a traffic light system: green, orange, and red denoted combinations that were discussed extensively, to a limited degree, and very little or not at all, respectively. Once all relevant information had been sorted, the outcomes were analysed; this analysis is presented below. The discussion and conclusions sections compare the results of the analysis to the current discourse on climate change and human wellbeing.

Analysis

The architect Ralph Erskine famously said that in winter communities:

> houses and towns should open like flowers to the sun of spring and summer but, also like flowers, turn their backs on the shadows and the cold northern winds, offering sun warmth and wind-protection to their terraces, gardens and streets (Collymore, 1994: 26).

While Erskine can be seen as a leading figure in winter design and his 1959 *Grammar for High Latitude Architecture* is an early set of design principles for winter settlements, the Canadian planner Dr. Norman Pressman was one of the most prolific advocates of the concept of winter cities. Pressman was a founding member of the Winter Cities Association (the WCA; 1982 to 2005), which focused on ways of improving the environments of winter settlements. Over time, the WCA shifted from advocating glassing over cities (Pressman, 1985) to favouring more urban concepts such as compactness, higher density, streets for people, and mixed-use and transit-oriented-development (Pressman, 2004). The dominance of Pressman and the WCA's studies on winter settlements is reflected in their high number of publications on the subject. Of the 35 documents reviewed for this paper, 17 were produced either by the WCA or in Canada; the others came from North America, Norway and Sweden. The demise of the WCA in 2005 resulted in a near-complete cessation of research into the design of winter cities. Nevertheless, the work of Pressman and the WCA defined three key issues that are still prominent in Winter settlement urban design, namely design for solar access, wind defence, and snow management (Andbert, 1979; Bengtsson, 1980; Børve, 1982; Werier, 1983; Pihlak, 1983; Pressman, 1985; Pressman & Zepic, 1986; Gappert, 1987; Børve, 1987; Pressman & Mänty, 1988; Matus, 1988; Glaumann & Westerberg, 1988; Børve, 1988; Sterten, 1988; Zrudlo, 1988; Pressman, 1988; Pressman, 1989a; Pressman, 1989b; Pressman, 1989c; Westerberg & Glaumann, 1990; Pressman, 1991; Pressman, 1994a; Pressman, 1994b;

Pressman, 1995; Pressman, 1996; Urban Systems, 2000; Bergström & Magnusson, 2003; Pressman, 2004; Eliasson, Knez, Westerberg, Thorsson, & Lindberg, 2007; Westerberg, 2009; Ebrahimabadi, 2012; Ebrahimabadi, 2015; Ebrahimabadi, Nilsson, & Johansson, 2015; Edmonton, 2016; Ebrahimabadi, Johansson, Rizzo, & Nilsson, 2018).

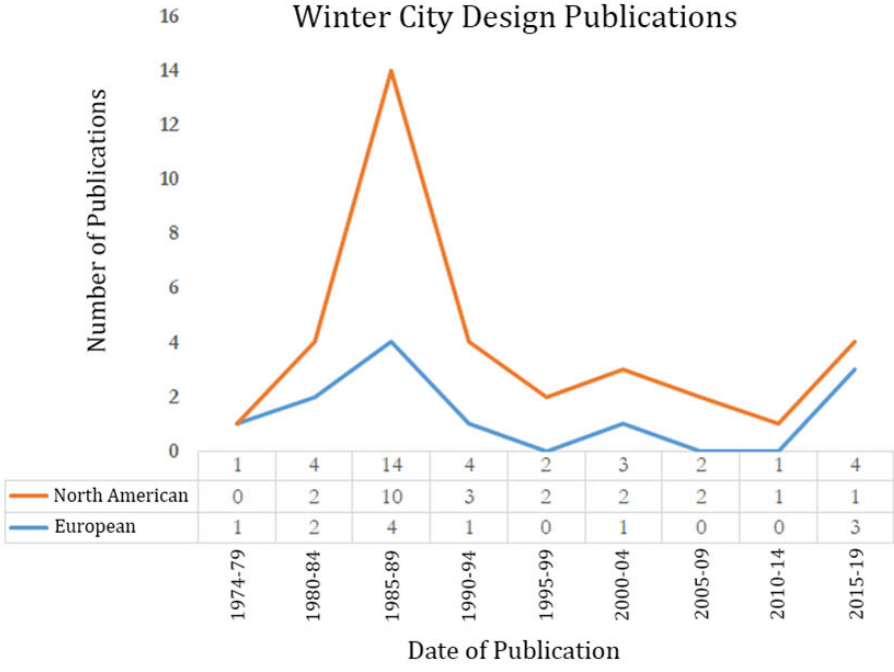


Figure 5: Years of publication of the 35 documents selected for inclusion in this review.

Maximising Solar Access

The review indicated that sunshine and solar access are mainly seen as positive factors, and urban designers commonly seek to capture their general benefits (Pressman, 1986, 1988; Pressman, 1988; Pressman, 1989a; Pressman, 1989b; Pressman, 1989c; Pressman, 1991; Pressman, 1995; Pressman, 1996; Urban Systems, 2000; Pressman, 2004; Ebrahimabadi, 2012; Ebrahimabadi, 2015; Ebrahimabadi et al, 2015; Edmonton, 2016; Ebrahimabadi et al, 2018). In the context of winter settlement design, two varieties of solar illumination are commonly considered: direct and reflected sunlight.

It has been noted that the case for maximizing direct solar access in high-latitude cities is complex because there can be significant issues of shadowing. Pressman & Zepic (1986) observe that in high-latitude winter settlements, the low angled winter sun can cast shadows whose length is up to 15 times an object's height. The large design distance between buildings suggested by Matus (1988) to overcome this issue is arguably too high a price to pay for the benefits of direct solar radiation. This was confirmed by Ebrahimabadi et al (2015) in a study on the New Kiruna settlement in Arctic Sweden, which concluded that the large open spaces needed to maximise solar access cannot be accommodated in central areas, making maximisation of solar access untenable as a major design objective.

Figure 6: A bright spring winter day making it attractive to be outdoors in sub-zero temperatures.

For winter settlements with low light levels and long winters, reflected light can bring significant benefits and should be considered in parallel with direct solar access. Andbert (1979) and Børve (1987) both suggest that snow reflects around 85% of directly incident solar radiation, whereas tarmac reflects only around 10% (Børve, 1987).

Other important features of nature light in high-latitude winter settlements are 'polar nights' and the 'midnight sun'. High-latitude settlements, and especially those above the Arctic Circle, can have extended periods of 'daylight' that may last for all 24 hours of the day in summer, and periods of almost continuous darkness during the winter.

Shelter from the Wind

Wind is commonly cited as one of the most uncomfortable outdoor weather conditions. However, Pressman's research (1995) suggested that improved outdoor microclimates can be achieved by good design, and that this could increase the number of comfortable outdoors days in winter settlements by as much as 30% in a year.

Of the three major issues in winter settlement urban design, wind is probably the most extensively studied. It is generally agreed that built forms and vegetation can either reduce or compound the effects of wind (Børve, 1982; Børve, 1987; Børve, 1988; Sterten, 1988; Glaumann, 1988; Zrudlo, Pressman, 1988; Pressman, 1989a; Pressman, 1989b; Pressman, 1989c; Pressman, 1991; Pressman, 1995; Pressman, 1996; Pressman, 2004; Ebrahimabadi, 2012; Ebrahimabadi, 2015; Ebrahimabadi et al, 2018). The literature and guidance on designing based on wind in winter settlements is often similar to that for more temperate climates, and suggests that it can be preferable to have low buildings that all have similar heights because they conduct wind over the buildings, reduce wind speed, and minimise turbulence at pedestrian level. Tall buildings (buildings that are at least twice the average height in a neighbourhood or area) should be avoided because they create their own

microclimates and downdrafts, and increase wind speeds at pedestrian level (Ebrahimabadi et al, 2015; Edmonton, 2016).

Ebrahimabadi also suggests that wind intensity can be reduced by around 50% if buildings more than twice the average height in an area are avoided (2015). Other urban design solutions for mitigating the impact of wind include stepping or terracing buildings where taller buildings are needed (Pressman, 1995), adding podium levels to protect pedestrians from strong wind at ground level (Glaumann, 1988; Pressman, 1995; Edmonton, 2016), or using closed blocks to the north and east to block cold wind (Pressman, 1995).

Trees can be used as windbreaks and have the advantage that they filter the wind without stopping it entirely (Pressman, 1995). It has been suggested that coniferous trees are preferable in winter settlements because they buffer wind and provide colour during winter (Pressman & Zepic, 1986). They also reduce airborne pollution better than deciduous trees.

Designs for winter settlements can also exploit the beneficial effects of wind. Snow gathers where wind speeds are low, so it is possible to control where snow gathers by understanding how wind is affected by the orientation of buildings, streets, and spaces (Glaumann & Westerberg, 1988; Pressman, 1995; Sterten, 1988). For example, a main road aligned with the prevailing wind benefits from natural snow clearing.

Design for Snow

Snow is one of the most prominent features of winter. On the one hand, it brings beauty and light, by reflecting up to 85% of solar radiation (Andbert, 1979; Børve, 1987). On the other, it brings slippery surfaces and risks of injury from falling. Discussions of snow in urban design often focus on its design opportunities, issues of safety & management, and its storage and removal (Andbert, 1979; Børve, 1982; Børve, 1988; Sterten, 1988; Pressman, 1988; Pressman, 1989a; Pressman, 1989b; Pressman, 1989c; Pressman, 1991; Pressman, 1995; Pressman, 1996; Urban Systems, 2000; Pressman, 2004; Ebrahimabadi et al, 2015; Edmonton, 2016).

Figure 7: Snow cover in the public realm can create hazards, as illustrated by this outdoor staircase.

The literature indicates that it is better to have multiple snow storage areas distributed across a city than to have a single storage location, and that where possible, storage areas should be incorporated into street designs (Urbansystems, 2000; Ebrahimabadi et al, 2015; Edmonton, 2016). It has also been argued that snow should not be stored in shaded places where colder and more humid microclimates prevail (Glaumann, 1988). Small storage areas with solar access are preferable because they accelerate melting (Edmonton, 2016).

Standing snow and snow cover can also be problematic in the melting period because they cause streets to fill with water and slush, making it very unpleasant to be outdoors (Edmonton, 2016). This issue can be exacerbated because snow that has been standing for a long time tends to carry greater levels of pollution than stormwater (Bengtsson, 1980), which can be unpleasant to pedestrians and users of the public realm.

Figure 8: A residential street can be significantly affected by water-based barriers to soft mobility in winter. Here the street is covered by water, slush, snow and ice all at the same time.

While the literature often focuses on maintenance, the reviewed publications highlight several ways in which the urban form influence snow. The siting and layout of buildings, streets, and vegetation can be used to control snowdrift and where snow gathers (Børve, 1987; Børve, 1988; Sterten, 1988; Pressman, 1995). The design of façades and interfaces (including roofs) can also be critical because it can affect the throw or falling of snow off roofs and icicle formation. The literature suggests that building entrances and roofs should be designed to limit falling ice, snow and other discharges from above (Urbansystems, 2000; Edmonton, 2016). Transition zones such as canopies, arcades, and other overhead shelter systems should also be considered to provide weather protection for outdoor soft mobility (Pressman & Zepic, 1986; Pressman, 1995; Urbansystems, 2000; Edmonton, 2016).

At ground or pavement level, it is recommended to slightly raise pedestrian streets or grade them to eliminate curb-side accumulation of snowmelt or ice formation (Urbansystems, 2000; Edmonton, 2016). Street designs should also direct snowmelt away from building entries (towards roadways), and roads should be dished in the middle to collect slush.

Other Weather Concerns

The main weather considerations examined in the included literature were solar access, wind defence, and snow management; other aspects of winter weather received less attention. In particular, the literature only rarely touches on issues relating to rain, darkness, and ice. References to rain are limited and confined to issues such as pooling in streets and spaces, and the use of permeable surfaces to mitigate heavy rainfall (Urbansystems, 2000; Edmonton, 2016). Almost nothing is said about how urban form and the public realm can mitigate the effects of rain on outdoor soft mobility.

Similarly, very little is said about darkness beyond the observation that it is a prerequisite for creative lighting (Edmonton, 2016) and enables architectural lighting to create focal points in the urban form (Urbansystems, 2000). Finally, ice and ice cover are only mentioned as the basis for various Winter sports (Ebrahimabadi, 2012) and as factors that should be considered when designing streetscapes (Urbansystems, 2000; Edmonton, 2016).

Urban design dimensions		Weather dimension					
		Light	Wind	Snow	Ice	Dark	Rain
Urban scale	Siting & Layout	🟢	🟢	🟠	🔴	🔴	🔴
	Height & Massing	🟢	🟢	🟠	🔴	🔴	🔴
	Facade & Interface	🟠	🟠	🟢	🟠	🔴	🔴
	Public Realm & Landscape	🟠	🟠	🟢	🟠	🟠	🔴

Figure 9: Matrix showing the treatment of different urban design issues and climate-sensitive aspects of winter weather in the urban design literature. Green, orange, and red dots indicate issues that have been covered extensively, to a limited degree, and little or not at all, respectively.

The results of the literature review are summarized in the above matrix, which shows how extensively the urban design literature discusses different aspects of winter weather in relation to various aspects of urban form. It is clear that the classical concerns of urban design for winter settlements – sun, wind, and snow - are well covered by research articles, books and policy, but issues relating to ice, darkness and rain are only lightly addressed.

Discussion

This study set out to explore winter settlement urban design principles and evaluate their fitness for purpose in light of climate change. The intention was to add to the discussion of how we can help communities maximise opportunities for outdoor soft mobility in winter and the physical wellbeing benefits this can bring.

The most striking result of this study is the age of the reviewed documents. Twenty-five of the 35 documents were published before the year 2000, and only one was published between 2010 and 2014. This is problematic for urban design and academia because new agendas emerged during these periods that have not been addressed in the literature. This is especially concerning because it means that many older (and possibly now outdated) books and articles continue to serve as cornerstones of urban design thinking for winter settlements.

Few of the reviewed publications mentioned the concept of sustainability even though it was introduced in 1987 by the report "Our common future" (WCED). They were also silent on the term climate change, which came onto the international agenda in 1988 with the establishment of the IPCC, as well as the issue of human health and wellbeing, which came to prominence in 1996 as a consequence of the U.S. Surgeon General's report on physical activity and health. The two notable exceptions were Pressman's article *Sustainable Winter cities: Future directions for planning, policy and design* (1996) and his book *Shaping Cities for Winter, Climate Comfort and Sustainable Design* (2004), which mention emerging agendas of reducing pollution, resource efficiency, sustainability, and human health.

Although Pressman references 'sustainable development' and 'human health' in these publications, knowledge about these issues has increased rapidly since they were written. Major climate frameworks have been developed since the 1990s under the aegis of the IPCC and are regularly updated with new information on climate change. The same is true for human health: although the 1996 Surgeon General's report was available when some of the included documents were being prepared, this issue has only really gained traction in the past decade. One of the key policy documents, *Step it up?*, which promotes walking and walkable communities and their health benefits (U.S. Department of Health and Human Services) was only published in 2015. Another important recently published policy document is the WHO's 2018 global action plan on physical activity, which places safe and enabling active outdoor environments at the heart of the WHO's mission. The recent publication of these two policy statements highlights the rapidly developing nature of this field.

While it can be argued that the reviewed urban design publications are dated, the more recent publications did focus more on creating compact settlements with higher densities, streets for people, and public transit-oriented development. This was likely done on the basis of contemporary policy concerns relating to resource efficiency and pollution (Gordon, 1997; Jenks et al, 1996) rather than human wellbeing. Nevertheless, such approaches also increase the walkability and cycle-ability of communities, which is beneficial for human wellbeing.

The reviewed publications largely focused on the three traditional urban design considerations for winter settlements – solar access, shelter from the wind, and design for snow storage and removal. These issues can be discussed individually in terms of their impact on outdoor soft mobility.

Almost all the reviewed publications highlight solar radiation as a positive contributor and facilitator of outdoor human activity (Andbert, 1979; Urbansystems, 2000; Ebrahimabadi et al, 2015; Edmonton, 2016). While many discussions are based on experience, such as the warmth created by direct sunlight, some focus on design considerations. Discussions around solar penetration and urban form highlight the difficulty of maintaining solar penetration in winter settlements. It is argued that the low sun angles experienced at high latitudes can create extensive shadowing over long distances (Matus, 1988).

This review does not indicate that these arguments conflict with efforts to address issues relating to climate change. Direct solar access is likely to remain as important in the future as it was when the principles of winter urban design were first established. However, the discussion about indirect lighting is likely to evolve. Light reflected from snow accounts for an appreciable proportion of the ambient light in winter, so reductions in snowfall and cover due to warming may mean that

communities benefit less from this indirect light. Consequently, climate change may necessitate better outdoor lighting in winter settlements.

Unlike sun and wind, snow is seen as both a positive and a negative (Andbert, 1979; Børve, 1987; Berggård & Johansson, 2010; Gard, Berggård, Rosander, & Larsson, 2018). Its beauty is noted, but various authors highlight its potential to inhibit the functioning of people and communities. Analyses of its beauty and leisure benefits are often limited to common sense discussions whereas information on its maintenance and management are often quite technical. Climate change is likely to significantly alter the impact of snow on winter settlements. As temperatures rise, potentially above 0 °C, some winter cities are likely to experience more rain and less snow, which could have a major effect on outdoor soft mobility in winter. Rain in winter settlements is highlighted as a major barrier to soft mobility in winter (Chapman et al, 2017), so this issue may become increasingly important for urban design.

Climate change is not expected to significantly change wind patterns. Therefore, protecting against and minimising the effects of wind will probably continue to be important in winter settlement design (Erell, 2011).

Overall, the results of the review indicate that climate change will probably alter the balance between snow and water in winter. This effect is relatively straightforward: in general (although not inevitably), if the temperature is below 0 °C, precipitation will fall as snow. However, above 0 °C, it is likely to fall as rain. As winter cities warm, water is likely to become a bigger barrier to soft mobility in winter and the positive effects of physical activity on wellbeing. This issue may not be limited to the occurrence of precipitation as rain; it may cause a range of problems including the build-up of standing water, the accumulation of ice if the temperature fluctuates around 0 °C, and the formation of slush. All of these could be barriers to soft mobility and increase the risk of being outdoors in winter.

Method Discussion

A unique aspect of this review is that it considers the treatment of urban design considerations in relation to individual weather conditions. This allowed the discussion of focus on the relationships between urban form and specific weather types, and to identify gaps in the research literature.

Whilst literature was systematically searched using appropriate keywords to identify publications with relevant content, the search protocol could only retrieve publications listed in research databases (namely Web of Science or Scopus) or cited in a relevant document listed in such a database. Consequently, relevant works may have been overlooked if they were not listed in the databases, not cited by listed documents, or not published in English.

While the climate data and trajectories considered in this work are drawn from IPCC documents, the implications of these trajectories were primarily considered in terms of their effects on Finland, Norway and Sweden. Consequently, the analysis is primarily relevant to the Nordic context.

Conclusions

This review indicates that most of the publications that serve as cornerstones in the field of urban design for Winter settlements do not account for current knowledge of climate change (including climate adaptation and climate resilience) or the impact of outdoor soft mobility on human

wellbeing. This is simply because most of the relevant publications were written either before or very shortly after these issues first came to prominence.

While the design principles of solar access, wind, and snow management remain important for modern winter settlements, winter warming due to climate change is significantly affecting snowfall and snow cover. Many winter settlements are likely to experience more rainfall and more fluctuations around 0°C because of warming; while this change may be minor in numerical terms, it will have profound implications for outdoor soft mobility because 0°C is the point at which snow (commonly seen as a positive attribute of the environment) becomes rain, water, and slush, all of which are commonly seen as negative attributes that create barriers to soft mobility.

We suggest that to facilitate outdoor soft mobility in winter and reduce risk under these changing conditions, the urban design principles for winter settlements may need to be widened in scope to encompass new winter conditions associated with climate change.

Warmer winter cities with temperatures that are often around 0°C and fluctuate more rapidly than they do at present will compel designers to consider how these conditions affect outdoor environments. Both present risks for outdoor activity because fluctuations around 0°C can rapidly change the nature of water in the public realm, transforming snow into ice, water, or slush. Designers must consider how the qualities of the 'built' public realm can be retained when streets and pathways are covered by winter precipitation. This may necessitate creating larger pedestrian areas within the public realm that can successfully accommodate both soft mobility and the build-ups associated with winter. Alternatively, designs could be created that exploit the sun and wind to help clear snow, ice, water and slush.

Figure 10: The Great Park Development, UK has green natural spaces that are designed flood with excessive storm water.

We may also consider how buildings and the public realm can be designed to help manage more rain in winter. Buildings and the public realm can be designed to provide temporary water storage when needed without affecting the usability of streets and pathways. Future building designs for winter cities may also include more features such as roof overhangs, arcades, and colonnades to provide street-level protection from rain and wind.

Urban designers working on high-latitude winter settlements will also need to consider how increasing levels of rain and lower levels of snow cover are likely to affect ambient light in winter. Ensuring adequate ambient outdoor lighting in winter may become an increasingly important design challenge. While rising outdoor temperatures are expected in winter, these changes are unlikely to change the natural seasonal lighting patterns of high-latitude settlements. Traditionally, light levels in winter are increased by reflection from snow, which mitigates against the impact of limited daylight hours and 'polar' nights. Reduced snow cover will therefore reduce the ambient lighting of the outdoor environment. This effect will be compounded because while snow is highly reflective, water is light absorbing and makes places visually darker. The reduction of outdoor ambient lighting in winter will present a fairly unique design challenge and will require an increased focus on making the outdoor environment attractive in winter.

These changes could all affect levels of outdoor soft mobility in winter and thus the wellbeing benefits associated with physical activity. However, because climate change will affect different winter settlements in different ways, designers should seek to understand its impact in the local context, and avoid generic 'one size fits all' approaches to climate mitigation, adaptation or resilience for winter settlements.

Designers will also benefit from looking at places whose present environmental conditions resembles those predicted for their settlement in future. For example, northern Scandinavian settlements that are expecting more rain could look to southerly settlements such as Bergen, Norway, which are designed to accommodate high levels of rain.

By taking such approaches and designing in context, urban designers of winter settlements may be better able to enable soft mobility in winter, reduce the risks of being outdoors in this season, and increase opportunities for residents to gain the associated physical wellbeing benefits.

Source Documents: Winter City Urban Design

1. Andbert, P. G. (1979). *Bygg rätt för väder och vind.* Bästlägen och baklägen för tomt och hus. Halmstad: Bokförlaget Spektra.

2. Bengtsson, L., Johnsson, A., Malmquist, P. A., Särner, E., & Hällgren, J. (1980). *Snöhantering i tätort.* Stockholm: Statens råd för byggnadsforskning.

3. Børve, A. (1982). Settlement Planning under Arctic Conditions in Northern Norway. *Energy and Buildings, 4*, Elsevier, 67-70.

4. Werier, V. (1983) *The liveable winter city (Canada)*. Habitat, Ottawa, 26 (3), 31-35.

5. Pihlak, M. (1983). Philosophy, Principles and Practice of Northern Latitude Urban Landscape Design. M.L.A., University of California at Berkeley, 92-93.

6. Pressman, N. (eds.) (1985). *Reshaping winter cities: concepts, strategies and trends*. [Waterloo, Ontario]: Univ. of Waterloo Press.

7. Pressman, N., & Zepic, X. (1986). Planning in cold climates: a critical overview of Canadian settlement patterns and policies. Winnipeg: Man., Canada: Institute of Urban Studies.

8. Gappert, G. (ed.). (1987). *The future of winter cities*. Place of PUB? Sage Publication, Inc.

9. Børve, A. (1987). Hus og husgrupper i klimatutsatte, kalde strøk: utforming og virkemåte. Oslo: Arkitekthøgskolen i Oslo.

10. Pressman, N. & Mänty, J. (eds.) (1988). *Cities designed for winter*. Tampere: Tampere Univ. of Technology.

11. Matus, V. (1988). Design for northern climates: cold-climate planning and environmental design. New York: Van Nostrand Reinhold.

12. Glaumann, M., & Westerberg, U. (1988). *Klimatplanering, Vind. Solna*: Svensk byggtjänst.

13. Børve, A. (1988). Settlement and housing design with special regard to local climate conditions in cold and polar-regions – examples from northern Norway. *Energy and Buildings, 11*, 33-39.

14. Sterten, A. (1988). Climate and Weather Protection Systems in Settlement Planning in the Arctic Regions of Northern Norway. *Energy and Buildings, 11*, 23-32.

15. Zrudlo, L. R. (1988). A climatic approach to town planning in the Arctic, *Energy and Buildings, 11*, 1-3, p. 41-63

16. Pressman, N. (1988). Developing Climate-responsive Winter Cities. *Energy and Buildings, 11*, 11-22.

17. Pressman, N. (1989A). Final Report, UN/ECE Research Colloquium on Human Settlements in Harsh Living Conditions. *Habitat Intl.* Vol. 13, No. 2, 127-137.

18. Pressman, N. (1989B). Harsh Living Conditions: A Research Agenda. *Habitat Intl.* Vol. 13, No. 2, 13-22.

19. Pressman, N. (1989C). The Search for Northern Settlement Form. *Habitat Intl.* Vol. 13, No. 2, 127-137.

20. Westerberg, U. & Glaumann, M. (1990). Design Criteria for solar access and wind shelter in the outdoor environment. *Energy and Buildings*, 1990/91, 15-16, 425-431.

21. Pressman, N. (1991). Human Health and Social Factors in Winter Climates. *Energy and Buildings*, 15-16, 765-773.

22. Pressman, N. (1994A). Climatic factors in play areas and public space. *Architecture & Comportement/Architecture & Behaviour, 10*(4), 417-427.

23. Pressman, N. (1994B). Climatic factors in urban design. *Architecture & Comportement/Architecture & Behaviour, 10*(1), 1-127.

24. Pressman, N. (1995). *Northern cityscape: Linking design to climate*. Yellowknife, N.W.T: Winter Cities Association.

25. Pressman, N.E.P. (1996) Sustainable winter cities: Future directions for planning, policy and design. *Atmospheric Environment, 30* (3), 521-529. DOI: 10.1016/1352-2310(95)00012-7.

26. Urban Systems. (2000). *Winter City Design Guidelines*. Urban systems Ltd.

27. Bergström, A., & Magnusson, R. (2003). Potential of transferring car trips to bicycle during winter. *Transportation Research Part A: Policy and Practice, 37*(8), 649-666.

28. Pressman, N. (2004). Shaping Cities for Winter, Climate Comfort and Sustainable Design. Winter Cities Association.

29. Eliasson, I., Knez. I., Westerberg, U., Thorsson, S., & Lindberg, F. (2007). Climate and behaviour in a Nordic city, *Landscape and Urban Planning, 82*, 1-2, 72-84.

30. Westerberg, U. (2009). The significance of climate for the use of urban outdoor spaces: some results from case studies in two Nordic cities. *International Journal of Architectural Research*, 131-144.

31. Ebrahimabadi, S. (2012). Improvements in addressing climate factors in urban planning and design (Licentiate dissertation). Luleå.

32. Ebrahimabadi, S. (2015). Outdoor Comfort in Cold Climates : Integrating Microclimate Factors in Urban Design (PhD dissertation).

33. Ebrahimabadi, S., Nilsson, K. L., & Johansson, C. (2015). The problems of addressing microclimate factors in urban planning of the subarctic regions. *Environment and Planning, B, 42*(3), 415–430. **https://doi.org/10.1068/b130117p**.

34. Edmonton. (2016). *Winter Design Guidelines, Transforming Edmonton into a Great Winter City*. Wintercity Edmonton. Retrieved: 2017-08-08. **https://www.edmonton.ca/city_government/documents/PDF/WinterCityDesignGuidelines_draft.pdf**.

35. Ebrahimabadi, S., Johansson, C., Rizzo, A., & Nilsson, K. (2018). Microclimate assessment method for urban design: A case study in subarctic climate. *Urban Design International, 23*(2), 116-131. **https://doi.org/10.1057/udi.2015.26.**

References

Berggård, G., & Johansson, C. (2010). Pedestrians in wintertime: effects of using anti-slip device. *Accident Analysis and Prevention*, *42*(4), 1199–1204. https://doi.org/10.1016/j.aap.2010.01.011.

Boverket. (2012). Samhällsplanering som stimulerar till fysisk aktivitet. Slutrapportering av ett regeringsuppdrag. Rapport 2012:22. Retrieved: 2017-09-22. http://www.boverket.se/globalassets/publikationer/dokument/2013/samhallsplanering-som-stimulerar-till-fysisk-aktivitet.pdf.

CABE. (2009). *This way to better residential streets*. CABE. Retrieved: 2015-11-11. https://www.designcouncil.org.uk/sites/default/files/asset/document/this-way-to-better-residential-streets%20(1).pdf.

Carmona, M., Punter, J., & Chapman, D. (2002). *From design policy to design quality*. Thomas Telford.

Carmona, M., Tiesdell, S., Heath, T., and Oc, T. (2010). *Public Places – Urban Spaces, The Dimensions of Urban Design* (Second Edition). Oxford, Architectural Press.

Chan, C.B., & Ryan, D.A. (2009). Assessing the Effects of Weather Conditions on physical Activity Participation Using Objective Measures, *International Journal of Environmental Research and Public Health, 6,* 2639-2654.

Chapman, D., & Larsson, A. (2018). *Arctic Risk in Urban Spaces (ARUS): Report of meeting 16th & 17th January 2018*. Forskningsrapport / Luleå tekniska universitet.

Chapman, D., Nilsson, K., Larsson, A., & Rizzo, A. (2017). Climatic barriers to soft-mobility in winter: Lulea, Sweden as case study. *Sustainable Cities and Society, 35,* 574–580.

Chen, D., & Chen, H. W. (2013). Using the Köppen classification to quantify climate variation and change: An example for 1901–2010. Environmental Development, 6, 69–79. **https://doi.org/10.1016/j.envdev.2013.03.007**.

Collymore, P. (1994). *The Architecture of Ralph Erskine*, Academy Editions.

Cowan, R., Adams, S., & Chapman, D. (2010). Quality reviewer: Appraising the Design Quality of Development Proposals. Thomas Telford.

Erell, E. (2011). Urban microclimate designing the spaces between buildings. London: Earthscan.

Eriksson, U. (2013). *Neighborhood environment and physical activity*. Lund University. Retrieved: 2017-09-22. http://lup.lub.lu.se/search/ws/files/3783145/3288094.pdf.

Evans, G.W., & McCoy, J.M. (1998). When buildings don't work: the role of architecture in human health. *Journal of Environmental Psychology, 18,* 85–94

Gard, G., Berggård, G., Rosander, P., & Larsson, A. (2018). Pedestrians perceptions of community walking with anti-slip devices: an explorative case study. *Journal of Transport and Health*. https://doi.org/10.1016/j.jth.2018.09.001.

Gordon, I. (1997). Densities, urban form and travel behaviour. *Town & Country Planning, vol.60, 9,* 239-241.

Gustavsson. H., Andreasson. J., Eklund. D., Hallberg. K., Persson. G., Sjökvist. E., & Tengdelius Brunell, J. (2011). *Klimatanalys för Norrbottens län.* Norrbottens länsstyrelse. Norrköping: SMHI.

Hanssen-Bauer, I., Førland. E.J., Haddeland, I., Hisdal, H., Mayer, S., Nesje, A., Nilsen, J., Sandven, S., Sandø, A., Sorteberg, A., & Ådlandsvik, B. (2017). *Climate in Norway 2100, a knowledge base for climate adaption*. Miljødirektoratet.

House of Lords (2016). *Building better places, Select Committee on National Policy for the Built Environment,* Report of Session 2015-16, London: The Stationery Office Limited.

IPCC. (2014). Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer Eds.]. IPCC, Geneva, Switzerland, 151 pp.

IPCC. (2007). Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds.]. Cambridge University Press, Cambridge, UK.

IPCC. (2001). Climate Change 2001: Impacts, Adaptation, and Vulnerability. Contribution of working group II to the third assessment report of the intergovernmental panel on climate change. [Core Writing Team, K. S. White, Q. K. Ahmad, O. Anisimov, N. Arnell, S. Brown, M. Campos, and T. Carter, Eds] Cambridge University Press.

IPCC. (1992). *Climate Change 1992: The Supplementary Report to the IPCC Impacts Assessment*. [Core Writing Team, W.J. Tegart, and G.W. Sheldon, Eds.). Australian Government Publishing Service, Camberra, Australia.

IPCC. (1990). *Climate Change: The IPCC Impacts Assessment.* [Core Writing Team, W. J. Tegart, G.W. Sheldon, and D.C. Griffiths, Eds.]. Australian Government Publishing Service, Camberra, Australia.

Jenks, M. Burton, E. and Williams. K. (Eds) (1996). *The Compact City: A Sustainable Urban Form?*, E & FN Spon, London.

Kohl, H. I., Craig, C. L., Lambert, E. V., Inoue, S., Alkandari, J. R., Leetongin, G., & Kahlmeier, S. (2012). The pandemic of physical inactivity: Global action for public health. *The Lancet*, 380(9838), 294-305. doi:10.1016/S0140-6736(12)60898-8.

Mäkinen, T. M., Raatikka, V. P., Rytkönen, M., Jokelainen. J., Rintamäki. H., Ruuhela. R., Näyhä. S., & Hassi, J. (2006). Factors affecting outdoor exposure in winter: population-based study. *International Journal Biometeorology*, 51(1), 27-36.

Murray, C. L., Richards, M. A., Newton, J. N., Fenton, K. A., Anderson, H. R., Atkinson, C., & ... Davis, A. (2013). UK health performance: findings of the Global Burden of Disease Study 2010. *Lancet*, 381(9871), 997-1020. doi:10.1016/S0140-6736(13)60355-4.

Patton, M.Q. (2002). *Qualitative Research and Evaluation Methods,* Thousand Oaks, CA: Sage.

Swedish Commission on Climate and Vulnerability. (2007) *Sweden facing climate change, threats and opportunities*. Stockholm, Swedish Government Official Reports.

Koivurova, T & Kähkönen, J. (2018). *Pre-Study for the Arctic Resilience Forum 2018*. Arctic Centre, University of Lapland.

U.S. Department of Health and Human Services. (1996). *Physical Activity and Health: A Report of the Surgeon General.* Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.

U.S. Department of Health and Human Services. (2015). *Step It Up! The Surgeon General's Call to Action to Promote Walking and Walkable Communities*. Washington, DC: U.S. Dept of Health and Human Services, Office of the Surgeon General.

U.S. Centers for Disease Control. (1999). *Lower Direct Medical Costs Associated with Physical Activity*. Atlanta: CDC. See http://www.cdc.gov/nccdphp/dnpa/pr-cost.htm.

Vaccia. (2014). *Climate change is here already. Will ecosystem services be disrupted, will we adapt to change?* Layman's report. Retreived 2017-08-17, http://www.syke.fi/en-US/Research__Development/Research_and_development_projects/Projects/Vulnerability_Assessment_of_ecosystem_services_for_Climate_Change_Impacts_and_Adaptation_VACCIA/Reports_and_Publications_of_the_VACCIA_project/Reports_and_Publications_of_the_VACCIA_p(10618).

WHO. (2002). Active Ageing, A policy framework. WHO.

WHO. (2014). Global Status Report on noncommunicable diseases, WHO.

WHO. (2015). *Fact Sheet; Physical Activity.* Retreived 2018-09-17: http://www.euro.who.int/__data/assets/pdf_file/0005/288041/WHO-Fact-Sheet-PA-2015.pdf.

WHO. (2018). Global action plan on physical activity 2018–2030: more active people for a healthier world. WHO.

World Commission on Environment and Development. (1987) *Our Common Future: Report of the World Commission on Environment and Development*, Oxford University Press.

When Words Matter: The Concept of "Sustainable Development" Derailed with Words like "Economy", "Social" & "Environment"[1]

Jørgen S. Søndergaard

Dedicated to Finn Lynge (1933 – 2014) in memory of many good discussions on the concept of "sustainable development".

The words used control the discussion, which means that something important can be forgotten. The discussion of Sustainable Development was derailed using the words "economy", "social" and "environment". This also applies to Arctic societal development. The article is based on the definition of the Brundtland Commission and shows that the understanding of the sustainability concept consisting of three dimensions: an economic, a social and an environmental, as it was usually defined in the years after the UN Conference in 1992, originating in the 1990s implementation discussions in the UK. The Earth Charter was an initiative that wanted to bring the concept of sustainable development back to the right track so that all elements of the Brundtland Commission's definition were included.

The discussion in Greenland has been focused on the exploitation of the living marine resources, which is reflected in the way the concept is translated into Greenlandic. At the same time, there has been an awareness in Greenland that the cultural dimension is part of the discourse, although the national implementation of sustainable development initiatives still mostly is economically motivated. The Arctic Council's Fairbanks Declaration (2017), paragraph 13 states that "the Arctic Council in promoting sustainable development through the harmonization of its three pillars in an integrated way: economic development, social development and environmental protection". The struggle for recognition of the cultural dimension as an integral part of sustainable development thus remains important in an Arctic context. Focusing on the main points of the Finnish Presidency's Arctic Council Program for the period 2017 - 2019, it can be concluded, that the struggle to expand the understanding and definition of 'sustainable development' to include the cultural dimension and thus go beyond "economy", "social" and "environment" continues. It is important to use the right words.

Introduction

"Economy", "social" and "environment" are the words that most often have captured the discussion on sustainable development. Politicians and NGOs, to a large degree, use these words when they want to discuss whether a particular initiative contributes to sustainable development.

Jørgen S. Søndergaard, MA Political Science, Former Senior Advisor, Greenland government, Department of Foreign Affairs. and Candidate in Political Science from Aarhus University, Denmark 1980.

But life is more than economy, social issues and the environment. The focus of this article is to reveal part of the story of what went wrong and what significance it had for Greenlandic and some of the Arctic discussion, and how this for example is reflected in the reports and declarations from the Arctic Council.

Since the first international conference on environment and development in Stockholm in 1972 and the publication of the book "The Limits to Growth"[2] (Meadows et al., 1972), the question of (the relationship between) the environment and the increase in consumption of resources has been on the agenda nationally and internationally. In the 1980's, the World Commission on Environment and Development was set up by the UN, and under Gro Harlem Brundtland's chairmanship, published the report "Our Common Future"[3] (WCED) in 1987. The report presented a definition of sustainable development which subsequently became widely accepted.

The Brundtland report explains sustainable development as follows:

Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs[4](WCED, 1987).

"The Limits to Growth" was seen by many as a doomsday prophecy, which focused on the danger of a catastrophic future. The Brundtland Commission's definition was therefore well received by all because it showed a positive way forward, as, to a large extent, the contradictions inherent within the definition were overlooked. Some have claimed however, that Brundtland's formulation sought to "square the circle" of the environment problem in order to gather the consensus of the UN commission.

On the other hand, the "Our Common Future" report comes with the following, often overlooked, recommendation: "We recommend that the General Assembly commit itself to preparing a universal Declaration and later a Convention on environmental protection and sustainable development"[5](WCED, 1987).

The report emphasized that this declaration should prescribe new norms for governmental and inter-governmental behaviour which are necessary for the preservation of livelihoods and life on our planet"[6] (ibid). This recommendation was seen by some groups as a call for the global community to develop an "Earth Charter", which countries should adhere to in their future national and international development (Rockefeller, 2000).

The recommendation resulted in "The Rio Declaration on Environment and Development" which the Rio conference followed up with "Agenda 21 – a comprehensive blueprint for the global actions to affect the transition to sustainable development"[7] (Earth Summit '92, 1992).

After Rio 1992, many countries began to work on finding ways to adapt national policy in ways that would enable changing the societal activities in alignment with the Brundtland commission's definition of sustainability. But the title of the Rio Declaration was in itself a contribution to focus on the environment.

A Concept is "Shaped to Fit"

In an article about the possibilities of ever finding a meaningful definition of sustainable

development, Susan Owens[8] (Owens, 2003) writes that a central problem occurs when market economists and neoliberalists refuse to acknowledge the difference between "need" and "demand" and thereby avoid discussion about preference, i.e., that some choices are better and more constructive for sustainable development in a society than others.

Over the course of the many discussions a learning process emerged, leading to a more nuanced understanding of the connections between economy, society and environment. Owens describes what happened in the UK in the 1990's when the government was politically forced to operationalise the concept of sustainability. It became necessary:

> to capture it to ensure that growth and development remain at the core. Thus, from around the mid-1990's onwards, we see a vigorous re-insertion of the economic dimension of sustainability, followed by inclusion of social consideration, alongside environmental protection. The UK Government was now at pains to stress that "achieving all these objectives at the same time is what sustainable development is about[9] (Owens, 2003).

Ultimately, the discussions resulted in the British government's redefining of the Brundtland commission's concept of sustainability, so that; *"relationships between economy, society and environment"* became *"economic dimension of sustainability"*, which includes: "*social consideration alongside environmental protection"*. The main point here is that the word *"society*" has now become "*social consideration*". Thereby, the cultural dimension of society, which is so important for the people of that society, disappears and society's inhabitants become mere social elements. This development took place in a legitimate search for indicators that could indicate whether a given policy led to sustainable development, but the search also had the effect that the discussion to a large extent was somewhat derailed.

In subsequent discussions about sustainable development, it has become standard that the concept has an economic, a social and an environmental dimension. From there on the three words had set the standard for how sustainability should be discussed and planned for.

A Concept Sticks

The result of this British discussions lodged itself in the international dialogue where it became the norm that sustainable development had three pillars; economy, social and environment! And it also became part of the official UN language use.

This is exemplified by the introduction to the resolution from The World Summit on Sustainable Development in Johannesburg in 2002:

> *Reaffirming* the need to ensure a balance between economic development, social development and environmental protection as interdependent and mutually reinforcing pillars of sustainable development[10] (UN, 2002).

It is not only in the introduction that this way of thinking about sustainability occurs. It also features as the heading of section IV of the main document of the conference, entitled; "*IV Protecting and managing the natural resource base of economic and social development"*[11](UN, 2002).

In the 10 years leading up to the 20th anniversary in Rio de Janeiro, the 3 pillars become so well established in the discourse that they feature in the first section of the meeting's final document:

> 1. We, the heads of State and Government and high-level representatives, having met at Rio de Janeiro, Brazil, from 20-22 June 2012, with full participation of civil society, renew our

> commitment to sustainable development, and to ensure the promotion of economically, socially and environmentally sustainable future for our planet and for present and future generations[12] (UN, 2002).

Grassroots Strike Back – Civil Society's Rebellion Against a Misinterpretation of the Brundtland Commission's Sustainability Concept

Internationally, discussions developed after Rio de Janeiro 1992 about what sustainability was, and whether the result from Rio fulfilled the expectations for the formulation of an Earth Charter that had arisen on the basis of the Brundtland Commission's recommendations.

For the various groups around the globe who were interested in sustainable development, it could be ascertained that, although the discussion about an "Earth Charter" had been part of the preparations for Rio 1992, it was evidently not the time for such a charter. As the declaration from Rio de Janeiro contained just 22 principles and the task developing an earth charter including the ethical and moral deliberations from the Brundtland Commission was still not solved.

This unsolved task inspired the general secretary of the summit in Rio 1992, Maurice Strong, and Mikhail Gorbachev, each of whom founded environmental organisations, Earth Council and Green Cross International respectively, joining forces in a civil society initiative to shape an earth charter. An independent Earth Charter Commission[13] (Earth Charter, 2000) was formed in 1994. Several years' dialogue between many cultures about the common goals and values which civil society laid out as elements of an Earth Charter followed. In 2000, the results of the commission's work, Earth Charter, were presented at a meeting in The Netherlands by the commission's chairman, Steven Rockefeller. The commission behind the Earth Charter views the results as "an ethical framework for building a just, sustainable, and peaceful global society in the 21st century"[14](ibid.).

At its launch in 2000, the commission's chairman expressed this in the following manner: "The Earth Charter vision reflects the conviction that caring for people and caring for Earth are two interdependent dimensions of one task. We cannot care for people in a world with collapsing ecosystems, and we cannot care for Earth in a world with widespread poverty, injustice, economic inequity, and violent conflict"[15] (idem.).

The Earth Charter movement shows that people with deep knowledge of the UN process and of the discussions about sustainable development at a global level, concluded that the ethical and cultural issues which need to be considered while applying the Brundtland Commission's sustainability concept to practical politics, do not feature clearly enough in the documentation of Rio 1992. Therefore, the Earth Charter was necessary.

Representatives of the civil society of the Arctic and of Greenland's Home-Rule had also noted that focus on the 3 pillars left out the ethical and thereby the important cultural elements, which are of great significance for people's lives and, not least, the ways in which they relate to nature and its living resources.

Discussions within IUCN, while Finn Lynge[16] represented Greenland's Home-Rule, raised awareness of Maurice Strong's and Mikail Gorbechev's initiative, and it was agreed that the former cabinet member Henriette Rasmussen[17] should be "the voice of the Arctic" in the Earth Charter commission, which was responsible for the final shaping of the Earth Charter.

The Brundtland Report led to the Rio Declaration on Environment and Development, but as it has been indicated above, part of the international discussions in the 1990s, tried to get all the elements in the Brundtland definition back on track and fight back against the derailment that had taken place.

The Arctic and the Culture in Which One Lives

The debate about sustainability in the Arctic has been taking place both in Greenland and in the international dialogue on nature and pollution that began after Gorbachev's Murmansk speech on the 1st of October 1987.[18]

Finland had long had major problems with the pollution that came from the Russian blast furnaces that extracted nickel in the Murmansk area. Finland saw the environmental section in Gorbachev's speech[19], as an invitation from the Russian side for cooperation on environmental issues in the Arctic. Finland's diplomatic efforts in 1989 - 1991 were called "The Finnish Initiative" or "the Rovaniemi Process" in the Arctic.

As a result, in 1991 the eight Arctic countries signed the Arctic Environmental Protection Strategy (AEPS) in Rovaniemi. This environmental strategy became the foundation on which the Arctic Council was built in 1996.

Denmark has responsibility for Greenland's foreign policy. As environmental issues are also a part of Greenland's own fields of responsibilities, the Greenland representatives played an important role in the Kingdom of Denmark's delegation during the negotiations. In a Greenlandic context, the environment is intimately connected to 'nature' because of the Greenlanders' utilization of the natural resources which has been the ultimate precondition for the existence of Inuit in both Greenland and other parts of the Arctic. Living off the land and the sea is the foundation of the Inuit culture.

A Greenlandic requirement in the negotiations on AEPS was therefore that the NGOs Inuit Circumpolar Council (ICC), Sami Council and the Russian Indigenous Peoples' Organization (RAIPON), all had a seat at the negotiating table with the right to participate in negotiations at all agenda points. For Greenland, it was important that the hunters' and fishermen's culture could be an integral part of the discussions on environmental issues concerning the nature that was and is Inuit's livelihood.

With the formation of the Arctic Council in 1996, the circle of "permanent participants" was expanded to a total of 6 NGOs.[20] In this way, Greenland hunting culture was involved in international discussions in the Arctic on environmental issues. One might say that this part of the cultural dimension was included in the discussion on Sustainable Development in the Arctic from the very beginning.

Exploitation of Greenland's living resources has for many years been a part of the discussion about sustainability in Greenland. There has also been an international discussion about what Inuit and Greenlanders ought and ought not to do in this regard. In the late 1970's, whaling attracted great interest from so-called environmental activists[21] (Lynge F., 2013), and later, attention was turned towards seal hunting[22] (Lynge F., 1992).

In 2003 the transcripts of ten radio lectures about sustainable development, broadcast in both Danish and Greenlandic, on Kalaallit Nunaata Radioa/KNR (Greenland's Radio) were published.

These were given in connection with the so called Tulugaq campaign[23] (Tulugaq, 2003), which had been initiated by the government. Nine of the lectures were given by H.C Petersen[24] (H.C. Petersen et al., 2003) and one by Finn Lynge on the subject of whaling.

The first lecture, entitled "The legacy of the ancestors", was introduced with a section about cultural heritage. H.C. Petersen expressed, among other things, the following:

> We have understood that if we are to live in and preserve our country, it must continue to be possible to make our living from it. We must also have a clear understanding that it is only possible to secure for our descendants the possibility to remain living in this country if we use its resources in an orderly manner, which is to say, that we make it clear to ourselves that there are limits to how much we can exploit this country's resources, its animals, birds and fish[25] (H.C. Petersen et al., 2003).

In a shortened form, H.C. Petersen later said; "*Certain doctrines were imprinted from childhood, for example," "You can take the animal you need (i.e. kill it). But not the animal you don't need*"[26] (2003). As was stated later in the same lecture, such an intention about wanting to behave in a particular way is an ethical way of thinking, and it is interesting that the question of how one behaves in certain situations is something that occupies all cultures in one way or another.

The thinking behind the modern sustainability concept is essentially the idea that the securing of immediate needs must not destroy the possibility for future generations to fulfil their needs. In his book "Platons Gåde. Den levende Skrift" Ivar Gjørup, in reference to the Fourth Book of Plato's REPUBLIC, writes that; "*Entrepreneurship is driven by our needs. Each one of us endeavours to master oneself. Some manage to do so, others do not, others learn to do so eventually. They are clever enough to understand that we cannot satisfy our own needs endlessly as it leads to abuse and misery*"[27] (2016). The problem with the concept of sustainability is thus not new. The idea has deep cultural roots!

On the Application of the Concept of Sustainability by Greenland Authorities

In 2008, a short report was developed by the administration of Greenland's Home Rule, the purpose of which was to describe the work being done on sustainability and globalisation in Greenland. The report shows that the sustainability concept was at no point applied consistently by the changing political coalitions of Greenland governments. It was the same situation when the issue was simplified by applying the three dimensions stated above.

The case is further complicated by their focusing on "*sustainable exploitation*" rather than "*sustainable development*". Added to this is how, in different situations, different Greenlandic expressions are used for the concept of "*sustainable exploitation*". The report provides five different Greenlandic expressions for *"sustainable exploitations"* when used in particular contexts, as shown in the table below. The concept was and still is an important part of the discussion concerning the use of living resources[28] (Nielsen, 2008).

Sustainable Exploitation	
Various translations to Greenlandic (from Danish) which have been used	*Translated back to Danish (and then to English)*
Nungusaataanngitsumik atorneqarnissaq	The continued use of something in such a way that it doesn't run out.

Piujuartitsinissamik tunngaveqarluni Iluaquteqarneq	To make use of something in such a way that it remains at one's disposal.
Imminut nammassinnaasoq	Which has to carry (take responsibility for) itself.
Piujuartitsisumik iluaquteqarniarneq	To make use of something in such a way that it will always be at one's disposal.
Nungusaataanngitsumik	To use something in such a way that it doesn't run out.

In 2016, a new linguistic formulation arrived. This occurred in connection with Naalakkersuisoq for Finances presentation of Naalakkersuisuts. Sustainability and Growth plan[29] (Department 2016). Here, the following designations were used[30] (ibid):

Piujuartitsineq	Sustainability

Since the Nordic Prime Ministers, in connection with the Nordic Council's session in 1998, adopted a declaration on "A Sustainable North", Greenland has been active in the shaping of subsequent Nordic strategies, the purpose of which has been to operationalise the Nordic government leaders' declaration.

The various linguistic designs of the sustainability concept in the reports pinpoints what in a Greenlandic culture is not just important but fundamental, namely the exploitation of the living resources of nature.

As stated in the previous section, this approach has been central to Finn Lynge's responses to the hunters' right to kill and eat marine mammals and sell for example sealskin in order to become part of the modern society's monetary economy.[31]

Very easily, one can thus see how culture is used to defend the maintenance of a group of people's personal economy. Fishermen and hunters – and thus the hunting culture – are dependent on being able to sell their catches on the market in order to acquire other things necessary to live in a modern Arctic society. A culture survives through the wise use of economic, social and environmental elements.

As mentioned, Greenland was instrumental in getting ICC on board from the very beginning of the AEPS process. At the AEPS 2nd ministerial meeting in Nuuk, Greenland in 1993, the ICC specifically expressed the desire to discuss what is known as "Indigenous Peoples Knowledge" as a way of knowing in line with the knowledge gained through conventional research based on, for example, biological measurements in nature. Iceland offered a seminar on the subject and Denmark funded the report.[32]

It was at the same meeting in Nuuk that the eight Arctic countries agreed to establish a "task force" to discuss issues of social and cultural conditions.[33] This task force was later the inspiration for the formation of the Sustainable Development Working Group (SDWG), which was established as part of the Arctic Council in 1996.

The most recent Nordic strategy is entitled "A good life in a sustainable North – Nordic strategy for sustainable development" (Ett gott liv i ett hållbart Norden – Nordisk strategi för hållbar

utveckling), and was adopted by the Ministers for Cooperation in the Nordic Council of Ministers in 2013.

As stated in the introduction, the concept of "sustainable development" lost an important dimension when it became the norm to characterise the concept as development which was based on three pillars; the economic, social and environmental dimensions. The aspect, which concerns people's culture was left out when "society" became "social" in everyday talk about the issue.

From the outset of its international cooperation, Greenland's Home-Rule, and later Self-Government, has argued that the UN, and moreover, organisations internationally, should work for the rights of the Indigenous peoples, more specifically, the right to preserve their own culture and identity. A noteworthy point in this endeavour was the establishment of the Permanent Forum of the UN in 2000. It has also been the Greenlandic government, Naalakkersuisut's, policy that culture should be included on equal footing with the three stated dimensions when discussions dealt with the following-up of Brundtland's "Our Common Future". In Naalakkersuisut's case, this happened at "Rio+20", which was the world community's marking of the 20th anniversary of the United Nations' adoption of the declaration on sustainable development from 1992. At that time, Greenland found out it had entered the discussions in Rio de Janeiro too late to influence language usage on that point. Instead, Greenland focused its political efforts on avoiding losing ground on the theme of "Indigenous Peoples".

In May 2016, Greenland's Self-Government worked on applying the sustainability concept in connection with the published Sustainability and Growth plan for Greenland. It is interesting to note here that sustainability becomes one of five guiding principles.

The Sustainability and Growth Plan's Five Guiding Principles:

- **Sustainability**
- Increased **self-sufficiency**
- Good and stable frameworks for **private investments**
- **Holistic** and effective problem solving
- An **attractive place** to grow up and live in as part of a community"[34] (Department, 2016)

In its broader presentation, one can see that sustainability is bound to the management of nature's resources, which in this article is a part of the environmental component of the sustainability concept.

One can surmise that the application of the concept in ways that include the cultural dimension is not something being worked on in all parts of the Greenlandic administration up to now. Looking at a Greenland context, and focusing on the three words "economy", "social" and "environment" it is easy to get the impression that "economy" is the most significant underlying factor for the principle mentioned above.

The Sustainability and Growth plan is the first attempt in Greenland to develop a document which, viewed ideally, should encompass all parts of the sustainability concept. It will be interesting to see whether the work that is underway, and which stems from the UN's 2030 Sustainable Development Goals (SDG), leads to including the cultural dimension and thus ensuring that culture also 'finds its place'. This can then become a substantial contribution to the discussion about moral and ethical questions, which humanity in general must ask itself if the

planet in the far future is supposed to include humans at all. The planet will probably remain in its place in the solar system. In this context it can be pointed out that Earth Charter was a proposal of how these considerations might be included in the thinking about sustainability.

The Original Starting Point: Is There a Way Back?

As stated above, there are good historical and factual reasons for including 'culture' as a fourth pillar or dimension, if a dividing up of the Brundtland Commission's concept "sustainable development" is wished for. The concept thereby becomes broader, its implementation more practicable, and the concept's inner logic and more holistic approach easier to understand and preserve. This logic, however, both includes and highlights the contradictions, which demand that political decisions be taken to implement sustainability in day-to-day politics.

The historical development of the concept, which we have witnessed on a global level, has been mirrored by the Nordic dialogue at the Nordic Council of Ministers and the Nordic Council. The Nordic Council of Ministers created its first regional sustainability strategy in 2001 entitled "New Course for the North". It also states here that sustainable development contains "three interdependent dimensions: an economic, a social and an environmental dimension"[35] (Nordisk Ministerråd, 2001).

At the most recent revision of the Nordic strategy for sustainable development in 2013, it was the Greenland government's policy that culture should be discussed on equal footing with the three pillars. This was not exactly the case, but the Greenland government contributed with the formulation of the following text, which features in the introduction to the latest strategy:

> There are three interdependent dimensions of sustainable development: the economic, the social and the ecological. One of these dimensions must not undermine the conditions for development in the others. Culture is also very important for the Nordic values. Culture concerns, for example, choice of lifestyle, consumption patterns, relationship to the environment and acceptance of the processes of change in society. Consequently, it is important to include cultural issues in the work on sustainable development.[36] (ANP, 2013).

In the Autumn of 2017, the Nordic Council of Ministers and the Nordic Council adopted a regional follow-up document for the UN Sustainable Development Goals, called Generation 2030. With this document it can be argued that now, also the Nordic framework has departed from "the three pillars way of thinking", in preference to a more holistic approach.

As mentioned, the sustainability concept is included in the Self-Government's current work with a Sustainability and Growth plan, which had its point of departure in the UN's 2030 SDG agenda and in the Nordic plan of action, Generation 2030. The Greenland plan has the potential for further development, so that, if it is politically desirable, a future update can present an actual strategy for "The sustainable arctic welfare society". It can be argued that this will require a government in Greenland that will prioritize other than economic growth. In this connection, it should be recalled that economic growth in Greenland is particularly motivated by the desire to create the foundation for the independent Republic of Greenland.

The full understanding of Brundtland's sustainability concept is something that most people and their politicians still have to work with. Or, one might argue, that this is 'a gift' that is unopened on most politicians' tables in the Arctic – as it is in the rest of the world.

The work carried out in concretising the sustainability concept in the UN framework continued

after the 20-year anniversary in 2012, and several years of negotiating led to the UN's 2030 Sustainable Development Goals. The resolution: **Transforming our World: the 2030 Agenda for Sustainable Development**[37] (UN, 2015) was passed, and it is now this document that sets the framework for the regional, national and international execution of the General Assembly's decisions.

The cultural element is included in many places in UN's 2030 SDGs, and it is also the main element of goal 16, which includes striving to: *"Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and; build effective, accountable and inclusive institutions at all levels"*[38] (ibid).

If subsequent discussions continue to regard the application of the sustainability concept in terms of "pillars", then as a minimum these must be extended to include a cultural pillar, which contains the ethical questions which were taken into consideration through Earth Charter. It can be further argued that 'culture' has from the start been a central part of the concept. The circumstances under which it fell out of ordinary language usage after the British discussions about how 'Our Common Future' was to be implemented, shows how far-reaching and influential the effects can be when a globally used concept is interpreted and developed in a world language.

This is particularly important in a Greenland/Arctic context where the struggle for cultural rights in general, and the rights of Indigenous peoples in particular is a fundamental part of, for example, the Greenland Self-Government's understanding of itself. However, the continuing regional cooperation in the Arctic is still not without its problems, particularly when addressing the sustainability issue. Whereas the regional cooperation in the Nordic Council of Ministers made the decision in Autumn of 2017 and adopted Generation 2030, there are still unresolved issues in relation to the understanding of sustainable development in the Arctic Council.

If the Arctic Council is to be attributed a significant role in the general development of societies in the Arctic, one must look critically at how the Council's ministerial declarations are shaped around the area we are discussing here.[39]

The latest ministerial declaration is from the 10th Arctic Council's meeting of Ministers in Fairbanks in 2017[40] (Arctic Council, 2017). Over a range of points, the concept "sustainable development" is used, such as in the third section of the introduction; "Reaffirming our commitment to the well-being of the inhabitants of the Arctic, to sustainable development and to the protection of the Arctic environment."

It is noteworthy that it is deemed necessary to mention the protection of the Arctic environment as well as 'sustainable development', which otherwise traditionally encompasses the environment. The seventh section of the introduction states:

> Noting with concern that the Arctic is warming at more than twice the rate of the global average, resulting in widespread social, environmental, and economic impacts in the Arctic and worldwide, and the pressing and increasing need for mitigation and adaptation actions and to strengthen resilience.

This is a return to the classic three-part concept, but this is hardly because it is thought that the residents' culture won't be affected by the stated warming, just as adaptation and resilience to the changes clearly have specific cultural conditions and implications. Coming to the last of the sections in the preamble, it is as if there is a glimmer of hope prior to recognition that culture is

included in the discourse surrounding sustainability, in that it states; "Reaffirming the United Nations Sustainable Development Goals and the need for their realisation by 2030."

But this hope is short lived. The actual declaration is divided into sections, the second of which has the heading "IMPROVING ECONOMIC AND LIVING CONDITIONS". And the following point 13 states: "*13. Reaffirm the role of the Arctic Council in promoting sustainable development through harmonizing its three core pillars in an integrated way: economic development, social development and environmental protection*"[41] (Arctic Council, 2017).

Not only are the three pillars reiterated, but are also viewed as the realization of sustainable development "through harmonizing its three core pillars". You don't need to be a fortune teller to predict that there will be a pressing need to apply the ethical and cultural considerations, as laid out in Earth Charter, when this policy is carried out in the Arctic.

When it concerns the Arctic Council, Greenland's formal position differs from that it holds in, for example, in the Nordic cooperation, where countries sit under their own flag during discussions in the Nordic Council of Ministers. In the Arctic Council, Greenland is a part of the Kingdom of Denmark's delegation. From a Greenlandic perspective, it could be claimed that the Arctic Council has established "the rights of Arctic indigenous people**s**", with this "**s**", which gave rise to an American footnote in the AEPS Minister declaration from Inuvik back in 1995, and thereby has gained some ground in the struggle for recognition of culture as being important for a society's development.

It seems fair to conclude that the Arctic Council has not yet taken the UN 2030 Sustainable Development Goals into consideration on an operational level but will Finland accomplish that?[42]

From the start AEPS was the result of a highly professional diplomatic effort from Finland, so the question is what to expect from the current Arctic Council leadership. From the outset, Finland announced the following 10 areas[43] which should be prioritized:

- Paris Climate Agreement
- UN Agenda 2030 for Sustainable Development
- The economic perspectives
- Environmental protection
- Connectivity
- Meteorology
- Education
- The Environment and Climate
- The Seas
- The People

One might ask about the understanding of the concept of sustainability that lies behind this list of priority topics. The UN Agenda 2030 for Sustainable Development is mentioned as an independent point, but if one re-reads the UN 2030 goals, including the sub-sets of the individual goals, it is obvious that the other prioritized AC-areas are also included in the UN 2030 goals.

A proper application of the UN 2030 goals would require that the UN 2030 was part of the Declaration's headline, indicating in each of the priority areas which UN 2030 targets they are part of. The prospects for a consistent application of the classic concept of sustainability in the political

declaration signed by ministers and reports designed by diplomats with input from scientists of the forthcoming Arctic Council's ministerial meeting in Finland in 2019 is not necessarily promising.

Another relevant question is: how will political decisions made in parliaments and governments affect the places where people live? If governments in the long run want to find out they need indicators that can be used for systematic measurements.

Each country, of course, has the opportunity to develop and apply its own indicators, but an example shows that countries and groups of countries rarely use resources to develop new indicators to get data because of a politic declaration.[44] They try to use whatever statistics they already have.[45]

A promising example contradicting a skeptical expectation is EUROSTAT that has organized and developed its data and thus its statistical information according to the UN 2030 SDGs targets and indicators.

The Arctic Council has not yet defined specific indicators to measure and assess the different aspects of sustainable development. A number of projects such as the Survey of Living Conditions in the Arctic, SLiCA (see e.g. Kruse et al., 2007 and Poppel, 2005), the Arctic Human Development Report I and II[46], and Arctic Social Indicators I and II.[47] It will therefore be the present article's suggestion that a statistical follow-up to the political declarations of the Arctic Council be structured according to the UN 2030 targets. Then one might be tempted to argue that 'sustainable development' is back on track.

Conclusion

This article substantiates the understanding that the Brundtland Report's sustainability concept was derailed shortly after the conference in Rio in 1992, when the concept had to be made operational through political implementation in the United Kingdom.

With the Earth Charter initiative, this interpretation and operationalisation came under pressure, and during the years following there has been a fight for Greenland to preserve the general acceptance of its hunting cultures' way of living.

Through the participation of the Arctic NGOs the cultural dimension was included in the AEPS and was further developed in the Arctic Council, where it has been a part of the discussions in SDWG. But this case also shows that the wording used to establish and carry out policy in the Arctic Council is still under influence of the "the 3 pillars" thinking. Even when it comes to the priorities set out by Finland in their chairmanship of the Arctic Council for the period 2017-19 the term "Sustainable Development" is mentioned as one of eight priorities and along with it, different dimensions.

A more consistent – and loyal to the UN's application of the term "Sustainable Development" - would have the term in the headline, and as a service to the reader each of the priorities could have a badge with the number of the UN 2030 Sustainable Development Goals to where it belongs. This would have shown the people of the Arctic what part of sustainable development in the Arctic would be the political focus under Finland's chairmanship.

Despite an overall Arctic Council commitment to the UN Sustainable Development Goals – and the fact that all UN members (including the eight Arctic states) develop national SDGs – it will most likely be an ongoing struggle to broaden the understanding of sustainable development and include the cultural dimension as an important pillar.

Notes

1. A smaller part of this article was previously published in *Tidskriftet Grønland* juni 2017 [The Greenland Journal, June 2017] Acknowledgements to Birger Poppel for the idea of bringing my thoughts about sustainable development to an English speaking audience.
2. Meadows et al., 1972
3. WCED, 1987
4. WCED, 1987
5. WCED, 1987: 2 (Chapter 12 II section 5.2 A paragraph 86)
6. Vores fælles fremtid. 1987 FN – forbundet og mellemfolkeligt Samvirke,p.311[Our common future. World commission on Environment and development 1987]
7. Earth Summit '92. The Regency Press corporation, Gordon House, 6 Lissenden Gardens London NW5 ILX
8. Owens, 2003
9. Owens, 2003 p. 4-5
10. UN, 2002 p. 2
11. UN Doc A/conf.199/L.1 p.16
12. UN 2012. First paragraph
13. See http://earthcharter.org/discover/the-earth-charter/
14. From speech by Steven Rockefeller when The Earth Charter was formally launched in ceremonies at The Peace Palace in The Hague. 29 June 2000. www.earthcharter.org SR 6-29-00 p. 2
15. Ibid.
16. Finn Lynge (1933 – 2014). Educated in philosophy and theology in Rome and USA, he was Nuuk's Catholic priest and a social worker. He was also Director of Greenland's radio and in 1979 was elected to the European Parliament until Greenland altered status to an OCT country in relation to the EU. He later became Greenland consultant in the Danish Ministry of Foreign Affairs. He then became a member of Greenland's self-government commission from 2000 – 2003. He authored a range of articles and books on sustainable development, and particularly Greenlandic hunters' rights regarding the exploitation of sea-mammal resources in Greenland's coastal waters.
17. Henriette Rasmussen (1950 – 2017). Journalist and politician. Member of the Greenlandic parliament from 1991 -1995. Member of government responsible for social affairs and labour markets. From 1995-97, employed by the International Labour Organisation (ILO)

in. Geneva, responsible for indigenous peoples' rights. Member of Earth Charter Commission responsible for the Arctic.

18. Poppel, B., 2018, p. 314
19. For some background on the creation on the environmental part of the Gorbatjov speech, see Lynge F (2013) p 174 -75.
20. Arctic Council, 2006
21. In 1981, when their anti-whaling campaign, which lacked any biological rationale in relation to Greenland, fell on political deaf ears, Greenpeace made a direct personal attack on the Danish representative for the international whaling commission. Lynge 2013, p.213, note 103.
22. For deeper insight into this, see Lynge F., 1990
23. Tulugaq: Handlingsplan for kampagnen om bæredygtig udnyttelse af levende ressourcer, Tusagassiivik, Landsstyrets sekretariat 2003. [Tulugaq: Plan of action for the campaign for sustainable exploitation of living resources, Tusagassiivik, Government secretariat 2003]
24. H. C. Petersen (1925 - 2015) was headmaster of Knud Rasmussenip Højskolia in Sisimiut from 1962 to1975. He was active in working to promote awareness about Greenlandic culture and the development of its society, in the later years, particularly around the use of Greenland's resources and the relation to old cultural values.
25. Petersen H.C. & Lynge F., 2003 p. 8
26. Petersen H.C. & Lynge F., 2003 p. 14
27. Gjørup I., 2016, p. 290.
28. Nielsen P., 2008.
29. Power Point Presentation of 30th of May 2016. Department of Finance and Taxes.
30. "Piujuartitsineq" was the word used in the Power Point Presentation with the translation that showed here.
31. See Lynge F., 1992
32. "Arctic Environment. Report on The seminar On Integration of Indigenous Peoples Knowledge. Reykjavik – Iceland 20 - 23. September 1994
33. Poppel, B., 2018, p. 314
34. Slide 15 from Power Point Presentation, 30th of May 2016, see www.naalakkersuisut.gl.
35. ANP 2013: 728, p.5
36. ANP 2013: 728, p.5
37. UN 2015 Transforming our world: the 2030 Agenda for Sustainable Development.
38. Ibid.
39. For an in depth analysis of the declarations of the Arctic strategies in the participating countries see for example Poppel. B, 2018
40. Arctic Council, 2017.
41. Ibid.

42. Sustainable Development Working Group (SDWG). Working within the Arctic Council, this group is currently discussing sustainable development from an Arctic perspective. In this context, agreement about an operational application of the concept of sustainability is being sought. If the nations involved take the UN's 2030 goals as their starting point, there would be a chance that culture gets a natural placing in future operationalizing of the sustainability concept in Arctic Council documents.
43. See https://oaarchive.arctic-council.org/bitstream/handle/11374/2027/Finnish_Chairmanship_Program_Arctic_Council_2017-2019.pdf?sequence=1&isAllowed=y
44. From the first sustainability strategy in the Nordic Council of Ministers from 1996 up to the latest from 2013, the present writer was a representative of Greenland for the working group, who formulated the texts of the strategies. Following a political decision in the Nordic Council of Ministers, the first set of Nordic indicators was drawn up in relation to the Nordic strategy for sustainable development in 2006. There was a recognition in the working group that no country would spend money developing new indicators, so the task was to find the right part of the existing statistics, that could show something about the development of the goals, that the strategy included. Modern statistics in the Nordic countries are well developed. It was possible to find a number of relevant indicators, but it did not change the principle that the existing statistics was determinative for the feedback the politicians received on the strategy they had adopted. (Fokus på bæredygtig udvikling. Nordiske indikatorer 2006. Nord 2006:002 ISBN 92-893-1357-9 *[Focus on sustainable development. Nordic indicators 2006])*
45. The Survey of Living Conditions, SLiCA (www.arcticlivingconditions.org) was based on a questionnaire developed in partnerships between the research team and representatives from the indigenous peoples to reflect the welfare priorities of the indigenous peoples in the SLiCA survey regions (Inuit, Saami and the indigenous peoples of Chukotka and the Kola Peninsula) (see e.g. Poppel, 2015). The first Data results were grouped according to the AHDR recommendations.
46. The Arctic Human Development Report, AHDR, concluded that a combination of the UN Human Development Indicators (HDI) focusing on 'longevity', 'education', and 'material success' should be supplemented by three dimensions of human development of special importance to indigenous peoples and other Arctic citizens: 'Controlling one's own destiny, Maintaining cultural identity and Living close to nature' (AHDR, 2004: 240).
47. The Arctic Social Indicators, ASI I (ASI I, 2010) and ASI II (ASI II, 2014) further elaborated, both methodologically and empirically, on the AHDR recommendations into indicators.

References

Arctic Council 1996. The Declaration of the Establishment of the Arctic Council September 19 1996 Ottawa, Canada, https://oaarchive.arctic-council.org/bitstream/handle/11374/85/EDOCS-1752-%20v2-ACMMCA00_Ottawa_1996_Founding_Declaration.PDF?sequence=5&isAllowed=y.

Arctic Council 2017. *Fairbanks Declaration*. The Tenth Ministerial Meeting of the Arctic Council. May 11 2017 Fairbanks, AK.

AHDR 2014. Larsen. J.N. and Fondahl, G. eds 2014 *Arctic Human Development Report. Regional Processes and Global Linkages* TemaNord 2014:567 Nordic Council of Ministers, Copenhagen, http://norden.diva-portal.org/smash/record.jsf?pid=diva2%3A788965&dswid=_e_1Ilz.

ASI 2010. Larsen, J.N., Schweitzer, P. and Fondahl, G. eds. *Arctic Social Indicators: A Follow-up to the Arctic Human Development Report* TemaNord 2010:519 Nordic Council of Ministers, Copenhagen, www.norden.org/sv/publikationer/publikationer/2010-519.

ANP 2013. Nordic Council of Ministers 2013 *A Good Life in a Sustainable Nordic Region. Nordic Strategy for Sustainable Development*. ANP 2013-728. Nordic Council of Ministers. Copenhagen.

Greenland Government. Department of Finances 2016.

http://naalakkersuisut.gl/~/media/Nanoq/Files/Attached%20Files/Finans/DK/Politisk%20Oekonomisk%20Beretning/HVP%20da.pdf.

Gjørup I 2016. *Platons Gåde. Den levende skrift. [Plato's Riddle. The living text]* Gyldendal, Copenhagen 2016.

Kruse, J., Poppel, B., Abryutina, L., Duhaime, G., Martin, S., Poppel, M., Kruse, M., Ward, E., Cochran, P. and Hanna, V. 2008. 'A Survey of Living Conditions in the Arctic' in Møller V., Huschka D. and Michalos A.C. eds. *Barometers of Quality of Life around the Globe*. Dordrecht, Netherlands: Springer. 107–134.

Lynge, F. 1992. *Arctic Wars, Animal Rigths, Endangered Peoples*. Dartmouth College, University Press of New England, Hanover. NH 03755

Lynge, F. 2013 *Et langt liv på tværs. [A long life at odds.]1980 2010. – Eqqaamasat. - Erindrings og debatbog*, bind 2. Forlaget Atuagkat, [*Memoirs and debate book,* volume 2. Publisher Atuagkat,] Nuuk.

Meadows, D. H., Meadows, D. L., Randers. J. Behrens III W. W., (1972) *The limits to Growth*. A report for the Club of Rome's Project on the Predicament of Mankind. Universe Books, New York.

Nielsen, P. 2008 *Arbejdet med bæredygtighed og globalisering i Grønlands Hjemmestyre*. Upubliceret rapport udarbejdet for Grønlands Hjemmestyre. *["Working with sustainability and globalisation in Greenland's Home-rule government."* Unpublished report compiled for Greenland's Home-rule government.] Nuuk.

Nordisk Ministerråd. 2001 *Bæredygtig udvikling Ny kurs for Norden [Sustainable development New Cource for the North"]* in print only.

Our Common Future 1989 *Brundtlandkommissionens rapport i Dansk Udgave. FN – forbundet og Mellemfolkelig Samvirke. [The Brundtland Commission's report – Danish edition. UN and Action Aid Denmark]* Copenhagen.

Owens, S. 2003 Is there a meaningful definition of sustainability? Department of Geography, University of Cambridge, NIAB 2003.

Petersen, H. C. & Lynge, F. 2003. *Fangst og redelighed i vor tid*. Nalitsinni piniarneq pissuserissaarnerlu.

Ti foredrag holdt i Kalaallit Nunaata Radioa. KNR-mi oqalugiaatit qulit. [*Sustainable hunting behavior in our time*. Nalitsinni piniarneq pissuserissaarnerlu. 10 lectures held on Kalaallit Nunaata Radioa (Greenland's Radio). KNR-mi oqalugiaatit qulit.] Publisher, Atuagkat, Nuuk 2003.

Poppel, B. 2018. Sustainable development and sustainability in Arctic political discourses. In: Nuttall, M., Christensen, T. and Siegert, M. (Eds.). *Handbook of Polar Regions*. Routledge.

Poppel, B. (ed,) 2015. SLiCA: Arctic living conditions – Living conditions and quality of life among Inuit, Saami and indigenous peoples of Chukotka and the Kola Peninsula. Nordic Council of Ministers. TemaNord 2015:501

Rockefeller, Steven C: Speech at Earth Charter Launch, 29 June 2000 – Peace Palace, The Hague, Netherlands. http://earthcharter.org/virtual-library2/speeches-at-earth-charter-launch-29-june-2000-peace-palace-the-hague-netherlands/

UN 2015 General Assembly: Resolution adopted by the General Assembly on 25th September 2015 doc. A/RES/70/1.

United Nations. General Assembly 10. December 2002. Doc. A/C.2/57/L.83, p.2.

UN 2002 Doc A/conf.199/L.1 p.16) Draft plan of implementation of the World Summit on Sustainable Development.

UN 2012. Final document from Rio 2012 First paragraph

World Commission on Environment and Development 1987, *Development and International Cooperation Report of the World Commission on Environment and Development* United Nations General Assembly 42 session item 83; (A/42/427)4 August 1987.

Tourism & Quality of Life in Greenland:

Exploration through Farm Stays in South Greenlandic Settlements

Naja Carina Steenholdt & Daniela Chimirri

Studies of how the development of industries impacts resident quality of life in Greenland have largely focused on fisheries and mining, neglecting the emerging tourism industry in the country. In this article, we aim to contribute to the reduction of this gap within academia and praxis by exploring how the developing tourism industry in South Greenland interrelates with resident quality of life in this area. Based on the lack of existing academic literature and public awareness within tourism and quality of life in South Greenland, we investigate the relevance of the tourism industry, specifically farm tourism, effect on resident quality of life. Through a small-scale exploratory case study of farm stays in South Greenlandic settlements, we aim to create an understanding of how resident quality of life and farm tourism interrelates. By applying the bottom-up spillover theory as theoretical frame, we investigate whether generated income from farm tourism can contribute to people's state of wellbeing, but also that there is more to wellbeing than "just" money. Based on generated data, our study concludes that there is a close interrelation between farm tourism and resident QoL in South Greenland. Subsequently, we argue that there are relevant grounds in a larger perspective for further research within the field of tourism and QoL in Greenland.

Introduction

The increasing amount of debates in Greenland, centering on economic growth, reflects the widespread acknowledgement of its essentiality for the welfare state as such as well as on the way to independence from Denmark. Common grounds proclaiming economic development as an inevitable step on the way towards this goal can certainly also be found across academic perspectives and related arguments. According to the current political administration: "*regardless of whether the aim is a strong welfare economy, independence, or trade and industry growth, the Number One resource*

Naja Carina Steenholdt is a PhD Fellow at the University of Aalborg. Daniela Chimirri is a PhD Fellow at the University of Aalborg Copenhagen. They are members of the research group Centre for Innovational Research and Living in the Arctic (CIRCLA) in University of Aalborg.

is the nation's population. […] This makes it imperative to raise the general level of education and training, and creating good conditions for coming generations to grow up in" (Naalakkersuisut, 2017). This illustrates the necessity to enlarge the perspective of and create grounds for development that embrace the economic as well as the socio-economic dimensions. Up until the present, quality of life studies in Greenland like the Survey of Living Conditions in the Arctic (SLiCA) have addressed how fishing, hunting and mining have affected resident quality of life (Poppel, 2015; Snyder & Poppel, 2017, Poppel et al. 2007).

Within the tourism related debates in Greenland, public discussions beyond the point of economy and its monetary significance for the country as well as research on the role of tourism in socio-economic dimensions for the Greenlandic people are scarce. Undeniably, as researched by numerous academics: tourism happens within communities and therefore influences local life in positive as well as negative ways (Adanan et al., 2010). Arguably, since the communities are affected by tourism, the social dimension needs to be granted the same attention as the economic dimensions of tourism development. Hence, policy makers, tourism actors and researchers need to consider the causal relation of resident quality of life and tourism development in Greenland. In order to raise the awareness and inspire a rethinking in this direction, we explore how tourism development in Greenland, in our specific case farm tourism in South Greenland, interrelates with quality of life. To do so, we proceed with a bottom-up hypothesis, which is the understanding that different life domains, such as material wellbeing, health, emotional wellbeing etc. have an impact on overall quality of life, where the different life domains can spill over one another.

Let's Talk About South Greenland: The Status Quo

During the past century, development in South Greenland has, setting aside the comprehensive development of the public sector, evolved mainly around natural resources, such as fisheries and mining of raw materials. There are, however, promises and expectations linked to the development of other sectors. As Prime Minister Kim Kielsen stated in his New Year's speech in 2018, "*(w)ith the economic challenges we have in this country, it is of upmost importance to secure the framework for business development of the four business pillars – fisheries, raw materials, tourism and industry*" (Kielsen, 2018). They constitute the foundation of the Greenlandic economy, generating income and offering jobs. The fishing industry, a well-established sector, has been a pillar of the country's economic policy since the early 1900s, and the prospects of its importance remains. "*Increased growth and employment in the private sector is decisive in safeguarding the foundation for the future welfare and prosperity. […], we need to boost the development in the fisheries, which continue to be our most important trade and industry sector*" said Karl-Kristian Kruse, then Minister of Fisheries of Naalakkersuisut[1] at a recent conference (2017). Tourism, which has existed in Greenland since the middle of the 20th century, lacks hitherto to serve as a stable pillar of society like the fisheries; however, the potentials are not unrecognized: "*We are now seeing an upturn in our tourism industry. Tourism could ultimately become one of Greenland's leading industries*" (Naalakkersuisut, 2017). Even though discussions around development of fishery, mining and tourism are significantly focusing on the monetary aspect of it, there are occurrences illustrating an extent towards a more socio-economic perspective. However, this largely occurs within the context of fishery and mining. Naalakkersuisut states by example: *"Earnings from the fisheries must not only generate revenue for Greenland. It is also important to maximize the socio-economic return from our resources, whether these are fish or minerals for example"* (2017) and in another example regarding mining, "*(t)here is promise and expectation among national policymakers and community members alike that*

development and nearby industrialization could further improve living conditions in Qeqertarsuatsiaat" (Snyder & Poppel, 2017). The existence of diverse research[2] with a socio-economic perspective on fishery and mining reflects the awareness of how these sectors contribute in more than monetary senses.

Based on the apparent awareness for the link between economic means and well-being in these two sectors, we decided to put our focus on tourism. As tourism is considered the third economic pillar of Greenland's economy and has been flourishing within the past few years, it feels crucial to also investigate how this sector interrelates with well-being and QoL in Greenland. By looking at the concept of farm stay as an example within the tourism industry, we explore how this specific type of tourism contributes to resident quality of life. We aim to broaden the discussion and to create awareness that tourism, as research in the field of fisheries and mining already showed, also has the potential of contributing to the quality of life in Greenland. We are aware that this means that we are coming short in addressing the interrelation between tourism and quality of life in Greenland as a whole, however, the ambition here is primarily to launch an important debate rather than discussing multifaceted development in Greenland in general.

Agriculture, Tourism & Farm Stays in Greenland

Before exploring how South Greenlandic farm stays contribute and interrelate with resident's quality of life, we provide a short introduction to agriculture, tourism in Greenland and farm stays in South Greenland in the following section. This will pave the way for our analysis section "Exploring the present – Interrelation between quality of life and farm tourism", in which we unfold how farm tourism in South Greenland and QoL are interrelated.

Agriculture

"Agriculture in Greenland!" – That might sound strange to some ears, but farming as such has a long tradition in South Greenland, tracing back to the Norsemen and Eric the Red in 982 (Bichet et al., 2013). It still represents an important occupation in the small settlements in the South, for example in Qassiarsuk (Visit Greenland, n. d., b). However, it is not surprising that the connection to agriculture is often not made outside of Greenland. Even though agriculture as a department is represented within the governmental bodies, its allocated significance as part of the national economy is shown by its lack of appearance within the annual report of Greenland (Statistics Greenland, 2017). Here, it is merged together with fishery and hunting (when it comes to numbers) and only mentioned within this context (as illustrated by the only explicit mentioning as followed: "Agriculture – products: Sheep, cows, reindeer, fish", Statistic Greenland, 2017: 7). Due to the lack of accountable numbers regarding agriculture and more specifically farming, the assumption that the generated income to the nation's economy through agricultural activities is relatively low (in comparison to fishery and mining) seems substantial.

Tourism in Greenland

Tourism is a relatively new economic sector in Greenland as it has been carried out in an organized way since the 1960s (Christensen, 1992; Kaae, 2002; Kaae, 2006; Johnston & Viken, 1997). Even though tourism might not be considered a long-established industry in Greenland, it certainly affects the turnover and employment rate in many professions, such as e.g. transportation by air and sea, the hospitality and catering sector, as well as touristic services and offers, such as the trade with souvenirs (Naalakkersuisut, 2015; Statistics Greenland, 2010). Tourism plays an increasing

role in the economy of these professions. Accordingly, the interest in and focus on tourism and its development in Greenland has increased over the past years (Bjørst & Ren, 2015; Ren & Chimirri, 2017; Ren & Chimirri, 2018).

As shown in the figure below (fig. 1), the tourism sector has been growing over the last years. Although, this development has not been smooth (due to multiple reasons such as SARS, terroristic attacks, which also affected tourism wordlwide) (Statistics Greenland, 2017), it nevertheless led to the further development of the tourism landscape.

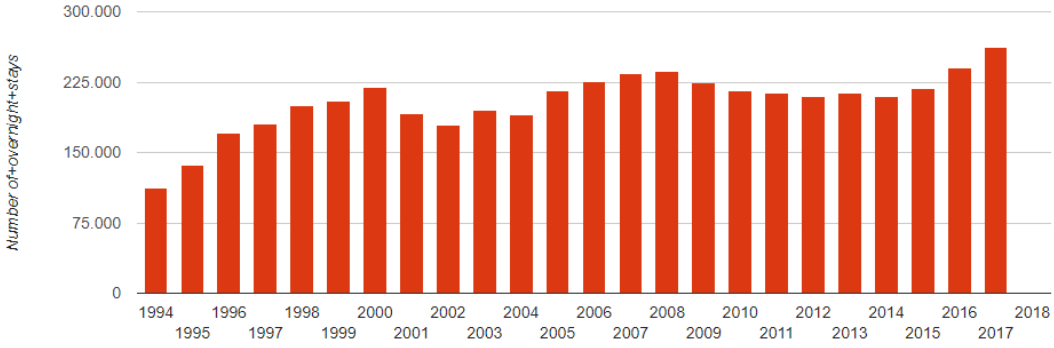


Figure 1: Number of overnight stays in Greenland (Statistics Greenland, 2017)

However, there are no figures on the total economic impact of tourism on society as the statistical reports published by Statistics Greenland presents descriptions of bednights, number of passengers and so forth.

Tourists arrive in Greenland by either cruise ship or international flights into Kangerlussuaq, Ilulissat, Nuuk, Narsarsuaq, Kulusuk or Nerlerit Inaat in Ittoqqortoormiit. Inside Greenland, tourists travel the country by using either flights and/or ships or a combination of both (Statistics Greenland, 2018). So far, tourism in Greenland has been known to be most successful in places like Ilulissat in the Disco Bay area as well as further south in Nuuk and Qaqortoq. Ilulissat is visited by individual travelers, package and cruise ship tourists. This main destination offers tourists to experience the "Big Arctic Five", where tourists get to go on dog sled trips, whale-watching, meeting local people through the cultural tradition of "kaffemik"[3], experience the phenomena of Aurora Borealis and to see or stand on the ice cap. In addition, cruise ship tourism, coming with vessels from all over the world visiting settlements and major cities like the capital Nuuk is one of the largest tourism segments when it comes to arrivals (Visit Greenland, 2016). One example of development within the tourism sector are farm stays in South Greenland. Following we will introduce the landscape of farm stays in South Greenland.

Farms Stays in South Greenland

As part of the agricultural landscape in South Greenland, tourists have had the opportunity to be acquainted with the concept of farm stays for some time. "*For years the visitors in South Greenland have had the option to stay at sheep farms*" (Visit Greenland, n. d., a) located around Qaqortoq, Narsaq, Igaliku and Qassiarsuk.

Ten farm owners in South Greenland offer a variety of tourism products to visiting guests, from lodging and experiencing the life of farmers, hiking and trekking, hiring kayaks, fishing, horseback riding, participating in iceberg tours, and enjoying homemade Greenlandic food (Visit Greenland, n. d.).

Figure 2: The settlement Qassiarsuk near Narsarsuaq where tourists have an opportunity to stay as guests on the local farms (Photo: Naja Carina Steenholdt)

Due to the recent developments in South Greenland leading to a growth in the number of farms diversifying their traditional farm life and complementing it with tourism related activities, announcements in the public (Visit Greenland, 2017; Jørgensen, 2017) illustrate an increased interest in this field - its growth and future development. *"South Greenland has a unique opportunity to develop this special product, and we know from Iceland that the demand is there."* (Visit Greenland, 2017) This growing interest is confirmed by the local tourist operator stating, *"[…] the farmers never thought that this could be interesting for tourists […], but now I think that these farms are developing something"* (Tourism operator in Narsarsuaq). In addition, the newly established association "Farm Holidays Greenland" (consisting of ten farms located in the South - see Figure 3) as well as the collaboration between this association, the Kujalleq municipality[4], Icelandic operators and Visit Greenland (Visit Greenland, n. d., a) indicate the growing awareness of the significance and potential of this type of tourism for Greenland.

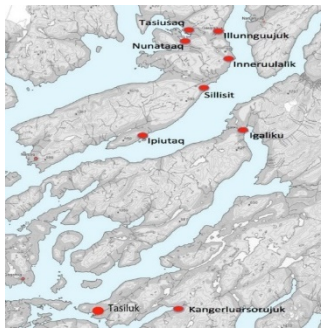


Figure 3: Places of farm stays in South Greenland

Theoretical Approach

In the following, we introduce the reader to what we understand by using the notions of wellbeing and quality of life. For the purpose of interrelating quality of life with tourism, we apply the bottom-up spill over theory, which is further elaborated below. Finally, this theoretical "layout" is linked to farm tourism as concept, based on the notion of farm diversification. Due to the focus of this article, we are not discussing farm diversification as such. The farmers in our case study are mainly farmers becoming tourist hosts, but continuing their farming business as a main source of income. Even though this complies with the characteristics of farm diversification (Ilbery, 1991; Mahoney, 2004, in Barbieri & Mahoney, 2009), we do not aim to investigate motivations or reasons for such a diversification. We aim to unfold the larger issue on the interrelation between QoL and tourism.

Figure 4: Overview of the location of the farm stays in Greenland (outlined with municipalities)

Therefore, farm diversification as concept functions in this article as a tool to generate an understanding of and unfold a connection between the economic and social dimension of tourism development.

Quality of Life and Wellbeing

There is no widely accepted single definition on the concept of quality of life (QoL) or wellbeing. The two terms are more than often mentioned in the same context (Glatzer, 2015). In this article, we apply both terms in the same meaning. In our application of the terms, we lean upon the definition of perceived QoL according to the Encyclopedia of Quality of Life and Wellbeing Research, which states: "*Perceived quality of life refers to how people perceive and evaluate their life. It is a perception that reveals the subjective evaluation of the life experience. The components focus on overall life satisfaction and happiness, as well as satisfaction with specific domains of life, e.g., marriage, interpersonal relationship, work, leisure activities, and health.*" (Liao, 2014: 4702). In order to analyze and discuss QoL, we apply the theoretical concept of social indicators. A social indicator is a statistical measure that can track change over time on different aspects of social phenomena (Land et al., 2012). Data about social indicators can derive of both objective statistics, such as e.g. crime rates and more qualitative data, such as perceived satisfaction with life. As Larsen and Fondahl (2010) put it, social indicators are "*simple measurements of key phenomena in complex human systems, (which) enable us to track the direction and rate of change, and thus performance in various domains, and progress toward specified goals"* (p. 22). Furthermore, they are "*valuable simply in building awareness of current conditions and trends over time*" (ibid)". In this article we follow an exploratory approach, meaning that the introduced theory and data about social indicators function as base in the analysis and discussion of how the developing concept of farm stay in South Greenland affects resident QoL.

Quality of Life in Greenland

Interest within QoL studies in Greenland arose in the 1970s. Since then there have been few studies on wellbeing and QoL in Greenland and most of those focused on social indicators in quantitative measures, such as household income, education levels and crime rates (From, 1975; Bjerregaard et al., 1995; Bjerregaard & Dahl-Petersen, 2008). Furthermore, the majority of the studies were conducted in frameworks developed in the context of Western societies (Andersen et al., 2002).

The Arctic Human Development Report (AHDR 2004, AHDR 2014) depicts trends and the development state of the Arctic communities. The report recommended applying six distinct indicators in assessments of QoL in the Arctic. Three of the indicators applied were from the Human Development Index (HDI) from the United Nations Development Programme, namely GDP per capita, education and health. However, acknowledging that the HDI indicators failed to address Arctic human development comprehensively, a list of Arctic social indicators was suggested. This formed the basis for further studies with the aim of "filling the gaps" that conventional studies left. In 2010, the studies resulted in the report Arctic Social Indicators (ASI), presenting three social indicators essential for the Arctic communities. The three indicators were fate control, cultural vitality and contact with nature. Fate control can be described as the overall ability to carry life out on own terms. Cultural vitality represents the aspects of cultural community belonging. Contact with nature concerns the close ties to the natural world.

These indicators were also applied in the methodological approach in the Survey of Living Conditions in the Arctic (SLiCA), which was one of the first to address wellbeing and QoL on a redefined level, taking an interest in the distinctive characteristics of the Greenlandic culture and background (Poppel et.al, 2007). The overall purpose of SLiCA is listed as to:

- *Measure living conditions in a way relevant to Arctic residents*
- *Document and compare the present state of living conditions among the indigenous peoples of the Arctic*
- *Improve the understanding of living conditions to the benefit of Arctic residents* (ibid).

One of the major findings, which were based on nearly 8,000 interviews with Indigenous populations of Canada, Alaska, Greenland, Norway, Sweden, Finland, Chukotka and the Kola Peninsula, indicated a strong connection between cultural ways of life, cash employment and quality of life (Poppel, 2015).

Theoretical Link between Tourism and Quality of Life

There seems to be academic consensus that tourism has an influence on resident QoL in tourist destination communities (Kim et.al., 2013; Adanan et al., 2010; Fang et.al., 2010; Jurowski et.al., 1997; Cecil et.al., 2010; Nawijn et.al., 2012; Meyer, 2011; Aref, 2011; Liu & Var, 1986). By example, Kim et al. (2013) found that there is a link between the impacts of tourism and perceived overall satisfaction with life. Fang et al. (2010) explored QoL with objective measures, their study implied a connection between increased tourist development and increased QoL. Adanan et al. (2010) discovered that tourism had both positive and negative impacts on residents perceived QoL. When tourism offered economic benefits to the community, the QoL increased. When tourism, on the other hand, resulted in e.g. an increase in cost of living, the QoL decreased. Related to the case of Greenland there is, however, little literature addressing the interrelation between tourism and QoL. Taking our point of departure in the existing literate investigating the link between tourism and QoL in Greenland, this article's general understanding of the interrelation between tourism (including farm tourism) and QoL rests on the bottom-up spillover theory. We chose this specific theoretical approach due to a lack of academic literature and missing statistical data specifically focusing on QoL in connection with tourism in Greenland. Even though an extensive body on literature regarding tourism and its economic, social, cultural and environmental impacts exists, we deliberately chose to use an approach that has not been used to investigate the link between QoL and tourism in Greenland. The spillover theory offers us the possibility to investigate whether generated income from farm tourism in South Greenland can contribute to people's state of wellbeing and if there is more to wellbeing than "just" money.

The bottom-up spillover theory suggests that overall satisfaction of life prerequisites the satisfaction of different life domains and sub-domains (Diener, 1984). In other words, wellbeing is the outcome of the levels of wellbeing in various domains. The life domains and sub-domains are as Kim et al. (2013) characterizes: material wellbeing (e.g. income and cost of living), health and safety wellbeing (physical and mental health as well safety indicators such e.g. crime rates), community wellbeing (living conditions in the communities) and emotional wellbeing (e.g. cultural vitality, leisure time). The principle of the theory signifies that the set of life domains as well as each one of the sub-domains contribute to the overall satisfaction with life, meaning e.g.,

dissatisfaction with income or with the community can "spill over" to the other domains and eventually have an impact on overall QoL (Diener, 1984; Kim et al., 2013). In this article, we apply the theory in connection to the concept of farm stay, as illustrated below:

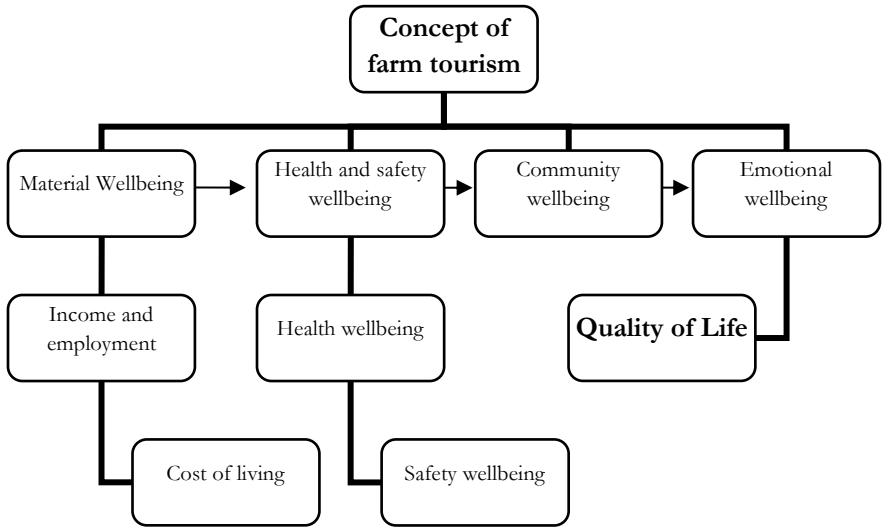


Figure 5: Bottom-up spillover theory and QoL (own visualization based on Aref, 2011**)**

Additionally, we apply the bottom-up spillover theory to our thematic focus by interconnecting it with the Arctic social indicators (Larsen & Fondahl, 2010) forming part of the theoretical frame of this article. The Arctic social indicators are marked in color, as illustrated beneath:

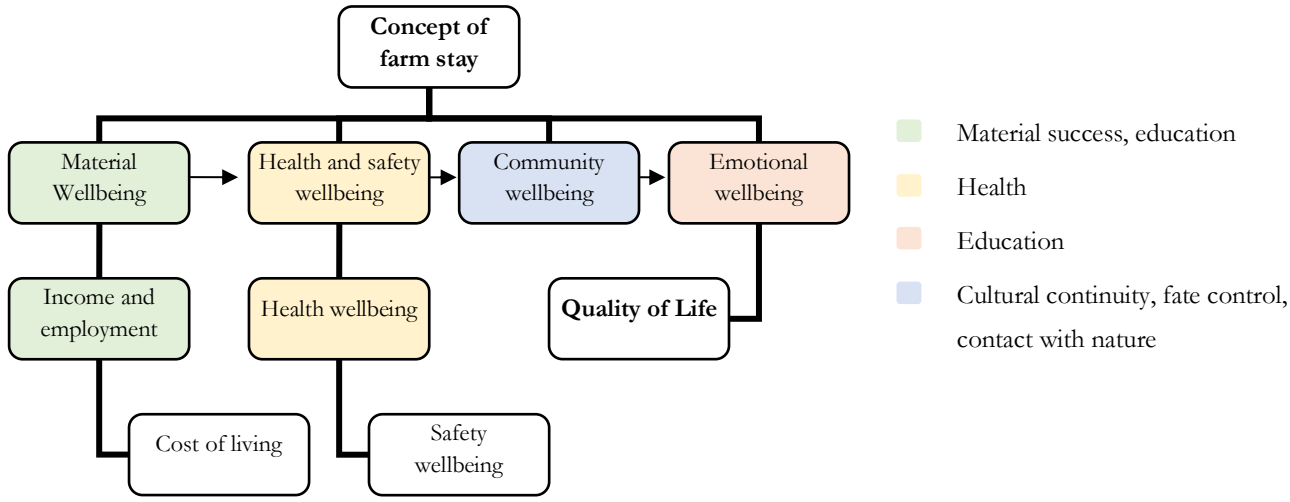


Figure 6: Bottom-up spillover theory and the Arctic social indicators (own visualization based on Aref, 2011)

By interconnecting the bottom-up spillover theory with the Arctic social indicators, it becomes clear that a significant share of the Arctic social indicators are contained in a single life domain (emotional wellbeing). This underlines its importance within the frame of QoL research in the Arctic. Moreover, it displays our hypothesis of QoL being "more than money".

Finally, the theoretical approach to tourism is inspired by the concept of farm diversification forming the ground for farm stays as part of farm tourism. Farm diversification, the recombination of farm related resources with new and (for a traditional working farm) non-agricultural offers and

services on the farm (Ilbery, 1991), leads to the establishment of farm stays (as part of farm tourism as such). Farm diversification is considered farm tourism when it is incorporated into a working farm and with the purpose of (primarily or secondarily) generating additional income through tourism offers (Mahoney, 2004, in Barbieri & Mahoney, 2009).

Methodology

In this article, we explore how the developing tourism industry in South Greenland interrelates with resident quality of life. Based on the scarceness of existing academic literature and public awareness within tourism and quality of life in Greenland, we investigate the relevance of the tourism industry, specifically farm tourism, effect on resident quality of life. Through a case study focusing on the concept of farm stays in South Greenlandic settlements, we aim to create an understanding of how resident quality of life and farm tourism interrelates.

Phronesis – An Exploratory Research Approach

Phronetic research by Flyvbjerg (2001) is a research approach which produces *"experience in context as the most appropriate means of generating knowledge that matches social priorities and can contribute to public debate"* (in Thomas, 2012: 2). Accordingly, this specific research approach is exploratory in nature focusing on activities and practical knowledge in everyday life situations and thereby aims to explore current practice as well as historic circumstances in order to find ways to understand praxis (Dredge, 2011) and inform the discussions in Greenland. The farmers' experiences and motivations to engage in farm tourism are presumably related to the awareness of the significance of tourism and its potential to contribute to their daily life.

In consequence, this exploratory single, small-scale case study aims to generate knowledge and create an understanding of the interrelation of QoL and tourism. Therefore, we believe, that this article can contribute to the ongoing public debate to enlarging the perspective of and to creating grounds for tourism development that embraces economic as well as socio-economic dimensions.

Case Study Approach

The case study approach used for this article is qualitative and was applied to get close to the 'object under study' as such an approach "*aims to develop understanding of the context in which phenomena and behaviors take place*" (Altinay et al., 2008). Following, this article serves as exemplary for doing research in the field of QoL and its relation to the economic sectors in Greenland. We try to contest the prevalent perception towards development in Greenland focusing on economic growth and monetary wealth and aim to inspire a different debate on the significance of tourism as a contributor to the QoL of Greenlanders. This way, we aim to contribute a case study that might also be transferable to the investigation of other similar cases in the Arctic (Swanborn, 2010). We are aware of critics posing the question on how far findings of a single case study are applicable and generalizable to similar cases (Ryan & Bernard, 2000, in Kohlbacher, 2006: 22). Here we follow Flyvbjerg (2006), who emphasizes, that "*one can often generalize on the basis of a single case, and the case study may be central to scientific development via generalization as supplement or alternative to other methods"* (ibid: 12). Therefore, the force of our single case studies should not be underestimated, as similar groundings could be found in the Arctic and it potentially can generate knowledge essential in the debate on achieving economic growth on socio-economic terms in Greenland.

Data Collection

The case study application entails conducting in-depth investigations (Stake, 1995; Creswell, 2013) of qualitative and quantitative data material. The primary data collection of this article derives from three qualitative interviews conducted during a joint field trip in South Greenland in April 2018 as well as the quantitative online survey "Tourism in South Greenland – Farm Stays". A collection of secondary data material found within the thematic frame of quality of life, tourism and farming is analyzed. The secondary data material consists of relevant publications, articles, reports, press releases and statements from both academic and non-academic sources.

Qualitative Interviews

In the context of this article, three semi-structured interviews from Narsarsuaq, and the nearby settlements are analyzed. It is important to state that the interviews were not conducted within the frame of this article, as they are each part of the author's individual PhD projects. Even though the questions were not intentionally posed with the aim of unfolding the connection between tourism and QoL, the content and the following findings revealed such a link leading to the initiative to write this article in the first place. The interviewees, one local tourist operator and two residents working with tourism, were found via a convenience sampling. The residents are married to local farm keepers in settlements near Narsarsuaq and are the primary persons on the farms managing the farm stays. Both of them have more than one occupation and are pursuing other occupations besides activities related to the farm stays. The tourist operator interviewed is a local operator that has been active in the industry for more than 30 years and is involved with farm stays.

Online Survey "Tourism in South Greenland – Farm Stays"

To complement our qualitative interviews we created an online survey titled "Tourism in South Greenland – Farm Stays"[5] to collect quantitative data about farm stay tourism and elements of quality of life. Complementing refers here to the fact that the interviews were not specifically conducted with focus on QoL in connection with tourism. The survey was created at a later stage (one month after the fieldwork) and served as a tool to enrichen existing knowledge and gain new insights. To make it more concrete, one question of the survey specifically asked if the respondent thinks that tourism enrichens his/her personal well-being. In the process of working on this article, the need to ask farmers such additional questions appeared and was met by creating the survey. We invited (by email as well as publication on social media platforms, e.g. the Facebook group "Greenland's Tourism Outback"[6]) farm keepers to answer the survey from the beginning of April until the end of May 2018. Sixty per cent (6 respondents) of the present (10) farm stay owners completed the survey. The questions were categorized into basic data, such as location and year of establishment, and questions on personal opinions e.g. the development of their own business, motivation for starting farm stays, growth potential, challenges and barriers for the business and opinions on possible roles of tourism in their perspectives as farm owners.

Exploring the Present - Interrelation between Quality of Life & Farm Tourism

Findings in the online survey "Tourism in South Greenland – Farm Stays" indicate that farm owners in South Greenland are aware of the significance and potential of farm stays to their traditional farming activities. All of the respondents credit the motive of "developing their communities" as being one of the most crucial reasons for starting the farm stays. The results from

the online survey "Tourism in South Greenland – Farm Stays" show that farmers commenced to offer farm stays in order to generate further income. Additionally, in the interview with the farm keepers' wife in Farm B, she expressed: *"Ten years ago, we had more rain. The fields had water and grass, which is what we feed the sheep with during wintertime. Now we are having trouble feeding them, all the sheep farmers here experience this, because of the drought. That is why we began to think about getting involved with tourism. That way we do not have to change the lifestyle, we have become accustomed to on the sheep farm"*. The changing climate affects, in other words, both positively and negatively, which supports the notions of Barbieri and Mahoney (2009). Linking it with the bottom-up spillover theory, the changing climate challenges the sustainability of the sheep farm, with the reduction in household resources (material wellbeing and safety wellbeing). However, it also provides an opportunity to combine their livelihood with tourism, which generates more income (material wellbeing) to help sustain the farm lifestyle. Following Getz and Carlsen (2000), farm tourism as the only source of a supplementary non-agricultural income to the existing farm is "*not an end in themselves but a means to support a rural lifestyle"* (Barbieri & Mahoney, 2009: 60). The farm keeper's wife from Farm A supported this conception, when asked to describe what made her feel dissatisfied: *"I feel so frustrated sometimes at our place. (…) We could use our time better if it was not so expensive to feed the sheep. We could use that money to develop our farm. Almost all of our money goes to feed the sheep. It's like we're being strangled. If I did not have my job on the side, it would be very difficult to live the way we do now"*. This supports the aforementioned theoretical link between material wellbeing and QoL, and it leaves this analysis with the notion of sustaining a specific lifestyle through the livelihood, feeding into the discussion on the good life in relation to QoL. So far, we have taken a glance into the concept of QoL, including social indicators significant for QoL in Greenland. Later we addressed how farm stays as an up-and-coming segment come into play in the Greenlandic tourism development. We have constituted its relevance and its need for awareness. The remaining question of whether the concept of farm stays contribute to resident QoL in more than monetary aspects, however still remains.

The Effect of Farm Tourism on Quality of Life

Literature on farm tourism refers to the potential of this type of tourism as a motor for economic development in order to face socio-economic challenges (Lobo et al., 1999; Barbieri & Mahoney, 2009; Dernoi, 1983; Ilbery et al., 1998; Sharpley & Vass, 2006). Existing studies illustrate that significant changes for farmers (e.g. globalization leading to an increase of competition, more efficient cultivation systems, etc.) lead to major difficulties (Barbieri & Mahoney, 2009). Farm diversification, relating to the combination of farming and tourism, became increasingly popular in the light of these significant challenges for farmers. As stated by Barbieri and Mahoney (2009), "*studies have demonstrated the economic value of farm diversification as one alternative strategy that farmers can utilize to survive and even prosper in today's changing agriculture climate*" (ibid: 58). However, even though tourism seems to be depicted in academia as this magic wand to nurture economic progress offering the door to economic and socio-economic benefits for the farm owners, questions arise on how it looks in South Greenland. As mentioned before, the three social indicators cultural continuity, contact with nature and fate control, as applied in SLiCA, are key to QoL studies in the Arctic, including the Greenlandic people. As part of the discussion, we assess if the data from our case study refer to these indicators. Albeit there is potential, farming as well as tourism currently play a minor role in the bigger picture of the economy of Greenland. The minor role of tourism

and farming might serve as explanation for their absence in existing QoL studies, like SLiCA, when putting a focus on Greenland.

Analyzing the perspective in SLiCA, by examining the full questionnaire and connecting it to QoL aspects, it is clear that the focus on societal sectors effect on QoL mainly evolves around natural-resource industries like hunting, fishing and oil/mineral extraction as well as public administration. Tourism is mentioned in a few places connected with job opportunities in e.g. Alaska (Poppel, 2015); however, there are no apparent references to tourism in a QoL perspective in Greenland. The same applies for farming. The study addresses the importance of cultural activities, such as hunting, fishing and other nature-related activities like gathering and processing, however farming as such, is not included in simple terms. There are a few references to elements tracing into farming, such as the categories 'harvesting' and 'growing crops', however, it is unclear whether the findings represent leisure or business farmers. As it is now, farm tourism may play a minor role in the overall picture of both tourism and QoL in Greenland. Nevertheless, tourism in general plays an important role in developing communities in Greenland, as seen in e.g. Ilulissat.

Studies from the newest entry from SLiCA show that in some cases, industrial growth can contribute to improving quality of life. A recently published article by Snyder and Poppel (2017) explores the living conditions in the settlement Qeqertarsuaatsiat, near Nuuk. As part of their research, they uncover how a nearby mine is affecting the living conditions in the adjacent community. The study shows, that "*(…) living conditions in one settlement have improved regardless of the presence of a fully-operational mine.*" (Snyder & Poppel, 2017). We are aware that occupations within mining and tourism cannot be directly compared, however, since Greenlandic people are not known to traditionally be a mining people, one could argue that the improved living conditions in Qeqertarsuaatsiat are a result of an increase of labor opportunities and income rather than the sole opportunity to work in a mine. With some reservation, it is thus not an unlikely thought that a similar increase in opportunities within the concept of farm stays and tourism in general will result in improved living conditions in South Greenland, as well as other places. Some indications supporting this hypothesis can be found in our analysis. As stated earlier by the farm keepers' wife from Farm A, she could not sustain the lifestyle they have become accustomed to, without her job on the side. When asked about her overall satisfaction with life, she further elaborated the notion: *"I want a job where I am in control and make the decisions. A job, where I am not so dependent upon others. I mean, of course we are dependent on the tourists, but where I can make the decisions on my own. I am a bit frustrated with the fact that I have yet to reach that goal, but all it takes is the courage to go and do it."*. The opportunity of working fully self-employed with farming, would in other words, improve her sense of QoL, thus indicating that fate control as an indicator contributes to resident QoL. When asked to describe QoL in her own words, the farm keeper's wife from Farm A further answered: *"Quality of life for me is to be self-employed, that I can take care of myself, that I can go*

Figure 7: The main street of Qassiarsuk where horses walk freely around. There are two farms in the settlement that offers stays for tourists. (Photo: Naja Carina Steenholdt)

out in nature and use the resources in nature". This is on track with the answer from the farm keeper's wife from Farm B that stated: *"Quality of life is for me is having the sheep. To be able to make our own roast lamb. I think money controls a lot. Of course, you need money, but I feel that quality of life is to be close to nature.*". These perspectives illustrates the importance of farm tourism as a means to a self-sustaining lifestyle and the interrelation between the farm lifestyle and contact with nature, fate control as well as cultural vitality, which furthermore supports the findings in SLiCA. They also support the bottom-up spillover theoretical approach in terms of overall QoL being influenced by the QoL levels on different domains. Based on these perspectives, we argue, without discarding the importance of material wellbeing, that being able to sustain the farm lifestyle is thus more than generating an income; it contributes to the improvement of the residents' QoL.

Remarks & Reflections

Our study suggests that there is a close interrelation between farm tourism and resident QoL in South Greenland. This is supported by our findings that showed, that

a) Farm tourism provides the opportunity for a self-sustaining lifestyle,

b) Farm tourism corresponds with residents' needs, analyzed in terms of social indicators, such as cultural continuity, fate control and contact with nature and finally, thus contributing to overall QoL.

These findings are illustrated in our model of the interrelation between farm tourism and resident quality of life, that serves to demonstrate how tourism, farming and QoL are connected in the case of the farm stays in South Greenland.

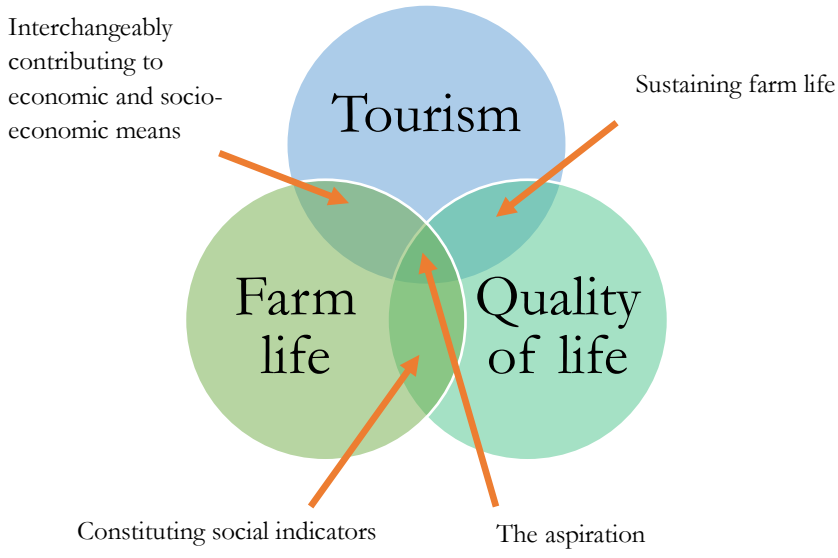


Figure 8: Model of interrelation between farm tourism and QoL in South Greenland

We explain this model, by stating that when farming is connected with tourism there is an economic as well as socio-economic interrelation. The Arctic social indicators constitute the interrelation between farming and QoL. When we look at tourism in the optics of QoL we learn that it helps sustain the farm life. In the middle where all three segments meet, we find the aspiration, the point where interrelations contribute to positive results within tourism, farming as well as QoL.

Furthermore, this exploratory case study situated within the tourism field as well as the studies of QoL offers a theoretical contribution by applying the bottom-up spillover theory. We ascertained that our study supports the bottom-up spillover theory in the sense that our qualitative interviews corresponded with the notion of overall QoL being influenced by the levels of well-being in different life-domains. Income and money were indeed important means to sustain the farm lifestyle and develop it further. However, we found that the emotional value of being close to nature and having some autonomy over one's own fate were significant indicators and contributed to a higher sense of quality of life in our case study.

As a final reflection, we argue that there are relevant grounds in a larger perspective for further research within the field of tourism and QoL in Greenland. Based on our analysis, we think it is safe to assume that the thousands of tourists coming in all over Greenland every year with cruise ships or visiting households for "cultural experiences" etc., have positive as well as negative impacts on resident QoL.

Acknowledgements

We would like to thank the informants from South Greenland, who shared their experience and life viewpoints during our field trip in April 2018. We would also like to thank the respondents in our online survey. Additionally, we would like to thank all who supported this article with comments and sound advice. In particular, we would like to extend our gratitude to Lill Rastad Bjørst, Ulrik Pram Gad, Birger Poppel and Carina Ren.

Notes

1. The Government of Greenland.
2. By example, Hertz (1995) addresses how fishing and mining affects living conditions in North Greenland, Poppel (2006; 2015) explore how subsistence economy deriving partly from hunting and fishing, affects the living conditions throughout Greenland. As a last example, Snyder & Poppel (2017) investigates living conditions in a settlement nearby a mine, and subsequently how mining affects the living conditions in the settlement.
3. A unique Greenlandic tradition, where people serve coffee and homemade cakes and traditional food for family and friends and where everyone who are interested are invited. The custom politeness in a "kaffemik" is that you don't stay for too long, but rather eat and drink at a reasonable pace and then leave the space for the next in line.
4. The most Southern municipality out of the 5 municipalities in Greenland.
5. Original title: "Turisme i Syd Grønland - Bondegårdsferie"
6. Original name: "Turismens Bagland I Grønland", public group, initiated by a tourism actor in Greenland.

References

Adanan, A., Radzi, S. M., Hanafiah, M. H. M., & Hamid, Z. A. (2010). *Tourism Development and its Impacts to Residents' Quality of Life: Case of Tioman Island*. Proceedings of the 4th Tourism Outlook & 3rd ITSA conference.

AHDR (Arctic Human Development Report) (2004). Stefansson Arctic Institute, Akureyri.

AHDR (Arctic Human Development Report – Regional Processes and Global Linkages). (2014). Nordic Council of Ministers. Copenhagen, Denmark.

Altinay, L., Paraskevas, A., & Jang, S. S. (2008). *Planning Research in Hospitality and Tourism*. Oxford, United Kingdom: Routledge

Andersen, T., Kruse, J., & Poppel, B. (2002). Survey of Living Conditions in the Arctic: Inuit, Saami and the Indigenous Peoples of Chukotka (SLICA). *Arctic*, *55*(3), 310-315.

Aref, F. (2011). The effects of tourism on quality of life: A case study of Shiraz, Iran. *Life Science Journal*, *8*(2), 26-30.

Barbieri, C., & Mahoney, E. (2009). Why is diversification an attractive farm adjustment strategy? Insights from Texas farmers and ranchers. *Journal of rural studies*, *25*(1), 58-66.

Bichet, V., Gauthier, E., Massa, C., Perren, B., Richard, H., Petit, C., & Mathieu, O. (2013). The history and impacts of farming activities in south Greenland: an insight from lake deposits. *Polar record*, *49*(3), 210-220.

Bjerregaard, P., Curtis, T., Senderovitz, F., Christensen, U. & Pars, T. (1995). Levevilkår, livsstil og helbred i Grønland. Copenhagen, Denmark: DIKEs Grønlandsskrifter, No. 4.

Bjerregaard, P., & Dahl-Petersen, I. K. (Eds.) (2008). Befolkningsundersøgelsen i Grønland 2005-2007: Levevilkår, livsstil og helbred. København: Syddansk Universitet. Statens Institut for Folkesundhed. SIF's Grønlandsskrifter, No. 18.

Bjørst, L. R., & Ren, C. (2015). Steaming Up or Staying Cool? Tourism Development and Greenlandic Futures in the Light of Climate Change. *Arctic Anthropology*, *52*(1), 91-101.

Christensen, T. (1992). Greenland wants tourism. *Polar Record*, *28*(164), 62-63.

Creswell, J. W. (2013). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. London, United Kingdom: SAGE Publications Ltd.

Dernoi, L. A. (1983). Farm tourism in Europe. *Tourism management*, *4*(3), 155-166.

Diener, E. (1984). Subjective Wellbeing, Psychological bulletin, 95(3), 542-575.

Dredge, D. (2011). Phronetic Tourism Planning Research: Reflections on critically engaged tourism planning research and practice. Paper presented at the IV International Critical Tourism Studies (CTS) Conference 2011, Tourism Futures: Creative and Critical Action, Cardiff, Wales, United Kingdom.

Fang Meng, Xiangping Li & Muzaffer Uysal (2010) Tourism Development and Regional Quality of Life: The Case of China, Journal of China Tourism Research, 6(2), 164-182.

Flyvbjerg, B. (2001). *Making social science matter: Why social inquiry fails and how it can succeed again*. Cambridge, United Kingdom: Cambridge University Press.

Flyvbjerg, B. (2006). Making Organization Research Matter: Power, Values, and Phronesis. In Clegg, S. R., Hardy, C., Lawrence, T. B. & Nord, W. R. (Eds.), The SAGE Handbook of Organization Studies (pp. 370-387), 2nd edition, London, United Kingdom: SAGE Publications Ltd.

From, A. (1975). *Sociale problemer i Grønland: Levevilkår og sociale problem i Vestgrønland.* Teknisk forlag.

Getz, D., & Carlsen, J. (2000). Characteristics and goals of family and owner-operated businesses in the rural tourism and hospitality sectors. *Tourism management*, *21*(6), 547-560.

Glatzer, W. (Ed.). (2015). *Global Handbook of Quality of Life: Exploration of Well-Being of Nations and Continents*. Dordrecht, Netherlands: Springer.

Hertz, O. (1995). Økologi og levevilkår i Arktis. *Uummannamiut. Copenhagen: Christian Ejlers' Forlag og Mellemfolkeligt Samvirke*.

Ilbery, B., Bowler, I., Clark, G., Crockett, A., & Shaw, A. (1998). Farm-based tourism as an alternative farm enterprise: A case study from the Northern Pennines, England. *Regional studies*, 32(4), 355.

Ilbery, B. W. (1991). Farm diversification as an adjustment strategy on the urban fringe of the West Midlands. *Journal of Rural studies*, 7(3), 207-218.

Johnston, M. E., & Viken, A. (1997). Tourism Development in Greenland, *Annals of Tourism Research*, 24(4), 978–982.

Jørgensen, T. J. (2017). Det idylliske farmerliv. Retrieved July 5, 2018, from https://de.calameo.com/read/000775194d643858b702f

Jurowski, C., Uysal, M. & Williams, D. R. (1997), A Theoretical Analysis of Host Community Resident Reactions to Tourism, *Journal of Travel Research*, 36 (2), 3-11.

Kaae, B. C. (2002). Nature and tourism in Greenland. *In: Watson, A., Alessa, L., Sproull, J., (compiler) Wilderness in the Circumpolar North: searching for compatibility in ecological, traditional, and ecotourism values; 2001 May 15-16; Anchorage, AK. Proceedings RMRS-P-26. Ogden, UT: US Department of Agriculture, Forest Service, Rocky Mountain Research Station. p. 43-53.*, *26*, 43-53.

Kaae, B. C. (2006). Greenland/Kalaallit Nunaat. In Baldacchino, G. (Ed.). (2006). *Extreme tourism: Lessons from the world's cold water islands*, 101-114.

Kielsen, K. (2018). Nytårstale 2018. Retrieved September 19, 2018, from https://naalakkersuisut.gl/da/Naalakkersuisut/Nyheder/2018/01/01012018_nytaarstale

Kim, K., Uysal, M., & Sirgy, M. J. (2013). How does tourism in a community impact the quality of life of community residents? *Tourism Management*, *36*, 527-540.

Kohlbacher, F. (2006). The use of qualitative content analysis in case study research. In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* (Vol. 7, No. 1, pp. 1-30). Institut für Qualitative Forschung.

Land, K. C., Michalos, A. C., & Sirgy, M. J. (2012). Prologue: The Development and Evolution of Research on Social Indicators and Quality of Life (QOL). In Land, K. C., Michalos, A.

C., & Sirgy, M. J. (Eds.). *Handbook of Social Indicators and Quality of Life Research* (pp. 1-22). Dordrecht, Netherlands: Springer.

Larsen, J. N. & Fondahl, G. (2010). Introduction: Human Development in the Arctic and Arctic Social Indicators. In Nymand Larsen, J., Fondahl, G., & Schweitzer, P. (Eds.). *Arctic Social Indicators – A follow-up to the Arctic Human Development Report* (p.11-28). Nordic Council of Ministers: Copenhagen, Denmark.

Liao, P. S. (2014). Perceived Quality of Life. In: Michalos A.C. (Eds.). *Encyclopedia of Quality of Life and Well-Being Research* (pp. 4701-4704). Dordrecht, Netherlands: Springer,

Liu, J. C. & Var, T. (1986). Resident attitudes toward tourism impacts in Hawaii, *Annals of Tourism Research*, 13(2), 193-214.

Lobo, R., Goldman, G., Jolly D., Wallace B., Schrader, W. & Parker, S. (1999). Agritourism benefits agriculture in San Diego County. *California Agriculture* 53(6):20-24.

Meyer, L. (2011). An exploratory investigation of perceived tourism impacts on resident quality of life and support for tourism in Cologne, Germany. University of Florida.

Naalakkersuisut (2015). *Turisme udvikling i Grønland. Hvad skal der til? National sektorplan for turisme 2016 – 2020*. Retrieved August 12, 2018, from http://naalakkersuisut.gl/~/media/Nanoq/Files/Hearings/2015/Turismestrategi/Documents/Turismestrategi%202016-2020%20FINAL%20DK.pdf

Naalakkersuisut (2017). *Speech at Future Greenland. Speech delivered by Minister for Fishery and Hunting Mr. Karl-Kristian Kruse on behalf of The Premier of Greenland Mr. Kim Kielsen.* Retrieved September 18, 2018, from http://naalakkersuisut.gl/en/Naalakkersuisut/News/2017/05/090517_KKK_Future-Greenland

Nawijn, J., & Mitas, O. (2012). Resident attitudes to tourism and their effect on subjective well-being: the case of Palma de Mallorca. *Journal of Travel Research*, 51(5), 531.

Poppel, B., Kruse, J., Duhaime, G. & Abryutina, L. (2007). SLiCA Results. *Anchorage: Institute of Social and Economic Research, University of Alaska Anchorage*.

Poppel, B. (Ed.). (2015). SLiCA: Arctic living conditions: Living conditions and quality of life among Inuit, Sami and indigenous peoples of Chukotka and the Kola Peninsula. Nordic Council of Ministers.

Poppel, B., Fægteborg, M., Siegstad, M. O., & Snyder, H. T. (2015). The Arctic as a 'Hotspot' for Natural Resource Extraction and Global Warming. *The Economy of the North*, 129-135.

Ren, C. B., & Chimirri, D. (2017). Turismeudvikling i Grønland: Afdækning og inspiration. Institut for Kultur og Globale Studier, Aalborg Universitet.

Ren, C. & Chimirri, D. (2018, April 3). Arctic Tourism – More Than an Industry? The Arctic Institute. Retrieved September 18, 2018, from https://www.thearcticinstitute.org/arctic-tourism-industry/

Sharpley, R., & Vass, A. (2006). Tourism, farming and diversification: An attitudinal study. *Tourism management*, 27(5), 1040-1052.

Snyder, H. & Poppel, B. (2017). 'Subsistence in the Arctic - results from SLiCA 2015 in Qeqertarsuaatsiat'. In Glomsrød, S., Duhaime, G. & Aslaksen, I. (Eds.), *Economy of the North* (pp. 119-123). Statistics Norway.

Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage

Statistics Greenland (2010). *Transport, Tourism and Communication*. Retrieved September 14, 2018, from http://www.stat.gl/dialog/main.asp?lang=en&version=201008&sc=SA&subthemecode=o2&colcode=o

Statistics Greenland (2017). *Greenland in Figures 2017*. Retrieved August 17, 2018, from http://www.stat.gl/publ/en/GF/2017/pdf/Greenland%20in%20Figures%202017.pdf

Statistics Greenland (2018). *Greenland in Figures 2018*. Retrieved September 14, 2018, from http://www.stat.gl/publ/kl/GF/2018/pdf/Greenland%20in%20Figures%202018.pdf

Swanborn, J. (2010), *Case Study Research: What, Why and How?* Thousand Oaks, CA: Sage.

Thomas, G. (2012). *Phronetic Social Research: Putting Power in Context*. Panel Paper: "Research in Context: Three Approaches to Thinking Phronetically". Paper presented at the SPA/EASP York 2012 "Social Policy in an Unequal World" (17th July 2012), York, United Kingdom.

Visit Greenland (n. d., a). *Development of Farm Tourism in South Greenland*. Retrieved 18 September, 2018, from http://corporate.greenland.com/en/newsletter-archive/development-of-farm-tourism-in-south-greenland/

Visit Greenland (n. d., b). *Vikings in Greenland*. Retrieved July 22, 2018, from https://visitgreenland.com/things-to-do/vikings-in-greenland/

Visit Greenland (n. d., c). On Holiday Among South Greenland's Sheep Farmers. Retrieved 18 September, 2018, from https://visitgreenland.com/articles/holiday-south-greenlands-sheep-farmers/

Visit Greenland (2016). *Tourism Strategy 2016-2019*. Visit Greenland. Retrieved 15 September, 2018, from http://corporate.greenland.com/media/8043/turismestrategi_eng_light_senest.pdf

Visit Greenland (2017). *Tourism Statistics Report 2017. South Greenland*. Retrieved 15 September, 2018, from http://www.tourismstat.gl/resources/reports/en/r20/South%20Greenland%20tourism%20statistics%20report%202017.pdf

Navigating Governance Systems & Management Practices for Pleasure Craft Tourism in the Arctic

Pierre-Louis Têtu, Jackie Dawson & Julia Olsen

Pleasure craft are one of the fastest growing sectors of maritime transportation across the global Arctic and increasingly also in the Antarctic. The increase in interest among pleasure craft operators in traveling to polar regions presents a number of local economic development opportunities. However, current governance systems do not yet fully address the numerous safety, security and environmental concerns associated with developing this sector, which compounds an already precarious situation considering the remoteness and harshness of the polar environment. This study aimed to identify practices regarding the management and governance of pleasure craft in Arctic regions, including inventorying national, regional and local regulations. Using data from secondary sources, statistical information, and Coast Guard reports, this study discusses the diversity of management policies that exist throughout the Arctic that support and manage pleasure craft tourism, and concludes that harmonization of governance frameworks and improved reporting mechanisms among Arctic states could be beneficial.

A Complex Set of Governance Systems & Management Mechanisms in the Arctic: Introduction

Climate change is having disproportionately large impacts on the polar regions – including both biophysical changes and related socio-economic responses. For example, the reduction in the extent and thickness of sea ice has resulted in an increase in both industrial and private sector shipping and maritime transportation opportunities in the region (Melia et al, 2017). Increased access and open water season lengths in the Arctic bring both risks and opportunities. Quantitative assessments of Arctic shipping from 2011 to 2014 shows increasing activity, particularly for the Norwegian and Barents Seas (Eguiluz et al., 2016), but also around Svalbard and the western coast

Pierre-Louis Têtu is a Postdoctoral Fellow in the Environment, Society, Policy Group (ESPG), Department of Geography, Environment & Geomatics, University of Ottawa, Ontario, Canada. Jackie Dawson is the Canada Research Chair in Environment, Society, and Policy and an Associate Professor in the Department of Geography, Environment, and Geomatics at the University of Ottawa. Julia Olsen is a PhD Candidate at Nord University, Faculty of Social Sciences, Bodø, Norway.

of Greenland, and to a lesser extent through the Northwest Passage in Arctic Canada (Dawson et al., 2017b; Dawson et al., 2018).

There are good records of commercial shipping for the entire Arctic region as well as a large foundation of literature and research focused on Arctic commercial and expedition cruise tourism.[1] However, there is very little information and only a limited number of studies focused on the trends, movements, and impacts of pleasure craft (i.e. private yachts) in the Arctic (Krakau & Herata, 2013; Johnston et al., 2017). More attention has been given to understanding pleasure craft movements and management in the Antarctic and insight from these studies (and others) can be used to establish a better understanding of potential challenges in the Arctic (see Johnston et al., 2013). Furthermore, Orams (2010) underlines the fact that cruising yachts have the potential to produce similar environmental impacts as cruise ships, albeit on a smaller scale and therefore it is also useful to understand the impacts of these cruise vessels. Even still, the increase in private yacht tourism, requires focused management and research attention due to the unique range of potential impacts these vessels pose for the marine environment, biodiversity, safety, and security (Speckman et al., 2004; Keller et al., 2010; Bergmann & Klages, 2012). For example, pleasure craft can be a vector for the spread of invasive species, leading to biosecurity concerns (Hall & Wilson, 2010) and they are more nimble than larger vessels and thus have the option to travel into unknown and more dangerous and uncharted areas. In extreme cases there are recorded concerns about cruise ships and pleasure craft engaging in surreptitious operations to map the sea floor and spy on military operations and infrastructures, importing illegal goods, or having involvement in human or other trafficking activities (IMO, 2018a; Johnston et al., 2017; Dawson et al., 2014). Local residents across the Arctic have commented on their increasing concern about these potential impacts of marine tourism and have revealed a number of undesirable behaviour among some pleasure craft operators including trading drugs for local Indigenous art, causing general community disruptions – such as using fireworks nearby communities, disrespecting Inuit burial grounds and cultural heritage sites - and being culturally disrespectful in general (Stewart et al., 2012; Dawson et al., 2014). Compounding all of these concerns is the fact that pleasure craft are exempt from many of the regulatory mechanisms that are mandatory for larger ships meaning there are much less systematic data on smaller vessel movements and impacts as well as less oversight.

The majority of larger expedition style cruise vessels that are currently engaged in marine tourism activities in the Arctic are already required to carry an Automatic Identification System (AIS), which is a worldwide vessel tracking system, and it is mandatory for them to report when entering various national maritime authorities. Smaller vessels such as fishing vessels and pleasure craft are types of vessels that fall below the size requirements of the mandatory regulation established by the International Convention for the Safety of Life at Sea (SOLAS), and as such do not have the same level of traceability (Arctic Council, 2015). Another significant challenge associated with understanding the trends and impacts of pleasure craft is the fact that different jurisdictions and nations use dissimilar sampling, reporting protocols, and management approaches, which makes it difficult to estimate, compare, and understand traffic trends and implications (Johnston et al., 2017; Fay & Karlsdottir, 2011). As such, there is a pressing need to understand the implications of the increase of pleasure craft tourism across the polar regions – including related risks and opportunities. The harmonization of Arctic shipping rules and regulations for pan-Arctic polar waters to ensure consistent regulations within all exclusive economic zones across the Arctic region

(Dawson et al., 2015; Fauchald, 2011) require the identification of various national regulations and the study of institutional governance structures and their interplay. This paper attempts to respond to this challenge and aims to identify the management and governance practices of pleasure craft by reviewing existing literature on the governance structures that exist to manage pleasure craft across the polar regions (when data is available) and especially in the Arctic in order to draw global comparisons and understanding.

Governance, Institutional Structures and Legal Regimes

There is a diverse set of management and legal regimes that collectively serve to govern shipping operations in the Arctic. These governance structures are administered by a diverse set of multi-scale institutions that have been set up to serve specific purposes, including for example, building knowledge, strengthening norms, enhancing problem-solving capacity, or enforcing rule compliance (Stokke, 2012). As defined by Stokke (2012), "institutions are sets of rules, decision-making procedures, and programmatic activities that serve to define social practices and to guide the interactions of those participating in these practices". Two of the main international institutions involved in Arctic shipping governance (broadly defined) include: the International Maritime Organization (IMO) and the Arctic Council. There are many other relevant international, national and regional institutions and the most relevant of these are discussed in this paper.

The IMO works "… to protect ships and people aboard them, both seafarers and passengers, in the harsh environment of the waters surrounding the two poles" (IMO, 2018a). It is an institution that is further supported by a number of other non-governmental institutions that provide more specific guidance on how to fulfill international standards and that determine if requirements are fulfilled (Fauchald, 2011). The IMO institution serves in large part to build knowledge and to establish and suggest options for enforcing rule compliance. For example, the IMO was instrumental in the development of the Polar Code and has now adopted this international code for ships operating in polar waters making it mandatory under both the International Convention for the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution from Ships (MARPOL) (IMO 2018b). The Polar Code officially entered into force on 1 January 2017.

The Arctic Council is a "high level intergovernmental forum to provide a means of promoting cooperation, coordination and interaction among the Arctic states" (Arctic Council, 2015). Throughout most of the post cold-war period, there were few international regimes across the east-west divide in the Arctic region: relations were marked by the strategic sensitivity of the region. The initiative launched by Gorbachev in 1987 – the Glasnost and the Perestroïka - for broader collaboration and opening with the West– led to the implementation of the creation of the Arctic Council by the Ottawa Declaration ratified by eight states in 1996. In addition to several transnational associations of Arctic Indigenous peoples that have gained status as Permanent Participants, Switzerland (2017), China, Italy, Japan, India, Singapore and Korea (2013) joined other non-Arctic States approved as Observers such as Spain (2006), France (2000), Germany, Poland, the United Kingdom and the Netherlands (1998). Unlike the IMO, the Arctic Council mainly serves to build knowledge and to enhance problem solving capacity (again see Stokke, 2012). The Arctic Council has only eight official and full member states and lacks the ability to enforce legally binding rules (Stokke, 2012: 16). However, the institution is particularly well suited

to produce knowledge relevant to Arctic shipping that is credible, legitimate, and salient and is thus still very capable of triggering political action and influencing formal governance structures.

International Frameworks

Various terms exist internationally to describe pleasure craft, including yachts, recreational vessels, small boats etc., but there is no uniform or single definition among Arctic states for these vessels. However, the International Maritime Organization (IMO) does specify that the category of 'pleasure craft' broadly defined are not subject to the International Convention for the Safety of Life at Sea (SOLAS) and they do not routinely engage in commercial activities such as carrying cargo or passengers for hire. The term pleasure craft is missing in the IMO Convention on the International Regulations for Preventing Collisions at Seas (COLREGs, 1972). Instead, the Organization developed non-mandatory guidelines on security aspects of the operation of vessels, such as pleasure craft, in order to ensure some coverage for vessels that do not fall within the scope of SOLAS Chapter XI-2 and the International Ship and Port Facility Security (ISPS) Code (2008).

The International Convention for the Prevention of Pollution from Ships (MARPOL), one of the most important international marine environmental conventions, was designed to minimize pollution from ships at sea, including from dumping, oil and exhaust emissions. All ships flagged under countries that are signatories to MARPOL are subject to its requirements. However, in terms of pleasure craft, MARPOL does not often apply considering are most vessels are under 400 Gross Tons (GT) and carry less than 15 persons. Annexe 1 states that yachts having a gross tonnage equal to or over 400 GT and are engaged in an international voyage must provide an International Oil Pollution Prevention Certificate. Annexe IV, which deals with sewage, is also only applicable to yachts with a gross tonnage equal to or over 400GT or carrying more than 15 people. In 2010, Annexe I was amended to ensure that any yacht or pleasure craft with a fuel tank capacity exceeding 30 cubic metres must be protected by a double hull (see Annexe 1 of Lasserre & Têtu (2015) for a synthesis) to prevent accidental spillage in case of collision or grounding.

The idea of creating a Polar Code (IMO 2018) dates back to the Exxon Valdez oil spill on the coasts of Alaska in March 1989 (Berlanga, 2017). With the 2018 IMO led implementation of the international polar code regime, management of global commercial shipping in the Arctic within a framework of ocean conservancy became the central objective. However, not all ships travelling in the Arctic are subject to all provisions of the Polar Code. Vessels that are not subject to SOLAS (fishing vessels, cargo ships of less than 500 GT (SOLAS, 1974), warships, pleasure yachts, ships not propelled by mechanical means and wooden ships of primitive build) all do not have to adhere to the core Part 1-A on Safety Provision of the Polar Code (IMO, 2018a). The Polar Code however has recommended that in the Arctic, the vessel's crew should include at least one ice navigator with documented evidence of having completed an ice navigational training program (O'Rourke, 2014).

Industry Association Initiatives

The Association of Expedition Cruise Operators (AECO) is an example of industry associations that has implemented environmental management on a voluntary basis to ensure safe tourism in what we refer to as the Euro-Russian Arctic and to a lesser extent in Arctic Canada. AECO members voluntarily agree to respect the guidelines issued by the association, but those guidelines

typically apply to shore locations rather than regulations concerning marine activity, which in Svalbard is under the responsibility of both the Governor of Svalbard and the Norwegian Maritime Authority (NMA) and in Canada is under the responsibility of the federal, territorial or Indigenous led governments. Recognizing the urgency of developing pleasure craft guidelines, AECO established a Yacht Working Committee in 2016 to look at the possible establishment of yacht (i.e. pleasure craft) guidelines. In Antarctica, the International Association of Antarctica Tour Operators (IAATO) plays a similar role to AECO and has led previous efforts to improve regulations of private and non-IAATO-members yachts with some success. In Svalbard, there is a clear need to continue this focus on yacht/pleasure craft voluntary or guidelines- based management considering the rapid increase in traffic. In Canada, where the increase has indeed been rapid, the numbers still remain small and thus it is less urgent in this region comparatively. However, it should be remembered that the risk and related consequences of a major pleasure craft accident are much higher in the Canada considering it is more remote and has less infrastructure and services. In general, the development of specific guidelines or management regimes for pleasure craft operation in the Arctic is needed to avoid development without the strategic benefit of an adequate mandatory system (Orams, 2010). Lessons from Antarctica can be applied in the Arctic and should be overseen in large part by industry associations.

National Frameworks and Initiatives

In Svalbard, the Spitsbergen Treaty provides the legal framework for maritime areas (Anderson, 2007). Article 2 and 3 of the Spitsbergen Treaty make explicit reference to the territorial sea where the Norwegian Marine Authority (NMA) ensures safety of navigation from 4 to 12 nautical miles (nm), and in the waters beyond to the outer limit of the Economic Exclusive Zone (EEZ) (200 nm) of Svalbard. Section 7 of the 2017 amended regulations No. 1400 of 2009 (NMA, 2017) contains provisions on the operation of vessels carrying 12 passengers or less and without a superstructure set Operating Limitations[2] within 12 nm of Svalbard (See Table 1 for a list of acts and regulations). Those small vessels must limit their activities in the territorial sea (12 nm) whenever they have or not a superstructure. Despite this regulation, it seems that there is a high level of pleasure craft involved in accidents, violating site visitation rules, and generally being unaware of risks of navigation in the Arctic waters (NCA, 2015). The Svalbard Environmental Protection Act (2002) amended in 2012 stipulates as a fundamental principle that "all access and passage in Svalbard shall take place in a way that does not harm, pollute or in any other way damage the natural environment or cultural heritage. Moreover, it should not result in unnecessary disturbance to humans or animals" noting that the area of its application extends to 12 nm from the coast. To limit the possibility of negative consequences, a number of local regulations and guidelines were developed for visitors (The Governor of Svalbard/Sysselmannen 2016: 69). "Safety precautions must be top priority when travelling in Svalbard" (ibid.) especially outside Management Area 10 (Isfjorden area) where planned trips will be evaluated on the need for insurance/bank guarantee to cover the cost of search and rescue operations and patient transportation should the need arise. A registration card is also mandatory. As such, all private boat operators travelling to Svalbard must "comply with the notification and SAR-insurance requirements" (ibid). Moreover, they are obligated to learn about local "regulations, particularly those dealing with environmental and safety precautions" (ibid).

Table 1. List of National Level management acts and regulations addressing Pleasure Craft in the Arctic

Area of application	*Act*	*Regulations*	*Typology of Pleasure craft*	*Authority*
*All Canadian Waters for all vessels**	Canada Shipping Act (2001)	Small Vessel Regulations (2010)	Pleasure Craft Passenger carrying not more than 15 GT and ≥ 12 passenger Workboat ≥ 15 GT Human-powered vessel other than a pleasure craft Not more than 6m; more than 6m but not more than 9m; more than 9, not more than 12; more than 12 but less than 24m; 23m or more	Transport Canada, Canadian Coast Guard
NORDREG Area (Arctic) (EEZ, 0-200 nm)	Canada Shipping Act (2001)	NORDREG Typology	Pleasure Craft/adventurers	Canadian Coast Guard
Greenland's Water (0-3 nm); Danish Waters (3-200 nm),	Order on safety with recreational craft 1687 (2016);		New and existing recreational craft with a hull length > 24m; Recreational craft with hull length < 24m (built before 2004)	Danish Maritime Authority
	Order for Greenland on safe navigation (1697) (2015)		Cargo ships of more than 150 Gross Tons and ships with 12 passenger or more	
	Technical Regulation no. 10 on small vessels carryings ≥	Regulation 9 – Radio equipment; Regulation 10 – Measure to prevent pollution	12 passenger or less, Length > 15 meters and scantling numbers > 100	

	12 passengers (2003)		
Svalbard's water (0-12 nm); Norwegian Waters (4-200 nm)	Ship Safety and Security Act (2007)	Vessel carrying 12 passengers or less	Norwegian Maritime Authority
Russian Waters	CU TR 026/2012 "Safety of small-boats" (2012)	Vessels carrying 12 passengers or less, non-commercial purposes, and designed for recreation	Russian Ministry of Emergency Situations

Figure 1. Several pleasure crafts berth in a port of Longyearbyen, Svalbard. In background: the expedition vessel MS Fram owned by Hurtigruten. August 2017

Source: Julia Olsen

The implementation of regulations dealing with environmental and safety precautions is something that is also observed in the Canadian Arctic (Johnston et al., 2017). Under the Canada Shipping Act, 2001 (S.C. 2001, c.26) every vessel of 300 gross tons or more must report to the Northern Canada Vessel Traffic Services Zone (NORDREG), a system of management of shipping in the Arctic and administered by the Canadian Coast Guard's Marine Communications and Traffic Services (MCTS) when entering or leaving Canadian Arctic waters. In addition, vessels carrying more than 453 cubic metres of fuel are also required to notify the relevant authorities. However, pleasure craft, along with fishing vessels, tugboats, research vessels and other vessels, are not required to report to authorities. These categories of vessels are also not currently required to carry equipment that automatically tracks their movement, but a recommendation has been made by the Arctic Council to make carriage of AIS transponders by all tourism vessels in the Arctic mandatory (see Arctic Council, 2015). According to the Office of the Auditor General of Canada (VOA), the paucity of information on local weather conditions and the lack of mandatory reporting requirements for pleasure craft in the NORDREG area pose significant environmental risks relative to the enforcement mandate of the system (VOA, 2014). Most pleasure craft operators are aware of the risks posed by these challenges and according to Johnston et al (2017) the majority of operating pleasure craft report to the Canadian Coast Guard MCTS voluntarily because of the related benefits including access to ice and weather information and improved safety protocols.

In Canada, Transport Canada sets minimum requirements for pleasure craft and non-pleasure vessels. One program of particular relevance is the Office of Boating Safety (OBS), which helps educate boaters about these requirements with the help of tools such as guides for various areas, but no including the Arctic waters of the Northwest Territories and Nunavut. In the Canadian

Arctic (Northwest Territories and Nunavut), just like in Yukon as well as southern waterways, various safety organizations are working together such as the Canadian Safe Boating Council, the Canadian Red Cross and other agencies with prevention-based programs to reduce risks and environmental impacts of boating such as the National Defence and the Canadian Armed Forces, the Royal Canadian Mounted Police, etc. The harsh conditions and the vastness of the Canadian Arctic Archipelago is however an important constraint for search and rescue missions.

Figure 2. The SV 'Fine Tolerance' in Cambridge Bay, Canada

Source: Jackie Dawson/Emma Stewart

At the national scale, The Canada Shipping Act stipulates that in Canada a pleasure craft is defined as a vessel used for pleasure, holidays or daily life (Transport Canada, 2018). The Canada Shipping Act on Small Vessel Regulations (SOR/2010-91) states that pleasure craft respecting the safety equipment requirements of another country is not captured by Part 2 of the Act on the Safety Equipment for Pleasure Craft. However, the Small Vessels Regulations does not apply to pleasure craft in the NORDREG Area, but provides guidance on defining a pleasure craft (see Table 2 for a list of pleasure craft by length of hulls). For example, a rented charter vessel is a commercial vessel if the master is the owner or someone provided by the owner, or if it is used other than for pleasure (Transport Canada, 2018). Moreover, if an individual rents or charters a vessel without crew and either hires a master or operates it oneself, it is a pleasure craft only so long as it is used

solely for the purpose of pleasure, hunting, fishing, food harvesting, or for other daily living needs (Ministry of Justice of Canada, 2001).

Table 2. List of 204 pleasure craft sailing in the Canadian Arctic waters (1990-2015), based on length of hulls

Length (m)	*Number of Pleasure Craft*	*% of Total Pleasure Craft*
1-5	3	1,47
6-10	19	9,31
11-15	100	49,02
16-20	27	13,24
21-25	15	7,35
26-30	5	2,45
31-40	6	2,94
41-50	10	4,90
51-60	4	1,96
61 or more	7	3,43
No data	8	3,92
Total	204	100

Source: CCG 2018

On the St Lawrence Seaway, a popular boating region in southern Canada, a guide for pleasure craft is available for those vessels that are equal to or more than 317.5 tons of displacement. Vessels less than 6 metres (20 feet) or less than one ton are not authorized to navigate the seaway. However, in all Canadian waters, every pleasure craft less than 12 metres in length and with a motor over 10 horsepower must be licenced through a free registration process and can be transferred to future owners. Transport Canada's newly drafted Canadian Guidelines for Passenger vessels operating in the Canadian Arctic make a distinction between pleasure craft and non-pleasure craft, but also states in section 1.3.4 that vessels such as pleasure craft are exempt from the environmental impact screening process (Transport Canada, 2017).

Similar to Canada and Norway, Greenland has a higher provision for maritime safety than is set out within the IMO's Polar Code. In Danish and Greenlandic waters, the Act on Safety at Sea (2002) sets administrative provisions relating to recreational crafts, but does not apply to the Faroe Islands and Greenland, according to section 36. Technical regulations on radio equipment and other measures to prevent pollution by small vessels carrying no more than 12 passengers were issued in 2003. Nearly two years after the Danish Act on Safety at Sea (2002) was put into force, a Danish royal decree (2004) amending the Land Regulations for the Protection of the Marine Environment of Greenland gave Nuuk full jurisdiction over the marine area up 3 nm from baseline. "This means the Greenlandic territorial sea consisting of inland waters on the landing side of the baseline of the territorial sea and the waters up to the outer boundary of the territorial sea. This is the line which at any point is at distance from the nearest point on the baseline corresponding to the latitude of the sea rhythm" (Department of Law and Justice of Greenland, 2004: Ch.1, par. 2). As stated on its website, the Government of Greenland is working on updating the regulations to enhance the protection of oceans to international standards. Danish maritime authorities have responsibilities for waters beyond 3 nm to 200 nm.

Figure 3. The increasingly diverse pleasure craft vessels in the Canadian Arctic increase challenges for coastal communities

Source: National Aerial Surveillance Program (NASP), Government of Canada

The transfer of jurisdictional authority by Copenhagen to Nuuk shares similitudes with the Principles in Law contained in both article 211 and 234 of the United Nations Convention on the Law of the Sea (UNCLOS) (Beckman et al., 2017). The Article 211 on pollution from vessels emphasize the need to harmonize policy and adopt laws and regulation for the prevention, reduction and control of marine pollution from foreign vessels exercising their right of innocent passage (UNCLOS, 1982, Section XII). Article 234 (Idem, Section 8) also stipulates that on ice-covered areas stipulates that coastal states have the right to adopt and enforce non-discriminatory laws and regulations for the prevention, reduction and control of marine pollution that could cause major harm or disturbance of the ecological balance. However, "such Laws and regulations shall have due regard to navigation and the protection and preservation of the marine environment based on the best available scientific evidence" (UNCLOS, 1982, Section XII). However, this argument has not been used by Copenhagen vis à vis Greenland just like Norway did around Svalbard; Oslo could have used this argument to reinforce maritime protection and safety around Svalbard waters by arguing that these areas are "ice-covered" in the sense of article 234 of UNCLOS (Fauchald, n.d.). Just like Canada and other states, Norway has the "right to adopt and enforce non-discriminatory laws and regulations for the prevention of marine pollution" within the territorial sea, as long as such standards do not hamper the right of innocent passage (UNCLOS, art. 17-21). However, states must respect the 'freedom of navigation' (Fauchald, 2011). While Norway could pass legislation that would only allow ships fulfilling certain standards into its ports or internal waters, such rules would not prevent ships that do not fulfill such requirements

from sailing in the territorial sea or the EEZ. On the Polar Code and guidelines, they cannot be regarded as any authoritative delimitation of the geographical scope of application of article 234 and constitute an evidence of states practicing an *opio juris* concerning the minimum extension of ice-covered areas (art. 31(3)(C) of Vienna Convention on Law of Treaties (ibid). Furthermore, Canada and Russia have adopted standards on vessel discharges and design construction equipment stricter than those agreed in regulations of the IMO.

In 2015, the Danish Maritime Authorities issued an order for Greenland on safe navigation (2015). The main purposes were to enhance safe navigation in Greenlandic waters, covering four types of vessels: 1) Cargo ships of more than 150 GT and ships carrying 12 passengers or more; 2) ships carrying more than 250 passengers; 3) all kind of foreign ships; and 4) ships of war, troopships and naval auxiliaries like other state-owned ships. Sections 7 and 13 of the order for Greenland on safe navigation are particularly relevant in the field of marine safety where the former underlines that ships shall have at least one person on board with the necessary competencies in ice-covered waters and documented relevant person's local knowledge of the waters to be navigated (Idem, Section 7). Section 13 states that the ship shall have an ice class corresponding, as a minimum, to the ice that it is navigating, but is much stricter when it comes to ships in the northern navigation zone of Greenland. Within this zone, it has stated that the ship shall have a minimum ice class 1C or equivalent ice class. In this regard, the *Crystal Serenity*, a cruise ship with a 1D-classification equivalent in the Baltic System that crossed the Northwest Passage in 2016 and 2017, wouldn't have been allowed in Greenland's waters, as illustrated by several Russians and French cruise ships with the same classification in coastal areas of Arctic Canada since 1990.

Data on the pleasure craft sailing along the coastline of Greenland is absent but there has been a large portion of pleasure craft or adventurers sailing in the Canadian Arctic since 1990 who wouldn't have been allowed to visit Greenland internal waters following these regulations. Finally and not the least importantly, Order 1687 issued by the Danish Maritime Authority in December 2016 regarding safety when operating recreational vessels addressed the category of smaller recreational craft with a length below 24 meters. A powerboat license confirming basic skills may be required depending on the hull length or power output of certain engine-drive pleasure craft.

In Russian Arctic waters, many foreigners need a visa to enter the Russian Federation. However, there are very few English speakers in Russian Arctic ports and most of the regulations are in Russian (Pashkevich et al., 2015). As explained by Pashkevich, there is no central authority in Russia to govern the growth marine tourism industry nor specific cruise or yacht management plans or guidelines except those on Franz Josef Land. In the frame of the Eurasian Customs Union Commission (2012) between Russia, Belarus and Kazakhstan, a Russian Federal Law came into force and changed the legislative acts of the Russian Federation relating to the definition of the term 'small-sized vessel'" (Eurasian Customs Union Commission, 2012; Solski, 2013; Gutsulyak, 2017). The law of the Eurasian economic commission on safety of small-size vessel (pleasure vessels) of 2012 introduced the notion of a pleasure craft, defined as a vessel with a total number of not more than 12 people, used for non-commercial purposes, and designed for recreation on water objects.

A Decentralized Regulation Process among Arctic States but Not Less Efficient: Discussion

The longer shipping seasons in the Arctic as well as increased access to Arctic waters bring both risks and opportunities and there are growing concerns regarding management of pleasure craft sailing in the Arctic. Given the range of potential socio-ecological impacts on marine environments and biodiversity that those pleasure craft could have, the aim of this paper was to review governance systems in Canada and to some extent in other polar and non-polar regions, in order to provide a global picture of an emerging and less studied challenge area and to identify areas for future research. Here we provide some comparative insights regarding the governance of pleasure craft across the Arctic and make some suggestions for potential research and policy needs.

Shipping is a global industry and despite complementarity between the IMO and the Arctic Council, the shipping and marine transport industry and relevant industry associations therefore typically prefer any region-specific rules to be hammered out within the IMO where their participation is well established. They also prefer to avoid spatially fragmented regulations or dealing with complementary or harmonized environmental protection regulations. In this regard, there was very little chance that the Arctic Council would emerge as the leader in the provision and implementation of a mandatory Polar Code. A mandatory Polar Code led by the Arctic Council would have touched underlying geopolitical controversies over coastal states' jurisdiction in Arctic waters. Moreover, the Polar Code seems to be much less stringent than Canadian regulations. In sum, the IMO seems to be the most suitable institutional body to implement a harmonized Polar Code for pleasure craft as underlined by Stokke (2012). A dual & complementary action by the United Nations IMO and the Arctic Council would be to enhance the strength of regulations, but the IMO is much more recognized at the world level which would have an impact on its authority to implement mandatory regulations. It can be argued that the adoption of a Polar Code does not affect the freedom of states to adopt measures in accordance with article 234. If the Polar Code were set up as a treaty, it would have been binding for the states that accept it and they would not have the right to invoke article 234 as a basis for regulatory jurisdiction.

The implementation of the Polar Code adds a new set of regulations for certain types of shipping across all polar regions, and is a promising initiative to deal with national data and management differences; but as of yet the Code does not specifically comment on or regulate smaller private tourism vessels such as pleasure craft. At the national level of Arctic states, there are some regulations covering different descriptions of what we usually use as 'pleasure craft' based on NORDREG's terminology in Canada but there are significant variations amongst each regime.

Canadian regulations applying to Canadian waters could provide a useful management system and typology, but currently do not apply to the waters of Nunavut and the Northwest Territories, and the NORDREG recording system is not mandatory for pleasure craft.

There is certainly a need for further discussion on what should be a pleasure craft and what should not, but in terms of monitoring, a large proportion of pleasure craft seem to report to NORDREG for the access to real-time information on sea ice, meteorological conditions, etc. Based on various datasets and auxiliary data from Environment Canada, there is a high possibility that there are in fact many more pleasure craft traversing the Canadian Arctic than statistical information reveals. The lack of traceability of a vessel not carrying an AIS transponder such as pleasure craft and

fishing vessels and the more private dimension of voyages organized by billionaires or mega-yacht owners are amongst some of the reasons.

The regulations established by the Danish Authority in partnership with Greenland's government and the Norwegian Authority regarding Svalbard are two good examples of how the precautionary safety principle has been integrated as a core principle in the management of marine and coastal environments. In both cases, the governments of Greenland and Svalbard are responsible for their coastal environments from the baseline to 3 and 4 nm from the shore respectively. The precautionary principle is a widely accepted general principle in environmental management that provides action to avoid environmental damage in advance of scientific certainty of damage, sometimes resulting in regulation forbidding human activities (Hagen et al., 2012).

Of importance to note is Danish Authority's 2003 Technical Regulation no. 10 on small vessels carrying 12 passengers or less, particularly the regulations providing measures to prevent pollution and regulation on the necessary radio equipment required. Regarding the type of vessels the regulations covers, (12 passenger or less, with a hull length of less than 15 meters), Arctic states could adopt these regulations on radio equipment and measures to prevent pollution such as the dumping of garbage and wastewater. The Order for Greenland on safe navigation of 2015, which applies to vessels of more than 150 gross tons and ships with 12 or more passengers, ensures that all vessels sailings in the northern navigation zone of Greenland must be classified at least as an ice-strengthened hull of category 1C.

These regulations differ from other jurisdictions, such as in Svalbard where the Governor of Svalbard implemented a fee system and regulation limiting as much as possible the activities of vessels with 12 or less passengers without a superstructure in the territorial sea. Additionally, and in collaboration with the AECO, the Governor of Svalbard for the cruise industry has already created guidelines, and the AECO is in the process of developing guidelines for pleasure craft, but this applies to lands and not seas.

Some regions of Svalbard also require pleasure craft to carry special insurance for SAR emergencies. Safety precautions are a top priority for the Svalbard government, especially outside the main Management Area 10 (Isfjorden area), and indeed seem to be a top priority for most governments, although approaches to safety precautions differ from jurisdiction to jurisdiction. A similar system fee and anchorage free as it is now could be interesting for coastal communities in Arctic Canada. The need to address the fiscal aspects of managing the cruise industry and pleasure craft tourism in order to present a common voice to federal partners is at the core of the Government of Nunavut 2016-2019 Marine Tourism Management Plan.

Finally, in Antarctica, governance of pleasure craft is even stricter, as there is a distinction between IAATO members and private yachts, with the latter highly encouraged to join the IAATO. A pleasure craft sailing in Antarctica with more than 12 passengers is automatically classified as an expedition vessel making landings, and as such could be required to provide a dockside observer scheme, highly encouraged to carry an IAATO observer on board, provide all planned Antarctic itineraries, and comply with all IAATO by-laws, objectives and standard operating procedures. Arctic regions should pay careful attention to lessons learned and to established governance (formal and informal) that exist in Antarctica where pleasure craft are already operating to a greater extent.

A major challenge is certainly the fact that different jurisdictions and nations use significantly different definitions, methods of sampling, reporting protocols, and management legislation. It could pose a problem for a crew circumnavigating the Arctic and not willingly committing illegal acts or not possessing required permits. Without interfering with the sovereign jurisdictions of nation states, there is certainly a need for more centralized information for pleasure craft on best practices for various sites and communities of the Arctic, especially in the Canadian Arctic. International mechanisms such as UNCLOS also exist and are managed by the Government of Greenland. Given Canada's position that the Northwest Passage constitutes internal waters, invoking section 7 and 13 of the UNCLOS could potentially increase the safety in the waters surrounding the Canadian archipelago. Canadian Rangers or any relevant local or regional body could be an important tool for ensuring local safety and security throughout light and rapid water patrols.

In sum, the melting of sea ice in the Arctic increase opportunities for shipping activities but also increase risks and challenges associated with understanding the impacts of pleasure craft in different jurisdictions using dissimilar reporting approaches. Shipping across the Arctic region requires sailing through various national regulations monitored by different institutional governance structures that interplay with each other's. By identifying the management and governance practices that exist to manage pleasure craft across the polar regions, this paper has attempted to respond to this challenge to draw global pan-Arctic comparisons and understandings. More research will be needed to understand behaviors, motives and their impacts on communities and shore locations. Exploring the possibility of introducing stricter Arctic safety equipment provisions for recreational boaters is an approach that deserves more research. As we have seen in recent years, drifting pack ice in the Canadian Arctic is a major safety and security challenge for Arctic ship owners and mariners.

Notes

1. See, among others, Maher, 2010; Dawson et al. 2014; Maher et al. 2014; Pizzolato et al. 2014; Viken, 2014; Lamers & Pashkevich, 2015; Lasserre and Têtu, 2015; Shirokiy, 2015; Borch et al. 2016; Lasserre et al. 2016; Pizzolato et al. 2016; Bystrowska & Dawson, 2017; Bystrowska & Dolnicki, 2017; Bystrowska et al. 2017; Huijbens & Lamers, 2017; Johnston et al. 2017; Lamers et al. 2017; Stewart et al. 2017; Têtu, 2018; Dawson et al. 2017a; 2018.
2. A superstructure is an extended construction of any building or platform that rises above the rest of the building or platform in a distinct manner.

References

Anderson, D.H. 2007. The Status under International Law of the Maritime Areas around Svalbard. Paper read at the Symposium on "Politics and Law – Energy and Environment in the Far North," held at the Norwegian Academy of Science and Letters on 24 January 2007. http://www.dnva.no/binfil/download.php?tid=27096.

Antarctic Treaty Secretariat (2012). Final Report of the Thirty-fifth Antarctic Treaty Consultative Meeting Vol II. 35th Antarctic Treaty Consultative Meeting. Hobart, Australia, 11-23 June 2012. https://www.ats.aq/documents/ATCM35/fr/ATCM35_fr002_e.pdf.

Antarctic Treaty Secretariat (2014). Yachting guidelines for Antarctic cruises. https://www.ats.aq/documents/ATCM37/ww/atcm37_ww007_e.pdf

Arctic Council (2015). Arctic Marine Tourism Project (AMTP) Best Practice Guidelines. https://oaarchive.arctic-council.org/bitstream/handle/11374/414/AMTP%20Best%20Practice%20Guidelines.pdf?sequence=1&isAllowed=y.

Beckman, R.C., Henriksen, T., Dalaker Kraabel, K., Molenaar, E.J., Roach, A. (2017). Governance of Arctic Shipping. Balancing Rights and Interests of Arctic States and User States. Brill Nijhoff, 448p.

Bergmann, M., and Klages, M. Increase of litter at the Arctic deep-sea observatory HAUSGARTEN. Mar Pollut Bull, 64(12): 2734-41.

Berlanga, M.I. The Arctic Development: New navigational routes and maritime governance. In Conde, E and Sanchez, S.I. (Eds). 2017. Global Challenges in the Arctic Region: Sovereignty, environment and geopolitical balance. Routledge, Taylor & Francis Group. London and New York.

Borch, O.J., Andreassen, N., Marchenko, N., Ingimundarson, V., Gunnarsdóttir, H., Ludin, L., Petrov, S., Jakobsen, U., í Dali, B. 2016. Maritime activity in the High North - current and estimated level up to 2025. MARPART Project Report 1. Nord universitet. Utredning nr. 7. Bod, 2016. https://brage.bibsys.no/xmlui/bitstream/handle/11250/2413456/Utredning72016.pdf?sequence=5 .

Bystrowska, M. and Dawson, J. 2017. Making places: the role of Arctic cruise operators in 'creating' tourism destinations. Polar Geography, 40(3): 208-226.

Bystrowska, M. and Dolnicki, P. 2017. The impact of endogenous factors on diversification of tourism space in the arctic. Current Issues of Tourism Research, 5(2): 36-43.

Bystrowska, M., Wigger, K., Liggett, D. The Use of Information and Communication Technology (ICT) in Managing High Arctic Tourism Sites: A Collective Action Perspective. Resources, 6: 33-51.

Danish Maritime Authority (DMA) (2010). Notice F from the Danish Maritime Authority Technical regulation on the construction, equipment, etc. of small commercial vessels. https://www.dma.dk/Vaekst/Rammevilkaar/Legislation/Notice%20F/F-14122010-samlet%20dokument.pdf.

Danish Maritime Authority (DMA) (2014). Order no. 1008 of September 2014. Order on Notice F from the Danish Maritime Authority Technical regulation on the construction, equipment, etc. of small commercial vessels. 2014. https://www.dma.dk/Vaekst/Rammevilkaar/Legislation/Notice%20F/F-25092014-total.pdf

Danish Maritime Authority (DMA) (2016). 0rder no. 1687 of December 2016. Order on safety when operating recreational craft as well as safety requirements for recreational craft above 24 metres in length. https://www.dma.dk/Vaekst/Rammevilkaar/Legislation/Orders/Order%20on%20safety%20when%20operating%20recreational%20craft%20and%20safety%20requirements%20for%20recreational%20craft%20above%2024%20m%20in%20length.pdf

Dawson, J., Johnston, M.E., Stewart, E.J. 2014. Governance of Arctic expedition cruise ships in a time of rapid environmental and economic change. Ocean & Coastal Management, 89: 88-99.

Dawson, J., Stewart, E.J., Johnston, M.E. and C.J. Lemieux. 2015. Identifying and evaluating adaptation strategies for cruise tourism in Arctic Canada. Journal of Sustainable Tourism, 24(10):1425-1441.

Dawson, J., Johnston, M.E., Stewart, E.J. 2017a. The unintended consequences of regulatory complexity: The case of cruise tourism in Arctic Canada. Marine Policy, 76: 71-78.

Dawson, J., Hoke, W., Lamers, M., Liggett, D., Ljubicic, G., Mills, B., Stewart, E.J., Thoman, R. 2017b. Navigating Weather, Water, Ice and Climate Information for Safe Polar Mobilities

Dawson, J., Pizzolato, L., Howell, S.E.L., Copland, L., Johnston, M. 2018. Temporal and Spatial Patterns of Ship Traffic in the Canadian Arctic from 1990 to 2015. Arctic, 71(1): 15-26.

Department of Law and Justice of Greenland. 2004. County Council Regulation No. 2 of 21 May 2004 amending the Land Regulations for the Protection of the Marine Environment (Amendment of the definition of fish, authority to lay down rules for the discharge of fish from procurement and production vessels and repeal of provisions transferred to the Maritime Safety Act). http://lovgivning.gl/lov?rid=%7b5030A9B7-9CF3-4161-8919-083FB7759024%7d.

Eguiluz, V.M., Fernandez-Gracia, J., Irigoien, X., Duarte, C.M. 2016. A quantitative assessment of Arctic shipping in 2010-2014. Nature, 6. https://doi.org/10.1038/srep30682

Eurasian Economic Commission (2012). Technical Regulations of the Customs Union "On the safety of small boats" (TR TS 026/2012). Технический регламент Таможенного союза "О безопасности маломерных судов" (ТР ТС 026/2012). http://www.eurasiancommission.org/ru/act/texnreg/deptexreg/tr/Pages/BezopMalSudov.aspx.

Fauchald, O.K. 2011. Regulatory Frameworks for Maritime Transport in the Arctic: Will a Polar Code Contribute to Resolve Conflicting Interests? In John Grue and Roy H. Gabrielsen (eds), Marine Transport in the High North. Oslo, Novus Forlag, 2011, pp. 73-91.

Fay, G. and Karlsdottir, A. 2011. Social indicators for arctic tourism: observing trends and assessing data. Polar Geography, 34(1-2): 63-86.

Gutsulyak, V. 2017. International Maritime Law from the Russian Perspective: a Comprehensive Guide for Shipmasters, Lawyers and Cadets. Universal-Publishers, 414p. ISBN-10: 1627341919.

Hagen, D., Vistad, O., Eide, N.E., Flyen A.C., Fangel, K. 2012. Managing visitor sites in Svalbard: from a precautionary approach towards knowledge-based management. Polar Research, 31(1). https://doi.org/10.3402/polar.v31i0.18432.

Huijbens, E. and Lamers, M. 2017. Sustainable Tourism and Natural Resource Conservation in the Polar Regions: An Editorial. Resources, 6(3): 45-52.

International Association of Antarctica Tour Operators (IAATO). 2016. IAATO Yacht Membership Guidelines & Observer Requirements. https://iaato.org/documents/10157/14873/Membership+Guidelines+for+Yachts+May+2016/20137bd7-b1a6-4d9b-a992-9edab3f94a4d.

International Association of Antarctica Tour Operators (IAATO). 2018. Yachts. https://iaato.org/yachts.

International Convention for the Safety of Life at Sea (SOLAS). 1974. Regulation 1 – Application. http://solasv.mcga.gov.uk/regulations/regulation01.htm.

International Maritime Organization (IMO). 2008. Non-mandatory guidelines on security aspects of the operation of vessels which do not fall within the scope of SOLAS chapter XI-2 and the ISPS Code. http://www.imo.org/en/OurWork/Security/SecDocs/Documents/Maritime%20Security/MSC.1%20Circ.1283.pdf.

International Maritime Organization (IMO). 2018a. Safety regulations for different types of ships. http://www.imo.org/en/OurWork/Safety/Regulations/Pages/Default.aspx

International Maritime Organization (IMO). 2018b. Shipping in polar waters. Adoption of an international code of safety for ships operating in polar waters (Polar Code). http://www.imo.org/en/MediaCentre/HotTopics/polar/Pages/default.aspx

Johnston, M., Dawson, J., De Souza, E., Stewart, E.J. 2017. Management challenges for the fastst growing marine shipping sector in Arctic Canada: pleasure crafts. Polar Record, 53(1): 67-78.

Keller, AA., Fruh, E.L., Johnson, M.M., Simon, V., McGourty, C. Distribution and abundance of anthropogenic marine debris along the shelf and slope of the US West Coast. Mar Pollut Bull, 60(5): 692-700.

Kings Bay AS. 2017. Regulations for NY-Ålesund Harbour – Svalbard. http://kingsbay.no/visitor_information/harbour/content/filelist_6cec825b-b9b2-4110-8596-66d9ef4813df/1494403688997/_2017_regulations_and_prices_for_ny_lesund_harbour.pdf. Krakau, M. & Herata, H. 2013. German tourism activities in the Antarctic area: A governmental perspective. In D. K. Mueller, L. Lundmark & R.H. Lemelin, Eds., New Issues in Polar Tourism: Communities, Environments, Politics. Dordrecht: Springer, pp. 111–121.

Lamers, M., Van der Duim, R., Spaargaren, G. 2017. The Relevance of Practice Theories for Tourism Research. Annals of Tourism Research, 62(2017): 54-63.

Lamners, M. and Pashkevich, A. 2015. Short-circuiting cruise tourism practices along the Russian Barents Sea Coast? The case of Arkhangelsk. Current Issues in Tourism. DOI: 10.1080/13683500.2015.1092947.

Lasserre, F. and Têtu, P-L. 2015. The cruise tourism industry in the Canadian Arctic: Analysis of activities and perceptions of cruise ship operators. Polar Record, 51(1): 24-38.

Lasserre, F., Beveridge, L., Fournier, M., Têtu, P-L., Huang, L. 2016. Polar seaways? Maritime transport in the Arctic: An analysis of shipowner's intentions II. Journal of Transport Geography, 57(2016): 105-114.

Maher, P. 2010. Cruise Tourist Experiences and Management Implications for Auyuittuq, Sirmilik and Quttinirpaaq National Parks, Nunavut, Canada. In Hall, C.M. and Saarinen, J. (eds). Tourism and Change in Polar Regions: Climate, Environments and Experiences. Routledge.

Maher, P., Gelter, H., Hillmer-Pegram, K.C., Hohaard, G., Hull, J., Por Johannesson, G., Karlsdottir, A., Rantala, O., Pashkeich, A. 2014. Arctic Tourism: Realities and Possibilities. Arctic Yearbook 2014. https://www.arcticyearbook.com/articles2014/103-arctic-tourism-realities-possibilities.

Melia, N., Haines, K., Hawkins, E. 2017. Future of the Sea: Implications from Opening Arctic Sea Routes. Report. Government Office for Science, Gov.uk. pp39.

Ministry of Justice of Canada. 2002. Nunavut Surface Rights tribunal Act S.C. 2002, C. 10. http://laws-lois.justice.gc.ca/eng/acts/n-28.8/FullText.html

Ministry of Justice of Canada. 2010. Canada Shipping Act - Small Vessel Regulations SOR/2010-91. http://laws-lois.justice.gc.ca/eng/regulations/SOR-2010-91/FullText.html.

Norwegian Coastal Administration (NCA). 2015. Maritime Safety Analysis – Maritime Safety in Norwegian Waters – Today and Towards 2040. Kystverket – DNV-GL. http://www.kystverket.no/contentassets/30b19da5d8c74ed68e83582e830b66d2/maritime-safety-in-norwegian-waters-2014.pdf.

Norwegian Maritime Authority (NMA). 2017. Ship Safety and Security Act – Regulations of 24 November 2009 No. 1400 on the operation of vessels carrying 12 passengers or less, etc. https://www.sdir.no/contentassets/f1da748309084bf1893028d0902852aa/24-november-2009-no.-1400-operation-of-vessels-carrying-12-passengers-or-less-etc..pdf?t=1528658555604.

Office of the Auditor General of Canada (VOA). 2014. 2014 Fall Report of the Commissioner of the Environment and Sustainable Development – Chapter 3 – Marine Navigation in the Canadian Arctic. http://www.oag-bvg.gc.ca/internet/English/parl_cesd_201410_03_e_39850.html.

O'Rourke, R. 2014. Changes in the Arctic: Background and Issues for Congress. Congressional Research Service. CRS Report Prepared for Members and Committees of Congress. https://www.everycrsreport.com/files/20140227_R41153_7719bae19b35dc77c82d3e75e1e53309162c380c.pdf.

Pashkevich, A., Dawson, J., Stewart, E.J. 2015. Governance of Expedition Cruise Ship Tourism in the Arctic: A Comparison of the Canadian and Russian Arctic. Tourism in Marine Environments, 10(3-4): 225-240. https://doi.org/10.3727/154427315X14181438892883.

Shirokiy, S. 2015. Problems and perspectives of tourism development in the high Arctic. Case of Franz Josef Land. Master thesis in Tourist Studies, Faculty of Tourism, The Arctic University of Norway. https://munin.uit.no/bitstream/handle/10037/10082/thesis.pdf?sequence=1&isAllowed=y

Solski, J. 2013. New developments in Russian regulation of navigation on the Northern sea route. Arctic Review on Law and Politics, 2013(1), pp. 90–120.

Speckman, S.G., Piatt, J.F., Springer, A.M., Ralph, C.J. 2004. Small boats disturb fish-holding marbled murrelets. Northwestern Naturalist, 85(1): 32-34.

Stewart, E.J., Dawson, J., Howell, S.E.L., Johnston, M.E., Pearce, T., & Lemelin, R.H. (2012). Local-level responses to sea ice change and cruise tourism in Arctic Canada's Northwest Passage. Polar Geography, 36(1), 142-162.

Stewart, E.J., Liggett, D., Dawson, J. 2017. The evolution of polar tourism scholarship: Research themes, networks and agendas. Polar Geography, 40(1): 59-84.

Stokke, O. S. 2012. Regime interplay in Arctic shipping governance: Explaining regional niche selection. International Environmental Agreements: Politics, Law and Economics. https://www.fni.no/getfile.php/131466-1467543454/Filer/Publikasjoner/OSS-INEA-2012.pdf.

Têtu, P-L. 2018. The Northern Marine Transportation Corridors Initiative in the Canadian Arctic: a Marine Tourism Adapted Reality? The Canadian Geographer, June 2018. DOI: https://doi.org/10.1111/cag.12498.

The Governor of Svalbard/Sysselmannen. 2016. Svalbard. ROS-Analyse 2016. https://www.sysselmannen.no/Nyheter/2013/07/Risiko-og-sarbarhet-er-analysert/.

Transport Canada (2018). Small Commercial Vessel Safety Guide – TP 14070 E. Chapter 1 – Know and comply with the requirements that apply to you. https://www.tc.gc.ca/eng/marinesafety/tp-tp14070-3579.htm.

Transport Canada. 2017. Guidelines for Passenger Vessels Operating in the Canadian Arctic. https://www.tc.gc.ca/media/documents/marinesafety/tp13670e.pdf.

United Nations Convention on the Law of the Sea (UNCLOS). 1982. http://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf.

Viken, A., Johnston, M., Nyseth, T., Dawson, J. 2014. Responsible tourism governance. A case study of Svalbard and Nunavut. In Viken, B. Granas, B. (eds). Tourism Destination Development: Turns and Tactics. Taylor & Francis Group. Routledge, London 292p.

Section IV:

Research, Education & Arctic Development

Reviewing Northern Capacity for Impact Assessment in Yukon Territory, Canada

Samantha Darling, Aynslie Ogden & Gordon M. Hickey

Northern 'capacity' has long been identified as a priority area for public policy in Canada and recognized as a major constraint to regional social and economic development. The concepts of capacity and sustainability often meet in impact assessment (IA) processes in Canada, which include environmental, social and economic aspects of development and where there has been an important evolution in the role of both communities and science in the process. In Yukon, the Yukon Environmental and Socio-Economic Assessment Board (YESAB) is the legislated mechanism for impact assessments. The establishment of YESAB provided sites for the inclusion of local perspectives and traditional knowledge in assessments; however, calls for enhanced northern research capacity to inform impact assessment and associated decision-making remain prominent. This paper explores the concept of 'capacity' in its various forms and considers its core relevance to ensuring effective IA processes associated with northern development. Through a literature review, we identify that ambiguity surrounding the concept of capacity requires careful policy attention to fully appreciate conditions that prompt appeals for increased northern research capacity and help minimize confusion amongst different actors and institutions working to build northern capacity.

Introduction

The term 'capacity' is commonly identified as central to sustainable natural resource management and socio-economic development (Kolhoff, Driessen & Runhaar, 2018; Konovalova, Kuzmina, Hansevyarov & Persteneva, 2016). In Canada, capacity has been formally acknowledged as an important factor in northern development since at least the 1970s (Buckler, Wright & Normand, 2009; de la Barre, 1979; Science Council of Canada, 1977). However, the concept of capacity tends to be ambiguous in practice, despite attempts to develop coherent definitions and identify common characteristics across disciplines (Brinkerhoff & Morgan, 2010; Condell & Begley, 2007; Simmons, Reynolds & Swinburn, 2011). This literature review seeks to unpack the concept of

Samantha Darling is PhD Candidate at McGill University, Aynslie Ogden is Science Advisor at the Yukon Government, and Gordon Hickey is Associate Professor at McGill University.

'capacity,' and in particular 'research capacity' – on its own and as it relates to 'community capacity' and 'governance capacity' -- in northern Canada using the case of Impact Assessment (IA) in Yukon Territory. It begins by outlining the broad connections between scholarship on capacity, IA and sustainable natural resource management in Canada, the northern territories, and Yukon; focuses on how capacity is conceptualized in key disciplines; and concludes with a discussion of future directions.

Impact Assessment and Sustainability in Canada

The US Environmental Protection Agency (EPA) first initiated the practice of Environmental Impact Assessment (EIA) in 1970 as a "...decision tool employed to identify and evaluate the probable environmental consequences of certain proposed development actions," (Cashmore, 2004: 404). In Canada, the Environmental Assessment Review Process (EARP) was put in place in 1972 to establish the federal position on environmental impact assessment (Gibson, 2000; Noble, 2009). The importance of considering the socio-economic aspects of development in the IA process very quickly came to the fore with the Berger Inquiry in 1977, completed as part of the impact assessment of the Mackenzie Delta Pipeline (Berger, 1977; Burdge, 2002; Gamble, 1978). Similar discussions occurred in James Bay, northern Quebec, around the same time (Berkes, 1988). The EARP continued as a Guideline Order after 1984, until the Canadian Environmental Assessment Act (CEAA) passed into legislation in 1992. This legislation harmonized the federal and provincial systems (to varying degrees) and facilitated impact assessment at regional levels (Gibson, 2000; Herring, 2005; Hickey, Brunet & Allan, 2010; Noble, 2009). The recognized need to incorporate local, regional and traditional knowledge in Canadian IA processes (Paci, Tobin & Robb, 2002; Sallenave, 1994; Stevenson, 1996) led to the adoption of more participatory and inclusive approaches (Burdge, 2002; Joyce & MacFarlane, 2001) and the inclusion of social impact assessments in larger processes as standard practice (Morgan, 2012).

Importantly, local capacity has become a recurring challenge identified in the transition towards more participatory and localized IA and sustainable development (Nuttall, 2002). Shifting accountability for IA processes to regional and local contexts was meant as a mechanism for encouraging regional development through providing more local control over development projects (Angell & Parkins, 2011; Arctic Council, 2004; Armitage, 2005; Huskey & Southcott, 2016). Concurrently, the shift away from 'minimal damage' towards 'maximum desirable net gains' requires project proponents to more explicitly consider local sustainability in their permit applications (Gibson, 2000). To a large extent, requiring community participation in the IA process has contributed to the popularity of local approaches to natural resource management in the circumpolar North, such as co-management agreements (Barker, 2005; Ellis, 2005; Gibson, 2000; Joyce & MacFarlane, 2001; Robards & Lovecraft, 2010). However, barriers to the quality of available scientific knowledge, the recognition of traditional knowledge, differences in knowledge systems, assumptions of community homogeneity, and the 'insider-outsider dialectic' all contribute to the challenge of meaningful participatory assessment processes (Caine, Salomons & Simmons, 2007; Ellis, 2005; Greig & Duinker, 2011; Nadasdy, 2003; Natcher, Davis & Hickey, 2005; Staples & Natcher, 2015). For example, Prno and Slocombe (2012) recognized a shift in decision-making towards community inclusion for northern mineral development, accompanied by implications for community ability to participate in decision-making processes. According to Raik (2002), the success of co-management and co-production relationships rely on the capacity of all participants,

and so "…should be of keen interest for co-management," (Raik, 2002: 2). Similarly, Booth and Skelton (2011) considered First Nations participation in assessment processes in B.C. from industry and government perspectives, citing a lack of capacity as one of the major limitations. Calls for capacity building with regards to IA are commonly justified in the academic literature.

Impact Assessment and Capacity in the Canadian North

The rapid and sustained social and economic development of the Canadian North continues to challenge the capacity of local actors to fulfill legislated obligations. The relationship between the territorial and federal government also continues to change through the devolution of various responsibilities (Abele, 1987; Bielawski, 1984; Dacks, 2004; Hodgins, 2009). In 1979, the Science Council of Canada (SCC) argued that IA processes were under-supported by national capacity building programs (de la Barre, 1979). The pre-1990 politics of assimilation heavily influenced discussions of northern development in terms of giving a greater voice to local communities, but only through certain avenues (Angell & Parkins, 2011). Interestingly, the SCC recommendations were echoed by a House of Commons Standing committee in 1997, which underlined the development of territorial capacities as a requirement for future northern development, and supported the argument that local voices have been purposely directed through chosen mechanisms (Graham, 1997).

Since 1990, the discussion around sustainable development and local empowerment has changed considerably, particularly after the implementation of the Umbrella Final Agreement and the establishment of Nunavut (Angell & Parkins, 2011). In 2008, the Minister of Indian Affairs and Northern Development commissioned a review of northern regulatory systems. The resulting report pointed out that new regulatory bodies, such as those facilitating IA processes, were aimed at giving voice to local populations but lacked the corresponding increase in institutional, community, and research capacities (McCrank, 2008). Similar work done on boards established by land-claims and settlement agreements, including wildlife and resource management boards, have identified the ongoing presence of constraints on Indigenous participation in natural resource management (White, 2008). Research on the social impacts associated with increased research funding, a common capacity building strategy in northern Canada, has largely focused on economic impacts and community-researcher interactions, with little formal evaluation of local capacity outcomes (Abele, 2009; Brunet, Hickey & Humphries, 2014; Carr, Natcher & Olfert, 2013; Gearheard & Shirley, 2007; McCrank, 2008; Pfeifer, 2018). The research agenda for northern environmental assessment presented by Noble, Hanna, and Gunn (2013) included capacity for meaningful engagement as a major theme. Other work has focused on the incorporation of traditional knowledge, another aspect of research capacity, into the northern IA process either through proponent submissions or through public review, with mixed results (Angell & Parkins, 2011; Bowie, 2013; Usher, 2000). Research into, and evaluations of, the impact of capacity building activities on northern development continues to be limited (Angell & Parkins, 2011; Carlson, 2016; Pfeifer, 2018).

The economic development timelines associated with primary industries in northern Canada have often reduced the positive impacts of resource development on northern community capacity, leaving regions exposed to the variability of boom-and-bust economies (Banta, 2006; Leadbeater, 2007). For example, work done on the Mackenzie Valley Environmental Impact Review Board (MVEIRB) by Galbraith, Bradshaw and Rutherford (2007) identified limited capacity as a major

deficiency in the northern IA process. There have since been calls for a comprehensive federal northern policy that addresses this lack of capacity (Gilmore, 2016; Ogden, Schmidt, Van Dijken & Kinnear, 2016; Simon, 2017), particularly as the effects of global climate change manifest at local levels. For example, local capacity to accommodate the opening of the Northwest Passage shipping route, and the regulatory needs that will accompany it, or the degradation of permafrost resulting in increased mineral exploration, are of increasing policy concern (Barber et al., 2008; Fenge & Penikett, 2009). In response, the territorial governments and national organizations have released science agendas and strategies to inform assessments and associated decision-making, underlining the need for northern research capacity (Table 1) (Territorial Governments, 2016).

Table 1. Northern Canadian science and research policy documents emphasize the need to develop capacity.

Title	Organization/Author	Year	Mentions of capacity
Building a Path for Northern Science	GNWT's Science Agenda	2009	11
A pan-northern approach to science	GNWT, YG, NT	2016	19
Government of Yukon Science Strategy	Government of Yukon	2016	6
Knowledge Agenda: Northern Research for Northern Priorities	Government of Northwest Territories	2017	8
National Inuit Strategy on Research	Inuit Tapiriit Kanatami (ITK)	2018	22

Since 2011, various government departments and national organizations, including the Conference Board of Canada, through the Centre for the North, have attempted to address the question of various northern capacities including labour force (Martin, 2011), economic potential (Auditor General of Canada, 2014b; The Canadian Chamber of Commerce, 2013), governance capacity (AANDC & CPC, 2013), and the ability of communities to participate in IA (Auditor General of Canada, 2014a). Another progress report on northern capacity was produced by the Canadian Polar Commission, focusing on adaptive and community capacities and outlining shortcomings in labour force, forestry, and environmental monitoring (Canadian Polar Commission, 2014). Within this context, IA often serves as a connection between development, primary industry, and governance, acting as both an instrument for the empowerment of communities in decision-making, while also facilitating clashes between knowledge systems and political visions for development (Bowie, 2013; Morgan, 2012).

Impact Assessment and Capacity in Yukon

IA in Yukon offers an interesting example of network governance[1], with multiple actors interacting within a complex landscape of overlapping formal and informal authorities and responsibilities. The traditional territories of 14 First Nations often overlap with each other, as well as sharing interests with the Yukon and federal governments in some decision-making processes, including natural resource management in certain areas. The Yukon Territory was established in 1898, after the influx of Klondike gold stampeders caused concern for Canadian sovereignty (Abele, 2009; Coates, 1985). In 1979, 'responsible government' was granted to the territorial legislature. The Council for Yukon Indians (CYI, now Council for Yukon First Nations) at that time chose to work with existing territorial structures for service support, while negotiating individual self-government agreements between each First Nation and the federal government, that included the

delineation of settlement lands (Abele, 1987). The IA process in Yukon was negotiated and established as part of the Umbrella Final Agreement, taking the form of federal legislation in the Yukon Environmental and Socio-Economic Assessment Act (YESAA) in 2006 (Noble, Hanna, & Gunn, 2013). YESAA federally established the independent Yukon Environmental Socio-Economic Assessment Board (YESAB), through which all development projects in the Yukon are reviewed, including mining and infrastructure projects. First Nations interests and local public review are included in recommendations provided to the 'decision-body' who renders the final decision, which varies depending on the project. The Board of Directors for YESAB include an Executive committee, with representatives nominated by the Council for Yukon First Nations (CYFN) and Yukon Government, who then confer with the federal Minister of Environment to appoint a chair. Four additional board members are nominated as follows: two nominees from CYFN, one from Yukon Government, and one directly appointed by the federal Minister. District offices located throughout the territory are intended to engage with community contexts. Certain major projects are forwarded to an executive committee for assessment (Government of Canada, 2003). A comparison of territorial, provincial, and federal environmental assessment legislation shows that YESAA shared a very similar distribution of mandatory requirements with the federal CEAA (Hickey, Brunet & Allan, 2010).

With a resource-based economy that depends heavily on the 'boom-and-bust' cycle of commodity prices and rates of development, including the highly variable mining sector (Petrov, 2010; The Conference Board of Canada, 2017; Tukker, 2016), Yukon and First Nations governments rely quite heavily on the IA process to support and guide sustainable economic development (Noble & Hanna, 2015). In addition to labour shortages, changes to the CEAA in 2012 included amendments to YESAB operations and changes to assessment timelines which have stressed local capacity (Banks, 2014; Rodon & Therrien, 2015). International discussions around environmental, strategic, and health impact assessment and Aboriginal and public participation often include references to Yukon as a positive example of multi-governmental collaboration but few academic publications have focused directly on the territory and its IA processes (Kwiatkowski, Tikhonov, Peace & Bourassa, 2009; Udofia, Noble & Poelzer, 2017). The context of Yukon Territory therefore offers an interesting landscape to further examine the role of research capacity in northern impact assessment processes, as the general need for capacity has been well outlined in government documents and popular media.

But What is Capacity?

Defining 'Capacity'

The concept of capacity has been identified as being overused and highly variable both within and between disciplines, despite considerable efforts to clarify the concept (Analoui & Danquah, 2017; Brinkerhoff & Morgan, 2010; Gadsby, 2011; Lauzon, 2013; S Louafi, 2016; Raik, 2002; Simmons, Reynolds, & Swinburn, 2011; Suarez-Balcazar, Balcazar, Iriarte, & Taylor-Ritzler, 2008). Contributing to the ambiguity of the term, capacity can be (and often should be) built at many scales, from individual to collective, occupying "…a nether world between individual training and national development" (Morgan 2003, as cited in (Brinkerhoff & Morgan, 2010)). Considering capacity development at the scale of individuals, organizations and institutions allows for a more systemic perspective, which can be useful for addressing development strategies that transcend

scale (Brinkerhoff, 2010). Capacity as a goal and a concept has been examined in fields such as public administration, international development, education, health and agriculture, and is often tied directly to development goals and governance processes (Analoui & Danquah, 2017; Grindle & Hilderbrand, 1995; Ika & Donnelly, 2017; Selim Louafi, 2016; Wetterberg, Brinkerhoff & Hertz, 2015). Distinctions are broadly made across disciplines between adaptive, community, governance, policy, and research capacities, though they tend to overlap considerably in practice. This suggests the need for a more refined working lens specific to the capacities engaged in the context of IA in order to help assess and improve capacity building efforts (Kolhoff, Driessen & Runhaar, 2018).

The Components of Capacity

The term 'capacity', here understood to mean the ability of a system to function and adapt, often considers two components: capability and competence (Chaskin, 2001; Fowler & Ubels, 2010; Frank & Smith, 1999; Howlett & Ramesh, 2015; Morgan, 2006; Wu, Ramesh, & Howlett, 2015). Within this definition, *capability* is the availability of appropriate resources for a particular problem, while *competence* is the knowledge and understanding necessary to utilize these resources (Wu, Ramesh & Howlett, 2015). The concept of capability extends beyond conventional resources like financial and human to include resources such as access to knowledge and institutional authority (Araral et al., 2015; Howlett & Ramesh, 2015). For example, Chan, Kirsop and Arunachalam (2005) have illustrated how the capabilities of post-secondary institutions, including access to journal subscriptions, can affect regional economic and political development. International development organizations have often focused on the capability component of capacity, since these challenges can be the easiest to overcome, often in the form of technology transfer (Analoui & Danquah, 2017; Lansang & Dennis, 2004). There is, however, a general movement away from this approach towards more community-instigated capacity development strategies for growing local competence (Bockstael & Watene, 2016) through wider knowledge system development (Lansang & Dennis, 2004), such as agricultural and health extension (Coutts & Roberts, 2003). It is broadly understood that the combination of competencies and capabilities will influence the overall capacity of any system at any level, from the individual to the network scale (Howlett & Ramesh, 2015; Van Loon, Driessen, Kolhoff & Runhaar, 2010).

Conceptual Frameworks for Understanding Capacity

There are many conceptual frameworks available to help understand capacity. Potter and Brough (2004) offer a framework for systemic capacity building in the context of health policy that separates four hierarchical types of capacity, including: tools, skills, staff/infrastructure, and institutions. They then examined the interactions between nine sub-capacities that include: performance, personnel, workload, supervisory, facility, support service, systems, structural, and role capacities. Kirchhoff (2006) applies and expands this framework to the IA context in Brazil, using the systemic approach to add human, scientific, technological, organizational, institutional and resource capabilities to the previous findings. Fowler and Ubels (2010) review two of the leading frameworks for understanding capacity in international development: European Centre for Development Policy Management (ECDPM) with the 'five capabilities' framework; and Community Development Resource Association (CDRA), which identifies six elements of capacity. Gupta et al. (2010) approaches adaptive capacity through an institutional (social rule) perspective, identifying six dimensions to consider: variety; learning capacity; flexibility for self-

initiated change; leadership; resource availability; and fair governance. Van Loon, Driessen, Kolhoff and Runhaar (2010) divide the capacity of IA into six capacities: institutional, organizational, human, scientific, technical, and resource. Kolhoff, Driessen and Runhaar (2018) applied this same division of capacities to IA organizations in the context of low and middle income countries (LMICs). Wu, Ramesh, and Howlett (2015) provide a conceptual framework that addresses the analysis and measurement of policy capacity, describing a nested model of policy capacity that includes political capacity, analytical capacity, and operational capacity. These various frameworks all identify multiple types of capacity that interact and build off of one another, but often use different terminology to describe similar concepts.

Interacting Capacities

The classification of capacity into different types is one source of confusion that is not easily remedied as the terms tend to have definitions that overlap and interact, either as distinct types of capacity or as foundations for larger capacities. Fischer and McKee (2017) examine linkages between organizational, infrastructural and personal capacities, finding that community capacities and capitals interact; are key to understanding community situations; are understudied; can be negative, if not destructive, presenting obstacles to overcome; and are heavily impacted by local engagement. Kolhoff, Driessen and Runhaar (2018) connect IA performance and capacity development, focusing on the assessment of key capacities for IA processes, including organizational, human, scientific, technical, and resource capacities. Van Loon, Driessen, Kolhoff and Runhaar (2010) build on concepts outlined in both Potter and Brough (2004) and Kirchhoff (2006) to establish a model of interacting 'sub-capacities' and discuss the potential effect of uncoordinated development of these capacities within an organization. They consider capacities in a hierarchical structure, where sub-capacities, such as research capacity, are foundational to the development of more complex capacities, such as governance capacity. This same breakdown of capacities was used by Kolhoff, Driessen and Runhaar (2018) to develop an assessment tool specifically for the IA process in low and middle income countries.

In the context of IA in Yukon, the capacities at play generally include adaptive, community, governance, policy, research, and institutional capacities (Figure 1). Definitions for each of these are explored further in Table 2. Adaptive capacity, or the ability of a community to respond to stress, has gained attention as concerns around the impacts of climate change become increasingly important to community sustainability. Community and governance capacities interact to enable collective decision-making for large groups, which rely on the ability to gather and process information; the ability to make and implement policy; and the ability to synthesize information or knowledge into multi-organizational collaboration, or research capacity, policy capacity, and institutional capacity respectively. As a contributing capacity, research capacity is an important foundation upon which other capacities often depend. IA sees the interaction of community and governance capacities, while performing the function of research capacity, providing recommendations after assessing available science, local and traditional knowledges.

For the purposes of this paper, research capacity, captured by various terms in the frameworks previously mentioned, is defined as the ability of an actor, organization or network to engage, produce, maintain and use knowledge through individual and collective development (Cooke, 2005; Kaseje, Edwards & Mortley, 2016; Trostle, 1992). As a distinct concept, research capacity has become an important economic and social consideration for the development of governance

and community capacities, including the empowerment of communities and the health and diversity of their economies (Andrews et al., 2011; Chan, Kirsop & Arunachalam, 2005; Cooke, 2005; Lansang & Dennis, 2004; Velho, 2004).

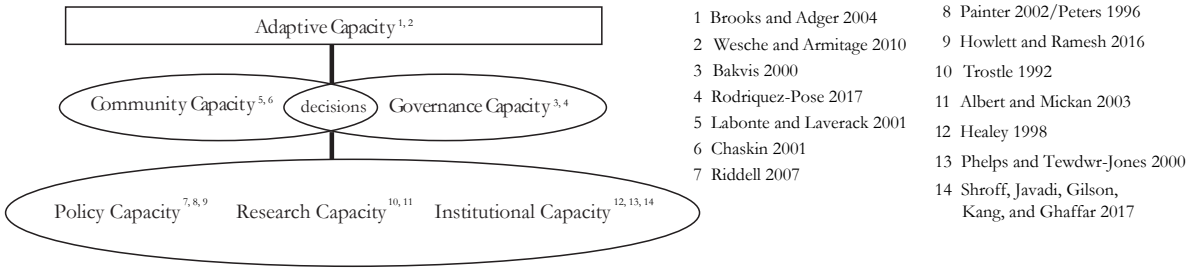


Figure 2. Interaction between six types of capacities involved in impact assessment.

Research capacity has also been seen as necessary for the development of other larger capacities alongside policy and institutional capacities, contributing to community, adaptive and governance capacities (Howlett & Ramesh, 2015; Lalor & Hickey, 2014; Riddell, 2007). One strength of IA processes depends on availability and access to viable and pertinent knowledge and the abilities of participants to utilize that knowledge (Greig & Duinker, 2011). The connection between community, governance and research capacities is highlighted in the IA context, where community and public participation in the IA process generally improves assessments through the inclusion of more knowledge, as long as these groups have the means to do so. Calls for increased northern capacity, meant to provide an impetus for addressing capacity needs, often lack specificity with regards to the types of capacity needed. The importance of research capacity for the effective implementation of the IA process and for the development of larger capacities therefore deserves further exploration.

Avenues for Future Research

The Canadian IA process has evolved through three distinct phases: 1) the direct application of science to assess potential impact; 2) the inclusion of community consultation within the IA process; and 3) a movement towards community-based and participatory research. Movement into a fourth phase could be explored, where the development of research capacity and community capacity concurrently becomes a focus, allowing the community to set their own research agenda, then use the results of that agenda to more effectively engage in the IA process, and associated decision-making. Recently, there has been a general acknowledgement that northern researchers should, where appropriate, be consulting communities in how certain research is done and in co-designing the research agenda itself (Brunet, Hickey & Humphries, 2014). The development of a community's research capacity has the potential to benefit both local and research communities through a critical reflection on the roles and responsibilities in the research process. Likewise, the ability of IA processes to incorporate, interpret and apply traditional ecological knowledge to assessments is also a form of research capacity and represents an important component of the assessment process (Paci, Tobin & Robb, 2002). The fluidity of the concept of northern capacity needs to be carefully managed in the development of IA in Yukon Territory to more fully appreciate the stresses that prompt local appeals for increased capacity and minimize confusion in

the future (Black, 2015; Brinkerhoff & Morgan, 2010; Condell & Begley, 2007; S Louafi, 2016; Simmons, Reynolds & Swinburn, 2011).

More generally, the role of policy capacity in governance and community capacities has been well developed and there hints at the role of research capacity in larger governance processes (Howlett & Ramesh, 2015; Marsh & Smith, 2000). However, further exploration into the relationships between research capacity and policy, institutional, governance and community capacities in the context of IA would be helpful. Potentially fruitful areas for future research include: 1) identifying the different dimensions of northern research capacity and their relation to IA-related policy, institutional, governance, and community capacities; and 2) examining the role of research capacity in the governance of Yukon Territory, where institutions and organizations have often been legislated, without adequate consideration of human, scientific and resource capacities to deliver. In order to achieve this, a better understanding of the different dimensions of research capacity, and how it interacts with other functions and capacities within a system, such as network governance, needs to be developed. Such an understanding would also help respond to wider calls for increased northern research capacity (Graham, 2016; Irlbacher-Fox & Gibson, 2010; Simon, 2017); the need for concrete assessments of the impacts of capacity building activities on northern natural resource governance (Angell & Parkins, 2011; Carlson, 2016; Noble & Hanna, 2015); and for enhancing the effectiveness of IA for sustainable development in the Yukon.

Acknowledgements

This work is supported by Yukon Government's Executive Council Office, the Association of Canadian Universities for Northern Studies (ACUNS), and the Natural Science and Engineering Research Council of Canada (NSERC) CREATE-Environmental Innovation (EI) project.

Notes

1. Network governance: Collaborative decision-making engaging different groups with different expertise, agendas and values that engage in problem-solving for complex problems, including environmental and development issues (Klijn, 2010; Kooiman, 1993).

Table 2. Specification of defining characteristics for various types of capacity that appear in the wider literature.

Capacity	Defining characteristics The ability to:	Sources
Adaptive	- Collective ability to respond to environmental, economic, and social stress - Collective community resources and skills - Directly related to vulnerability and resilience	Brooks and Adger (2005), Gallopín (2006), Smit and Wandel (2006), Magis (2010), Wesche and Armitage (2010), Wamsler and Brink (2015)
Community	- Sustained collective ability to collaborate, problem-solve and function - Commitment, resources and skills for community engagement and the maintenance of community well-being - Empowerment and identity	Labonte and Laverack (2001), Chaskin (2001), Kwan, Frankish, Quantz, and Flores (2003), Smith, Littlejohns, and Roy (2003), Craig (2007), MacLellan-Wright et al. (2007), Merino and de los Ríos Carmenado (2012), Matarrita-Cascante, Trejos, Qin, Joo and Debner (2016)
Governance	- Collective ability to make decisions and manage relationships - Includes political, economic, financial, technical, and managerial or organizational aspects	Woodhill (2010), Araral, Pelizzo, Burkhanov, Chen, Janenova and Collins (2015), Ramesh, Saguin, Howlett and Wu (2016)
Institutional	- Ability to use, appraise, and synthesize evidence towards policymaking - Range, density, and collaborative ability of a network of organizations	Healey (1998), Phelps and Tewdwr-Jones (2000), Shroff, Javadi, Gilson, Kang, and Ghaffar (2017)
Policy	- Ability to assess and make collective choices - Perform policy functions including knowledge acquisition, utilization, and implementation - Includes analytical, operational/managerial, and political capacities	Bakvis (2000), Riddell (2007), Howlett and Ramesh (2015), Angel (2015), Howlett and Ramesh (2015), Wu, Ramesh, and Howlett (2015), Ramesh, Saguin, Howlett, and Wu (2016)
Research	- Ability to undertake high-quality research and produce, use, maintain and disseminate results and knowledge - Includes policy, resource, and program management	Crisp, Swerissen, and Duckett (2000), Albert and Mickan (2003), Lansang and Dennis (2004), Velho (2004), Segrott, McIvor, and Green (2006), Condell and Begley (2007), Leitch (2009), Gadsby (2011), Kahwa, Edwards, and Mortley (2016), (Fellesson & Mählck, 2017)

References

AANDC, & CPC. (2013). *Departmental Performance Report* https://www.aadnc-aandc.gc.ca/eng/1403266180077/1403266487720: Government of Canada.

Abele, F. (1987). Canadian contradictions: forty years of northern political development. *Arctic*, 310-320.

Abele, F. (2009). Northern development: past, present and future. *Northern Exposure: Peoples, Powers and Prospects in Canada's North*, 19-65.

Albert, E., & Mickan, S. (2003). Closing the gap and widening the scope: New directions for research capacity building in primary health care. *Australian Family Physician, 32*(12), 1038.

Analoui, F., & Danquah, J. K. (2017). *Critical Capacity Development*: Springer.

Andrews, D., Crowther, F., Abawi, L., Conway, J., Dawson, M., Lewis, M., . . . Petersen, S. (2011). *Capacity building for sustainable school improvement: An Australian research study*: VDM Verlag Dr Muller.

Angel, H. (2015). Measuring policy analytical capacity for the environment: A case for engaging new actors. *Policy and Society, 34*(3-4), 197-208.

Angell, A. C., & Parkins, J. R. (2011). Resource development and aboriginal culture in the Canadian north. *Polar Record, 47*(01), 67-79.

Araral, E., Pelizzo, R., Burkhanov, A., Chen, Y.-w., Janenova, S., & Collins, N. (2015). Capacity and Autonomy: An Exploration of Fukuyama's Governance Hypothesis *Varieties of Governance* (pp. 173-193): Springer.

Arctic Council. (2004). Arctic human development report. *Stefansson Arctic Institute*.

Armitage, D. (2005). Adaptive capacity and community-based natural resource management. *Environmental management, 35*(6), 703-715.

Auditor General of Canada. (2014a). *Implementation of Canadian Environmental Assessment Act*. Retrieved from

Auditor General of Canada. (2014b). *Transfer Payment Programs - Canadian Northern Economic Development Agency*. Retrieved from

Bakvis, H. (2000). Rebuilding policy capacity in the era of the fiscal dividend: A report from Canada. *Governance, 13*(1), 71-103.

Banks, S. (2014). *Bill S-6: An Act to amend the Yukon Environmental and Socio-economic Assessment Act and the Nunavut Waters and Nunavut Surface Rights Tribunal Act*: Library of Parliament.

Banta, R. (2006). The resource curse and the Mackenzie Gas Project. *Options Politiques, 2007*.

Barber, D., Lukovich, J., Keogak, J., Baryluk, S., Fortier, L., & Henry, G. (2008). The changing climate of the Arctic. *Arctic*, 7-26.

Barker, A. (2005). Capacity building for sustainability: towards community development in coastal Scotland. *Journal of Environmental Management, 75*(1), 11-19.

Berger, T. R. (1977). Northern Frontier, Northern Homeland: The Report of the Mackenzie Valley Pipeline Inquiry, Vol. 1 (Ottawa: Minister of Supply and Services, 1977), 1.". *The North"—Alastair Campbell and Kirk Cameron, 167*.

Berkes, F. (1988). The intrinsic difficulty of predicting impacts: lessons from the James Bay hydro project. *Environmental Impact Assessment Review, 8*(3), 201-220.

Bielawski, E. (1984). Anthropological observations on science in the North: the role of the scientist in human development in the Northwest Territories. *Arctic*, 1-6.

Black, K. (2015). Extracting Northern Knowledge: Tracing the History of Post-Secondary Education in the Northwest Territories and Nunavut. *Northern Review*(40), 35.

Bockstael, E., & Watene, K. (2016). Indigenous peoples and the capability approach: taking stock. *Oxford Development Studies, 44*(3), 265-270.

Booth, A. L., & Skelton, N. W. (2011). Industry and government perspectives on First Nations' participation in the British Columbia environmental assessment process. *Environmental Impact Assessment Review, 31*(3), 216-225.

Bowie, R. (2013). Indigenous self-governance and the deployment of knowledge in collaborative environmental management in Canada. *Journal of Canadian Studies, 47*(1), 91-121.

Brinkerhoff, D. W. (2010). Developing Capacity in Fragile States. *Public Administration and Development, 30*, 66-78. doi:10.1002/pad.545

Brinkerhoff, D. W., & Morgan, P. J. (2010). Capacity and capacity development: Coping with complexity. *Public Administration and Development, 30*(1), 2-10.

Brooks, N., & Adger, W. N. (2005). Assessing and enhancing adaptive capacity. *Adaptation policy frameworks for climate change: Developing strategies, policies and measures*, 165-181.

Brunet, N., Hickey, G., & Humphries, M. (2014). The evolution of local participation and the mode of knowledge production in Arctic research. *Ecology and Society, 19*(2).

Buckler, C., Wright, L., & Normand, L. (2009). Securing a Sustainable Future in the Arctic.

Burdge, R. J. (2002). Why is social impact assessment the orphan of the assessment process? *Impact Assessment and Project Appraisal, 20*(1), 3-9.

Caine, K. J., Salomons, M. J., & Simmons, D. (2007). Partnerships for social change in the Canadian north: revisiting the insider–outsider dialectic. *Development and Change, 38*(3), 447-471.

Canadian Polar Commission. (2014). *The State of Northern Knowledge in Canada* Retrieved from

Carlson, J. (2016). *Exploring the Potential for Achieving Self-determined Community Economic Development in Nunavut: An Examination of the Government of Nunavut's Economic Development Strategies.*

Carr, K., Natcher, D. C., & Olfert, R. (2013). Measuring the economic impact of publicly funded research in Northern Canada. *Polar Geography, 36*(4), 291-304.

Chan, L., Kirsop, B., & Arunachalam, S. (2005). Open access archiving: the fast track to building research capacity in developing countries.

Chaskin, R. J. (2001). *Building community capacity*: Transaction Publishers.

Coates, K. S. (1985). *Canada's colonies: a history of the Yukon and Northwest Territories*: James Lorimer & Company.

Condell, S. L., & Begley, C. (2007). Capacity building: a concept analysis of the term applied to research. *International Journal of Nursing Practice, 13*(5), 268-275.

Cooke, J. (2005). A framework to evaluate research capacity building in health care. *BMC Family practice, 6*(1), 44.

Coutts, J., & Roberts, K. (2003). *Extension models and best practice in extension.* Paper presented at the Australasian Pacific Extension Network Forum, Hobart, November.

Craig, G. (2007). Community capacity-building: Something old, something new...? *Critical Social Policy, 27*(3), 335-359.

Crisp, B. R., Swerissen, H., & Duckett, S. J. (2000). Four approaches to capacity building in health: consequences for measurement and accountability. *Health promotion international, 15*(2), 99-107.

Dacks, G. (2004). Implementing first nations self-government in Yukon: Lessons for Canada. *Canadian Journal of Political Science/Revue canadienne de science politique, 37*(3), 671-694.

de la Barre, K. (1979). Northward Looking—A Strategy and a Science Policy for Northern Development Science Council of Canada Report No. 26. *Arctic, 32*(2), 170-175.

Ellis, S. C. (2005). Meaningful consideration? A review of traditional knowledge in environmental decision making. *Arctic*, 66-77.

Fellesson, M., & Mählck, P. (2017). Untapped Research Capacities? Mobility and Collaboration at the Intersection of International Development Aid and Global Science Regimes. *International Journal of African Higher Education, 4*(1).

Fenge, T., & Penikett, T. (2009). The Arctic vacuum in canada's foreign policy. *Policy Options, 30*(4), 65-70.

Fischer, A., & McKee, A. (2017). A question of capacities? Community resilience and empowerment between assets, abilities and relationships. *Journal of Rural Studies, 54*, 187-197.

Fowler, A., & Ubels, J. (2010). The multi-faceted nature of capacity: two leading frameworks. *Capacity development in practice. Earthscan, London.*

Frank, F., & Smith, A. (1999). The community development handbook. *Ottawa: Human Resources Development Canada.*

Gadsby, E. W. (2011). Research capacity strengthening: donor approaches to improving and assessing its impact in low-and middle-income countries. *The International journal of health planning and management, 26*(1), 89-106.

Galbraith, L., Bradshaw, B., & Rutherford, M. B. (2007). Towards a new supraregulatory approach to environmental assessment in Northern Canada. *Impact Assessment and Project Appraisal, 25*(1), 27-41.

Gallopín, G. C. (2006). Linkages between vulnerability, resilience, and adaptive capacity. *Global environmental change, 16*(3), 293-303.

Gamble, D. J. (1978). The Berger inquiry: An impact assessment process. *Science, 199*(4332), 946-951.

Gearheard, S., & Shirley, J. (2007). Challenges in community-research relationships: Learning from natural science in Nunavut. *Arctic*, 62-74.

Gibson, R. B. (2000). Favouring the Higher Test: Contribution to sustainability as the central criterion for reviews and. *Journal of Environmental Law and Practice, 10*(1), 39-54.

Gilmore, S. (2016). The North and the great Canadian lie. *Maclean's, Online.*

Government of Canada. (2003). *Yukon Environmental and Socio-Economic Assessment Act*.

Graham, B. (1997). *Canada and the Circumpolar World: Meeting the Challenges of Cooperation Into the Twenty-first Century*: Canada Parliament House of Commons Standing Committee on Foreign Affairs International Trade.

Graham, H. W. C. (2016). The Arctic, North America, and the World: A Political Perspective *Governing the North American Arctic* (pp. 13-25): Springer.

Greig, L. A., & Duinker, P. N. (2011). A proposal for further strengthening science in environmental impact assessment in Canada. *Impact Assessment and Project Appraisal, 29*(2), 159-165.

Grindle, M. S., & Hilderbrand, M. E. (1995). Building sustainable capacity in the public sector: what can be done? *Public Administration and Development, 15*(5), 441-463.

Gupta, J., Termeer, C., Klostermann, J., Meijerink, S., van den Brink, M., Jong, P., . . . Bergsma, E. (2010). The adaptive capacity wheel: a method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. *Environmental Science & Policy, 13*(6), 459-471.

Healey, P. (1998). Building institutional capacity through collaborative approaches to urban planning. *Environment and planning A, 30*(9), 1531-1546.

Herring, R. J. (2005). The Canadian federal EIA system. *Environmental Impact Assessment: Practice and Participation. Oxford University Press, Toronto*, 231-247.

Hickey, G. M., Brunet, N., & Allan, N. (2010). A Constant Comparison of the Environmental Assessment Legislation in Canada. *Journal of Environmental Policy & Planning, 12*(3), 315-329.

Hodgins, A. P. (2009). Re-appraising Canada's Northern" Internal Colonies". *Northern Review*(30), 179-205.

Howlett, M., & Ramesh, M. (2015). Achilles' heels of governance: Critical capacity deficits and their role in governance failures. *Regulation & Governance*.

Huskey, L., & Southcott, C. (2016). "That's where my money goes": resource production and financial flows in the Yukon economy. *The Polar Journal, 6*(1), 11-29.

Ika, L. A., & Donnelly, J. (2017). Success conditions for international development capacity building projects. *International Journal of Project Management, 35*(1), 44-63.

Irlbacher-Fox, S., & Gibson, G. (2010). Scoping potential for developing northern institutional policy capacity: the 2009 Northern Governance Policy Research Conference. *Pimatisiwin: A Journal of Aboriginal & Indigenous Community Health, 8*(1).

Joyce, S. A., & MacFarlane, M. (2001). Social impact assessment in the mining industry: current situation and future directions. *London: International Institute for Environment and Development (IIED)-Mining, Minerals and Sustainable Development*, 8-10.

Kahwa, E., Edwards, N., & Mortley, N. (2016). Research Capacity Building: A Literature Review and the Theoretical Framework. *Building and Evaluating Research Capacity in Healthcare Systems*, 11.

Kaseje, D., Edwards, N., & Mortley, N. (2016). Indicators for measuring and evaluating research capacity building. *RESEARCH CAPACITY*.

Kirchhoff, D. (2006). Capacity building for EIA in Brazil: Preliminary considerations and problems to be overcome. *Journal of Environmental Assessment Policy and Management, 8*(01), 1-18.

Klijn, E. (2010). Trust in governance networks: looking for condition for innovative solutions and outcome. In S. P. Osborne (Ed.), *The New Public Governance? Emerging perspectives on the theory and practice of public governance* (pp. 303-321): Routledge/Taylor & Francis, London.

Kolhoff, A. J., Driessen, P. P., & Runhaar, H. A. (2018). Overcoming low EIA performance-A diagnostic tool for the deliberate development of EIA system capacities in low and middle income countries. *Environmental Impact Assessment Review, 68*, 98-108.

Konovalova, M., Kuzmina, O., Hansevyarov, R., & Persteneva, N. (2016). Intellectual Capital as a Key Factor in the Economic Development of the Region. *Global Media Journal, 14*(27).

Kooiman, J. (1993). *Modern governance: new government-society interactions*: Sage.

Kwan, B., Frankish, J., Quantz, D., & Flores, J. (2003). *A synthesis paper on the conceptualization and measurement of community capacity*: Health Canada.

Kwiatkowski, R. E., Tikhonov, C., Peace, D. M., & Bourassa, C. (2009). Canadian Indigenous engagement and capacity building in health impact assessment. *Impact Assessment and Project Appraisal, 27*(1), 57-67.

Labonte, R., & Laverack, G. (2001). Capacity building in health promotion, Part 1: For whom? And for what purpose? *Critical public health, 11*(2), 111-127.

Lalor, B. M., & Hickey, G. M. (2014). Strengthening the role of science in the environmental decision-making processes of executive government. *Organization & Environment, 27*(2), 161-180.

Lansang, M. A., & Dennis, R. (2004). Building capacity in health research in the developing world. *Bulletin of the World Health Organization, 82*(10), 764-770.

Lauzon, A. (2013). From agricultural extension to capacity development: Exploring the foundations of an emergent form of practice. *International journal of lifelong education, 32*(2), 247-266.

Leadbeater, D. (2007). The Mackenzie Gas Project proposal: Critical socio-economic impacts and alternatives. *Retrieved August, 27*, 2012.

Leitch, R. (2009). Harnessing the slipstream: building educational research capacity in Northern Ireland. Size matters. *Journal of Education for Teaching, 35*(4), 355-371.

Louafi, S. (2016). *9 Capacity building for global science-policy interface activities*. Paper presented at the The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES): Meeting the challenge of biodiversity conservation and governance.

Louafi, S. (2016). Capacity Building for Global Science-policy Interface Activities: Establishment of the IPBES Task Force on Capacity Building.

MacLellan-Wright, M. F., Anderson, D., Barber, S., Smith, N., Cantin, B., Felix, R., & Raine, K. (2007). The development of measures of community capacity for community-based funding programs in Canada. *Health Promotion International, 22*(4), 299-306.

Magis, K. (2010). Community resilience: An indicator of social sustainability. *Society and Natural Resources, 23*(5), 401-416.

Marsh, D., & Smith, M. (2000). Understanding policy networks: towards a dialectical approach. *Political studies, 48*(1), 4-21.

Martin, H. (2011). *Building Labour Force Capacity in Canada's North*.

Matarrita-Cascante, D., Trejos, B., Qin, H., Joo, D., & Debner, S. (2016). Conceptualizing community resilience: Revisiting conceptual distinctions. *Community Development*, 1-19.

McCrank, N. (2008). *Road to Improvement: Report to the Honourable Chuck Strahl, Minister of Indian Affairs and Northern Development: the Review of the Regulatory Systems Across the North*: Canadian Museum of Civilization/Musee Canadien Des Civilisations.

Merino, S. S., & de los Ríos Carmenado, I. (2012). Capacity building in development projects. *Procedia-Social and Behavioral Sciences, 46*, 960-967.

Morgan, P. (2006). The concept of capacity. *European Centre for Development Policy Management*, 1-19.

Morgan, R. (2012). Environmental impact assessment: the state of the art. *Impact Assessment and Project Appraisal, 30*(1), 5-14.

Nadasdy, P. (2003). Reevaluating the co-management success story. *Arctic*, 367-380.

Natcher, D. C., Davis, S., & Hickey, C. G. (2005). Co-management: managing relationships, not resources. *Human Organization, 64*(3), 240-250.

Noble, B., & Hanna, K. (2015). Environmental assessment in the Arctic: A gap analysis and research agenda. *Arctic*, 341-355.

Noble, B., Hanna, K., & Gunn, J. (2013). Northern Environmental Assessment: A Gap Analysis and Research Agenda.

Noble, B. F. (2009). Promise and dismay: The state of strategic environmental assessment systems and practices in Canada. *Environmental Impact Assessment Review, 29*(1), 66-75.

Nuttall, M. (2002). Global interdependence and Arctic Voices: Capacity-building for sustainable livelihoods. *Polar Record, 38*(206), 194-202.

Ogden, A. E., Schmidt, M., Van Dijken, B., & Kinnear, L. (2016). Science in the Yukon: Advancing a Vision for Evidence-based Decision Making. *Arctic, 69*(2), 210-221.

Paci, C., Tobin, A., & Robb, P. (2002). Reconsidering the Canadian Environmental Impact Assessment Act: A place for traditional environmental knowledge. *Environmental Impact Assessment Review, 22*(2), 111-127.

Petrov, A. (2010). Post-staple bust: modeling economic effects of mine closures and post-mine demographic shifts in an arctic economy (Yukon). *Polar Geography, 33*(1-2), 39-61.

Pfeifer, P. (2018). From the Credibility Gap to Capacity Building: An Inuit Critique of Canadian Arctic Research. *Northern Public Affairs, 6*(1), 29-34.

Phelps, N. A., & Tewdwr-Jones, M. (2000). Scratching the surface of collaborative and associative governance: identifying the diversity of social action in institutional capacity building. *Environment and planning A, 32*(1), 111-130.

Potter, C., & Brough, R. (2004). Systemic capacity building: a hierarchy of needs. *Health policy and planning, 19*(5), 336-345.

Prno, J., & Slocombe, D. S. (2012). Exploring the origins of 'social license to operate'in the mining sector: Perspectives from governance and sustainability theories. *Resources Policy, 37*(3), 346-357.

Raik, D. B. (2002). Capacity building for co-management of wildlife in North America.

Ramesh, M., Saguin, K., Howlett, M. P., & Wu, X. (2016). Rethinking Governance Capacity As Organizational and Systemic Resources.

Riddell, N. (2007). Policy research capacity in the federal government. *Ottawa: Policy Research Initiative*.

Robards, M. D., & Lovecraft, A. L. (2010). Evaluating Comanagement for Social-Ecological Fit: Indigenous Priorities and Agency Mandates for Pacific Walrus. *Policy Studies Journal, 38*(2), 257-279.

Rodon, T., & Therrien, A. (2015). Resource Development & Land Claim Settlements in the Canadian Arctic: Multilevel Governance, Subsidiarity and Streamlining. *Arctic Yearbook 2015*, 119.

Sallenave, J. (1994). Giving traditional ecological knowledge its rightful place in environmental impact assessment. *Northern Perspectives, 22*(1), 16-19.

Science Council of Canada. (1977). *Northward Looking: A Strategy and A Science Policy for Northern Development*. (26). Ottawa, Canada: Government of Canada.

Segrott, J., McIvor, M., & Green, B. (2006). Challenges and strategies in developing nursing research capacity: a review of the literature. *International Journal of Nursing Studies, 43*(5), 637-651.

Shroff, Z. C., Javadi, D., Gilson, L., Kang, R., & Ghaffar, A. (2017). Institutional capacity to generate and use evidence in LMICs: current state and opportunities for HPSR. *Health research policy and systems, 15*(1), 94.

Simmons, A., Reynolds, R. C., & Swinburn, B. (2011). Defining community capacity building: Is it possible? *Preventive medicine, 52*(3), 193-199.

Simon, M. (2017). *A new Shared Arctic Leadership Model.*

Smit, B., & Wandel, J. (2006). Adaptation, adaptive capacity and vulnerability. *Global environmental change, 16*(3), 282-292.

Smith, N., Littlejohns, L. B., & Roy, D. (2003). *Measuring community capacity: State of the field review and recommendations for future research*: Health Canada.

Staples, K., & Natcher, D. C. (2015). Gender, Decision Making, and Natural Resource Co–management in Yukon. *Arctic*, 356-366.

Stevenson, M. G. (1996). Indigenous knowledge in environmental assessment. *Arctic*, 278-291.

Suarez-Balcazar, Y., Balcazar, F., Iriarte, E. G., & Taylor-Ritzler, T. (2008). Capacity Building and Empowerment: A panacea and a challenge for agency-university engagement. *Gateways: International Journal of Community Research and Engagement, 1*, 179-196.

Territorial Governments. (2016). A Pan-Northern Approach to Science.

The Canadian Chamber of Commerce. (2013). *Developing the Economic Potential of Canada's Territories* Retrieved from

The Conference Board of Canada. (2017). *Territorial Outlook Economic Forecast: Summer 2017*. Retrieved from

Trostle, J. (1992). Research capacity building in international health: definitions, evaluations and strategies for success. *Social science & medicine, 35*(11), 1321-1324.

Tukker, P. (Producer). (2016). Yukon's economic outlook 'bleakest' in Canada, report says. *CBC news*.

Udofia, A., Noble, B., & Poelzer, G. (2017). Meaningful and efficient? Enduring challenges to Aboriginal participation in environmental assessment. *Environmental Impact Assessment Review, 65*, 164-174.

Usher, P. J. (2000). Traditional ecological knowledge in environmental assessment and management. *Arctic*, 183-193.

Van Loon, L., Driessen, P. P., Kolhoff, A., & Runhaar, H. A. (2010). An analytical framework for capacity development in EIA—The case of Yemen. *Environmental Impact Assessment Review, 30*(2), 100-107.

Velho, L. (2004). Research capacity building for development: from old to new assumptions. *Science Technology & Society, 9*(2), 171-207.

Wamsler, C., & Brink, E. (2015). Adaptive capacity: from coping to sustainable transformation. *Climate change adaptation and development: transforming paradigms and practices*, 54-82.

Wesche, S., & Armitage, D. R. (2010). From the inside out: A multi-scale analysis of adaptive capacity in a northern community and the governance implications *Adaptive capacity and environmental governance* (pp. 107-132): Springer.

Wetterberg, A., Brinkerhoff, D. W., & Hertz, J. C. (2015). From compliant to capable: Balanced capacity development for local organisations. *Development in Practice, 25*(7), 966-985.

White, G. (2008). " Not the Almighty": Evaluating Aboriginal Influence in Northern Land-Claim Boards. *Arctic*, 71-85.

Woodhill, A. (2010). Multiple actors: capacity lives between multiple stakeholders *Capacity development in practice* (pp. 25-41): Earthscan.

Wu, X., Ramesh, M., & Howlett, M. (2015). Policy capacity: A conceptual framework for understanding policy competences and capabilities. *Policy and Society, 34*(3), 165-171.

The Sustainable Development Goals and Student Entrepreneurship in the Arctic

Lau Øfjord Blaxekjær, Martin Mohr Olsen, Hanne Thomasen, Maria Tammelin Gleerup, Sune Nordentoft Lauritsen, Anne Lise Kappel, Kristoffer Buch, Pål Simon Fernvall & Jay Friedlander

This article answers the research question of how entrepreneurship projects in Higher Education (HE) in the Arctic can incorporate the Sustainable Development Goals. Students can play a significant role as driving force for sustainable development in the Arctic. Their unique combination of highly specialized skills, innovative thinking and strong entrepreneurial spirit can make a substantial contribution to the development of the Arctic region. Many students are intrinsically motivated towards engaging themselves in sustainable change. It is a well-documented attitude among the so-called "millennial generation" that they are looking beyond profit and strive to make a difference in their communities and to make an impact on pertinent social and environmental issues. The article analyses a project called "Promoting sustainable student entrepreneurship in the Arctic", which seeks to support the entrepreneurial potential among students to the benefit of the sustainable development of Arctic societies. In terms of sustainability thinking, the project builds on two key frameworks: 1) The UN Sustainable Development Goals, and 2) The Abundance Cycle framework. By incorporating social, environmental as well as financial aspects, the internationally recognised Abundance Cycle framework provides an operational approach for working with sustainable entrepreneurship and a toolkit for incorporating sustainability thinking into teaching and entrepreneurial projects in Higher Education in the Arctic. The project highlighted that experiences and methods from outside the Arctic can be translated and implemented if adapted to specific Arctic needs and experiences, and furthermore that the partners from outside the Arctic context learn something new about innovation and entrepreneurship processes.

Lau Øfjord Blaxekjær is Researcher at NIAS – Nordic Institute of Asian Studies, Denmark, Associate Researcher at University of the Faroe Islands, and Adjunct Professor at Shanghai Ocean University. Martin Mohr Olsen is PhD Candidate at Technical University of Denmark and Centre of Innovation, The University of the Faroe Islands. Hanne Thomasen is Special Advisor at the National Space Institute, Technical University of Denmark. Maria Tammelin Gleerup is Project Coordinator at the National Space Institute, Technical University of Denmark. Sune Nordentoft Lauritsen is Head of Secretariat at the National Space Institute, Technical University of Denmark. Anne Lise Kappel is Head of Department of Economics and Business at The University of Greenland. Kristoffer Buch is Project Manager in startup support at DTU Skylab, Technical University of Denmark. Pål Simon Fernvall is Project Manager in startup support at DTU Skylab, Technical University of Denmark. Jay Friedlander is the Sharpe-McNally Chair of Green and Socially Responsible Business at College of the Atlantic in Maine, USA.

Introduction

How can entrepreneurship projects in Higher Education (HE) in the Arctic incorporate the Sustainable Development Goals? We provide a project-based answer to this question. The question (and project) is relevant, because of several overlapping trends. First, we observe a general trend that both public and private actors demand more focus on entrepreneurial skills and mind-set being included in HE curricula and courses. North American universities like MIT and Stanford have since the late 1990s been highlighted as frontrunners of "the entrepreneurial university" (Trencher *et al*, 2014). In a European Commission report on entrepreneurship in HE from 2008, it is concluded that in most EU-countries "entrepreneurship in non-business studies is a very new issue. In general terms, entrepreneurship is not yet sufficiently integrated into the curriculum of higher education institutions" (European Commission, 2008: 15). Ten years later, programmes, courses, conferences, projects, and camps are too numerous to count.

Secondly, the focus has widened from a belief that an entrepreneurial mind-set and skills would lead to new jobs and economic growth in countries struggling after the financial crisis. Today, entrepreneurship is included in all kinds of courses and thinking across the disciplines from the natural sciences to humanities spanning the traditional business focus to entrepreneurship and innovation in the public sector and socio-economic or environmental projects with non-economic purposes (Chiu, 2012; Reffstrup & Christiansen, 2017). The focus has also deepened as universities are increasingly going beyond their third mission or engagement with society by adding a fourth mission of "co-creation of sustainability".[1] Innovation and entrepreneurship has been a natural way of increasing and experimenting with new triple or quadruple helix projects, but also moving from economic to non-economic purposes (Rosenlund, Rosell & Hogland, 2017; Trencher *et al*, 2014). As Richard Chiu writes in an analysis of entrepreneurship education in the Nordic countries:

> It has been long understood that entrepreneurship is a key driver of economic growth, employment, innovation and productivity. Entrepreneurship could also contribute to social and environmental development (2012: 4).

Third, the Sustainable Development Goals (SDGs) or the global goals running from 2015-2030 are for all, also for the Arctic. There are 17 SDGs with 169 targets.[2] They all include the three dimensions of sustainable development, namely the social, economic, and environmental dimensions, and focus on five areas: People, Planet, Prosperity, Peace, and Partnerships (United Nations Department of Economic and Social Affairs, n.d.). The SDGs are not specifically targeted at developing countries like the predecessor the Millennium Development Goals (United Nations, n.d.). Moreover, although the SDGs are from the United Nations, everyone is invited to take ownership and work with the SDGs. With increasing global attention given to the Arctic, it should come as no surprise that the SDGs have also found their way to the Arctic. The peoples, communities, and countries of the Arctic have long been focused on sustainable development, which is also at the core of the work of the Arctic Council (AC) since its inception in 1996, especially in the Sustainable Development Working Group (SDWG). The current Finnish Chairmanship of the AC has placed the SDGs as its guideposts. It is illustrated by recent events such as the Rovaniemi Arctic Spirit Conference 14-16 November 2017 with SDG implementation as the main theme (Rovaniemi Arctic Spirit, n.d.). 1 December 2017, the Kingdom of Denmark in partnership with the Arctic Economic Council hosted an international high-level conference on the "SDGs in the Arctic: Local and Global Perspectives" (Ministry of Foreign Affairs of Denmark,

2017). From October 2017, UK based think-tank, Polar Research and Policy Initiative (PRPI) has held ten "High-Level Dialogue on SDGs in the Arctic" events in Iceland, Finland, Canada, UK, US, Norway, and the Faroe Islands, and even as far away as India and Australia. In Australia, the event was co-hosted with the Australian Institute of International Affairs[3] (PRPI, n.d.). At this roundtable, it was discussed:

> how Australia can contribute to the United Nations' 2030 Sustainable Development Goals, both domestically and in the Arctic region, and [the session] drew parallels between the experiences of Australia and New Zealand's Indigenous communities and those in the Arctic (AIIA, 2018).

Finally, we observe an increase in research and university collaboration across the Arctic as evidenced by e.g. University of the Arctic activities and thematic networks, the Fulbright Arctic Initiative (Virginia *et al*, 2016), a network like the China-Nordic Arctic Research Centre, the work and partnerships of PRPI, and finally, the Arctic Council's latest legally binding "Agreement on Enhancing International Arctic Scientific Cooperation" (Arctic Council, 2017).[4] All these activities and focus on SDGs in the Arctic suggest real commitment and coordinated efforts. Responding to these observations, this article analyses early findings from a new HE project called "Promoting sustainable student entrepreneurship in the Arctic". We present the project and findings over the next sections including how the project works on two parallel tracks: one about needs and experiences of the universities where the project is implemented, and one about translation of the transferable skills and mind set training from the experienced partner universities to the Faroe Islands and Greenland.

Promoting Sustainable Student Entrepreneurship in the Arctic

Since early 2017, five universities across the North Atlantic Arctic have been working on the project "Promoting sustainable student entrepreneurship in the Arctic". Our universities educate students in disciplines ranging from natural/technical to social sciences, and the project has been funded by the Nordic Council of Ministers, the Bank of Greenland Fund, and the Knud Højgaards Fund. The partners in the project are Ilisimatusarfik – University of Greenland (Nuuk), Arctic Technology Center, Sisimiut (Greenland), Fróðskaparsetur Føroya – University of the Faroe Islands (Tórshavn), Háskólinn á Akureyri – University of Akureyri[5] (northern Iceland), DTU – Technical University of Denmark, as well as the College of the Atlantic (Maine, USA) which has contributed with the Abundance Cycle method explained further below. The project has a total duration of three years and is going on its second year. The geographical focus on the West Nordic region has created good conditions for cooperation and a common need-driven approach to entrepreneurship in HE. Likewise, the West Nordic universities in Greenland, Iceland, and the Faroe Islands are presented with the same challenges of small communities with limited capacity in terms of entrepreneurial skills at HE levels and support for start-ups. However, the intention is to disseminate the project findings to a broader circle of Arctic universities via workshops at Arctic assemblies and by making the results and entrepreneurial methods public to other universities.

Needs and Experiences

Implementing any new project from one context to another is always a challenge. Simply put, the project transfers existing knowledge and experience from two universities, Technical University of Denmark (DTU) and College of the Atlantic (COA), initially to the University of the Faroe Islands and the University of Greenland. DTU and COA are very resourceful universities with long

traditions of innovation and entrepreneurship training. Furthermore, DTU is a large university operating in a North European context of a highly developed welfare system, highly functioning educational system with a critical mass of researchers and students, and a strong, diverse, and international business community supportive of the university. The Faroe Islands and Greenland, like many other countries and places in the Arctic, are not near this level of development and supporting circumstances found in the capital region of Denmark. This, of course, provides some barriers, but there are some opportunities of being small. Furthermore, Greenland is characterised by many small towns and settlements scattered across huge distances connected only by ocean and air travel, when weather conditions allow for it; whereas the Faroe Islands is rather small with a tight-knit society. The general educational level in Greenland is lower than in the Faroe Islands. In terms of economy and culture, both countries are still connected to fisheries, hunting, herding, and shipping. The populations are small; 51,000 for the Faroe Islands and 56,000 for Greenland compared to DTU's 11,200 active students and about 6,000 staff (DTU, n.d.). A main difference between Denmark, Faroe Islands, and Greenland is the degree of the national economy's diversity with Faroese and Greenlandic economies more dependent on the public sector for jobs and development than Denmark. Overall, to translate experiences and knowledge from DTU, we have identified a need for both scaling down DTU experiences and activity levels and focusing more on questions of public sector and social innovation than private sector and for-profit activities. We also sought to identify existing experiences from courses and other activities in Greenland and the Faroes that could be of inspiration.

Technical University of Denmark (DTU)

One of the core strategic missions of DTU is to disseminate research-based knowledge and technologies to society through cooperation with industry and the public sector. Innovation is an integrated part of the educational programmes and via traineeships and joint research projects, the student's knowledge and good ideas are put to the disposal of the companies, often resulting in start-ups. In 2017, DTU registered 60 start-ups and 50 student start-ups. The tradition of innovation and entrepreneurship combined with over 100 years of research in the Arctic has provided a strong basis for engaging in cooperation with Arctic HE institutions to develop student entrepreneurship adapted for the Arctic societies. At the same time, DTU works with the SDGs at a strategic level and uses them as the basis for research and education. In many of the SDGs, technology plays an important role in the solutions of the articulated problems, and future generations of candidates will be increasingly concerned with sustainability. Thus, DTU's research and educational activities are supporting the realisation of the SDGs in the Arctic.

Experiences from DTU's Arctic Engagement

Arctic Technology Center (ARTEK) DTU has educated 100 Arctic engineers up to 2018; most of them are now employed in Greenlandic companies. DTU has student trainee programmes with Arctic companies and many of the students write their thesis based on this cooperation. This provides the students with direct knowledge of the opportunities as well as challenges of running a business in the Arctic.

DTU has been engaged in international research concerning climate, mining, fisheries, oceanography, telecommunications, environment, and much more contributing to the knowledge of how to create sustainable development in the Arctic. Among other things, DTU has analysed

the potential of business and societal development if a space-based infrastructure with satellites combined with drones and autonomous systems were at the disposal of Arctic societies. In the international Joint Nordic Master's programme, called Cold Climate Engineering, three tracks are offered: 1) *Space* including earth observation techniques, mapping and navigation, 2) *Land* including design and operations of Arctic infrastructure, and 3) *Coast* including Arctic ships and offshore infrastructure and operations. Students are of various nationalities, and thus, knowledge of Arctic engineering is actively disseminated across countries. Likewise, new educational programmes are being developed based in Greenland: A Bachelor's programme in fisheries technology together with the self-rule government of Greenland, and an international Master's programme in Arctic Mineral Resources under the EU Knowledge and Innovation Community called EIT Raw Materials.[6]

DTU Skylab

DTU Skylab[7] is the hub for technology-based innovation and entrepreneurship at the university. The hub is a meeting point between all kinds of stakeholders within the ecosystem including universities, industries, public sectors, and investors. Through various programmes, facilities, and other offers, DTU Skylab supports three types of innovation: 1) Start-up projects from idea to mature projects can get help on business development, fundraising, company creation, team, internationalisation, and communication; 2) Courses from DTU are hosted, co-created, and mentored with involvement of DTU Skylab; 3) Public and private engagements with students and researchers happen through case competitions, hackathons, sprints, and innovation projects. The physical space covers 2,000m^2 and offers highly accessible interdisciplinary prototyping workshops and labs, teaching facilities, incubation and office space, as well as flexible co-working and event space. Until recently, the hub was focused on student innovation, but with a new large grant from the A.P. Møller Foundation, an additional 3,000m^2 of facilities will be added, building up to an even more significant inclusion of researchers and industry. DTU Skylab is largely built around international partnerships where joint programmes and exchanges happen in relation to e.g. EuroTech[8], Nordic Five Tech[9], EUXCEL[10], and Nordic Entrepreneurship Hubs. This pushes DTU Skylab to a position as an internationally leading hub, and is a popular destination for visiting delegations (100 in 2017, half of them international from 18 countries).

The numbers from 2017 speak to the size and experience from DTU Skylab: 152 student start-ups and pre-start-ups used DTU Skylab services. DTU students registered 50 new companies during the year. Forty-three teams of students joined the hub's various start-up acceleration programmes like Skylab Ignite[11] and European Venture Programme[12] and 27 start-ups got soft funding of up to 20,000 EUR through Skylab Funding.[13] On corporate collaboration, numerous spinoff cases with student teams working on corporate IP were created in the course Hardtech Entrepreneurship[14] and the hub facilitated four major hackathons, e.g. the in-house bi-yearly hackathon Open Innovation X[15], based on corporate/organizational challenges. There has also been an increased focus on social innovation. DTU is a Danish partner university and DTU Skylab joined the facilitating team in the UNLEASH event,[16] which focuses on co-creation and problem solving for the SDGs. Moreover, DTU Skylab designed and hosted the student case competition "Better Food for More People" at the World Food Summit in Copenhagen, and held two "Let's Act Together" events for students on social innovation. These activities involved more than 260

students. Additionally, a new student-driven SDG-ambassador team counting 45 students was launched. (DTU Skylab, 2018).

College of the Atlantic and the Abundance Cycle Framework

Located in Bar Harbor, Maine, the College of the Atlantic enriches the liberal arts tradition through a distinctive educational philosophy called human ecology. A human ecological perspective integrates knowledge from all academic disciplines and from personal experience to investigate, and ultimately improve, the relationships between human beings and our social and natural communities. The human ecological perspective guides all aspects of education, research, activism, and interactions among the college's students, faculty, staff, and trustees. The COA community encourages, prepares, and expects students to gain expertise, breadth, values, and practical experience necessary to achieve individual fulfilment and to help solve problems that challenge communities everywhere.

Although most people feel that supporting sustainable development is important, entrepreneurs may encounter difficulties translating sustainability into business strategies and tactics for new ventures. The framework called Abundance Cycle, developed by Professor Jay Friedlander, Sharpe-McNally Chair of Green and Socially Responsible Business at College of the Atlantic, bridges this gap between sustainability and business (Friedlander, 2016). The Abundance Cycle framework is tailor-made for leveraging sustainable business models to launch enterprises, remake existing companies and provide pathways for Arctic entrepreneurs to simultaneously build economic value and fulfil SDGs. The three central perspectives in the Abundance Cycle framework – people, planet, profit – are derived from the concept of "the triple bottom line" (TBL). TBL refers to the notion that the performance of companies should be measured only by the traditional measure of financial profit, but by three different bottom lines:

- The profit and loss account; the traditional measure of corporate profit.
- The organization's "people account"; a measure of how socially responsible the organization has been in its operations.
- The company's "planet" account; a measure of how environmentally responsible it has been.

Rather than viewing these areas as trade-offs or separate, the Abundance Cycle inextricably links these areas and seeks solutions that build a virtuous cycle simultaneously strengthening each bottom line (see Figure 1). Finding a new perspective is at the heart of innovation and by building on the TBL line of thinking the Abundance Cycle framework can help operationalize the concept of sustainability for the coming generations of Arctic entrepreneurs.

The Abundance Cycle also goes further by tying together strategy and sustainability. It expands the value chain to seamlessly incorporate each aspect of the TBL into the main activities of an enterprise (see Figure 2). Doing so both de-risks sustainability and allows enterprises to link sustainability and competitive advantage, fundamentally tying value creation and sustainability together.

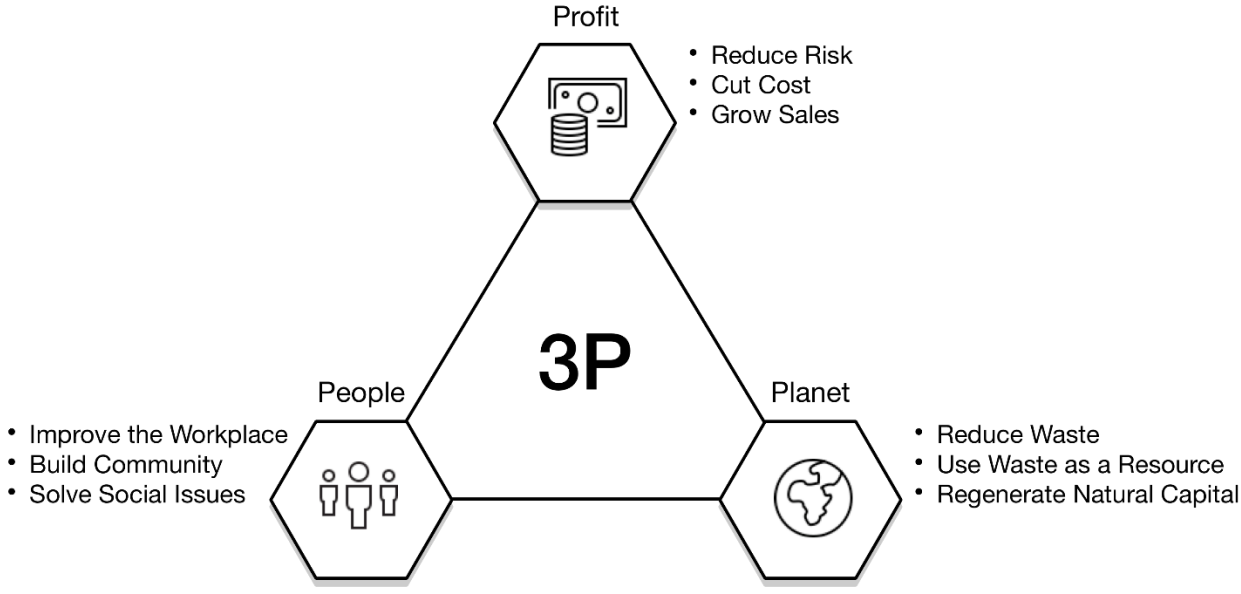


Figure 1: Abundance Cycle Framework's Basic Components

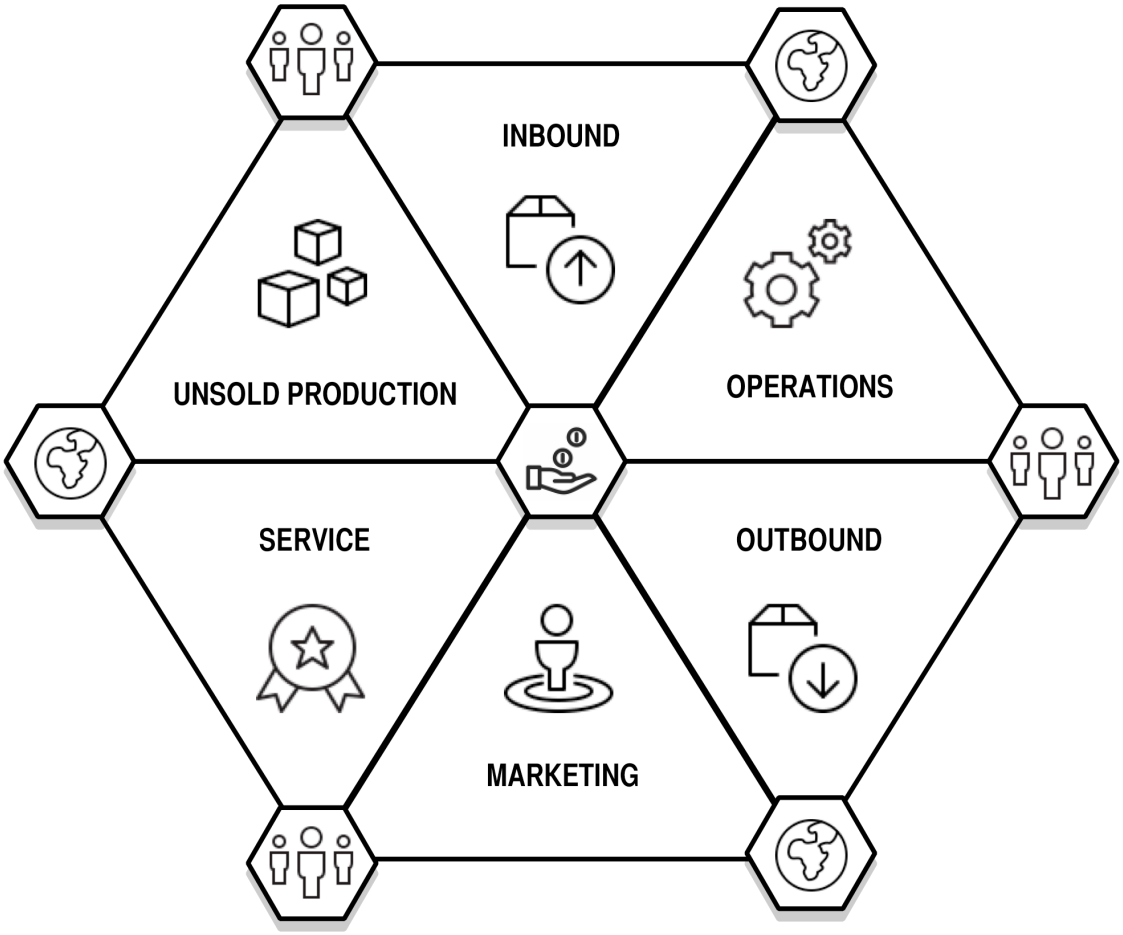


Figure 2: The Abundance Cycle links to strategy by incorporating TBL across the enterprise.

Experiences from The University of the Faroe Islands

Between September 2014 and January 2018, as part of the Master's in West Nordic Studies, Governance and Sustainable Management at The University of the Faroe Islands, we developed and taught a two-year international Master's Programme with more than 10 Master's and PhD courses relating to sustainability and included innovative teaching and learning methods.

Student numbers for each course were between five and fifteen. Our overall experience including student feedback of this (new) way of teaching is that students – if they read the course literature and participate in all elements of the courses – reach a qualitatively higher level of knowing compared to students following traditional classroom based courses. Our understanding of levels of knowing follow Bent Flyvbjerg's application of Aristotle's idea of phronesis (also known as practice and master learning) coupled with Dreyfus and Dreyfus' five stage model of skill acquisition. We have further applied Andrew Van de Ven's (2007) Engaged Scholarship approach in both research and teaching; an approach that situates the research and learning experience in a dialogic setting with relevant stakeholders.

We developed three types of courses that implicitly contained innovation and entrepreneurship, but mostly theorised these elements through the lens of transdisciplinarity.[17] The first type uses a teaching and learning approach with three elements in a 50-25-25% division:

1) Traditional classroom teaching and dialogue between teacher and students about academic literature and empirical examples. This element accounts for 50% of the time and will introduce different topics, theories, and concepts, which will be used to reflect upon, analyse, and discuss the other activities.
2) Dialogue meetings with stakeholders relevant to the course topics accounting for 25% of the time. Students help prepare the dialogue meetings.
3) Students' own communication projects about a course topic communicated to a non-academic audience accounting for 25% of the time. Students are free to work in groups or individually and select form, medium, and audience. Examples of projects include writing a blog, writing newspaper articles, making videos, podcasts, posters, public speaking, a radio programme, teaching elementary school pupils, or art exhibitions. Students are supervised throughout the process from project formulation to implementation to make sure projects fit with the course content and learning outcomes.

The second type of courses, projects on transition to a sustainable society, was developed as part of a larger project developing an old city house from the 1960s, which the University of the Faroe Islands inherited and uses (as per the testament) as a dormitory and guest house for foreign researchers. We call the house 'The Green Student-House', and have re-imagined it as a living learning lab. The larger project and vision is to develop the house into an example of how to retrofit and re-model a typical Faroese city house to a sustainable house, perhaps energy-neutral or energy+ house, through a pilot project of zero-emissions building. We work together with other schools, the municipality, architects, companies, and the neighbours and local community take part as well. All activities are documented on our websites.[18] Examples of student projects include an aquaponics system, a self-composting composter, growing vegetables and mushrooms, and upcycling trash to garden furniture. Students are supervised throughout the process from project

formulation, literature search, website communication, and implementation to make sure projects fit with the course content and learning outcomes.

The third type applies an Engaged Scholarship approach coupled with Narrative Governance theory in practice. Whenever possible we would bring students to workshops and conferences with stakeholders, and encourage them to become *green change agents* in their local communities. One course was a combination of these elements; a combined Master's and PhD course on Arctic Science Diplomacy in Practice with a one-day intensive course prior to participating in the three-day Arctic Circle conference. Other courses were in connection with a network called Green Growth Dialogue and its different conferences.[19]

The Project Progression and Lessons Learned

The first year of the project: "Promoting sustainable student entrepreneurship in the Arctic" has mapped the needs and challenges of introducing innovation and entrepreneurship as an integrated part of the educational programmes offered by the partner universities. Through group discussions of the very diverse needs and experiences identified, we found it important to work on two parallel tracks. On the one hand identifying and working with the specific needs of the places of implementation and experiences of the universities there. On the other hand identifying and translating the transferable skills and mind-set from the experienced partners to the new partners (e.g. from DTU and COA to West Nordic universities). Working with the SDGs and the Abundance Cycle framework is more or less the same across settings; however, developing and implementing new courses in Greenland and the Faroes is at this stage an experience of scaling down, focusing more on the social and environmental aspects and less on creating start-ups. Furthermore, it is about letting the students define and act out what is possible given the universities' very limited resources.

The main operational goal in the first year has been to train teachers at Arctic HE institutions based on the Abundance Cycle framework and the SDGs to be able to teach, train, and cultivate entrepreneurial mind-sets and competencies among students. Intensive workshops have been held at the partner universities for both faculty, senior students, and professional innovation facilitators, and business incubators. In combination with the training of teachers, the project has focused on the development and implementation of courses for students in sustainable entrepreneurship. The project has been presented to Arctic stakeholders: other universities, policy makers, and business sectors at the Arctic Circle Assembly in Reykjavik, 13-15 October 2017 and 19-21 October 2018, and at the Arctic Circle Forum in the Faroe Islands, 8-9 May 2018. The project has created awareness of the possibilities of integrating entrepreneurship thinking into the traditional HE systems.

In the next phase, developing, implementing and evaluating pilot curricular courses at the participating universities will continue – the key parameters for success being to complete at least four pilot student courses. The project will also continue to disseminate the knowledge and results to a broader range of Nordic and Arctic stakeholders at the Arctic Circle Assembly and Forum as well as putting the method and the experiences learned at the disposal of other Arctic universities. In numbers, the project aims at educating 10 faculty to be able to integrate the Abundance Cycle framework in their teaching, thus supporting the education of around 100 new Arctic

entrepreneurs spread across the West Nordic countries, and finally to present the project concept and results at a minimum of four international workshops.

Abundance Cycle Workshop – Train the Teachers

In December 2017, the first course in the Abundance Cycle Framework was held at DTU by Professor Jay Friedlander. Participants came from the universities of Greenland, the Faroe Islands, Aarhus University, and DTU. Studies have shown that people believe in sustainable development, but are often unclear as to how to achieve these goals. As a result, sustainability efforts happen in an *ad hoc* fashion rather than a systemic approach – reducing impact and wasting valuable resources. Furthermore, plenty of evidence from books like Conscious Capitalism to Harvard Business Review articles and academic studies tracking stock market performance show that sustainability focused enterprises outperform their peers. The objective of the workshop was to teach participants how to break down constructs, utilize proven tactics and use the Abundance Cycle to plan, analyse, and maximise sustainable development impact from across the curriculum. Throughout the two workshop days, the participants shared experiences described above and explored how to use the model and learn from others who are already creating abundance. Based on the SDGs and knowledge of context and local needs in Greenland and the Faroe Islands, the participants came up with sustainable business ideas and developed the business models by applying the Abundance Cycle Canvas (see figure 3) and the Abundancy Cycle Tactics. As tools, the Canvas and Tactics helped break down the businesses into their core activities in order to understand their competitive strengths. One of the ideas spurred a new project on sustainable Arctic container farming, which DTU students have been engaged in developing further. The participants left the workshop with a toolkit for incorporating abundance into their teaching and projects. The next section describes how this was done at the University of Greenland the following semester.

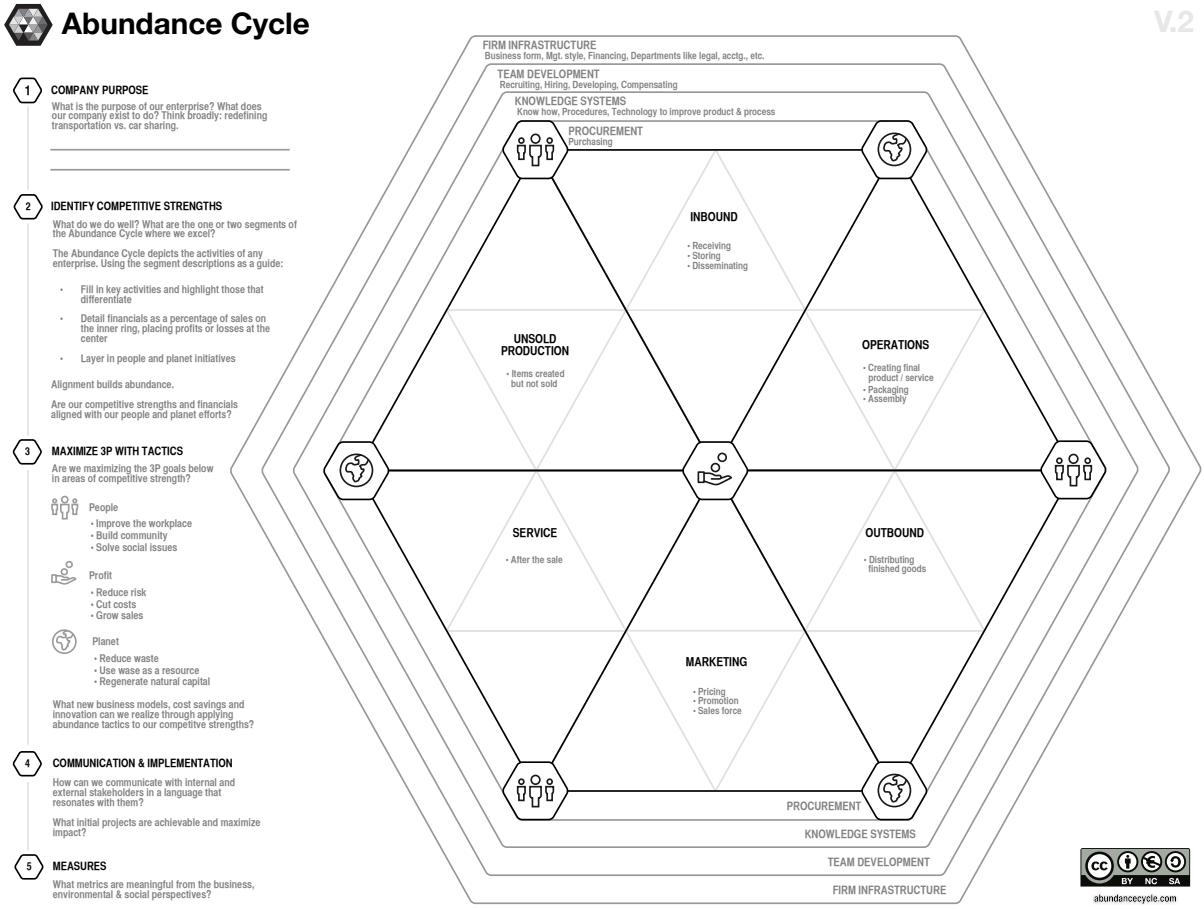


Figure 3: The Abundance Cycle Canvas allows enterprises to chart out their strategy and sustainability together.

Bringing the Arctic to DTU Skylab

In the 2018 Spring semester, at the DTU course Hardtech Entrepreneurship taking place at DTU Skylab, the Abundance Cycle platform facilitated the start-up business *Arctic Grow* reusing shipping containers for growing crops in the Arctic. Arctic Grow was started by students from Denmark and the Faroe Islands and is reaching out to Greenland to spread the concept further North. Inspired by SDG number two, Zero Hunger, students at DTU Skylab decided to focus on issues of food security and food production in the Arctic. During the course, students battled with the many practical issues of locally grown produce in the Arctic, like the not uncommon lack of available goods due to weather conditions. They quickly discovered that *food* as a theme is related to other SDGs and sustainability within the Arctic in a myriad of ways: CO_2 emissions from imports (e.g. SDG13 on Climate Action); accumulation of plastics and garbage (e.g. SDG14 on Life Below Water); spoilage and waste due to harsh climates and distances, high prices and their socio-economic impact on, often, low-income consumers, and, adverse effects on health such as diabetes and obesity due to the consumption of highly processed and low quality foods (e.g. SDG3 on Good Health and Well-Being) (Jørgensen, 2010). While working on Arctic Grow, a self-contained food production unit fitted within a repurposed shipping-container, the reality of scale of the problem became apparent to them. Not only did they realise how difficult such a solution

would be on a purely technical and financial level, but more importantly, how far-reaching the developmental implications of solving sustainable local food production in the Arctic can be.

Two Courses at University of Greenland

Based on the above, University of Greenland developed and taught two interdisciplinary courses in the Spring semester 2018. Both courses were offered to both Bachelor's and Master's level students. The first course, Sustainable Entrepreneurship I, ran from 5 February to 23 March, and the second course, Sustainable Entrepreneurship II, ran from 3 April to 18 June. The overall aim of the first course was that the students gain theoretical insight as well as hands-on experience with the pre-idea phase and planning for sustainable entrepreneurship (Marshall, Coleman & Reason, 2017; Bastien & Holmarsdottir, 2017). The second course builds on this and aims for planning, executing, and evaluating sustainable development projects in an iterative way in close relations with stakeholders (Berzin & Pitt-Catsouphes, 2015; Foley & O'Connor, 2013; Gibson-Graham & Roelvink, 2014; Godoy et al, 2005). The two courses individually and together form an action research process (Marshall, Coleman & Reason, 2017): After an introduction to the core theories, concepts, and methodology in the first course, the students form interdisciplinary teams based on interests, previous experiences, preferences, mixing bachelor's and master's students, etc. After the team formation, groups go on a field trip to a socio-geographical setting and context of which the groups are working. Here the students will perform ethnographic research (interviews, observations, etc.) and improve the project together with the stakeholders.

After the completed fieldwork, the groups analyse the data and embark on a creative process including divergent and convergent thinking. The Abundance Cycle Canvas will inspire, guide, and structure the creation of sustainable entrepreneurial opportunities. There have been eight students enrolled in both courses forming five teams, and at the time of writing, experiences are very positive.[20] The students have gained a better understanding of innovative processes in theory and practice as well as understanding of the importance of connections to and inclusion of relevant local stakeholders both to create viable, successful projects, and to validate the assumptions, implementation process, and results of the projects. It was easy for teachers and students to work with the Sustainable Development Goals and the Abundance Cycle framework. Another positive experience of the project has been the strengthened relations between the local communities and the university, which can be a starting point for collaboration on future projects.

A New Course on Innovation at the University of the Faroe Islands

Starting in the Autumn of 2018, the University of the Faroe Islands will run an experimental new course on innovation. The course will be a 10 ECTS, semester-long academic and practical elective course open to all university students (Bachelor's, Master's, and PhD level) and external participants. Based on the core values and reading lists of the two courses offered at the University of Greenland, it will make use of the Sustainable Development Goals as a framing device and the Abundance Cycle framework as two of its key guiding principles. While the University of the Faroe Islands does not offer courses on entrepreneurship or innovation at the time of writing, since 2015, initial experimental attempts to engage students utilising a combination of theoretical and practical work focusing on issues of local issues of sustainability have surpassed expectations. Furthermore, this built-up knowledge and experiences are combined with theoretical and practical training from the project workshop described above. The course will see students meet with local stakeholders from government, industry, civil society, and incubators in an effort to maximize the

impact of their chosen projects. While students will not be required to work on commercial ventures, their projects must take into account the triple-bottom-line outlined within the Abundance Cycle framework – and will be required to present their work to a panel of stakeholders they have encountered throughout the semester.

Conclusion

In this article, we have provided a project-based answer to the research question: How can entrepreneurship projects in Higher Education (HE) in the Arctic incorporate the Sustainable Development Goals? We argued that several trends are overlapping making this question and project relevant: Not only is HE in general experiencing more focus on innovation and entrepreneurship mind-set and transferable skills development, this is increasingly coupled with sustainability purposes and the SDGs widening and deepening the application of innovation and entrepreneurship. Furthermore, we observe the same trends in the Arctic: an increase in research and HE collaboration, more focus on innovation and entrepreneurship, and more focus on the SDGs; however, their combination in theory and practice is underdeveloped and understudied. This article has presented preliminary findings from the project: "Promoting sustainable student entrepreneurship in the Arctic".

The overall conclusion is that it is possible to incorporate the SDGs in HE in the Arctic, in our cases the Faroe Islands and Greenland, and bring SDGs and the Arctic into HE outside the Arctic, in our case Denmark. Based on a "train the teachers" workshop and many more meetings and workshops, two courses in Greenland implemented and demonstrated that the Abundance Cycle framework is a suitable theoretical and practical approach. It is easy to work with for teachers and students to include the SDGs in many different settings. It allowed us to bridge the gap between two diverse realities; to translate knowledge and experience from the resourceful and big-scale non-Arctic universities and reality to the less resourceful and small-scale Arctic universities and reality. Another finding from our project is that the existing courses and teaching approaches in the Faroe Islands and the new courses in Greenland have been able to demonstrate that students, if given the opportunity to lead, can drive projects quite far despite the universities' lack of resources utilising e.g. own social capital and goodwill from society. Thus, it seems obvious, that with a more focused approach on innovation and entrepreneurship coupled with the SDGs in HE in the Arctic, applying a clear framework like the Abundance Cycle, and with better trained teachers and new experiences, Arctic universities and not least the students can take SDG projects even further as we get closer to 2030.

Notes

1. First and second being research and teaching.
2. For a full list and description see https://sustainabledevelopment.un.org/sdgs.
3. An independent institute and forum for debate in Australia (similar to Chatham House).
4. It is beyond the scope of this article to cover all the HE actors working on SDGs in the Arctic.

5. University of Akureyri joined the project later in 2018 and activities there are not covered in this article.
6. See also www.coldclimate-master.org; www.eitrawmaterials.eu
7. See www.skylab.dtu.dk
8. See http://eurotech-universities.eu/
9. See http://www.nordicfivetech.org/
10. See http://euxcel.eu/
11. See www.skylab.dtu.dk/programmes/ignite
12. See www.europeanventureprogramme.com
13. See http://www.skylab.dtu.dk/programmes/funding
14. See http://hardtechentrepreneurship.dk/
15. See http://www.oi-x.dtu.dk/
16. See www.unleash.org
17. See appendix for list of courses.
18. www.lindbergshus.fo and www.greenstudenthouse.com
19. See also www.greengrowthdialogue.com
20. The courses have not been formally evaluated yet.
21. A PhD course was offered, but no PhD students signed up.
22. No courses were offered because of a lack of teaching resources, but the conference is part of one student's master's thesis on tourism in the Faroe Islands.

References

Abundance Cycle (n.d.), http://www.abundancecycle.com

AIIA (2018), Sustainable Development Goals in the Arctic Roundtable, *Australian Institute of International Affairs*, 22 January 2018, http://www.internationalaffairs.org.au/news-item/sdgs-arctic/

Bastien, Sheri and Halla B. Holmarsdottir (2017), The Sustainable Development Goals and the role of youth-driven innovations for social change. In Bastien and Holmarsdottir (Eds.) (2017), *Youth as Architects of Social Change: Global Efforts to Advance Youth-driven Innovation*. New York: Palgrave Macmillan, pp. 3-22.

Berzin, Stephanie and Marcie Pitt-Catsouphes (2015), Social innovation from the inside: Considering the "intrapreneurship" path. *Social Work*, 60(4): 360-362.

China-Nordic Arctic Research Centre (n.d.), www.cnarc.info

DTU (n.d.), Om DTU, www.dtu.dk

DTU Skylab (n.d.), www.skylab.dtu.dk

DTU Skylab (2018), *DTU Skylab 2017*, DTU Skylab Annual Report, January 2018. http://emagstudio.win.dtu.dk/e-books/DTU_Skylab/%C3%85rsrapporter/Annual_report_2017/aeb201433e6ab9d27ea517647eea1a8c/pubData/source/aeb201433e6ab9d27ea517647eea1a8c.pdf

DTU Skylab Funding (n.d.), http://www.skylab.dtu.dk/programmes/funding

EIT Raw Materials (n.d.), www.eitrawmaterials.eu

European Commission (2008), *Best Procedure Project: Entrepreneurship in higher education, especially within non-business studies. Final Report of the Expert Group*, Luxembourg: Enterprise and Industry Directorate-General.

European Venture Programme, www.europeanventureprogramme.com

Eurotech Universities (n.d.), http://eurotech-universities.eu/

EU XCEL (n.d.), http://euxcel.eu/

Flyvbjerg, Bent (2001), *Making Social Science Matter: Why social enquiry fails and how it can succeed again*. Cambridge: Cambridge University Press.

Foley, Dennis and Allan John O'Connor (2013), Social capital and the networking practices of indigenous entrepreneurs. *Journal of Small Business Management*, 51(2): 276-296.

Friedlander, Jay (2016), Five Steps to Strategic Sustainability and Abundance, *MIT Sloan Management Review*, March 21, 2016.

Fulbright Arctic Initiative (n.d.), https://www.cies.org/program/fulbright-arctic-initiative

Gibson-Graham, J.K and Gerda Roelvink (2014), Social Innovation for Community Economies. How action research creates "other worlds". In Frank Moulaert, Diana Maccallum, Abid Mehmood and Abdelillah Hamdouch (Eds.) (2014), *The International Handbook on Social Innovation: Collective Action, Social Learning and Transdisciplinary Research*. Cheltenham, U.K. and Northampton, Massachusetts: Edward Elgar, pp. 453-465.

Godoy, Ricardo, Victoria Reyes-García, Elizabeth Byron, William R. Leonard, and Vincent Vadez (2005), The effect of market economies on the well-being of indigenous peoples and on their use of renewable natural resources. *Annual Review of Anthropology*, 34 (1): 121-138.

Green Growth Dialogue (n.d.), www.greengrowthdialogue.com

Green Student-House (n.d.), www.greenstudenthouse.com

HardTech Entrepreneurship (n.d.), http://hardtechentrepreneurship.dk/

Ignite (n.d.), www.skylab.dtu.dk/programmes/ignite

Jørgensen, Marit Eika (2010), Obesity and diabetes— an Arctic challenge, *International Journal of Circumpolar Health*, 69:4, 320-321.

Lindbergs hús (n.d.), www.lindbergshus.fo

Marshall, Judi, Gill Coleman, and Peter Reason (2017), *Leadership for Sustainability: An Action Research Approach*. London: Routledge.

Ministry of Foreign Affairs of Denmark (2017), The SDGs in the Arctic, *Ministry of Foreign Affairs*

of Denmark, http://um.dk/en/foreign-policy/the-arctic/the-sdgs-in-the-arctic/

Nordic Five Tech (n.d.), http://www.nordicfivetech.org/

Nordic Master in Cold Climate (n.d.), www.coldclimate-master.org

Rosenlund, Joacim, Erik Rosell, and William Hogland (2017), Overcoming the triple helix boundaries in an environmental research collaboration, *Science and Public Policy*, 44(2): 153–162.

Rovaniemi Arctic Spirit (n.d.), Program, https://www.rovaniemiarcticspirit.fi/EN/Program

Oi-X (n.d.), http://www.oi-x.dtu.dk/

Polar Research and Policy Institute (PRPI) (n.d.), Events, https://polarconnection.org/events/

Sustainable Development Goals (n.d.), https://sustainabledevelopment.un.org/sdgs

Trencher, Gregory, Masaru Yarime, Kes B. McCormick, Christopher N. H. Doll, Steven B. Kraines (2014), Beyond the third mission: Exploring the emerging university function of co-creation for sustainability, *Science and Public Policy,* 41(2): 151–179.

United Nations (n.d.), News on Millennium Development Goals, *United Nations*, https://www.un.org/millenniumgoals/

United Nations Department of Economic and Social Affairs (n.d.), Transforming our world: the 2030 Agenda for Sustainable Development, *United Nations*, https://sustainabledevelopment.un.org/post2015/transformingourworld

UNLEASH (n.d.), www.unleash.org

University of the Arctic's Thematic Networks (n.d.), www.uarctic.org/organization/thematic-networks/

Virginia, Ross A., Michael Sfraga, Tom Arnbom, Linda Chamberlain, Susan Chatwood, Asli Tepecik Diş, Gunhild Hoogensen Gjørv, Tamara K. Harms, Anne Hansen, Gwen Holdmann, Noor Johnson, Trevor Lantz, Bjarni Magnússon, Itty S. Neuhaus, Gregory Poelzer, Laura Sokka, Maria Tysiachniouk, Øystein Varpe, and Niels Vestergaard (2016), Fulbright Arctic Initiative: An Innovative Model for Policy Relevant Research and Public Outreach, *Arctic Yearbook* 2016, https://www.arcticyearbook.com/briefing-notes-2016/204-fulbright-arctic-initiative-an-innovative-model-for-policy-relevant-research-and-public-outreach

Appendix

Name of course	ECTS	Where	When / student no.
Political Sociology of Governance and Sustainable Management in the West Nordic Region	10	Uni. Faroe Islands	Autumn 2015 / 5 Autumn 2017 / 10
Science, Economics and Politics of Sustainability, Climate, and Environment	10	Uni. Faroe Islands	Autumn 2015 / 5 Autumn 2017 / 10
West Nordic Geopolitics from a Faroese Perspective	10	Uni. Faroe Islands	Autumn 2016 / 10
Governance and Sustainable Management in the Faroe Islands	10	Uni. Faroe Islands	Autumn 2016 / 10

Table 1. Overview of 50-25-25% courses (Master's level)

Project	ECTS	When	Student no
Aquaponics system and food security in the Faroe Islands	10	Autumn 2016	2 (and 1 teacher)
Mushroom growing and food security in the Faroe Islands	10	Autumn 2016	2
Composting, community building, and food security in the Faroe Islands	10	Autumn 2016	2
Potato planting, youth action, SDGs, and food security in the Faroe Islands	5	Spring 2017	1
5R guidelines for sustainable living	10	Autumn 2017	1
Window plants in homemade recycled glass pots	10	Autumn 2017	1
Garden makeover, community-building, and upcycling	10	Autumn 2017	1
History of Lindberg and Lindberg's House	15	Spring 2018	1

Table 2. Overview of Green Student-House projects, University of the Faroe Islands (Master's level)

Name of course	**Level**	**ECTS**	**Where**	**When / student no.**	**Focus**
Green Growth Dialogue	Master	0	Reykjavik, Iceland	3 days, August 2015 / 15	Green Diplomacy; Renewable Energy
Green Growth Dialogue	Master	5	Nuuk, Greenland	3 days, May 2016 / 10	Sustainable Shipping; Indigenous peoples climate action
Green Growth Dialogue	Master[21]	5	Sandoy, Faroe Islands	5 days, June 2017 / 10	Sustainable Agriculture; Aquaponics and Hydroponics in the Arctic
Green Growth Dialogue	Master[22]	30	Tórshavn, Faroe Islands	3 days, May 2018 / 1	Responsible Tourism
Arctic Science Diplomacy in Practice	Master and PhD	5	Reykjavik, Iceland	4 days, October 2017 / 15 students	Science Diplomacy in theory and practice. Participation in Arctic Circle

Table 3. Overview of Engaged Scholarship courses offered by the University of the Faroe Islands

Coherence in the Greenlandic Education System? Educational Planning & Evaluation in Greenland from a Complexity Theory Perspective

Mîtdlârak Lennert

A solid primary school is an important part of the foundation for creating a strong and sustainable society. Almost every country has undertaken school system reforms during the past two decades, but very few have succeeded in improving their systems from poor to fair to good to great to excellent (Mourshed et al., 2010). History, culture, and context matter for understanding applicability, if any, of one educational innovation over another. This can be said to have been the case in Greenland. One of the fundamental objectives after the introduction of Home Rule in 1979 was to adapt the Danish structures and systems to the Greenlandic conditions and culture. This article aims to analyze the Greenlandic education governance system and how the central level design, organizes and steers education systems across complex multilevel governance arrangements. In governing educational systems, how the central and the decentralized levels interact and communicate and how this affects trust, cooperation and negotiation of conflicts, and ultimately the outcomes of reform, will be discussed.

Introduction

This article is a case study analysis of the Greenland education governance system through the lens of complexity theory. It examines the governance approach with an emphasis on the primary and lower secondary school system (grades 1-10, ages 6-16). *Coherence* in education systems is defined by Fullan and Quinn (2016) as the *shared depth of understanding about the purpose and nature of the work* across governance levels. In terms of enabling better teaching and greater outcomes for students, the focus of this article is on how the governance system coordinates and evaluates the strategies around these efforts.

Unlike other former colonized and Indigenous peoples around the Arctic, the Greenlanders constitute the majority of the population, and also have full law-related decision-making powers in many areas, including education (Darnell & Hoem, 1996). This makes education in Greenland

Mîtdlârak Lennert is an Assistant Professor at the University of Greenland.

unique as to the postcolonial context and society; the policies, perspectives and content of education affect not only the educational situation, but the opportunities for change and development in the society as well. However, the challenges in education that other Indigenous peoples in the Arctic face, can largely be found in Greenland as well. With only 56,000 people, the small and geographically dispersed population poses many political and economic challenges. While the education level within the population of Greenland is increasing,[1] 60% of the workforce has no education beyond primary and secondary school (Statistics Greenland, 2018).

The formal education system and the culture of education in Greenland is still young and with varying specific national and regional challenges. One of the fundamental objectives after the introduction of Home Rule was to adapt the educational systems to Greenlandic conditions and culture. The cultural and economic transformation during the 1950s throughout the introduction of Home Rule resulted in significant challenges in the attempt of adapting frameworks, content and context to the educational system in Greenland.

Greenland is facing the same challenges as education systems outside the Arctic, namely the pressure for better results and an increasing level of education in the population. However, in addressing these challenges, Greenland has a different starting point than most developed countries, and therefore has different opportunities and options available. Exploring developments in the Greenland context highlights what may be crucial to develop policies that both address and reveals some of the challenging cultural, geographic, political, and economic realities. This article examines these differences and opportunities, but also the similarities that cut across nations when it comes to effective education governance.

Literature Review: Education Governance & Complexity Theory Framework

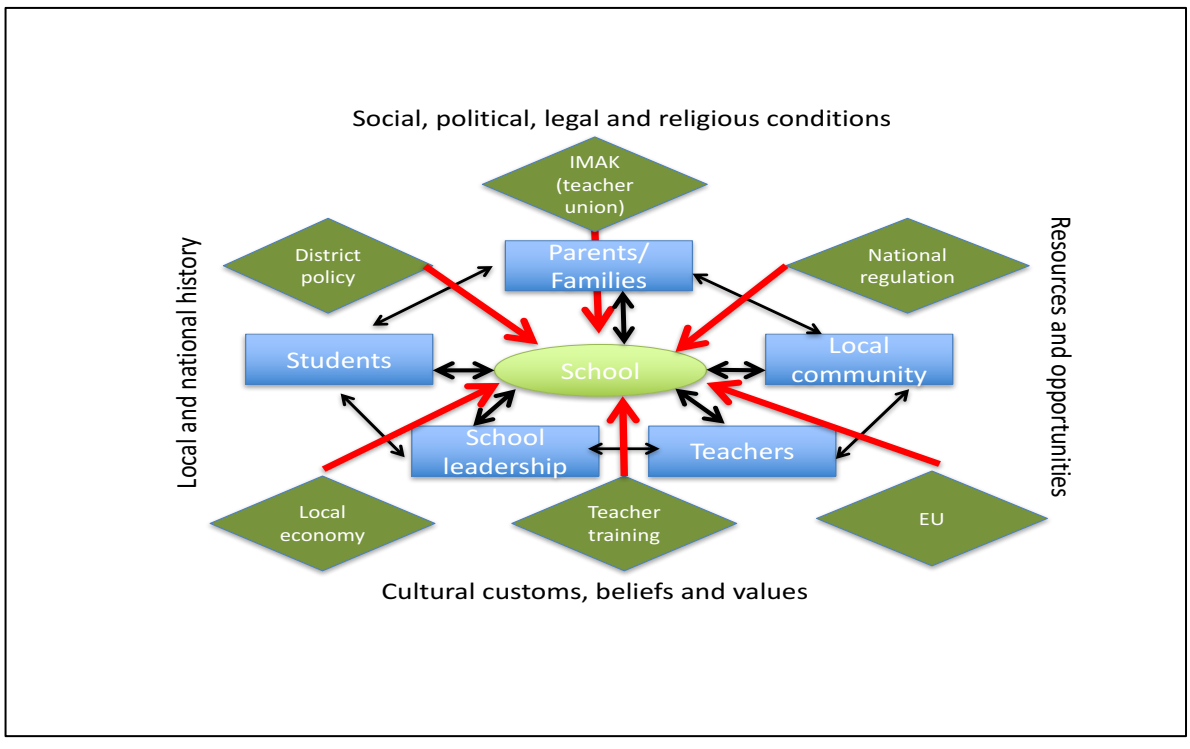
There is a growing body of evidence on the different factors that contribute to education improvement. A number of international reports have reviewed the factors that contribute to quality education (See for example Fullan, 2015; Fullan & Quinn, 2016; Levin, 2010; Hargreaves & Shirley, 2012; Barber & Mourshed, 2007; Mourshed et al., 2010; Schleicher, 2012; Elmore, 2004; OECD, 2015). The takeaways being that to guide reform efforts, education systems rely on evaluation and assessment, and ensuring capacity at the local level to successfully implement reforms.

Currently, many educational philosophers and researchers are focusing on the complex nature of education and offer complexity theory as a useful research paradigm, and a necessary mean for understanding change within complex social systems (e.g. Snyder, 2013, Johnson, 2008). The theory of complexity offers a means to analyze emerging patterns and trends to illuminate how the disparate system parts are, or are not, working together (McQuillan, 2008: 1773). A central concern of complexity theory is *thus* with the relationships *among* the elements or agents that constitute a particular and sufficiently complex environment or system (Mason, 2008: 33). The concepts behind complexity theory give rise to analyze the reform processes retrospectively, as a way to learn more about the elements, power structures and relationships in the complex system, but also as a framework to navigate current reform processes. The successful implementation of a centrally designed reform depends largely on the capacity and the resources on the local level to fulfill the reform goals and put them into practice, as the amount and quality of connections between system elements likewise impact a system's ability to adapt (Trombly, 2014). A key challenge for countries is assuring alignment and consistency in governance approaches to guide their entire systems

towards improving outcomes. Fullan and Quinn (2016) defines *coherence making* in education as a continuous process of making and remaking meaning in your own mind and in your culture, resulting in consistency and specificity and clarity of action across schools and across governance levels, as a way to create consistency and alignment.

Understanding the origins of the dynamics of educational systems from a complexity lens opens up a fresh perspective for thinking about and managing these systems. As according to Trombly (2014: 48), complex systems whose *agents and* elements are isolated from one another are both slower to adapt and less likely to achieve genuine learning; *while* those whose *agents and* elements regularly engage *and coordinate* with one another are far more *capable* to learn and thrive (Trombly, 2014: 48). In complex systems, by not *rather than* assuming *such* predictable and linear interactions among discrete elements *in an educational system*, complexity *theory* instead draws attention to the evolving inter-relationships among system elements at various levels of the system (McQuillan, 2008: 1773). This focus on interrelationships is especially important in the Greenlandic multilevel educational governance setting, as coherence between stakeholders in various levels of the governance layers is decisive for planning in implementation. The assumptions that lead to stability of educational systems are deeply rooted in the overlapping structures that comprise the system (Model 1 is an example of a complexity model of the Greenlandic primary and lower secondary school) and indeed, within the social and cultural context in which they operate. It is essential to understand the micro-structural relationships that shape the macro behavior of the system if change efforts are to be successful.

Model 1. A complexity model of the Greenland primary and secondary school system



The figure illustrates how groups and organizations affect the everyday life of the school in question, but also how they affect each other.[2] Schools and education systems are self-organized in that their structure and function often spontaneously shift as the actions and reactions of

autonomous agents become interlinked. Schools and *education* systems are also emergent in that, as *the continual evolution and communication between actors* transcends the sum of the component parts (Johnson, 2008), while, however, the communication that takes place between actors within schools and the education systems is often dependent on the coherence of the short-range relationships and constructive communication within the system.

Research Problem

According to Fazekas and Burns (2012) policy making needs to be aligned to its governance structure and take into account the respective responsibilities of different actors. This article analyzes how Greenland addresses the challenges and opportunities to the educational system, and how stakeholders work for system improvement. How do the different primary stakeholders implement education policies in a complex environment and how are they supported in this process? The role of national government versus local government and school boards in countering the quality of teaching provided is examined.

Methodology

The research design, inspired by the Governing Complex Education Systems case study structure (Burns & Köster, 2016), emphasizes the analyzing of reform processes with a focus on planning, evaluation and coherence between the different actors. The present study takes a qualitative case study approach to analyze the Greenland primary and lower secondary school governance system.

Case study data collection provides the opportunity to employ multiple sources of evidence. As such, rich and descriptive data reveals the complexity involved within the selected case site. Qualitative methodology encourages detailed description and fits the objectives to document the circumstances surrounding educational policies and practices in Greenland. Practice, *or the way of doing things*, is defined by Bennett and Checkel (2014: 241) as socially meaningful and organized patterns of activities. As practice can differ from policy intentions, inquiries into 'the way of doing things' among the different actors in the governance system provides important information for understanding the context of the reform processes in the education system in Greenland.

Data Collection and Analysis

Yin (1982) considers three research methods particularly suited for examining public policies: (1) non-structured interviews; (2) documentation study; and (3) participatory observation. Empirical data were collected using in-depth interviews (n=17), informal interviews (n=10), documentary analysis and field observation (over 2 years). Observations at key meetings and interviews with primary stakeholders in different levels of government about their experiences and understandings of roles were conducted. The observation notes and interviews were transcribed and analyzed using the Nvivo software. The interview excerpts were translated by the author.

Limitations

This study applies an empirical–analytical approach rather than a theoretical–conceptual one. I have chosen not to focus on pedagogy or curricula, however important these subjects might be in themselves, as there is much less focus on the school 'system' itself – the critical infrastructure that underpins performance – and how it creates conditions for great education for every child.

Table 1. Overview of research techniques and collected data

Research technique	Data
Text analysis of relevant primary documents	Parliamentary/governmental documents and documents produced at local level
Secondary analysis	Internal and external evaluations of policy
Semi-structured elite interviews with key stakeholders	Policy makers Representatives of school boards Heads of schools Teachers
Observation of key meetings between governance levels	Observation notes

The Educational Context of Greenland

Greenland is a self-governing country within the Kingdom of Denmark. An education system strongly rooted in the Danish system was inherited when the Greenland Home Rule assumed responsibility for the education sector in 1980. In accordance with changing policies over the years the education system in Greenland has gone through an evolutionary process. With the basic political consensus being a need for higher levels of education among the population, planning in the education policy front has been the subject of demands for quick results; partly to minimize imported foreign labor, and later, to achieve more autonomy and independence.

Given that the education system was based on the Danish education system, the reality was, and still is today, that for Greenlandic students to continue studying after primary and lower secondary school it is a prerequisite that they have a working knowledge of the Danish and English language. Greenland has one university, *Ilisimatusarfik*, which offers 11 university degrees. Many Greenlandic students therefore obtain undergraduate and graduate degrees, free of tuition, in Denmark.

Today, the modern public primary and lower secondary school system, which is the focus of this research, has just about 8,000 students in 87 schools along the 4,700 kilometer habitable coast line, from Qaanaaq and Siorapaluk in the far north to Nanortalik and Narsaq Kujalleq in the south, to Ittoqqortoormiit in the East. 2017 statistics from the Ministry of Education show that 40% of the children that complete primary and lower secondary schooling do not directly continue in further schooling. The primary and lower secondary school is one unit.

Background and Outcome of the 2002 Atuarfitsialak[3] Reform

Your starting point in a school reform often has a big impact on where you end up. The work with *Atuarfitsialak* (The Good School in Greenlandic) had shown the necessity that the entire primary and lower secondary school should be redefined from being a copy of another system into an international school based on Greenlandic culture and values. A key person in the reform process wrote:

> We had to tear everything down to build it up again. It is to be a Greenlandic school, which should be competitive, international, and based on research. That has been the task here in Greenland, where there has not been much research. (Hindby in Folkeskolen, 2003, author's translation).

The purpose of *Atuarfitsialak*-reform was to improve primary and lower secondary school education. The teaching method was changed, as it departed from the traditional hourly teaching, which was based on one classroom, one teacher and one lesson, and towards a more project-oriented teaching method with the individual student at the center (Greenland Parliament Debates, Agenda 29, 2002). A major prerequisite for the anticipated success of *Atuarfitsialak* objectives was to significantly improve the physical frameworks of the schools, and more bilingual teachers to lift the task (Greenland Parliament Debates, Agenda 29, 2002).

After the preparatory phase of experience gathering, preparation of a status description, and a nationwide survey of students' wishes and attitudes towards the school, a conference was held in September 1999. The conference expressed a number of recommendations for further reform. The result was a proposal for a legislation, which for the first time in the Greenlandic history included the socio-cultural perspective of education. As something completely new, a 10-year compulsory program was laid out, divided into three clearly defined stages, each with description of purpose and educational profile (Greenland Primary and Lower Secondary School Act, 2002). The school was to be grounded in the Greenlandic culture, values, traditions and facts, but also have an international outlook.

A 'Study of Readiness' conducted by the Agency of Education (Inerisaavik, 2004), a subdivision under the Ministry of Education, was completed at the end of 2003 (same year as the start of implementation). The key results were that 10% of the teachers reported that they had detailed knowledge of formal elements in the reform and teachers reported lack of capacity building, information, teaching materials, cooperation and trained teachers as barriers for implementation.

In 2015 the primary and lower secondary school was evaluated by an external consultancy (EVA, 2015). The evaluation concluded that the municipal school authorities, including school leaders, have not been able to create or support intended changes in leadership, teaching and practice that are needed to create the educational environments that support the demands of modern society on the professional and human competencies of our children. Conclusions from the 'readiness study' (Inerisaavik, 2004) and the external evaluation (EVA, 2015) conducted 12 years later indicate that the necessary clarity and capacity to implement the intentions behind the reform has not been sufficient.

Steering from the Centre in Greenland: Governance Gaps, Roles and Responsibilities

The educational system in Greenland is, like many other countries, characterized by a decentralized multi-level governance system (e.g. Wilkoszewski & Sundby, 2014; Blanchenay, Burns & Köster, 2016). This decentralization has contributed to the fact that more decision-makers and more stakeholders have become more involved in primary and lower secondary schools. The many layers of administration make relationships complex, as the responsibility for a good primary and lower secondary school is shared between decision makers across the governance system (see also Table 2). A main challenge in multi-level systems is the question of who retains the responsibility for oversight and steering. This is particularly true for the education sector, as there is a general trend towards more comparability and compatibility of curricula and education outcomes across regions and countries: even in very decentralized systems the central level will need to retain some steering capacity, if national or international standards are to be monitored and met (Burns &

Wilkoszewski, 2013). Hence, the inherent asymmetry between the various governance levels in multi-level contexts persists. This asymmetry leads to governance gaps in seven areas: information, capacity, fiscality, policy, administrative, objectives and accountability (Charbit, 2011; Charbit & Michalun, 2009).

The seven governance gaps are explored in the context of Greenland in the following sections. Schools are per force highly decentralized as the Greenlandic people live in small towns and settlements along the coastline. To be effective, reforms have to reach into even the most distant classrooms, which mean they may have to go through multiple levels of administrative hierarchy, including provincial, municipal, and school-level directors any of whom can delay, dilute, or distort reforms (Bruns & Schneider, 2016).

Table 2. Governance gaps in multi-level education governance systems

Governance gap	Description
Information gap	Asymmetries of information (quantity, quality, type) between different stakeholders, either voluntary or not. The central governance level often has better access to quality information (e.g., comparative data on school performance) than the local level. Also, the central level usually has better capacity to use this information. At the same time, the local level has direct access to information on how policy reforms affect schools – data that the central level first needs to gather. This information asymmetry on both sides can hinder the successful implementation of educational policies.
Capacity gap	Insufficient scientific, technical, infrastructural capacity of local actors, in particular for designing appropriate strategies. This gap occurs when there is a lack of human capital and financial resources between levels of government.
Fiscal/funding gap	Unstable or insufficient revenues undermining effective implementation of responsibilities at sub-national level or for crossing policies. Sub-national governments' own revenues (taxes and fees) often exceed their expenditure responsibilities in education, while the lower levels in the system suffer from too few financial means.
Policy gap	This gap results from the incoherence between sub-national policy needs and national level policy initiatives. It can occur when ministries take a purely vertical approach to policy issues that are inherently cross-sectoral.
Administrative gap	This gap occurs when the administrative scale for policy making, in terms of spending as well as strategic planning, is not in line with functional relevant areas. A very common case concerns municipal fragmentation which can lead jurisdictions to set ineffective public action by not benefitting from economies of scale.
Objective gap	A gap in objective can emerge, when the various levels do not coordinate their aims to make them coherent across policy areas. This is particularly the case when objectives are prioritized asynchronously: a national education ministry might look for strong accountability measures to foster international competitiveness of the system, whereas municipalities might first look for necessary infrastructure and capacity building.
Accountability gap	Difficulty to ensure the transparency of practices across the different constituencies. This gap occurs when the necessary institutional quality measurement mechanisms for each governance level are lacking or misplaced.

Source: Classification of Charbit (2011).

The primary and lower secondary schools in Greenland are a municipal responsibility, and neither the Agency for Education (a subdivision under the Ministry of Education) nor the Ministry of Education have any enforcement authority. *Inatsisartut* (the national parliament) sets the legal and governance framework for the primary and lower secondary school, while the detailed provisions are laid down by *Naalakkersuisut* (the national government). In the municipalities, the municipal council determines the goals and frameworks for schools' activities with by-laws. At each school, there are school boards, which - within the goals and limits set by the municipal council - lay down principles for activities of the school. The administrative and pedagogical management of the municipal school system is regulated locally by the individual municipality.

Table 3. Overview of key roles, interests and interventions

Stakeholders	Role/interest	Intervention repertoire
Central level: Ministry of Education and The Agency of Education	-Responsible for the overall quality of teaching in primary and secondary schools -Professional consultancy service -Development of teaching materials -Evaluation of primary and secondary school activities -Provider of teacher professional development courses -Overall supervision/monitoring of primary and secondary schools	-Development of national policy -Development of quality norms -Supervision of quality of teaching -Can establish requirements and criteria in the form of accreditation models for achieving the purpose and foundation of the primary school - Issues curricula, learning objectives and standardized tests -Appoints external examiners
Regional level: (Municipal Council and administration)	-Owner of school buildings and responsible for their maintenance -The municipal council regularly supervises/monitors the activities of the schools	-By-laws -Hiring and -Supervision of quality of teaching -Establishes goals and frameworks for the school's activities
Local level: Parent School Council	-The school board carries out its activities within the goals and limits laid down by the municipal board, and supervises the activities of the school. -The school board sets objectives for the school's teaching and other activities.	-Approves the school's teaching plan for each school year. -Supervision of quality of teaching
School principal	-Manages and is responsible for the day to day operation in the school	-Internal quality monitoring -Prepares proposals for the school board regarding the school's teaching plan for each school year

		and guidelines for other school activities
Teacher	-Responsible for the quality of teaching in the classroom	-Make changes in the classroom -Contact with parents -Motivating the students
Parents and students	-Client of the education system, some formally part of local school council	-Participate actively in the school -Assist with day-to-day activities

Source: Greenland Primary and Lower Secondary School Act 2017, Government of Greenland. Author's translation

Decentralization has allowed local authorities and schools a greater degree of freedom to respond to diverse and local demands. Individual schools can formulate programs and school visions, missions and values with a high degree of autonomy. There are no requirements from the central or decentralized level to the existence or content of these, other than they must fit within the overall intentions of the Education Act and the municipal by-laws. Given the multilevel governance structure in the education system, the division of roles and responsibilities is a continuous matter of debate. Tension exists between steering and control on outcomes by the national government on the one hand, and the autonomy of the municipalities and schools regarding the delivery of education on the other. The central government acts as regulator for the education system, setting the legal framework and rules within which increasingly autonomous schools must operate. Alignment in multi-level systems is a major challenge, particularly in those most decentralized systems (Hopfenbeck et al., 2013; Blanchenay, Burns & Köster, 2016). Apart from the increased role for schools and local administrations, there is a host of other stakeholders (including teacher unions, teachers, parents, the media and students themselves, see also Model 1) that play a significant role. When it comes to setting a national education strategy, negotiation and dialogue have therefore become important governance mechanisms.

The central level is required by law to carry out evaluations, collect and disseminate knowledge in order to strengthen the efforts of the municipal council in the field of primary school and lower secondary school to maximize resource utilization. In practice, due to an expressed lack of resources and capacity by the Agency of Education, this is limited to the collection and validation of data in the form of reports, standardized test results and final examination results. As shown in Table 3 and 4, the central, regional and local level of the governance system all have supervisory obligations. These obligations, however, are not specified in content nor frequency, other than what is stated written in the Greenland Primary and Lower Secondary School Act 2017. These obligations are summarized in Table 3.

Table 4. Supervisory obligations between governance levels

Central level (Ministry and Agency of Education)	**Regional level (Municipal administration and Board)**	**Local level (School board, consisting of parent representatives)**
§ 37. The Greenland Government supervises the municipality administration of	§ 43. The municipality council has the overall responsibility for the municipal school and ensure	§ 47. The school board carries out its activities within the goals and framework set out by the

this Act. Sub-section. 2. The Government of Greenland may require municipal information deemed necessary to carry out its duties under this Act.	that all children of school age in the municipality are enrolled in public school or receive an education commensurate with what is usually required in primary and lower secondary school. The municipal council sets goals and frameworks for the school's activities. The municipality council regularly supervises the activities of the schools, including in relation to the school's compliance with the provisions of the education act.	municipality council, and shall moreover supervise the activities of the school.

Source: Greenland Primary and Lower Secondary School Act 2017, author's translation

The regulation and supervision structure of the Greenland education system reflects the traditional forms of education regulation elsewhere, known as the bureaucratic-professional model,[4] which is based on arrangements such as control of conformity to rules, the socialization and autonomy of the teaching professionals and the joint regulation regarding questions of employment or curriculum.

The supervisory obligations by the central level is hampered by the fact that the Agency of Education is on one hand obligated to supervise the quality of teaching and on the other have the responsibility for capacity development and professional learning of the teachers and schools. This construction in practice, results in the entire management and supervision of the school system resting on reports by the local school board and statistics without a professional, external authority to question the quality and validity of this information. Nor are there formulated any follow-up or support mechanisms following the results of a supervision in a school with 'underperformance', or formulated any threshold for when a school underperforms. Apart from the formal supervision, centrally appointed examiners perform indirect supervision.

According to the Greenland Primary and Lower Secondary School Act (2017), local school boards, consisting of parent representatives, carry a significant role and responsibility, when it comes to the management and supervision of primary and lower secondary schools.

> There are probably some things about the board work as in which the board is given quite much power in relation to the regulation and such. But where the boards do not really manage to take that power. So, if a board wanted something, really wanted, then there are really many options for the board (Interview, Chairman of School Board, School X).

The local school council, a construction introduced in 1997, are to present an annual report to the municipality council. The purpose of the annual report is to strengthen the ability of the municipality council to carry out their supervisory obligation. The annual report documents the municipality school system and shall give the municipality council the foundation for assessing the academic level at the municipality primary and lower secondary schools and the opportunity to intervene if necessary (Qeqqata Municipality, by-laws, author's translation).

> The only kind of supervision we perform, is actually based on information from the school management. And we have not taken the initiative to come and observe anything, so it has been

> driven exclusively through the information we receive from the management on how it goes. (Interview, Chairman of School Board, School X)
>
> They (the school board) are in lack of both insight and skills to assess almost all the details of a school leader's tasks. And that is on a regular day. On difficult issues or assignments, e.g. follow up on municipal guidelines, there is no help for them. Finally, they're in no position to question any disposition from either school leadership or municipal direction. That's bad! (Interview, School leader, School Y)

The above interview excerpts illustrates an international trend; in countries where school decentralization reforms have granted significant power to school level councils including parent representation, researchers have found that parents often do not feel empowered to challenge the views of school directors and teachers, given income and class disparities (Bruns & Schneider, 2016).

The school principal is responsible for the day to day operation in the school and internal quality monitoring, and according to above interview excerpts, provides all material and information for which the supervision structure rests upon. One school leader has experienced a significant lack of assistance from the authorities:

> Supervision as a concept is completely absent in our line of work. If, as a school leader, you ask for advice, counsel or guidance you will likely get a non-answer or a reminder on municipal goals. The idea of dialogue on a specific difficult matter seems not to exist. You're on your own! I have not experienced anyone perform supervision on a leadership basis. Nobody seems to want to know or learn what is actually going on at the schools, much less in the classrooms. Once the guidelines have been formulated the general perception seems to be that they're already in effect. Well, it doesn't work like that! (Interview, School leader, School Y)

Summary of Governance Structure

Practice and governance structure are defined partly by the interrelationships (see also Model 1) in the governance system and society as a whole. The decisions and practice are influenced by the networks and context the stakeholders find themselves in. Every vital part of the system – school, community, municipality, and government – contributes individually to the system as a whole to drive improvement and success.

According to Fazekas and Burns (2012) policy making needs to be aligned to its governance structure and take into account the respective responsibilities of different agents. When reorganizing decision making and strengthening local capacity, education systems should have capacity at the ministry level, and support at regional and local levels to drive large-scale improvements (OECD, 2015). One can discuss if that is the case in Greenland. The governance structure seems to have been designed for a bigger society, and so will require a greater level of capacity at all governance levels. The respective responsibilities throughout the system is distributed between governance levels and offers a high degree of autonomy. However, this high degree of autonomy needs to be accompanied with the required capacity, support mechanisms and knowledge to fulfill the intentions of policy. Due to the composition and capacity of the local parent school boards to carry out the responsibility, the foundation of which the supervision of quality assurance rests upon should therefore be questioned.

> The legislation has not looked at practical possibilities and does not fit into the Greenlandic conditions. It is not adapted to everyday life (Governance meeting observation November 2016, comment by Kujalleq Municipality).

Capacity, both in the form of staff and funding, varies greatly among the five municipalities, as the municipalities with the lowest populations also have the highest numbers of settlement schools.[5]

Drivers For Change – How Does Greenland Work for System Improvement?

In the previous section the focus was the governance structure, the roles and responsibilities of agents at the various levels of the education system. In this section, the analysis focuses on how the various stakeholders address quality and what types of strategies for planning and implementation have been used to set a direction, to ensure capacity and ownership at local level, and lastly how these efforts are monitored and evaluated.

Fullan (2011) defines drivers as policy and strategy levers that have the least and best chance of driving successful reform. A right driver is identified as *a policy or initiative* that ends up achieving better measurable results for students, while a wrong driver is identified as a deliberate policy that has little chance of *changing status quo and* achieving the desired result. The right drivers are effective because they work directly on changing the culture and practice. Fullan (2011) further states intrinsic motivation, instructional improvement, teamwork, 'allness' as the crucial elements for whole system reform and aligning the goals of reform.

According to McQuillan (2008: 1781), all education reforms assume that some *system*, be it a classroom, school, district or nation, is ineffective. The root cause of the ineffectiveness, depending on where in the hierarchy one sits, seem to be a matter of how one should frame the discussion – in terms of people or numbers. As expressed by a school teacher:

> I do not believe that the political ambitions are compatible with the reality of the school. I think those politicians should try to get out and experience what a public school is! And it does not matter if we speak the highest political level or the municipal level. They set some goals, but they never come out and see the reality. It quickly becomes a matter of numbers and percentages, and the numbers they should preferably be black on the bottom line (Interview, School teacher, School C).

The following sections look at what lead drivers and underlying theory of action has been employed over the last 15 years of education policy in Greenland.

Objectives, Accountability Structures and Evaluative Thinking

According to the OECD (2015) the key to guide education policy improvement is to establish a small number of clear, prioritized and measurable goals that can drive the system for all those involved. Fullan and Quinn (2016) likewise identify accountability as a driver for system improvement, however for that to work, there needs to be a culture of evaluation in the system. It must make sense to evaluate. To evaluate, objectives must be formulated. So, what types of objectives are being set, what is being monitored and for what purpose? Evaluation culture and an intent to pursue overall strategies is expressed as a requirement by the central level in the below excerpt, but there is no further information on how this should be done.

> Resources allocated to education must be exploited optimally to consistently pursue overall strategies. This requires a strong evaluation culture that can continuously inform the administrative

> and political level of the impact of the efforts (Ministry Education Strategy, 2015, author's translation).

An interim evaluation report (2010) for the 2002 *Atuarfitsialak* reform revealed that there is much data that describes public schools from many perspectives, however, that data was either difficult to access, often not on a digitalized form, or presented in such a way that makes it difficult for policy makers to analyze the numbers and make decisions (Inerisaavik, 2011).

Specification of policy objectives and means is one of the factors influencing successful implementation (Mazmanian & Sabatier, 1983; Blackmore, 2001). The Ministry of Education has since 2005 developed education strategies and plans on system and national level. A direction is set from the central level with a framework legislation and an overall education strategy. However, this direction is not defined or clarified further. A review of 30 years of education policy in Greenland suggests that educational reform work has lacked objectives and strategies to guide the changes and implementation forward in the system (Lennert, 2014). As a result, there has been no national monitoring of the education system prior to the 2005 Education Plan. The only current system-level monitored objectives for the primary and lower secondary school consists of quantitative output targets, e.g. proportion of cohorts continuing directly in the education system and the proportion of trained teachers. A wish for more elaboration on the centrally set direction and goals was expressed by a municipal board member, as there is no clarification of what is meant by quality, and therefore makes the concept subjective.

> What is behind the statistics and numbers? What is it that we need to work on? We all have the same overall goal, that is better outcomes for our kids. But how we reach our goals, is the question. We all have goals, but we need to have a closer look at the implications of these goals and how to reach them (Interview, Municipal Board Member).

Naalakkersuisut (the national government) states in their Education Strategy (2015) that it is their intention to strive for more people completing an education and therefore better able to support themselves and their families. In addition, education in Greenland is seen as a means of a self-sustaining economy and independence; the overall objective of the education system is "for cohorts who complete primary and lower secondary school by 2015, 70% shall obtain training/education leading to a vocational or professional qualification before the age of 35" (Ministry Education Strategy, 2015: 8).

The stated theory of action can be said to position the rationale of education for the sake of society, not the individual. This contradicts on some level the 21st century knowledge and information society Greenland is situated in and the value of knowledge (especially Indigenous knowledge[6]) in itself.

The Education Strategy (2015) forms the basis for Greenland's cooperation with the EU through the Partnership Agreement (European Commission, 2014).[7] The Partnership Agreement provides a responsibility to ensure that the level of education is raised, that this is done effectively and that the efforts are continuously evaluated. The agreement has meant that the Self-Government of Greenland has focused even more on results and progress in education, as the Partnership Agreement has a reporting obligation on a set of indicators. Interviews with municipal staff and board members indicated a lack of inclusion in the construction of the indicators and a wish for better consultation processes.

> Better consultation processes are needed. We would like to be consulted on how we'd like to govern our schools, because we are the ones in charge of the operation, the implementation and supervision. Maybe, if they listened more to our needs we would all end up with a solution that we were satisfied with. If they listened more carefully and asked for what information we have and used that in their planning. Better cooperation on top-down and bottom-up approaches. From the politicians to the ones who carry out the change in the field and vice versa. That connection needs to be better (Interview, Municipal Board Member).

In Europe the traditional form of education regulation through rule-governed processes, centralized legal frameworks and shared assumptions has been shifting to and been replaced by goal-governed steering of outputs and outcomes, accompanied by the monitoring of targets (Maroy, 2008). The 2002 Atuarfitsialak reform introduced standardized national tests in the subjects Greenlandic, Danish, English and Math, and School Quality Reports to monitor the quality of schooling. At the same time, key objectives on outcomes related to the standardized tests were not specified, and the central or municipal level have not established follow-up mechanisms, like high-stakes incentives or mechanisms to support struggling schools, that are characteristic of accountability policies. As a consequence, one could argue that Greenland has only moved "half-way" toward accountability.

The intentions with standardized tests, differentiated teaching and ongoing evaluation, while looking good on paper, have not been fully implemented, as illustrated by a school teacher:

> I simply don't think that we are good enough in conducting ongoing evaluation. We set up some pointers, some benchmarks with the standardized tests, the final examinations, and midterms, so we have some data there. The ongoing evaluation, however, we are not good enough at that. We are not good enough to state and write down the goals of an activity, and determine how we measure that when we are done (Interview, school teacher, School C).

A focus on external accountability is further exemplified by an expressed wish from the central government to introduce international comparable tests as a means to raise the quality of education and teaching.

> Naalakkersuisut wishes to introduce the use of international comparable tests to ensure a high quality in primary and lower secondary schools. This will be an important tool for developing the primary and lower secondary school in the future (Ministry Education Strategy, 2015).

However, the focus and needs of teachers are more on internal accountability and student-centered evaluation.

> If you go over to the municipality and ask, they will say that we must have the highest marks in the country. But I look at it differently, because I'd rather have a look at the starting points of the students and how much they have improved. I think that is more interesting, I think it's impossible to compare cohorts because there are too many different factors that play into that. It's not two pieces of wood, it is people we work with (Interview, School teacher, School C).

The interview excerpts and analysis illustrate the differences in *shared depth of understanding* across the governance levels, namely between classroom, municipal and central levels of government on how the primary and lower secondary school system should be monitored and with what indicators.

Conclusion

The findings illustrate what seems to be a historical lack of coordination in connection with the implementation processes in regards to educational reform, where there has been no tradition of extensive cooperation and planning across municipalities and central government, or a solid tradition for monitoring and conducting utilization focused evaluations. Complexity theory and developmental evaluation, to a large extent, focus on the constructive and evolving interrelationships between the key stakeholders at various levels of the education system. Relationships between the central administration, municipalities and school leaders have historically not been particularly good, but according to the data collected, there is a turnaround in progress. These relationships will be key in shaping a constructive policy environment and setting a clear and coherent framework for the school system in Greenland.

Schools and education systems, are also structure-determined as they adapt to changes within social, economic, and political contexts while internalizing, learning from, and evolving from systemic memory inherent in the system. As mentioned in the introduction, the formal education system is young in Greenland, which is also illustrated by the education level in population.

The challenges in the Greenland education governance system touches upon all seven multi-level governance gaps (see Table 2). The Greenlandic education system is an example of a complex dynamic system, whose elements are isolated from one another, and the policy making is not aligned to its governance structure and the respective responsibilities of different actors are not taken into account. The multilevel governance structure seems to complicate the constructive planning and steering of the primary and lower secondary school system due to a lack of clarity (and possibly a lack of agreement) about roles and tasks, as strategies are not consistent nor guiding (administrative and objective gap). Whether the planning of education reform relies on an evidence-based understanding of the characteristics of the Greenlandic school system and is constructed in such a way that reform contributes significantly to improved student achievement and well-being, can be questioned (policy gap). The governance structure is also fragile due to limited staff on all levels with great responsibilities not limited to education (administrative and capacity gap), with close links to the small and scattered populations in the municipalities that puts pressure on the funding of the school system (fiscal gap).

The purpose of national education strategies and plans is unclear due to the simple and positivistic nature of monitored indicators. Existing strategies are not constructed to guide change, and there is no alignment between governance levels. At the system level, no theory of action or plan has been formulated on how to raise the quality of the primary and lower secondary school. Stakeholders with responsibilities in the quality of primary and lower secondary school area formulate their own strategies and objectives, which are not held up on a major theory of action or strategy. This causes mismatches and lack of coherence in the objectives, and resulting priorities, formulated from the central level with the rest of the system (e.g. the Teacher Training College, the municipalities, and the schools). The lack of alignment across a multilevel governance system therefore makes negotiation, cooperation, and coordination a necessary and important tool.

Apart from the centrally set curriculum learning outcomes, no standard or objective is set on the level of quality of the standardized tests or final examinations. There is a lack of clarity in what is meant by the quality of the primary and lower secondary school, how to raise or increase quality and by what means. The nationally monitored objectives say nothing about quality. Whether

students continue directly from lower secondary schooling in the education system is often influenced by the limited capacity of education programs, number of available apprenticeships, and ultimately not the results of the final examinations. To use the proportion of trained teachers as a quality indicator is unfortunate, as practice is more complex, and the quality of schooling is influenced by a variety of factors that cannot be reduced to one indicator – trained teachers.

Whether the current supervision structure serves its purpose should be questioned (accountability gap). Following the international shift toward a post-bureaucratic 'governance by results' model (Maroy, 2008), Greenland has in the past 10-15 years been increasingly focused on results in the monitoring of the system. This article suggests that developments in Greenlandic policies demonstrate the difficulties of navigating the tensions between promoting two key aspects of accountability—internal and external and the challenges of building capacity for both. There is a great focus on external accountability and results. Without a foundation on internal accountability, external accountability drivers have limited effects (Abelmann et al., 1999). There is a strong need for a focus on internal and collective accountability and an incorporation of qualitative evaluation initiatives in individual institutions to get indicators of what works. A dual focus on both performance and impacts will allow for a critical assessment of the extent to which and whether goals are met.

The current situation in Greenlandic education policy is characterized by the lack of basic analyses, studies of developments in the field, the effects of different actions; on the other hand, a considerable amount of positivistic information is gathered in the form of statistics (information gap). This total reliance on statistics is most likely linked to lack of evaluation capacity and evaluation culture. The formulated objectives, and the monitored indicators, are output goals that assume that the foundation is well functioning. However, Greenland has an education and school system in strong need of development and quality improvement. A blind focus on desired output goals is therefore not sufficient in driving the change forward. Without evaluations that look at contexts and other variables such as day-to-day teaching, it is difficult to see which initiatives lead to what results. Supervision and monitoring only looks at intended consequences. What are some unintended consequences of policy?

In 21st century complex systems there is a need for continuous innovation, assessed through co-learning (within and across classrooms, schools and municipalities; and school to municipality to ministry). Structures and networks to do so in Greenland are limited. There is therefore a strong need for a type of data management that can track emergent and changing realities, and feeding back meaningful findings in real time to the practitioners. A way of thinking characteristic of complexity and developmental evaluation (Patton, 2011).

Systems thinking, complexity and developmental evaluation together offer an interpretive framework for engaging in sense making (Patton, 2011). Sense making across governance levels and classrooms is identified by Fullan and Quinn (2016) as an imperative factor for successful implementation of education reform. One thing is the coordination and cooperation between governance levels, institutions and key stakeholders to secure a coherent framework and infrastructure. Another is implementing the wanted change in the classroom and working towards the desired outcomes. To create conditions for system wide development there is a need for a discussion between the governance levels and all relevant stakeholders on the root causes of the current conditions of the system and how to address them. A discussion centered on how to raise

the bar for all and what success and quality look like in practice. On national, municipal, school and classroom level. General principles, guidelines and frameworks to clarify roles, tasks and expectations should then be formulated in cooperation and consensus.

Notes

1. Looking at the population over 16 years, a development of approx. 6 percentage points over the past ten years.
2. A more detailed discussion of a similar complexity model of a school can be found in Johnson (2008).
3. Greenland Education Act 2002, it has since been amended (2012, 2017) with minor changes. The pedagogical intentions, structure and governance remain as it was.
4. The model brings "state, bureaucratic, administrative" regulation and a "professional, corporative, pedagogical" regulation together (Barroso, 2000).
5. Avannaata Kommunea, for instance, has a population of 10.600 and 26 schools (2018). At the same time, it is the municipality that is the most challenged by an extensive geography (stretching from Siorapaluk to Ilulissat) and complex infrastructure. Two settlement schools were closed in 2017.
6. While acknowledging that there are ongoing debates in both academic, applied contexts and among Indigenous Peoples about the appropriate concept to use when discussing knowledge and indigeneity, the definition by Bohensky and Maru (2011) is provided: *Indigenous Knowledge is holistic and often encompasses interrelationships between diverse phenomena, including social and environmental phenomena.*
7. A full description of the Partnership Agreement and monitored indicators can be read in the annual planning and implementation reports conducted by the Ministry of Education: http://naalakkersuisut.gl/~/media/Nanoq/Files/Attached%20Files/Uddannelse/Engelsk/Annual%20Work%20Plan%202017.pdf

References

Abelmann, C., Elmore, R. F., Even, J., Kenyon, S., & Marshall, J. M. (1999). When accountability knocks, will anyone answer? Place of publication not identified: Consortium for Policy Research in Education, University of Pennsylvania, Graduate School of Education.

Barber and Mourshed (2007). How the world's best-performing school systems come out on top. McKinsey & Company.

Blackmore, M. (2001). 'Mind the gap: Exploring the implementation deficit in the Administration of the Stricter Benefits regime', Social Policy and Administration, 35, 2, 145-162.

Bohensky, E.L., & Maru, Y. (2011). Indigenous knowledge, science, and resilience: What have we learned from a decade of international literature on "integration"? Ecology and Society 16, 6.

Burns, T. and F. Köster (eds.) (2016). Governing Education in a Complex World, Educational Research and Innovation, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264255364-en.

Burns, T. and H. Wilkoszewski (2013). OECD Project on Governing Complex Education Systems. in ITB Info Service 12/2013, p. 23-26.

Bruns, Barbara and Schneider, Ben Ross (2016). *Managing the Politics of Quality Reforms in Education Policy Lessons from Global Experience*. The Learning Generation Background Paper. The Education Commission.

Charbit, C. (2011). Governance of Public Policies in Decentralised Contexts: The Multi-level Approach. OECD Regional Development Working Papers, No. 2011/04, OECD Publishing.

Charbit, C. and M. Michalun (2009), Mind the Gaps: Managing Mutual Dependence in Relations among Levels of Government. OECD Working Papers on Public Governance, No. 14, OECD Publishing.

Davis, B., & Sumara, D. (2006). Complexity and education: Inquiries into teaching, learning and research. Mahwah, NJ: Lawrence Erlbaum Associates.

Elmore, R. F. (2004). School reform from the inside out: Policy, practice, and performance. Cambridge, MA: Harvard Education Press.

European Commission (2014). Programming Document for the Sustainable Development of Greenland 2014-2020. https://ec.europa.eu/europeaid/sites/devco/files/signed_programming_document_for_sustainable_development_of_greenland_2014-2020_colour.pdf

EVA (2015). Grønlands folkeskole. Danmarks Evalueringsinstitut. ISBN: 978-87-7958-811-0

Fazekas, M. and T.Burns (2012). Exploring the Complex Interaction between Governance and Knowledge in Education. OECD Education Working Papers. No.67. OECD Publishing, Paris.

Folkeskolen, (2003). "Med børn skal land bygges". Nr.8 28. August 2003.

Fullan, M. (2010). All systems go: The change imperative for whole system reform. Thousand Oaks, CA: Corwin.

Fullan, M. (2011). Choosing the wrong drivers for whole system reform. Centre For Strategic Education. Seminar Series Paper No. 204, April 2011.

Fullan, M., Rincón-Gallardo, S., & Hargreaves, A. (2015). Professional Capital as Accountability. Education Policy Analysis Archives. doi:10.14507/epaa.v23.1998.

Fullan, M., & Quinn, J. (2016). Coherence: the right drivers in action for schools, districts, and systems. Thousand Oaks, CA: Corwin.

Greenland Education Act (2002, 2012, 2017). Government of Greenland.

Greenland Parliament Debates (2002). Fall Session Agenda item 35. Parliament of Greenland.

Greenland Parliament Debates (2002). Spring Session Agenda item 29. Parliament of Greenland.

Hargreaves, A., & Shirley, D. (2009). The fourth way. Thousand Oaks, CA: Corwin Press.

Hargreaves, A., & Shirley, D. (2012). The global fourth way. Thousand Oaks, CA: Corwin Press.

Hopfenbeck, T., A. Tolo, T. Florez and Y. El Masri (2013), "Balancing trust and accountability? The assessment for learning programme in Norway, A Governing Complex Education Systems case study", OECD Education Working Papers, No. 97, OECD Publishing, doi.org/10.1787/5k3txnpqlsnn-en.

Inerisaavik (2004). "Parat til Atuarfitsialak? Rapport af undersøgelse af læreres og skoleleders parathed til skolereformen." Evalueringsafdelingen.

Inerisaavik (2011). Midtvejsevalueringen af folkeskolen november 2010 i Ilulissat Rapport samt status på opfølgningen og initiativer.

Johnson, E. S. (2008). "Ecological systems and complexity theory: Toward an alternative model of accountability in education". Complicity: An international journal of Complexity and Education, Vol. 5, No.1, pp. 1-10.

Lennert, Mitdlarak (2014). *Education in Greenland: an analysis of central parts of the education policy, with special emphasis on the primary and lower secondary school, in the period 1950-2009*. Master's thesis. Ilisimatusarfik, University of Greenland.

Levin, B. (2010). Governments and education reform: some lessons from the past 50 years. Journal of Education Policy. 25(6): 739-747.

Maroy, C. (2008). "Ch.2: The New Regulation Forms of Educational Systems in Europe. Towards a Post-bureaucratic Regime", in Jaccard, P. & Soguel, N.C (eds). Governance and Performance of Education Systems 2008. 13-33. Springer.

Mason, M. (2008). *Complexity theory and the philosophy of education*. Chichester, West Sussex, U.K.: Wiley-Blackwell.

Mazmanian, D.A and P.A Sabatier. (1983). Implementation and Public Policy. Glenview, IL: Scott, Foresman.

McQuillan, P. (2008). Small school reform through the lens of complexity theory: It's "Good to Think With". Teachers College Record, 110(9), pp. 1772-1801.

Ministry of Education (2015). Education Strategy. Government of Greenland.

Ministry of Education (2018). Education Plan. Government of Greenland.

Mourshed, M., Chijioke, C., & Barber, M. (2010). How the world's most improved school systems keep getting better. McKinsey & Company.

OECD (2015), *Education Policy Outlook 2015: Making Reforms Happen*, OECD Publishing, Paris.

Patton, Michael Q. (2011) Developmental Evaluation: Applying Complexity Concepts to Enhance Innovation and Use. New York: Guilford.

Qeqqata Municipality (2013). By-laws for the administration of the school system in the Municipality of Qeqqata.

Rist, R.C. (2000). 'Influencing the Policy Process with Qualitative Research', in N.K. Denzin and Y.S Lincoln (eds), Handbook of Qualitative Research, 2nd edn. London: Sage.

Schleicher, A. (Eds.) (2012), Preparing Teachers and Developing School Leaders for the 21st Century: Lessons from around the World, OECD Publishing, Paris,

Snyder, S. (2013), "The Simple, the Complicated, and the Complex: Educational Reform Through the Lens of Complexity Theory", OECD Education Working Papers, No. 96, OECD Publishing.

Trombly, C. (2014). "Schools and Complexity". Complicity: An International Journal of Complexity and Education. Vol. 11 (2014), No. 2. pp. 40-58.

Wilkoszewski, H. and E. Sundby (2014), "Steering from the Centre: New Modes of Governance in Multi-level Education Systems", OECD Education Working Papers, No. 109, OECD Publishing.

Yin, R.K. (1982). 'Studying the Implementation of Public Programs', in W. Williams (ed.), Studying Implementation: Methodological and Administrative Issues. Chatham, NJ: Chatham House Publishers, pp.36-72.

3D Heritage Preservation and Indigenous Communities in the Circumpolar North

Medeia Csoba DeHass & Eric Hollinger

We examine theoretical and practical applications of 3D technology in digital and physical preservation of Arctic and Subarctic Indigenous cultural heritage. A lasting legacy of colonialism in the Circumpolar North is the disconnect between local communities and their material heritage housed at memory institutions around the world. While collection methods varied, collecting activity was entrenched in colonial power relations expressed in the "researcher and the researched" paradigm. With diminished access to their material culture, loss of traditional knowledge ensued, which affected both local communities and global discourse. While postcolonial engagements have been exploring avenues for returning collections knowledge to origin communities, geopolitical realities of the Arctic have limited these efforts. The expenses of long-distance Arctic travel and the decentralized nature of communities, the lack of Indigenous-run museums, and the fact that Indigenous belongings are widely dispersed make it challenging to develop lasting and comprehensive approaches. Many museum objects remain unidentified or misinterpreted due to disengagement between Indigenous communities and ancestral possessions. Recent developments in 3D technologies can re-establish origin and descendant community access to collections, develop community-engaged collaborations and offer decolonizing approaches to collection management, acquisition, and engagement practices. Digital 3D models and physical replicas offer alternative modes of access and opportunities for Arctic and Subarctic communities. Rapid development of digitization and replication technologies reveals a potential for empowering community heritage restoration and perpetuation as well as strengthen abilities of distant stewardship institutions to improve access, improve community collaborations and enhance their capacity for cultural preservation.

Introduction

Using new technologies to care for Indigenous collections in museums has a long-standing history in museology. Museum preservation, conservation, and education have all benefited from digitizing collections and using technological innovations to better understand and care for

Medeia Csoba DeHass is an Independent Researcher and Eric Hollinger is an Archaeologist at the National Museum of Natural History, Smithsonian Institution.

collection pieces (Turner, 2016). Yet, using digital platforms to connect museum collections with origin communities based on the principle of shared curation has not yet become a part of standard museum practice (Brown & Nicholas, 2012: 320; Rowley, 2013: 23; Srinivasan et al., 2009). For this reason, community-engaged collaborations that offer decolonizing approaches to collection management, acquisition, and outreach need further discussion to succeed in translating theory into practice.

3D technologies offer great promise to bridge the disconnect between museum collections and origin or descendant communities. Moreover, the separation between Indigenous collection pieces housed at memory institutions (Stainforth, 2016) and their ancestral communities results in a rupture between the tangible and intangible aspects of Indigenous cultural heritage. Strategically using 3D technologies can assist in narrowing, or even eliminating, this divide. On the most basic level, using 3D technologies in heritage preservation consists of creating digital models and printing replicas from those models. When 3D is incorporated into a comprehensive heritage preservation plan that places collaborating with Indigenous communities into its center, 3D technologies can engender, support, and complement physical repatriation. In this context, using 3D technologies does not replace physical repatriation, rather, it serves as one aspect of the repatriation process providing access to ancestral possessions and by extension, to traditional knowledge.

In Arctic and Subarctic Indigenous communities, physical distance and high travel costs limit meaningful physical access to collections and memory institutions. In the past decades, institutions often solved these problems through seeking tribal partnerships and providing access to select groups of Elders and knowledge bearers who traveled from remote areas of the Arctic to spend a few days with the collections (Crowell et al., 2010). The increased interest in developing partnership with Indigenous communities was spurred in the United States by federal repatriation legislation requiring museums to inventory their holdings, consult with tribes and repatriate specific types of collections to federally recognized Native communities, including those in Alaska. Those community members visiting the ancestral possessions carried knowledge about them back to their communities as information about the existence of Arctic collections became available. In the past decade, with growing assertion of Indigenous self-determination in Arctic and Subarctic regions, Indigenous artists and historians, tribal organizations, and Indigenous communities took matters into their own hands and systematically explored well-known collections. As knowledge of these collections spread from community to community, specifics on what these collections contained was also shared. Bringing representatives to museums was a novel approach to addressing the acute problem of disenfranchised collections and imbuing them with cultural knowledge. At the same time, travelling to collections was still limited to a few participants and entailed a limited experience. As we discuss below, 3D technology provides alternative heritage preservation practices that allow more community members to have a personal engagement with the pieces with less gatekeeping or without a limited selection process. Moreover, 3D allows for the presentation of Arctic Indigenous material heritage in culturally appropriate contexts that are governed by community specific understanding and interpretations.

Colonialism as Arctic Legacy

Colonialism affected Indigenous peoples and cultures around the world including the Arctic and Subarctic. As communities continue to grapple with the lasting legacies of postcolonialism that are both overarching in general effects and idiosyncratic to the location, they draw on their own culturally specific coping mechanisms and strategies. In Arctic and Subarctic Indigenous communities, the process of reconnecting and meaningfully reincorporating traditional items now housed at museum collections is complex and fraught with challenges that are rooted in the colonial history of the Arctic. As in most colonial encounters, travelers, the military, missionaries, collectors, and members of the colonial administration removed material culture from Indigenous communities across the Arctic. Some of these removals were negotiated and obtained legally, but many of them were not (Cole, 1985; Killion & Bray 1994; Pullar, 1995). Whether it was taking items from graves and ceremonial places, trading them below value through local people who had no authority to sell them, as for instance in the case of clan ownership; or collecting items that were destined to be destroyed according to local conceptualization of these items' role in the universe, the outmigration of culturally significant material culture from the Arctic and Subarctic was relentless and pervasive (Cole, 1985; Lindsay, 1993).

Both ethnographic and archaeological pieces were removed from Arctic communities and assembled as collections in museums and heritage institutions. Most of these memory institutions were located in non-Arctic regions of the world, often in different nation states and on different continents than the origin communities. While knowledge about the existence of these collections was preserved in the memory institutions where curators, researchers, and museum personnel cared for these Arctic Indigenous items, the connection to the origin community was often lost. The detachment from the origin communities was further exacerbated by the practice of inter-museum trade that aimed at diversifying collections to have a fuller representation of the World's cultures. As the cultural knowledge about a specific piece or a group of items was lost, pieces that formed a cohesive intellectual unit based on Indigenous epistemology were separated and dispersed around the world. The detachment from the communities that produced and meaningfully interpreted these items created knowledge loss on both local and global scales. Local communities no longer knew about the existence of the material heritage of their ancestors, whereas heritage institutions were no longer cognizant of the intangible heritage attached to their collection pieces they were caring for.

As with all aspects of post-colonialism, national and international legislation and agreements aimed to address and ameliorate harm caused by past collection practices helped, but did not fully rectify the lasting legacy of cultural loss on the local scale. U.S. Federal repatriation legislation (1989's NMAI Act and 1990's NAGPRA) and the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP Articles 12 & 31) of 2007 addressed issues of Indigenous material cultural heritage including preservation and repatriation (Hollinger et al., in press). Although, with the exception of rare cross-border cases, U.S. laws do not affect international collections, UNDRIP is not a legally binding international agreement, and Canada lacks national repatriation legislation, repatriation of certain material Arctic Indigenous heritage can still take place (e.g. Grande 2017: 270-273; Mullen, 2003). Under U.S. legislation, only items in specifically defined categories are eligible for repatriation. These include human remains, funerary objects, sacred objects and objects of cultural patrimony and only those items shown to have been illegally

alienated must be returned. While physical repatriation is an important step in reuniting the once removed material heritage with its origin or descendant communities, in the Arctic and Subarctic regions the situation is complicated by the challenges of Arctic realities.

Items that are physically returned to Arctic regions and into the custody of the legally designated representative of an Indigenous origin or descendant community may still never be reunited with the members of the said community (Csoba DeHass & Taitt, 2018). Many Indigenous communities in the Arctic are decentralized in terms of geographical and political autonomy. Villages within a cultural region may spread over thousands of miles and legal representation in NAGPRA affairs can lie with several different organizations and appointees. As there are very few local museums and repositories in villages and rural, off-the-road Alaska Native communities that are equipped to care for repatriated items, these pieces often end up in larger museums, repositories, and memory institutions in Anchorage or in regional hubs.

The cost of travel in the Arctic is exorbitant and continually rising. Large distances, limited travel options, high price of fuel, and the culturally specific tendency for travelling in groups can all pose challenges, and as such, make it difficult to access repatriated collections that are deposited at centrally located facilities (Csoba DeHass & Taitt, 2017a). While "centrally-located" may imply easy-access by most stakeholders, in the Arctic, it often translates to the opposite. When people travel from rural communities to hubs, they often do so for a specific reason such as shopping, medical appointments, board meetings, or specific events. While these trips can accommodate meeting with family, travelers usually have very little free time. If people do make it to a heritage institution, they do not have more than a couple hours to spend with the repatriated pieces. As a result, most community members are either unaware of or have never connected with the repatriated items. In essence, community members often do not have easy and sustained access to these repatriated collections. While repatriated items are legally in the possession of the descendants, there is no meaningful engagement that allows for the continued reinternalization of the items as a community. This lack of repatriation to the cultural context detracts from the practical utilization of intangible cultural heritage as a source of traditional knowledge that informs contemporary Indigenous self-determination in the Arctic.

A reality of the legal and administrative organization of Alaska Native entities, including regional associations, village councils, and corporations, is partially due to the Alaska Native Claims Settlement Act (ANCSA) of 1971 and Federal Indian policy. Just over 40% of the 562 federally recognized tribes of the United States are located in Alaska (Williams, 2009: 2). In terms of heritage preservation, this translates to a great deal of autonomy from other tribal entities when it comes to decisions regarding material heritage. As there is no overarching policy either in Alaska or, on a more general level, in Artic regions that are jointly created and adopted by most Indigenous organizations and entities, there are significant differences in terms of access, involvement, and input when it comes to working with collections at memory institutions.

Museum Practices Preceding 3D Technology

Community outreach and museum programming to collaborate with origin and descendant communities predates digitization and digital technologies used for preservation. Cultural revitalization has been a major driving force behind forging partnerships between Indigenous communities and memory institutions (Fienup-Riordan, 2005). Printed catalogues of 2D images

were often widely shared with communities in the hopes of creating long-lasting connections, despite the fact that the cost of printing high resolution color photographs seriously limited the number of copies that could be produced.

The reburial movement of the 1970s and 1980s that culminated with the passage of federal repatriation legislation in the form of the National Museum of the American Indian Act in 1989 and the Native American Graves Protection and Repatriation Act in 1990 brought a paradigm shift to museums with the idea of physical repatriation that is not merely a possibility but a requirement (Hollinger et al. in press). Museums were obligated to inventory and share information about their collections with communities. Collection doors gradually opened to origin and descendant communities (Eaton, 2009) to work directly with collection pieces. As communities started to come to terms with the idea of their ancestral heritage being returned as well as learning about the everyday museum reality where material heritage is scattered around the world in various collections, the key concept of access emerged (Haakanson, 2015).

Knowing what is in a collection is challenging for both Indigenous communities and curators alike, although for different reasons. The former does not know where their heritage pieces may be located, while the latter may not fully be aware of what they have in their collections. For this reason, it is easy to see the appeal of digitizing basic catalog information that can be made available to the greater public online. Having relatively easy access to the basic collection information has the potential to greatly increase access, yet it is very unlikely to happen when such databases are not curated. Internet-based database search is a learned skill that most end users need to develop. Curated digital exhibits and digital humanities projects, regardless of their level of interactivity, can offer guidance on the nature of collections while drawing attention to certain items. The growing interest in curated digital projects are centered on harnessing the power of easy access and wide-reach that can yield rich network and metanetwork connections (Glass & Hennessy, in press). Yet, with Indigenous collections, culturally inappropriate access to material heritage remains in the center of the discourse (Anderson et al., 2018: 23; Christen, 2009; Hennessy, 2009; Were, 2014). The challenge of balancing knowledge-sharing, digital preservation, and culturally appropriate access is far from being resolved, partially, due to rapid developments in technology that require constant re-interpretation of previous agreements and best practices.

The widespread availability of using 3D technology for heritage preservation is largely possible due to the lucrativeness of the video gaming industry that continues to be the push behind ongoing, rapid technological development and making hardware and software affordable to the mass market. In heritage preservation, 3D technology can cover a variety of applications. It has been used for creating digital models of buildings and landscapes that were threatened by sociopolitical realities (Zamani project, 2015). In addition to preservation it can also digitally reconstruct historical structures (Hess, 2013; Neumann, 2013; Younes et al., 2017) and virtually bring information to users about historical structures from around the world (Levy & Dawson, 2006). Archaeology has been using 3D for both site and artifact documentation for decades. 3D laser scanning is particularly amenable to the hard-surface material archaeological excavations produce and has been used to document entire collections. Unlike archaeological collections, ethnographic collections that often consist of soft material and composite pieces are more of a challenge. Digital 3D models, particularly when combined with augmented reality, allow for cultural

contextualization and can offer new opportunities for collaborations that bring together culturally appropriate outreach, preservation, and place-based education.

In addition to creating 3D digital models in origin communities or in collections, printing has also been used as part of a community engaged heritage preservation strategy. With permission from origin and descendant communities, physical repatriation of material heritage can occur alongside digital 3D preservation and printing replicas of the original items (Hollinger et al., 2013; Hollinger & Partridge, 2017). While a replica can remain with the memory institutions and be used to support institutional mission, original pieces return to their communities. The practical applications of 3D printing in a heritage preservation context suggest a broader impact as each Indigenous community internalize the concepts of 3D printed replicas through their cultural logic and decide on their appropriate use.

3D Digitization and Replication Technologies

3D digitization and replication technologies offer new and wider opportunities for addressing cultural heritage preservation and perpetuation issues. 3D digitization adds to the positive attributes of 2D digitization by making objects more informative then merely a collection of 2D images. In the past, viewers would have to flip from still image to image on a CD or other media to experience different perspectives and angles on a single object. Photos taken for documentation of an object or for use in a publication often omitted details that were significant for origin community members (Csoba DeHass & Taitt, 2017b). The inside of a hat, the weave used to finish off the rim of a basket, or the carving marks on the back of a mask carry important cultural information that are difficult to access through 2D images. With 3D digital models the user can turn and spin an item and experience the changing light and shadow of different views as if the object were in their hands. The model can also be enhanced and manipulated to highlight or bring out features that are difficult to see even on an in-hand original. Multiple viewers can experience an object simultaneously thousands of miles from one another and can remotely offer comments and correction to the record of the item. In the case of models produced using CT-scans, even the interiors of objects, invisible by any other means, can be made accessible to the viewer revealing information critical to understanding its manufacture or use (Hollinger, in press).

In addition to narrowing the distance problem, digital 3D models offer the ability to access items that may be problematic for handling. Fragile items at risk if moved, or items that require climate controlled or high security conditions, can be examined in a 3D model form repeatedly without further risk to the object. In some cases, the objects themselves may pose a health hazard to those handling them because of pesticide treatments or hazardous substances applied during their original manufacture. For instance, the bright red paint seen on many objects from the North West Coast is cinnabar-based, mercury sulfide, which poses health risks for handling. Still other items may have an issue when direct physical contact or proximity to an item poses spiritual hazards. Access to 3D digital models offers options for experiencing the items without compounding the risks to the objects or to the handlers.

The use of 3D digitization and replication can also be used to supplement the repatriation process. At its most basic level, the term 'repatriation' means the return to the country of origin and it has been used to refer to spies, illegal immigrants, POWs, and stolen artworks. In the context of cultural heritage, it has usually been reserved for the tangible human remains and objects being

returned through a legal means for reburial, use in ceremonies, or other purposes of the descendant community whose rights are restored in the process. These returns are complete transfers of ownership and control of material items and remains and anything short of that complete control is viewed by some as something less than repatriation (Enote, 2013).

But the term 'repatriation' has also been applied to processes of returning copies of archival records and photographs (Christen, 2011; Krupnik, 2000) or 2D digital images of collections and records (Bell et al., 2013). These forms of information sharing by museums have all increased with the aid of digital technologies, and although they do not usually entail full restoration of ownership and control, they may still be best viewed as forms of digital repatriation. 3D digital files, as surrogates of physical items, can also be grouped in this approach.

In addition to the opportunity of being part of the repatriation process, Indigenous communities also see the benefit of 3D modeling. Repatriated items that are entrusted to a repository outside of the origin community due to lack of appropriate local facility and collection care can be 3D modeled and shared with community members. Engaging with a 3D model or printed replica provides personal access to ancestral heritage embedded in the original piece. When discussed within the community, the series of personal experiences can lead to a collective interpretation of the repatriated piece. Through these processes, the repatriated items can be reintegrated into the cultural reality of the community, despite fact that they are stored at a remote location.

In all its forms, digital repatriation complements and has the potential to go beyond physical repatriation to increase community access and aid in cultural heritage preservation. It facilitates access across great distances which are always an inhibiting factor in the Arctic and Subarctic. As access to computing technology and the internet has expanded, so has the capacity for digital communication of cultural heritage information. Indigenous communities and curating institutions have made use of the technology to increase community engagement with distant collections and archival records leading to a number of collaborations aimed at cultural heritage preservation.

Digital 3D Models

Digital 3D models serve multiple purposes in heritage preservation. Due to the relative newness and rapid development of the technology, we probably have not had an opportunity to explore all possible areas and applications of heritage work that can benefit from using 3D. Furthermore, as all aspects of 3D technology are tools that can be used to solve issues and offer up innovations, they are highly adaptable to cultural context and specific project goals.

In general, 3D models have two main parts. The first is the 3D point cloud that serves as the structure of the model. This data set carries the information needed to print replicas, to complete measurements, to run programs that can synthesize a large amount of information such as similarities, to edit the model, or to use the model to reconstruct pieces missing from the physical item. The second part is the 3D model that has a structure and a surface, which makes it closely resemble its physical counterpart. The 3D model can be displayed in a viewer, embedded into a variety of content management software, or uploaded to an online publishing platform such as Sketchfab (2018). Displaying the 3D model does not give access to the point cloud, and as such, does not make it possible to reproduce the item. This is a crucial element of working with 3D models in heritage preservation, as currently there are no best practices developed for 3D technology and Indigenous material heritage. The lack of regulations, guidelines, and widely-

shared best practices regarding 3D modeling of Indigenous heritage makes it one of the most important roles of researchers to thoroughly explain the nature of 3D models and the possible dangers of misuse and misappropriation to the collaborating communities.

The most basic way to experiment with digital 3D models is to use an application, such as Qlone, that renders the model within a few seconds. Many 3D modeling applications use a structure-from-motion algorithm to render the model, but there are also applications, such as Skanect, that pair a scanner with a mobile device. Using mobile applications to create 3D models can limit the size of the item being modeled and the applications may also have limited editing capabilities. Moreover, the geometric accuracy of the models produced with such applications are generally lower than those produced with photogrammetric software or high-quality laser scanners. Yet, the possibility of producing models quickly even by first-time users of the applications makes up for these limitations. 3D modeling applications usually work on smart phones or tablets using the built-in camera to view the physical item. Because 3D apps are highly mobile and can be easily deployed in origin communities, rural areas, in collections, or in the field, they can be an ideal tool to use as the first level of documentation. Some apps do not require cell-phone coverage or even internet to capture the data, which then can be stored on the device and shared via the internet at a later date. In the Arctic, where internet access and finding good quality internet connections are a constant struggle, using a simple 3D app is a good option for community engagement through citizen science, capacity building in origin communities, and supporting community-driven self-representation.

3D scanning, again, is a different type of technology that is particularly well-suited for documenting archaeological and hard-surface objects. Scanners can provide excellent quality when calibrated and used correctly, but their cost can be prohibitive. Learning to use scanners also requires some training, but investing in a scanner and a workshop that teaches several community members how to create digital 3D models can foster further interest in using 3D technology locally. The challenge of 3D scanning is twofold. First, scanning, similarly to most 3D technology, develops so quickly that the required hardware, in this case the scanner itself, can become obsolete within a few years. Replacing the unit and re-training local users may be possible but requires financial investment that may or may not be available. Secondly, 3D scanning does not work very well with soft material, many of which are staples of Arctic Indigenous material culture. Skin, gut, feather, fur, sinew, among others, are all difficult to 3D scan and producing a workable digital model by scanning is nearly impossible.

The third method to producing digital 3D models is using a photogrammetry software such as Agisoft PhotoScan (2018) or 3DF Zephyr (2018). These programs use a series of two-dimensional digital photos aligned through a Structure-From-Motion (SFM) algorithm to create the digital structure. Photogrammetry is particularly useful when working with Arctic and Subarctic collections as it can produce clear models of ethnographic and composite pieces that combine soft materials and hard surfaces. On the one hand, photogrammetry also has its drawbacks. For instance, modeling very small items such as beads or needles, elongated items such as atlatls or spears, and shiny items such as ivory or baleen requires a lot of patience and the ability to accept unpredictable results (Csoba DeHass et. al., 2017: 27). On the other hand, photogrammetry does not require specialized hardware and uses only a digital camera at its most basic application. Many origin communities have access to digital cameras and photogrammetry software can be quite

affordable. The challenge of using it for an extensive outreach and capacity building stems from the fact that using photogrammetry software and taking photos appropriate for 3D modeling has a sharp learning curve that is difficult to master in a day-long workshop. For this reason, active collaboration in project design is a must when creating 3D models of Indigenous heritage. Moreover, articulating clear expectations of the level and frequency of 3D modeling training provided to origin community members needs to be a part of all projects using 3D technology.

Finally, the question of ownership, archiving, access, and use-rights of 3D models and their corresponding point clouds are still a murky territory lacking guidelines and regulations. When working with Indigenous material culture, the question of cultural property rights, the rights of the person creating the 3D model, as well as the Principal Investigator (PI) of the project need to be carefully negotiated. Because point clouds carry the information needed to replicate an object, they carry culturally specific information that needs clearly laid-out protection. Sustainable and secure archiving of the digital files is perhaps the greatest challenge for the future of cultural heritage digitization, one that needs collaborative decisions and the flexibility to accommodate the cultural conceptualizations of the digitized items according to the origin and descendant communities. For this reason, archiving, control, access, and future use of point clouds should be negotiated and carefully laid out as part of the collaborative process. For the same reason, archiving in public digital repositories that provide free access to all end-users is not an appropriate option for digital 3D models of Indigenous material heritage. While a community may wish to use 3D technology to digitally document and preserve information about items located in their possession or in museum collections, they may also decide to restrict access to the model in order to comply with culturally specific restrictions. Other communities may decide that the 3D model does not carry the same cultural meaning as their physical counterpart and subsequently make the models available to the greater public. While the theoretical implications of digital 3D models in the preservation of Arctic Indigenous heritage is still unexplored, the usefulness of the technology that can be deployed to produce digital models in communities and in collections alike is manifold. Consequently, digital 3D models contribute to the development of local heritage preservation practices while also provide information that can be shared across the Arctic.

3D Physical Replicas

While the use of digital models for cultural heritage preservation and perpetuation continues to grow at a rapid pace, the addition of 3D physical replicas is emerging as a new domain and adding to the benefits and challenges of the digital. Once a cultural object has been digitized it is possible to use those files to return back to the physical world using 3D printing and/or 3D milling technology. A physical object, even a replica, has the power to convey a level of realness that a digital model cannot. Therefore, there are many contexts in which a physical object may be preferable for educational and even for ceremonial purposes.

The Repatriation Office of the Smithsonian's National Museum of Natural History (NMNH) in the United States has undertaken a number of collaborations with Native American tribes and Alaska Native villages and organizations to employ 3D replication technology for cultural purposes. In some cases, tribes are asking for 3D prints or milled objects to be produced so they can retain a physical copy of a funerary object which they intend to rebury (Hollinger et al., 2013). Having a physical object is preferable to photographs for handling and teaching about past material

culture and artistic attributes. Items from shaman's graves around the village of Hoonah, Alaska, which were repatriated as funerary objects by the NMNH, had multiple reasons why the community wanted them to be digitally documented and replicated. In addition to being very fragile, many were painted with mercury based red paint which posed a physical hazard to the handler. However, they also posed a spiritual hazard on that many Tlingit consider shamanic items untouchable because they may possess dangerous spirits. Printed and milled 3D replicas allow the community to handle and study their ancestral objects with much less risk to themselves as well as to the original objects.

Printed objects can be made in a variety of materials with different strengths and colors. Some prints can reproduce the color of paints on objects with great accuracy. They can also reproduce movable parts and complex spaces. In the Hoonah collaboration, the Smithsonian printed rattles with the beads still inside them using ct-scan files. In another collaboration with the Central Council Tlingit and Haida Indian Tribes of Alaska, the NMNH digitized two rare spear throwers (*Shee aan* in Tlingit) and then had them printed in a high strength nylon so the prints could be used to throw actual spears or darts. There had been questions as to whether the *Shee aan* were functional or ritual shamanic objects and the approach demonstrated that the throwers were likely functional hunting weapons. The prints were then taken to a clan conference in Sitka, Alaska, where Tlingit students and clan leaders experienced using them first hand. Printed throwers will now be available for use in Tlingit classrooms and culture camps and carvers can study them to revive their manufacture and use. Although not a true repatriation, it is a form of cultural restoration using 3D technology.

The prints can also be painted by hand, with attachments of hair, leather, shell, etc. applied by traditional methods. In the Hoonah/Smithsonian collaboration, dozens of milled and printed objects will be finished with painting and attachments by a team of Tlingit artists from Hoonah. This approach combines the high tech with the traditional arts and techniques and enhances community engagement and control. The project is producing two sets of the replicas, one for the Hoonah Indian Association to display and use for education in Hoonah and one for the NMNH to retain at the Smithsonian for research and education. Showing that the replica production process is not exclusive to large institutions, some of the objects are being milled in village of Hoonah using milling equipment already in the community. Milling replicas can be done using a range of materials including metal and foam, but being able to mill them from the same material as the originals, as can be done with wooden objects, offers the benefit of more closely matching the originals since they might even smell the same. Working with the Tlingit *Dakl'aweidí* clan, the Smithsonian used a laser scanner and photogrammetry to digitize a clan crest hat in the form of a killer whale, which had been repatriated to the clan years earlier as a sacred object and object of cultural patrimony (Hollinger & Jacobs, 2015). The digital files were archived as a form of security in case anything happened to the original, but the clan leader also authorized the Smithsonian to mill an exact replica for exhibit at the museum. Working in close consultation with the clan at every step, the hat was milled from alder, reproducing even the knife marks from the original, and then inlaid with abalone shell, and painted by hand. The replica hat was danced together with the original by clan members in Sitka and later at the NMNH. Although accessioned and on exhibit at the NMNH, an agreement with the clan allows for the replica to be checked off exhibit to be danced as regalia, but it is not considered a ceremonial crest object because it has not undergone a ceremonial dedication process. The 3D models are also viewable on the Smithsonian's 3D

viewer, but the clan leader, to protect their cultural property rights, asked that the models not be easily printable.

Tlingit caretakers of clan crest objects now recognize the potential for 3D digital files to serve as a backup which can be called upon to aid in replacing or repairing their precious ancestral objects (Hollinger, in press; Hollinger et al., 2013). They now frequently request the Smithsonian's assistance with digitizing their objects and archiving the files. In addition to being used in printing and milling, the 3D models themselves can serve as an aid for traditional carvers who were previously limited to 2D photos when called upon to replace an object. The digital files can also be used to recover exact measurements that can be critical in carving an accurate copy. The NMNH recently entered an MOU with the Tlingit *Kiks.adi* clan to scan and then digitally repair a broken hat in the Smithsonian collection and then use the files to mill a new intact hat to replace the original. Again, although not a true repatriation, this is an example of a cultural restoration that is made possible by the application of 3D digitization and replication technology to repair and remake a cultural object which will be formally brought out in ceremony to fully replace the original.

These examples illustrate the great potential for application of 3D technology in the service of Indigenous communities and caretaker institutions that would have been difficult to imagine just a few years ago. As more communities and caretakers come to understand the capabilities of the technology, we are likely to see a boom in the adoption of these tools to aid in preservation and perpetuation challenges. Objects not subject to repatriation laws, whether because they are in private collections, or because they do not fit a repatriation category, may be replicated using this technology. This option might convince private collectors to return the original if they can retain a 3D replica. Similarly, if deemed appropriate by the community, a replica may be made to replace an object that cannot leave a museum. Items too fragile to be loaned by a museum for exhibition could be digitized and even repaired digitally, and then remade for exhibition.

Conclusions

In our discussion we highlighted key concepts and issues pertaining to the role of 3D technologies in the preservation of Arctic and Subarctic Indigenous heritage. It is important to recognize that we are at the very beginning of understanding how each Indigenous community will use these technologies for their locally driven strategic development. Researchers, museum personnel, and origin community members interpret the significance of 3D technologies from their own perspectives. Yet, the goal of reconnecting Arctic Indigenous communities with their ancestral possessions brings all stakeholders together in their shared task to support community-based development and capacity building. 3D technology has the potential to empower communities and support their own decisions of what should be modeled, preserved, printed, and interpreted as a heritage piece. 3D technology also has the potential to deconstruct the researcher-researched paradigm (Isaac, 2015) and place origin communities in the driver's seat in deciding what can be physically or digitally replicated or removed from their communities.

For these reasons, 3D technology should be part of a comprehensive approach to heritage preservation of both archaeological and ethnographic collections. To support the wide use of 3D technologies, it is necessary to develop best practices that are informed by collaboration and community input from a variety of Indigenous stakeholders across the Arctic. By providing a guide

on how to best assist communities in understanding choices available to them through 3D technology, we can also inform policy on the creation and handling of 3D digital models and printed replicas in a way that takes Arctic realities into consideration. It is also necessary to outline the intellectual property and cultural rights regarding 3D points, 3D prints, the manner of creating and processing digital Indigenous heritage material, the way we engage with them as researchers and end-users, and the type of access local communities permit (Magnani et al., in press). Creating culturally responsible collaborative data sharing and curation practices that are developed from local epistemologies will support community well-being through reuniting tangible and intangible aspects of Indigenous heritage. 3D technologies can provide a sustainable heritage preservation network that help better understand cultural connections in Arctic regions while supporting Indigenous rights of self-representation.

References

3DF Zephyr. (2018) 3Dflow SRL. September 19, 2018. Retrieved from https://www.3dflow.net/3df-zephyr-pro-3d-models-from-photos/

Agisoft PhotoScan (2018) Agisoft. September 19, 2018. Retrieved from http://www.agisoft.com/

Anderson, S., Strawhacker, C., Presnall, A., et al. (2018). Arctic Horizons: Final Report. Washington D.C.: Jefferson Institute.

Bell, Joshua A.; Christen, Kimberley; and Turin, Mark (2013). Introduction: After the Return. SPECIAL ISSUE OF MUSEUM ANTHROPOLOGY REVIEW, 7(1–2): 1–21.

Brown, Deidre and Nicholas, George (2012) Protecting Indigenous Cultural Property in the Age of Digital Democracy: Institutional and Communal Responses to Canadian First Nations and Māori Heritage Concerns. *Journal of Material Culture* 17(3): 307-324.

Christen, Kimberly (2009) Access and Accountability: The Ecology of Information Sharing in the Digital Age. *Anthropology News*, April 2009, 4-5.

_____ (2011) Opening Archives: Respectful Repatriation. *The American Archivist*: Spring/Summer 2011, 74(1): 185-210.

Crowell, Aron L., Rosita Worl, Paul C. Ongtooguk, and Dawn Biddison (2010) Living Our Cultures, Sharing Our Heritage: The First Peoples of Alaska. Washington, DC.: Smithsonian Books

Cole, Douglas (1985) Captured Heritage: The Scramble for Northwest Coast Artifacts. Seattle, Washington: University of Washington Press.

Csoba DeHass, Medeia and Taitt, Alexandra (2017a) Alaska: Grass Basket with Lid. In Sketchfab blog series Around the World in 80 Models, Abby Crawford and Néstor F. Marqués, (Eds.). October 12, 2018 Retrieved from https://blog.sketchfab.com/around-world-80-models-alaska/

_____ (2017b) Alaska: Scraper. In the Sketchfab blog series Around the World in 80 Models, Abby Crawford and Néstor F. Marqués, (Eds.). October 12, 2018. Retrieved from https://blog.sketchfab.com/around-the-world-in-80-models-alaska-pt-2/.

_____(2018). 3D Technology in Collaborative Heritage

Preservation. In Digital Representation of Indigenous Peoples through Sharing, Collaboration, and Negotiation, edited by Christina Gish Hill and Medeia Csoba DeHass. *Special Issue of* MUSEUM ANTHROPOLOGY REVIEW 12(2): 120-152. Retrieved from https://scholarworks.iu.edu/journals/index.php/mar/article/view/22428.

Csoba DeHass, Medeia; Taitt, Alexandra; and Raymond-Yakoubian, Julie (2017) using 3D Technology to Preserve & Share Museum Pieces. *Kawerak News* Spring/Summer 2017: 26-27.

Eaton, Perry (2009) Kodiak Masks: A Personal Odyssey. In Maria Shaa Tláa Williams (Ed.), The Alaska Native Reader. History, Culture, Politics: (1-12). Durham: Duke University Press.

Fienup-Riordan, Ann (2005) Yup'ik Elders at the Ethnologisches Museum Berlin. Fieldwork Turned on Its Head. Seattle, Washington: University of Washington Press.

Glass, Aaron and Hennessy, Kate (in press). Emergent Digital Networks: Museum Collections and Indigenous Knowledge in the Digital Era. In *Introduction*, Igor Krupnik (Ed.), Handbook of North American Indians, Vol. 1, William C. Sturtevant Series editor, *Smithsonian Institution*, Washington, D.C.

Grande, Lance (2017) *Curators: Behind the Scenes of Natural History Museums*. The University of Chicago Press, Chicago.

Haakanson, Sven, Jr. (2015) Translating Knowledge: Uniting Alutiiq People with Heritage Information. In Raymond Silverman (Ed.), Museum as Process: Translating Local and Global Knowledges, pp. 123-129. London: Routledge.

Hess, Michael (2013) Preservation of Sitka's Totem Poles Enters the Digital Age. Retrieved from https://www.nps.gov/sitk/learn/news/preservation-of-sitka-totem-poles-enters-the-digital-age.htm.

Hollinger, R. Eric (in press). 3D Digital Replication: Emerging Cultural Domain for Native American Communities. In *Introduction*, Igor Krupnik (Ed.), Handbook of North American Indians, Vol. 1, William C. Sturtevant Series editor, Washington, D.C.: Smithsonian Institution.

Hollinger, R. Eric and Jacobs, Harold (2015). A Killer Whale Comes Home: Neil Kúxdei woogoot, Kéet S'aaxw, Mark Jacobs Jr., and the Repatriation of a Clan Crest Hat from the Smithsonian Institution. In *Sharing Our Knowledge: The Tlingit and Their Coastal Neighbors*, edited by Sergei Kan with Steve Henrikson, pp. 483-495. University of Nebraska Press, Lincoln.

Hollinger, R. Eric; Edwell, John, Jr.; Jacobs, Harold; Moran- Collins, Lora; Thome, Carolyn; Zastrow, Jonathan; Metallo, Adam; Waibel, Günter; and Rossi, Vince (2013). Tlingit-Smithsonian Collaborations with 3D digitization of Cultural Objects. SPECIAL ISSUE OF MUSEUM ANTHROPOLOGY REVIEW 7(1–2): 201–253. Retrieved from http://www.scholarworks.iu.edu/journals/index.php/mar/article/view/2173/4567.

Hollinger, R. Eric and Partridge, Nick (2017). Is 3D Technology the Key to Preserving Indigenous Cultures? Smithsonian Voices, Smithsonian.com. Retrieved from https://www.smithsonianmag.com/blogs/national-museum-of-natural-history/2017/11/29/3d-technology-key-preserving-indigenous-cultures/

Hollinger, R. Eric; Sieg, Lauren; Billeck, William; Swift, Jacquetta; and Snowball, Terry (in press). Cultural Heritage Laws and Their Impacts. In *Introduction*, Igor Krupnik (Ed.), Handbook of North American Indians, Vol. 1, William C. Sturtevant Series editor, Washington, D.C: Smithsonian Institution.

Isaac, Gwyneira (2015). Perclusive Alliances: Digital 3-D, Museums, and the Reconciling of Culturally Diverse Knowledges. *Current Anthropology* 56 (S12): S286-S296.

Killion, Thomas W., and Bray, Tamara L. (1994). Looking Toward Larson Bay: Evolving Attitudes at the Smithsonian Institution. In The Larsen Bay Repatriation and the Smithsonian Institution, Tamara L. Bray and Thomas W. Killion (Ed.), pp. 3-9. Washington, DC: Smithsonian Institution Press.

Krupnik, Igor (2000). Recaptured Heritage: Historical Knowledge of Beringian Yupik Communities, *Arctic Studies Center Newsletter*, 8: 9-10.

Levy, Richard and Dawson, Peter (2006). Reconstructing a Thule Whalebone House Using 3D Imaging. *IEEE MultiMedia* 3(2): 78-83.

Lindsay, Debra (1993). Science in the Subarctic: Trappers, Traders, and the Smithsonian Institution. Smithsonian Institution Press, Washington, D.C.

Magnani, Matthew, Guttorm, Annie; and Magnani, Natalia (in press). Three-Dimensional, Community-Based Heritage Management of Indigenous Museum Collections: Archaeological Ethnography, Revitalization and Repatriation at the Sámi Museum Siida. *Journal of Cultural Heritage.*

Metallo, Adam and Rossi, Vince (2011). The Future of Three-Dimensional Imaging and Museum Applications. *Curator* 54 (1): 63-69.

Mullen, William (2003). After Century at Museum, Indian Remains Go Home. Chicago Tribune October 17, 2003. Retrieved from http://www.chicagotribune.com/news/ct-xpm-2003-10-17-0310170445-story.html.

National Museum of the American Indian (2016). Lessons in Toolmaking. October 12, 2018. Retrieved from https://youtu.be/YlVGWcngr-s.

Neumann, Erik (2013). Digital Preservation in National Historical Park. Retrieved from http://www.kcaw.org/2013/07/01/digitally-scanning-totem-poles-in-national-historical-park/.

Pullar, Gordon (1995). The Qikertarmiut and the Scientist: Fifty Years of Clashing World Views. *U.B.C. Law review, Special Edition*:119-135.

Rowley, Susan (2013). The Reciprocal Research Network: The Development Process. *Museum Anthropology Review* 7, (1-2): 22-43.

Sketchfab (2018) Sketchfab. September 17, 2018. Retrieved from https://sketchfab.com/.

Srinivasan, Ramesh; Enote, Jim; Becvar, Katherine M.; and Boast, Robin. (2009) Critical and Reflective Uses of New Media Technologies in Tribal Museums. *Museum Management and Curatorship* 24 (2): 161-181.

Stainforth, Elizabteh (2016). From Museum to Memory Institution: the Politics of European Culture Online. *Museum & Society* 14 (2): 323-337.

Turner, Hannah (2016). The Computerization Of Material Culture Catalogues: Objects and Infrastructure in the Smithsonian Institution's Department of Anthropology. *Museum Anthropology* 39: 163–77.

Were, Graeme (2014). Digital Heritage, Knowledge Networks, and Source Communities: Understanding Digital Objects in a Melanesian Society. *Museum Anthropology* 37(2): 133-143.

Williams, Maria Shaa Tláa (2009). Alaska and Its People: An Introduction. In Maria Shaa Tláa Williams (Ed.), *The Alaska Native Reader. History, Culture, Politics*, pp. 1-12. Durham: Duke University Press.

Younes, Georges; Kahil, Rany; Jallad, Mayssa; Asmar, Daniel; Elhajj, Imad; Turkiyyah, George; Al-Harithy, Howayda (2017). Virtual and augmented reality for rich interaction with cultural heritage sites: A case study from the Roman Theater at Byblos. *Digital Applications in Archaeology and Cultural Heritage* 5, pp. 1-9. Retrieved from http://www.sciencedirect.com/science/article/pii/S2212054816300637.

Zamani Project (2015) The African Cultural Heritage and Landscape Database. September 17, 2018. Retrieved from http://zamaniproject.org/index.php/home.html.

Enhancing Well-Being Among Older People in Greenland through Partnerships of Research, Practice and Civil Society

Kamilla Nørtoft, Sidse Carroll, Anu Siren, Peter Bjerregaard, Christina Viskum Lytken Larsen, Merete Brædder, Lise Hounsgaard & Tenna Jensen

This article focuses on the methodology of the project Ageing in the Arctic (AgeArc) – Wellbeing, Quality of Life and Health Promotion among Older People in Greenland, and how the use of a collaborative approach aims at integrating ageing research, practices and policies to the benefit of the Greenlandic society. Thus, the aim of the article is to discuss how collaboration between research and practice can be an important factor in sustainable development of welfare solutions for older people in Greenland. In the project we study ageing policy, homecare, institutions, professional practices and municipal administration of these as well as older people's health, well-being, everyday life and historical perceptions of the roles of older people in Greenland. Moreover, researchers and municipalities collaborate on developing policies, initiatives within municipalities and civil society as well as creating network across the municipalities and between municipal administrations and civil society. In addition to this, we develop educational material for healthcare workers and professionals and work to create more public awareness about ageing in Greenland. We present three examples of our collaborative methods and discuss how the approach influences development and implementation of specific co-creation projects involving researchers, professionals and citizens on equal terms.

Introduction

For centuries the governance of Greenland has been developed and managed by the Danish state. In recent years Greenland has become increasingly independent and succeeded in establishing national and municipal political and administrative structures. However, the past still influences political structures and practices of the Greenlandic welfare state, as it is still, to some extent, modelled after the Danish welfare state (Sørensen, 1995; Høiris & Marquardt, 2012). In Greenland, healthcare and education is public and free for all. Responsibilities for welfare services are shared

The authors are respectively from CoRe, SAXO, University of Copenhagen; APEN, Activity and Health Enhancing Physical Environment Network; VIVE, The Danish Center for Social Science Research; SIF, National Institute of Public Health, University of Southern Denmark and Ilisimatusarfik (University of Greenland); University College Copenhagen; Ilisimatusarfik (University of Greenland), and; CoRe, SAXO, University of Copenhagen, affiliated at GCHR Ilisimatusarfik (University of Greenland).

by the national and the municipal authorities. Welfare services for older people include free healthcare in hospitals and health clinics, public pension, practical help in the home if the older person fulfills certain criteria, apartments suited for older people and nursing homes. The scarce and geographically dispersed Greenlandic population and the isolation of towns and settlements make it necessary to place welfare institutions such as hospitals and educational facilities in selected larger towns. The fundamental logistical challenges created by the geographical realities challenge both the political ambitions for provision of welfare and the municipal economy as well as the everyday lives of the population who must be mobile and travel long distances to obtain healthcare, education and jobs. This is also the case for the older parts of the population who often need to make life changing decisions about how and where to move, if they become dependent on regular healthcare and practical help to manage their daily lives.

The aim of this article is to discuss how collaboration between research and practice can become an important factor in sustainable development of local communities, welfare state benefits and meaningful and health promoting strategies with the aim to improve the everyday lives of older people in Greenland. It does so by presenting the collaborative methodologies used in the project *Ageing in the Arctic (AgeArc) – Wellbeing, Quality of Life and Health Promotion among Older People in Greenland*, and discussing how the project uses a collaborative project design to integrate ageing research, practices and policies to the benefit of the Greenlandic society in an ongoing dialogue between the project partners and participants. Since the project is only half way through its life span, we focus on the process rather than final results and products developed in the project. We will present some of the methodological activities of the project to show how AgeArc has embraced the research-practice collaboration from its initial explorative workshops to a specific co-created development project in a bigger town. The examples are followed by a discussion of the usefulness of this type of collaborative design, its implications and how we deal with some of the challenges that are often discussed regarding community research and projects using participatory methodologies.

Background: The Health and Everyday Lives of Older People in Greenland: Key Challenges, Knowledge Gaps and On-Going Initiatives

In 2004, the Greenlandic public health report singled out older people as a particularly vulnerable demographic group, because they suffer from surprisingly high disease rates, including a high prevalence of lifestyle diseases. At present, 12.6% of the Greenlandic population is over the age of 60, a number which is expected to increase to 17.9% by 2035 (Bjerregaard, 2004). It is expected that the number of people over 65 years of age will be almost doubled by 2040 (Grønlands Statistik, 2017). This rise, combined with the high disease rates, presents the municipalities with growing financial and logistic challenges. This calls for the establishment and improvement of welfare structures and solutions to improve the state of health and independence of older people in Greenland. In spite of high disease rates and economical concerns about the increasing number of older people, their well-being, lifestyle and health have only played a minor role in recent Greenlandic public health and ageing polices (Nørtoft & Jensen, 2017a; Inuuneritta II, 2012; Ældrepolitik, 2014). In this project the definition of old age depends on the specific context in each sub study and development project. When we do policy analysis, old age is defined by politically decided definitions based on chronological age - typically counting people of 60 years and older. When we do ethnographic fieldwork in older people's associations, nursing homes and

social housing for older people, we include all residents and members of the association regardless of their chronological age. When we do historical research, we define old age according to the archival material we analyze whether they are policy documents, personal journals, church books registering births, deaths, weddings etc.

Older people in Greenland have lived in a time of constant social change, and a society which is influenced by a mixture of Inuit and Danish values, identity, habits and traditions (Høiris & Marquardt, 2012). Moreover, regional and local differences in perceptions of health and ageing influences both local municipal planning, implementation and use of health initiatives, and individual lifestyle and health practices (Aagaard, 2015; Buchignani & Armstrong-Esther, 1999). Development of future policies, solutions and initiatives therefore necessitate locally specific knowledge, not only about the well-being, lifestyle and health of older Greenlanders, but also about culture and national, regional and local welfare benefits and political and care practices.

While the research literature on welfare policies and health care practices aimed at older people is scarce, there are, however, new local political initiatives that address the challenges of and among the older parts of the population in the five municipalities. The municipalities also engage in general health promotion and prevention of lifestyle and age-related diseases. A recent study of policy documents has found that these efforts include focus on dementia, which is a relatively new and growing challenge in Greenland caused by increased life expectancy, loneliness, and keeping older people longer in the labour market to encourage on-going personal development, health maintenance and financially sustainable solutions. Some municipalities are very specific about culture's relation to individual well-being, especially the interplay between traditions and everyday life (Nørtoft & Jensen, 2017a).[1]

At present, however, no systematic overview or exchange of initiatives and practice exist, and knowledge about the importance of including local and regional differences and similarities in solutions aiming to meet the needs of older people is insufficient. Sharing of local experiences with older people and institutional practices in political and developmental processes are vital if such ventures are to be valuable, both for older people and for health and care professionals.

Older People's Perceptions of Health, Life Quality and Welfare Needs?

One of the fundamental challenges for the municipal development of ageing policies, initiatives and solutions is that the health, everyday practices, well-being, and quality of life of older people in Greenland and their relationship to the welfare state's different benefits and institutions is only sparsely researched (Laursen, 2003) compared to other socio-cultural related health challenges (Aagaard, 2015; Lynge, 2000; Curtis et al., 2002; Niclasen, 2015; Larsen, 2014; Pedersen & Bjerregaard, 2012; Bjerregaard & Larsen, 2015; Curtis et al., 1997; Niclasen et al., 2007). Until now, the conditions of older people in Greenland has mainly been studied in the context of general population studies and reports (Bjerregaard, 2004; Bjerregaard & Dahl-Petersen, 2008; Dahl Petersen et al., 2015) or in the context of geriatric research (Olsen et al., 2010; Jakobsen et al., 2013; Lassen et al., 2013; Andersen et al., 2005).

In AgeArc, we explore healthy aging from many angles; we look at public policy and welfare benefits regarding older citizens and ask what works as well as what is challenging from an administrational and healthcare professional perspective. We also ask older people what is important in their everyday lives in order for the individual to experience general wellbeing. Which

factors and elements are important to experience good life quality and how is it possible to have or to get those factors and elements into the individual's daily life?

Previously ethnological and anthropological research about older people in the Arctic has primarily revolved around the perceptions of old age and cultural values of older people in Inuit societies (Collings, 2001) rather than on the everyday life, well-being, health and quality of life of older people in the 20th and 21st century welfare state. This focus stands in contrast to cultural analytical research on ageing conducted in Denmark from the 1980s onwards, where research into the cultural and social aspects of the lives of older people in and with the Danish welfare state gained momentum. This research resulted in a range of books and reports on various socio-cultural aspects of the interplay between the everyday lives and perceptions of older people and welfare state structures (Platz, 1987; Hansen & Platz, 1995; Blaakilde et al., 1991; Blaakilde, 1998; Andersen & Appeldorn, 1995; Swane, 1991). Moreover several recently established research initiatives study cultural aspects of ageing, the everyday life and lifestyle of older individuals, and their experiences with and of welfare state benefits, and integrate their findings into health studies, public initiatives and practice in order to improve health and well-being of older people, and to ensure the relevance of public benefits (Kofod, 2009; Nørtoft, 2017; Tomasen, 2009; Algreen-Petersen, 2011; Lassen, 2014; Nørtoft, 2013). AgeArc follows this tradition, but is in terms of its size, its inclusive focus and collaborative approach the first project of its kind in a Greenlandic context. Past and present municipal practices, policies and their interplay with the lives, wellbeing and health of individuals are both the starting and end point of the research, development and implementation activities inherent in the project. Resultantly, the collaborative approach necessitates an open research agenda that allows for the inclusion of themes throughout the lifespan of the project. Active engagement and integration of practice, research partners and older people are therefore key to the success of the project.

Collaborative Project Design and Research Methods

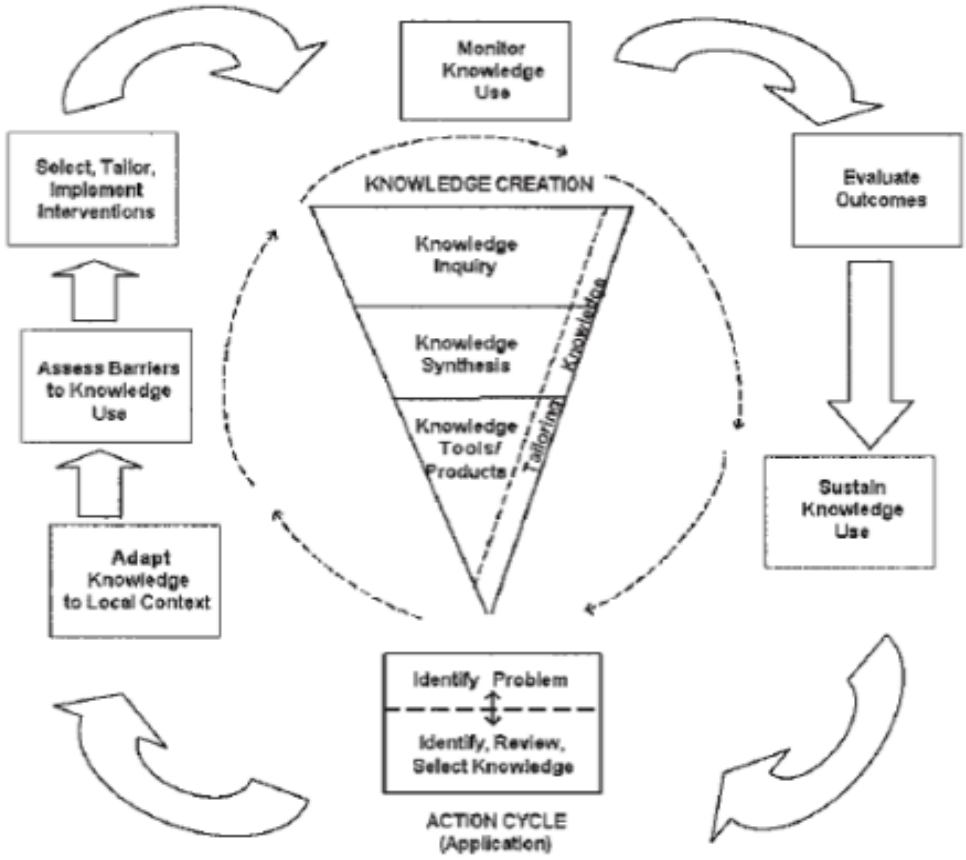
AgeArc runs from 2017-2020 and combines research with development of welfare initiatives in a partnership between municipalities and researchers from a range of research and educational institutions. Both researchers and practitioners influence the project's research activities and the outputs and formats of the initiatives developed throughout the lifespan of the project.

The design of AgeArc is inspired by the knowledge-to-action process (Figure 1, Graham et al., 2006: 19), which emphasizes the need for continuous involvement and exchange between research and practice for the development of successful solutions for use in practice settings. In our case this means that a) the combination of fieldwork, analyses and development and implementation of practical solutions depend on active involvement of all the projects partners, and b) the design must facilitate optimal conditions for collaboration on the design of both the research conducted throughout the project and of the practical testing and implementation of the developed solutions

Research Methods

AgeArc is a mixed method collaboration project that unites municipal administrations and care personnel with researchers in public health, history, ethnology and sociology and older people. Thus, a multitude of methodologies and approaches co-exist within AgeArc.

Figure 1: The Knowledge-to-action-process (Graham et al., 2006: 19).



The research part of the project combines studies of municipal ageing policies and practices (e.g., homecare, institutions, professional practices and municipal administration) and studies of the everyday life and historical perceptions of the roles of older people in Greenland with data on health status and health behavior. The aim of these studies is to gain knowledge about the health and well-being of older people and to develop policies, initiatives within municipalities and civil society as well as to create network across the municipalities and between municipal administrations and civil society. In addition to this we develop educational material for healthcare workers and professionals and work to create more public awareness about ageing in Greenland.

The project involves different research methods in order to gain broad knowledge about older people's physical health and general living conditions. Thus, AgeArc includes quantitative population surveys and anthropometry of Greenlandic and Danish older people. These are conducted by The Greenland Health Survey (NIPH) and by VIVE. The purpose is to gain essential background knowledge and to ensure that the proposed welfare solutions take existing general and regional health and social concerns into account. Thus, we create a unique combination of quantitative data on the health and well-being of older people within the Danish realm.

A large part of the research in AgeArc is ethnographic and historical studies with various foci. The purpose is to gain knowledge about the ways in which older people in Greenland relate to the welfare state, and of how health and ageing practices and policies affect the lives and health of older people in the past and present. To ensure the relevance of the research for the local healthcare practices, the specific field sites and focus areas are continuously discussed and selected

by researchers and municipal practitioners. This part of the research uses ethnographic and historical methodologies and incorporates semi-structured interviews (Hastrup et al., 2012; Clarke & Warren, 2007), focus groups (Halkier, 2010), workshops and visual participatory methods (Clark-Ibañez, 2004; Mitchell, 2008; Pink, 2009), document studies (Lynggaard, 2010) and participant observation (Hillersdal & Nørtoft, 2015; Tonkin, 1989; Spradley, 1979) in municipal institutions, local associations, public spaces and in people's homes.

The insights gained through the research activities are continuously shared and discussed with the municipal partners of AgeArc. This ensures the continuous collaboration and dialogue between the project partners, which is crucial for the early development and testing of both small and large initiatives developed in the project. The outcomes range from small information flyers to citizens and practitioners, reports for administrative and political use and media stories about older people and care workers to development of educational material, the planning of a national conference and building projects for older people to get access to nature even with limited mobility.

Co-Creation and Participation

The collaborative approach and design inscribes AgeArc in the field of co-creation (Brandsen & Pestoff, 2006). The overall aim of AgeArc is too broad for all parts of the projects to co-exist and be involved in a single co-creation process. However, AgeArc has turned out to be an ideal platform for smaller and more narrowly defined co-creation projects that all fit into the overall scope of AgeArc. Hence the collaborative approach of the overall project fertilizes the ground for specific co-creation projects in the part of AgeArc focusing on developing, testing and implementing new welfare solutions. In some ways, the collaborative approach in AgeArc overlaps with Participatory Action Research (PAR) in which elements such as community research (Wallerstein & Duran, 2010; Robinson, 1996), the use of citizens as co-researchers (Moller et al., 2010; Hoare, Levy & Robinson, 1993) and Indigenous ways of knowing are emphasized (ibid., Cochran et al., 2008). However, AgeArc has not been planned as a PAR project and does not quite live up to those points of emphasis. In AgeArc, the research is conducted by academically trained researchers – even when focus points of the research are decided in dialogue between researchers and practitioners. The researchers explore ageing, wellbeing and professional practices and challenges from various perspectives. Rather than presenting Indigenous ways of knowing, the data are translated and synthetized into academic ways of understanding as well as into formats that are understandable and useful to policy makers, municipal practitioners and healthcare workers in the field. The level of community participation varies from one development project to the next depending on the character of the project and level of engagement from community members. In practice this means that one municipality has requested a qualitative study among older citizens focusing on a number of topics and resulting in a report written by the researchers. Other municipalities are engaging in ongoing dialogues about possible development projects resulting in a range of activities and products developed in collaboration between planners, researchers, practitioners and citizens depending on the specific process surrounding each project.

The term co-creation designates forms of collaboration between different actors in a process creating welfare (Brandsen & Pestoff, 2006). Some researchers define it as a process where citizens are involved "in the initiation and/or design of public services to develop a beneficial outcome" (Voorberg et al., 2015: 1347). In a Danish context the volunteer council (Frivilligrådet, 2013) has pointed out 6 principles for co-creation. The principles describe what co-creation is and what it

implies: 1) the purpose of co-creation is to create new welfare in a local context. The involved parties should experience added value of the co-creation; 2) the center of the co-creation is the target group experiencing a problem. Various actors combine their resources and competences, thereby shedding new light on the problem and on possible solutions. Gradually the target group takes ownership of the problem and the other actors shift from being helpers to being collaboration partners; 3) it is crucial that the problem and actions taken are defined through a dialogue-based process between the involved actors. The problem and actions/solutions are continuously negotiable; 4) in co-creation everyone who is potentially relevant to the solution to a given problem can participate. Everyone can initiate a co-creation process, and everyone participates on equal terms; 5) the participating actors must be aware that the process implies acknowledgement and mutual respect, responsibility and dependency; 6) it is important that the actors in the co-creation process acknowledge their own limitations, dares to be open about them and show willingness to take risks and be open to other actors' input and development of ideas. The good collaboration has to be democratic and fruitful for all (Pagter, 2006). All parties get insights into each other's methods whereby they reach to an understanding of each other's strengths and limitations. This makes it possible to see how best to combine the resources to solve the commonly defined problem.

There is a great potential for learning in co-creation processes where participants depend on each other and where learning is understood as a social process during which problems and solutions are shared and beliefs are continuously updated. However, the degree of successful implementation and policy change resulting from a co-creation process seems to depend heavily on local context e.g. organizational structures and traditions. Hence strongly regulated and rule bound political contexts apparently makes policy change and implementation harder than less regulated contexts (Voorberg et al., 2017). Research on the success of collaborative approaches in innovation and development initiatives within public welfare points out that the involvement of professionals and attention to their agency is important. It is suggested that professionals act as individuals rather than representatives of their organization when engaging in these processes. This calls for an understanding of professionals as learning, emotional and cognitive subjects with their own histories and experiences. According to the literature the professionals need to identify with the purpose of the co-creation process to be engaged in it, rather than relate to a grand narrative decided by the organization (Andersen, 2015). It is not unusual to see resistance on different levels in co-creation processes, depending on the specific approach and level of voluntary participation of the involved actors. However, not all resistance is destructive for a co-creation process, since resistance can lead to fruitful discussions and new insights and change throughout the co-creation process (Nilsen et al., 2016).

Selected Activities of the Collaborative Design and Work in AgeArc

In the following we provide examples of the collaborative methods and activities we use in the project.

The two first activities we present were initiated by the research partners, while the third example was initiated by municipal partners. The examples are described from the AgeArc research partners' point of view as they are responsible for the various forms of academic presentations of the project. However, all project partners can present and publish insights, experiences and results from the project in ways that they find most useful.

Start-Up Workshops

In the Spring of 2017, we organized five workshops in Copenhagen, Ilulissat, Sisimiut, Nuuk and Qaqortoq: one with representatives from the involved research and educational institutions and one with various representatives from each of the four municipalities.[2] Each of the municipalities decided who should be invited to the workshop. Resultantly the participants varied in between the municipalities. The majority of the participants were administrative staff working with or responsible for the area of services to older citizens or representatives from nursing homes and homecare units. In some municipalities, members of local old age societies and local older people's councils also participated.

Besides performing a meet and greet function, the workshops had two purposes. One was to identify and discuss which specific topics within ageing the different partners prioritized. Another was to start a collection of systematic cultural analytical knowledge on perceptions and practices of old age and the everyday life of older people in different life stages and circumstances.

During these workshops the participants were presented with two exercises. The first was an individual exercise. During the exercise each participant had to place selected photos on an empty poster. The pictures had to represent elements or concepts that he/she perceived to be of importance to old age or ageing. All participants received identical sets of approximately 30 small photos displaying Greenlandic scenes of food, nature, transport, exercise equipment, buildings, advanced hospital equipment, sailing, hunting etc., and were also given blank cards to fill in if a certain subject or theme was missing. After selecting and placing the photos, everyone took turns telling about their poster.

Following this exercise, the participants were presented with a group exercise. Each group had to think of situations, events or projects concerning older people and/or ageing within the municipality that had been more or less successful. Each group then had to map the different actors involved in the chosen situation, event or project and discuss how they made use of each other, or how they potentially could make use of each other in the future.

The workshops ended with a session where the participants could comment on the workshop format and exercises and ask questions about the outcomes and the continuation of the process.

Figure 2: The posters produced during one of the municipal workshops in May 2017.

After the workshops the researchers analyzed the materials produced and wrote a short report for each municipality containing a description of the discussed themes. The municipalities were then

asked to prioritize the themes and state which they wished AgeArc researchers to investigate (Nørtoft & Jensen, 2017b).

The workshop with researchers and staff from educational institutions had the same format as the municipal workshops.

Focus Groups on Activity

The first series of workshops both became the starting point for a collaborative dialogue between the research and practice partners and informed the ethnographic fieldwork as well as the specific questions in The Greenland Health Survey mentioned earlier.

One of the themes to emerge from the workshops was activities for and among older people living on their own or in municipal care homes. One of the ways in which AgeArc has continued to work with this theme has been through the use of focus groups with older people. Between February and April 2018 seven focus groups were conducted in three different towns. For four of the focus groups, municipal staff helped recruit participants and for three focus groups, participants were recruited by the researcher in the local association for older people. Five of the focus groups were conducted with the help of an interpreter who was either a care worker or a consultant from the municipality. The remaining two focus groups were conducted with participants translating for each other and the researcher.[3]

The participants were asked to use photos, words or drawings to show which activities they take part in or wish to take part in in their daily lives. After telling about their current activities, the participants were asked to talk about which structures/persons/items they found would help make other types of desired activities possible. The participants were happy to share their ideas, experiences and wishes, and the format of the focus group allowed for both sharing of memories and conversations about how to make wishes come true.

The focus groups provided insights into the activities older people do, and into which kinds of activities they wish to engage in as part of a more active daily life. The focus groups also gave the participants a possibility to discuss possible ways to deal with practical, structural and social obstacles for some types of activities. In the focus groups that were conducted in collaboration with a member of the municipal staff, he or she expressed that the focus groups gave them an opportunity for participating in user involvement in a way they had not tried before, and they were very interested in the format and how the use of simple tools enabled conversations about daily matters such as activity in new ways. The staff members also noted that the focus groups facilitated the generation of new ideas for activities and suggestions for doable solutions to minor obstacles.

Creation of a Specific Outdoor Area

The third and final example of activities in AgeArc shows how we use co-creation in a specific development project which aims to design an accessible outdoor area outside a municipal social housing area for older people. The homecare management expressed a desire for some kind of ramp that could provide residents with restricted mobility access to the mountain area right next to the buildings. Simultaneously, they had initiated conversations about the idea with an administrative staff member in the municipality.

The preliminary results of the ethnographic fieldwork confirmed the needs for older people to be in nature, since experiences and activities related to nature is of great importance to their quality of life (Nørtoft & Jensen, 2017b). When the municipal partners decided to take action on the idea, the researchers provided background knowledge for the initial application for funds to begin the project.

After raising funds to begin the project, the design process was planned and conducted. The process consisted of three workshops and a presentation of the final designed and selected idea. The workshops were planned, arranged and facilitated in collaboration between an AgeArc researcher and a collaborating APEN[4] researcher and architect, the homecare management and staff members of the municipal administration.

The workshops were conducted in June 2018. The purpose of the design exercises was to learn what made an area suitable as a recreational outdoor area for the target group. Thus the exercises consisted of mapping and discussing current needs, good and bad experiences of and with different areas, which outdoor functions the older people were interested in as well as identifying the most suitable location by collectively studying existing outdoor spaces on site.

The design of the outdoor space was finalized in June and additional funding for the construction of the ramp was applied for and granted by Qeqqata Municipality's local development fund. When the construction is built, AgeArc will fund additional equipment for activities in the area such as places to sit, a fireplace for outdoor cooking, a stand for drying fish etc. In the late Summer of 2018 some of the ideas from the workshops that are less costly had been implemented in the apartment complex's existing outdoor area. The homecare management arranged a workshop with the residents making use of some of the same tools as was used in the previous co-design process. During the workshop it was discussed how the area could be more useful with places to sit and to do planting activities.

An AgeArc researcher has conducted follow up interviews with the participating staff from the homecare management and the municipal administration about the co-design process. A follow up study on participants' involvement in the design process, the implementation of smaller installations in the existing outdoor space and on the use of the new outdoor area will be conducted in the Summer of 2019 when the construction has been in use.

Moreover the experiences from the collaboration and participation of all involved in the design process will be gathered in a set of guidelines for citizen involvement. These guidelines will be shared across the municipalities and can be used in a variety of ways not only in new construction projects, but also in other types of projects and processes where municipalities and local organizations wish to involve citizens and gather knowledge for development of welfare solutions.

Figures 3-5. Workshop process posters, created by Sidse Carroll

One of the tools in the design process was to make a process poster after each workshop. The posters were made immediately after the workshop and displayed in two central locations to create awareness about the project among the residents. The aim was that everyone should be able to follow the process and feel welcome to join any of the workshops, even if they could or would not participate in all three workshops. The three process posters are made by Sidse Carrol.

Discussion

The descriptions of some of the activities in AgeArc highlight the interlinkages between the fieldwork activities of researchers and the goals and perceptions of municipal staff and civil society and how the oscillations between research and practice continuously broaden and enrich the outcomes of the project in both research and development projects. These interlinkages ensure that the research and municipal partners have an equal interest in the establishment of the networks and contacts that are necessary to the fieldwork and ensures that the conducted research includes the interests of the municipalities. They also involve municipal staff and civil society directly in the project's ethnographic fieldwork and methodological reflections and work with collaboration and co-design. However, the success of the project is to a large extent dependent on the personal relations between researchers and municipal key persons. Hence, the local development initiatives are more likely to be successful and have a lasting effect in municipalities where staff members become genuinely interested and involved in the project.

Implication for Practice

In projects with collaboration between researchers and community members, it has been discussed who should make the decisions about the research. In some projects, researchers train community members to do research (Hoare, Levy & Robinson, 1993). In other projects Indigenous ways of knowing are emphasized giving community members authority to define (parts of) the research (Moller et al., 2009; Cochran et al., 2009).

In AgeArc, decisions about the research are made in collaboration between practice and research partners. Practice partners point out relevant topics and directions for the research, and the researchers do fieldwork and analyse the data. All partners influence the research making sure that it is of relevance for practice (cf. Moller et al., 2009) as well as research. No partners have the final authority to make the decisions without the others.

Another challenge in community projects with a strong participatory element is the question of ownership of the research data (Robinson, 1996; Hoare, Levy & Robinson, 1993). In AgeArc, data are owned by the project. Results and insights from the research are continuously shared with practice partners and forms the base of the decisions made regarding the development projects in AgeArc. All partners are allowed to present the project in ways that are relevant for them as long as it lives up to the ethical guidelines of the project. It has not yet been relevant for any of our practice partners to write academic articles, but it is for the researchers. The practice partners have requested reports from the researchers. In such cases the researchers write the report and send it to the relevant practice partner for comments and changes before the report is made public. In those cases, a report written by researchers is then used as a tool by the practice partners to address a specific challenge to their administrations or local politicians. Both practice partners and researchers have presented the project in local and national media. In these cases, press releases

are sent to and edited by involved partners to make sure that everyone's experiences are represented correctly (cf. Robinson, 1996).

In research there is often room to experiment and test initiatives that might not turn out to work as expected. In practice there are often more focus on investment leading to measurable results – very often economically measurable results. So how do we make sure that the projects in AgeArc are efficient? First of all, AgeArc is funded by a private foundation covering the salary of the researchers and research activities. In addition there is money set aside for smaller development projects. This means that the municipalities invest in AgeArc with their engagement and by letting some of their employees participate in meetings, workshops etc. regarding AgeArc. Since the municipal partners are part of deciding the directions of the project, we work on themes, development projects and solutions, which they would have to work on in their daily practice anyway. We hope that working together in this way across research and practice leaves lasting impressions in the municipalities. Some of these impressions will be ideas, discussions and ways of working that are taken forward by practice partners without the researchers. Other impressions can be physical products such as the ramp described in this paper, information flyers for citizens, tools for dementia care such as e.g. a book designed for conversation between staff/relatives and people with dementia etc. Besides the specific products and ideas we leave, we will also do follow up activities to evaluate how the products and ideas are being used and developed, when the researchers are not around.

Findings

When new insights and ideas are developed in collaboration, all partners discuss how they can be translated into tools that can be used in practice. While the researchers might be the experts of synthesising insights from large data sets according to academic standards, the municipal partners are experts in practice and know what formats they can use to spread knowledge and ideas to politicians, colleagues and citizens. The ongoing dialogue between researchers from different disciplines and municipal staff means that knowledge can quickly be transformed into practice tools for various purposes. The close collaboration and mutual interdependence have incited researchers to present preliminary results and findings in the project group and practitioners and planners to share their experiences, knowhow and networks. At the same time the organizational structure is relatively loose making implementation easier than in a more rule bound and regulated society (Voorberg et al., 2017).

Besides developing a solution to an everyday life challenge, the described co-design process with the older participants was a learning arena for the participating municipal staff (cf. ibid.). In the process they learned and experimented with new methods for citizen involvement. This means that the four participating staff members got new experiences with and tools for working with citizens.

The co-design process could, however, not have taken place without the activities described in the two other activities described above. The personal connections made during the start-up workshops and the focus groups has not only established relations between the project partners, but also succeeded in involving older people, thus creating an interest for participating in and contributing to the design workshops. In this way the overall collaborative approach of AgeArc has proven to be a fruitful platform for specific co-created initiatives. The collaborative approach

and the open dialogues create a community in which it is safe and rewarding to share ideas, participating in discussions and create new initiatives. If anyone has an idea for a welfare solution with older people as the target group, AgeArc is a platform with various resources, competences, expertise and local networks that can be combined and activated to solve the specific problem in question. The collaboration between municipal staff and researchers also prevents various kinds of resistance from the professionals as seen in other co-creation projects (cf. Nilsen et al., 2016). The projects are as much the professionals' own project as it is the municipal administration's or the researchers' project. The project is not only a grand narrative that participants are forced into. Rather they identify personally with the project, their participation and the results, thereby giving the project the best possible preconditions for success (cf. Andersen, 2015). In times of lacking engagement from specific municipal partners, the project 'takes a break' because it can only be ongoing with engagement of both practice and research partners.[5] In such situations, project activities are put into other sub projects, where all partners are engaged. For as long as the project is going on, any partners who 'had a break' are welcome to re-engage in the project.

Recommendations for Research and Practice

If other researchers, practitioners and/or administrative should want to engage in collaborative projects as equal partners, we offer the following recommendations:

1) Openness and acknowledgement of each other's competences and resources as well as the partners' own lack of expertise in specific areas are crucial attitudes for an equal partnership. Any project will have a better chance of success if the partners' resources are accumulated for the good of the project. Acknowledgement of the partners' interdependence and different expertise areas will be likely to lead to all partners experiencing that they gain more from working together that if they worked without the others (cf. Pagter, 2006).
2) An open and flexible research agenda is important if the research should have direct relevance for the practice partners (cf. Robinson, 2006; Cochran et al. 2008; Moller et al., 2009). It is important with dialogue about focus areas so the researchers' interference in practice is experienced as a relevant contribution rather than a burden and a hindrance for the execution of daily tasks. Researchers need to be open for the fact that their ideas may be rejected, or that practice partners might want to bring ideas forward without the researchers. Practice partners must be open to researchers' possible rejection of their ideas, if these ideas are outside the scope of the externally funded project.
3) Transparent communication about results, insights, directions and progression of the project is important. It is necessary for the fruitful dialogue between the partners and it is crucial for the relationship between the partners who need to trust in each other to be able to contribute with ideas and competences (cf. Wallerstein & Duran, 2010). All partners should be able to follow the process and progress. When some partners are not engaged, the project will not be likely to move very much forward, in those specific areas.

Conclusion

The aim of this article was to discuss how collaboration between research and practice can become an important factor in sustainable development of local communities, welfare state benefits and meaningful and health promoting strategies aiming to improve the everyday lives of older people

in Greenland. We have presented the methodology of the research and development project Ageing in the Arctic (AgeArc) and shown how use of a collaborative project design succeeds at integrating ageing research, practices and policies to the benefit of the Greenlandic society in an ongoing dialogue between the project partners and participants.

Start-up workshops made it possible for representatives from both research partners, practice partners and civil society to influence the point of departure for the research in the project. The workshops also worked as arenas for establishing personal relations between project partners as well as informing municipal practitioners and local associations of older people about the project. Focus groups about activity with older people and with the assistance of municipal healthcare workers was part of the ethnographic fieldwork. Besides from generating knowledge about the participant's preferred activities and their possibilities for engaging in them, the focus groups taught the participating municipal staff new methods of user involvement.

Knowledge from both start-up workshops and focus groups supported an idea from the homecare management to create access for people with restricted mobility to an age-friendly outdoor area close to a municipal apartment complex for older people. The personal relations and the sharing of knowledge and experiences between researchers and practitioners fueled a co-creation process that is still ongoing. In this process an architectural researcher was invited to help with a co-design process where all residents in an apartment complex was invited to contribute to the design process. While everybody participating learns more about older people's specific experiences, needs and wishes for outdoor spaces, the municipal staff taking part has experienced methods of user involvement that can be used in other projects in the future. The experiences and methods are shared with all partners of AgeArc in order for all municipalities to have access to and knowledge about this approach.

The collaborative work in AgeArc has shown that the Greenlandic context is very fruitful for collaboration, development and implementation of new initiatives, when personal relations and partnerships are continuously maintained through dialogue between research and practice. However, the importance of personalized relations and the limited number of municipal employees makes development and implementation of new initiatives vulnerable.

Acknowledgements

Ageing in the Arctic. Well-being, Quality of Life and Health Promotion among older People in Greenland (AgeArc) (www.arktiskaldring.ku.dk) unites the Greenlandic municipalities, health and care personnel, older people and researchers and educators from the University of Copenhagen, Ilisimatusarfik (University of Greenland), University of Southern Denmark, Aarhus University, VIVE – The Danish Center for Social Science Research and University College Copenhagen.

Ageing in the Arctic (AgeArc) has received 5.6 million DKK in funding from the VELUX FOUNDATION's crosscutting call for cooperation between research and practice, and the project will last until the end of 2020. The project has also received support from the EGV Foundation for fieldwork activities, writing workshops and student activities.

Notes

1. In the late summer and autumn of 2018, fieldwork focused on dementia is taking place within the larger AgeArc project.
2. At the time there was four municipalities in Greenland. By January 1st 2018 Qaasuitsup Kommunia split into two new municipalities, Avaanaata Kommunia and Kommune Qeqertalik.
3. In Greenland, Danish has been, and still partly is, the language used in national and municipal administrations, and many, especially the older parts of the population, are fluent in Danish. Since many employees in administrations and health services and some owners of private businesses are Danish, official messages from authorities are often in both Greenlandic and Danish. Hence it is not unusual for older people to be in situations, where translation between Greenlandic and Danish takes place and the translation was not an obstacle for the conduction of the focus groups.
4. APEN, Activity and health enhancing Physical Environment Network is a research network hosted at KADK, Royal Danish Academy of fine arts, schools of architecture, design and conservation.
5. Some municipalities have a high degree of turn-over in administrative and practice positions meaning that contact persons for the project change often. Some municipalities are (re)structuring their organization meaning that they cannot focus on AgeArc for four years without breaks.

References

Aagaard, T. (2015). Hverdagsliv med sygdom patienters kulturelle perspektiver på sundhedspraksis i Grønland, INUSSUK, *Arktisk forskningsjournal 1*.

Algreen-Petersen, E. (2011). *"Kan man flytte solen?" Et aktionsforskningsprojekt om at bringe naturen ind i hverdagen på plejehjem,* Ph.D. thesis, Institut for Miljø, Samfund og Rumlig Forandring, Roskilde University.

Andersen D., Appeldorn A. (1995). *Tiden efter 60, de 60-74 åriges deltagelse i foreninger, frivilligt arbejde og private netværk.* København. Socialforskningsinstituttet.

Andersen, L.L. (2015). Micro-Processes of Collaborative Innovation in Danish Welfare Settings: A Psychosocial Approach to Learning and Performance, in: *Collaborative Governance and Public Innovation in Northern Europe*, pp. 249-268.

Andersen, S., Hvingel, B., Kleinschmidt, K., Jørgensen, T., Laurberg, P. (2005). Changes in iodine excretion in 50-69-y-old denizens of an Arctic society in transition and iodine excretion as a biomarker of the frequency of consumption of traditional Inuit foods. *The American Journal of Clinical Nutrition, Vol. 81, Nr. 3*, pp. 656-663.

Bjerregaard P, Dahl-Petersen IK (eds.) (2008). *Befolkningsundersøgelsen i Grønland 2005-2007 – levevilkår, livsstil og helbred.* København: Statens Institut for Folkesundhed.

Bjerregaard, P. (2004). *Folkesundhed i Grønland.* Rapport. Arktisk Forskningsjournal 1. København/Nuuk: Statens Institut for, Folkesundhed/Grønlands Hjemmestyre, Direktoratet for Kultur, Uddannelse, Forskning og Kirke.

Bjerregaard P. & Larsen CVL. (2015). Time trend by region of suicides and suicidal thoughts among Greenland Inuit. *Int J Circumpolar Health 2015 Feb 19; 74:26053.*

Brandsen, Taco & Victor Pestoff (2006): Co-Production, the third sector and the delivery of public services – an introduction. *Public management Review,* vol. 8, nr. 4, s. 493-501.

Buchignani, N. & Armstrong-Esther, C. (1999). Informal care and older Native Canadians, *Ageing and Society, Vol. 19, no. 1*, pp. 3-32.

Clarke, A. & Warren, L. (2007). "Hopes, fears and expectations about the future: what do older people's stories tell us about active ageing?" In: *Aging &* Society, Vol. 27, pp. 465-488.

Clark-Ibáñez, M. (2004). Framing the social world with photo-elicitation interviews. *American Behavioral Scientist, 47*(12), pp. 1507-1527.

Cochran, P., Marshall, C. A., Garcia-Downing, C., Kendall, E., Cook, D., McCubbin, L. & Gover, R. M. S. (2008): Indigenous Ways of Knowing: Implications for Participatory Research and Community, *American Journal of Public Health,* Vol. 98, no. 1.

Collings, P. (2001). "If you got everything, it's good enough": perspectives on successful aging in a Canadian Inuit community *Journal of cross-cultural gerontology, 16,* pp. 127–155.

Curtis, T., Kvernmo, S. Bjerregaard, P. (2002). "Violence, sexual abuse and health in Greenland" In: *International Journal of Circumpolar Health, Vol. 61*, pp. 110-122.

Curtis, T., Iburg, KM., Bjerregaard, P. (1997). *Familie, børn og sundhed i Grønland*Dahl-Petersen IK, Larsen CVL, Nielsen NO, Jørgensen ME, Bjerregaard P. (2015). B*efolkningsundersøgelsen i Grønland 2014.*

Frivilligrådet (2013): *Et magasin om samskabelse. Inspiration til velfærdsmagere,* Frivilligrådet. Frivilligrådet (2012): *Gode rammer for samskabelse,* Frivilligrådet.

Graham et al. (2006). Lost in Translation: Time for a map? *The Journal of Continuing Education in the Health Professions,* Vol. 26, pp. 13-24.

Grønlands Statistik (2017). http://www.stat.gl/dialog/topmain.asp?lang=da&subject=Befolkning&sc=BE#chart-wrapper

Halkier, B. (2010). "Fokusgrupper" in: Brinkman, S. & Tanggaard, L. (eds.) *Kvalitative metoder. En grundbog*, Hans Reitzels Forlag, København, pp. 121-136.

Hansen, EB., Platz, M. (1995). *80-100 åriges levekår, en interviewundersøgelse blandt ældre i 75 kommuner.* Amternes og Kommunernes Forskningsinstitut.

Hastrup, K., Rubow, C. & Tjørnhøj-Thomsen, T. (2012). *Kulturanalyse. Kort fortalt,* Samfundslitteratur, Copenhagen.

Hillersdal, L. & Nørtoft, K. (2015). "Observationer" i *Kvan – Tidsskrift for Læreruddannelse og Skole, Vol. 35, nr. 103.*

Hoare, T., Levy, C. & Robinson, M. P. (1993): Participatory Action Research in Native Communities: Cultural Opportunities and Legal Implications, *Canadian Journal of Native Studies,* Vol. 13, no. 1, pp. 43-68.

Høiris, O. & Marquardt, O. (2012): *Fra vild til verdensborger. Grønlandsk identitet fra kolonitiden til nutidens globalitet*. Aarhus Universitet.

Inuuneritta II (2012). *Naalakkersuisuts strategier og målsætninger for folkesundheden 2013-2019*. Naalakkersuisut. Jakobsen, A., Laurberg, P., Vestergaard, P., Andersen, S. (2013). Clinical risk factors for osteoporosis are common among elderly people in Nuuk, Greenland. *International Journal of Circumpolar Health, Vol. 72, 19596*.

Jensen, T. & Nørtoft, K. (2017). *Rapport nr. 2. Projektproces og outcome 2017*.

Kofod, J. (2009). "Ældre mennesker og mad belyst I et kulturelt perspektiv" In: Glasdam, S. & Appel, B. E. (eds.) *Gerontologi: Livet som ældre I det moderne samfund,* Dansk Sygeplejeråd and Nyt Nordisk Forlag Arnold Busck, pp. 216-225.

Larsen C.V.L. (2014). *Gambling and public health in Greenland - a large indigenous population in transition. A study of gambling behavior and problem gambling in relation to social transition, addictive behaviors and health among Greenland Inuit*. Ph.d.-afhandling Statens Institut for Folkesundhed, SDU.

Lassen, A.J. (2014). *Active ageing and the unmaking of old age: The knowledge productions, everyday practices and policies of the good late life*. Ph.d.-afhandling, SAXO-instituttet, Københavns Universitet.

Lassen, P.O., Olsen, T.M., Jakobsen, A., Andersen, S., Laurberg, P, Nielsen, O.B.F. (2013). 10-year Follow up on Medication and Functional Level in Nursing Home Residents in North Greenland. Poster session EUGMS , Venedig, Italien.

Laursen, K., Lange, S., Bjerregaard P. (2003) *At være gammel i Qasigiannguit*. Projektrapport.

Levevilkår. livsstil og helbred. København og Nuuk, Statens Institut for Folkesundhed og Departementet for Sundhed.

Lynge, I. (2000). *Psykiske lidelser i det grønlandske samfund.* Afhandling. Afd. For psykiatrisk demografi, Institut for Psykiatrisk Grundforskning, Universitetshospital i Århus.

Lynggaard, K. (2010). "Dokumentanalyse" in: Brinkman, S. & Tanggaard, L. (eds.) *Kvalitative metoder. En grundbog*, Hans Reitzels Forlag, København, pp. 137-152.

Mitchell, C. (2008). Getting the picture and changing the picture: visual methodologies and educational research in South Africa. *South African Journal of Education, 28*(3).

Moller, H., O'Blyver, P., Bragg, C., Newman, J., Clucas, R., Fletcher, D., Kitson, J., McKechnie, S., Scott, D. & Rakiura Titi Islands Administering Body (2009): Guidelines for cross-cultural Participatory Action Research partnerships: A case study of a customary seabird harvest in New Zealand, *New Zealand Journal of Zoology*, 36:3, 211-241, DOI: 10.1080/03014220909510152.

Niclasen B. (2015). *Trivsel og sundhed blandt folkeskoleelever i Grønland - resultater fra skolebørnsundersøgelsen HBSC Greenland 2014*. SIF's Grønlandsskrifter nr. 27.

Niclasen, B., Løngaard, K., Laursen, L.K., Schnohr C.W. (2007). *Sundhed på toppen. Resultater fra Health Behaviour in School-aged Children (HBSC) undersøgelsen i Grønland i 2006,* Inussuk: Arktisk Forskningsjournal, 2007, Vol 1.

Nilsen, E. R., Dugstad, J., Eide, H., Gullslett, M. K. and Eide, T. (2016). Exploring resistance to implementation of welfare technology in municipal healthcare services – a longitudinal case study. BMC Health Services Research (2016) 16:657. DOI 10.1186/s12913-016-1913-5.

Nørtoft, K. (2017). When Anna moved to a nursing home: empathic movements between self and others in the decision making and process of moving. I Endter, C. & Kienitz, S. (red.). Altern in Beziehungen. Ordnungen, Praktiken, Materialitäten.

Nørtoft, K. (2013). "Did you imagine that old people could be like this?" A Kaleidoscope of Ageing, Health and Processes of Identity in and Urban Danish Context. Ph.d.-afhandling, Institut for Uddannelse og Pædagogik, Århus Universitet.

Nørtoft, K. & Jensen, T. (2017a). Aldringsidentitet i spændingsfeltet mellem fangersamfund og velfærdsstat, Psyke og Logos, Vol. 38, nr. 1.

Nørtoft, K. & Jensen, T. (2017b). *Rapport nr. 1 om 1. kommuneworkshop i projekt Arktisk Aldring (AgeArc).*

Olsen, T.M., Laurbjerg P. & Andersen S. (2010). *Funktionsniveau og sygdom hos personer på alderdomshjem i Ilulissat.* Abstract from NunaMed 2010, Nuuk, Grønland.

Pagter, Linnea (2006): *Det gode samarbejde med frivillige sociale foreninger - en undersøgelse af danske kommuners samarbejde med frivillige sociale organisationer*. Rådet for frivilligt socialt arbejde.

Pedersen, C.P., Bjerregaard, P. (2012). *Det svære ungdomsliv. Unges Trivsel i Grønland 2011 – en undersøgelse blandt de ældste folkeskoleelever/Inuusuttuuneq nalorninartulik. Kalaallit nunaanni inuusuttut akornanni atugarissaarneq pillugu meeqqat atuarfianni atuartut angajulliit akornanni 2011-mi misissuisitsineq*. SIF's Grønlandsskrifter nr. 24.

Pink, S. (2009). *Doing sensory ethnography,* Sage, Los Angeles, London, New Delhi, Singapore, Washington DC.

Platz, M. (1987). *Længst muligt i eget hjem, en undersøgelse blandt ældre i Odense.* Socialforskningsinstituttet.

Robinson, M. P. (1996): Shampoo Archaeology: Towards a Participatory Action Research Approach in Civil Society, *Canadian Journal of Native Studies,* pp. 122-138.

Spradley, J. (1979). *The ethnographic Interview.* Holt, Rinehart and Winston, New York.

Swane, C.E. (1991). *Glimt i øjet. Udvikling af omsorgen for demente gamle mennesker.*

Sørensen, A.K. (1995). Greenland: From colony to home-rule, Tägil, S. (ed.), *Ethnicity and nation building in the Nordic world,* Hurst and Company, London.

Tomasen, L.S. (2009). *En god alderdom? Aktivering af svækkede ældre I leve-og bomiljø,* Specialerække no. 517, Institute for Anthropology, University of Copenhagen.

Tonkin, E. (1984). Participant observation, Ellen, R.F. (ed.) *Ethnographic Research* Academic Press, London, pp. 216-223.

Voorberg, W., Bekkers, V., Timeus, K., Tonurist, P., & Tummers, L. (2017): Changing public service delivery: learning in co-creation, Policy and Society. DOI: 10.1080/14494035.2017.1323711

Voorberg, W. H., Bekkers, V. J., & Tummers, L. G. (2015). A systematic review of co-creation and co-production: Embarking on the social innovation journey. *Public Management Review, 17*(9), 1333–1357.

Wallerstein, N. and Duran, B. (2010): Community-Based Participatory Research Contributions to Intervention Research: The Intersection of Science and Practice to Improve Health Equity, *American Journal of Public Health,* Supplement 1, 2010, Vol. 1., pp. 40-46

Ældrepolitik 2014-2017 (2014). Naalakkersuisut.

Section V:

Science Based Governance & Regulation of Arctic Energy Installations

Special Section Introduction

Science Based Governance and Regulation of Arctic Energy Installations

Elizabeth A. Kirk

This section of the Arctic Yearbook has its roots in a network established with the support of the UK Arts and Humanities Research Council: The Science Based Governance and Regulation of Arctic Energy Installations Network (SciBAr Installations) (www.scibarinstallations.org.uk). The network and this section of the Yearbook are designed to develop an overview of the potential risks and impacts associated with the construction and operation of offshore installations in the Arctic drawing on expertise from a range of disciplines. Thus we have contributions from law (Basaran, Vinogradov & Azubuike, and Kirk & Miller), environmental science (Kirk & Miller) management (Andræsen, Borch & Ikonen) and politics (Poppel).

The papers give some indication of the range of relevant disciplines and issues to be addressed if we are to ensure a 360 degree review of the regulation of offshore energy installations in the Arctic. Thus Vinogradov & Azubuike take a traditional legal approach in assessing the current global and regional regulations relating to pollution from offshore petroleum operations in the Arctic and propose solutions to identified gaps in the existing Arctic regime in the form of a regional intergovernmental framework or an industry-wide compensation scheme. Kirk & Miller provide an interdisciplinary analysis of the ways in which gaps in scientific understanding of the potential impacts from oil and gas installations on the marine environment may raise legal questions such as what "significant transboundary pollution" means in the Arctic context. Poppel's paper also directly links to oil and gas activities, but focuses more on the impacts or potential impacts on the political discourse in Greenland.

Elizabeth A. Kirk is Professor of International Environmental Law at Nottingham Trent University. She is the guest editor of this special section of the Arctic Yearbook 2018.

Two of the papers range slightly more widely, in that they address topics which encompass issues pertaining to Arctic offshore energy installations as well as broader issues. Thus Basaran's paper on civil liability for oil pollution has potential implications for the transit passage of oil tankers as well as pollution from shipping transporting oil from Arctic installations. Similarly, Andræsen, Borch & Ikonen's analysis of Arctic marine emergency response draws out how Arctic operational conditions add to inter-organizational coordination challenges in delivering emergency response to all maritime operations, not just those relating to offshore energy installations.

In this collection of papers we begin then to demonstrate the breadth and depth of research needed if we are to fully understand the issues that regulators must address if we are to attend to all threats and impacts from and to offshore installations in the Arctic. As the papers demonstrate these range from socio-political impacts, to impacts on human health and safety, to impacts on the marine environment. The responses required range from the development of monitoring and management techniques, to changes in law.

Offshore Oil & Gas Installations in the Arctic: Responding to Uncertainty through Science and Law

Elizabeth A. Kirk & Raeanne G. Miller

The Arctic Ocean's physical environments and ecosystems are some of the most fragile and least well understood on Earth. They are characterised by extreme light and dark cycles, shortened food chains, and slow ecosystem recovery from disturbance. The Arctic seabed also holds promise of lucrative oil and gas resources, whose future exploitation could have substantial environmental impacts. Arctic jurisdictions must weigh environmental conservation and global agreements to reduce carbon emissions against the social implications and potential economic gain of offshore oil and gas projects in the Arctic, and must do so in the face of substantial scientific uncertainty around the impacts of climate and environmental change in the Arctic. We know, however, that major projects such as oil and gas projects have the potential to lead to transboundary environmental harm. We have some understanding of how any pollution may be carried by sea ice or on the ocean currents which flow around the Arctic Ocean. Even so, we have little understanding of how such pollutants might affect the Arctic ecosystem. Substantial gaps remain in scientific understanding of Arctic ecosystem functioning, particularly as it changes rapidly with the advent of climate change. These gaps in scientific understanding raise legal questions about how, for example, the law's obligation not to cause significant transboundary environmental harm applies in the Arctic. In particular one may ask what actions are required by a state to show that they have acted with due diligence. Is it sufficient, for example, to show that they have complied with existing international treaties?

This paper draws out key legal and scientific issues on which greater understanding is required. In essence it presents a roadmap for further research and negotiation.

Introduction

Some of the largest remaining petroleum reserves worldwide are located in the Arctic. Since exploratory drilling began in the 1970's there has been consistent interest in exploiting these resources (AMAP, 2007), although to date few fields have entered into production, owing to: low oil prices; the technological and logistical challenges of operating in extremely cold and remote

Elizabeth A. Kirk is Professor of International Environmetnal Law at Nottingham Trent University. Raeanne G. Miller is Post-Doctoral Research Associate in Marine Energy at the University of the Highlands and Islands.

environments; national commitments to climate agreements; and the risk of environmental impact that could result from a large oil spill or other serious event (Gulas et al., 2017). Even so, Norway has been active in offshore petroleum exploration in the Arctic since the Snøhvit field was discovered in 1984 (Norwegian Petroleum Directorate, 2018) and there is potential for further activity.

Should offshore oil and gas activity increase in the Arctic, so does the risk of harm to the marine environment. AMAP (2010) highlighted a number of key risks to the Arctic environment associated with oil and gas extraction, including: spills of hydrocarbons and other pollutants from offshore drilling activities, blowouts, rig accidents and shipping disasters; operational pollution from exploratory drilling; increasing volumes of rubbish and sewage; an influx of people to the Arctic; increased air pollution; noise pollution to the marine environment; increased emissions from burning fossil fuels; light pollution; and cumulative impacts stemming from multiple installations and human activities. Of these, this paper will focus on certain impacts directly associated with offshore oil and gas development: hydrocarbon spills, pollutants, underwater noise pollution, and the impact of cumulative development. While the remaining effects are important, they are also associated with wider human activity in the Arctic (mining, tourism, shipping, etc.) and so draw in broader considerations we do not have space to address here.

The Arctic Ocean itself is a remote and challenging environment, but also one which is inherently vulnerable to environmental change, and about which we know very little. Of the eight Arctic nations, five have exclusive economic zones within the Arctic circle (Canada, USA, Russia, Denmark, Norway). For the purposes of this paper, we consider 'the Arctic' to be the region defined by the Arctic Circle. More specifically, this includes the Arctic Ocean, as defined by the ocean north of the latitude 66°34', and the states whose coastlines border it. This definition is environmentally relevant, as it includes not only areas of sea ice cover, but also the 'subarctic marine' regions between Norway and Greenland, through which most of the water entering and exiting the Arctic Ocean flows (Jones, 2001). This boundary is also politically relevant: the five aforementioned states have indicated their intention to collaborate, as communicated in the Ilulissat Declaration of 2008, and as illustrated in more recent agreements such as the 2017 moratorium on fisheries activity in the central Arctic Ocean.

Although separate in legal terms, the territorial waters of each nation bordering the Arctic are linked by ocean circulation, sea ice drift, and species migration, all of which can transport resources and impacts such as pollutants between them. It is an inherently connected environment. These characteristics mean that, for example, the risk of harm being caused to other states or to the environment beyond national jurisdiction may be higher in the Arctic than elsewhere even where pollution would normally be regarded as small scale. Similarly, recent advances in oceanography suggest that in some cases (e.g. pollutant spills in ice, Blanken et al., 2017) it may be possible to demonstrate causation linking operational pollution to significant transboundary harm.

Thus we highlight key legal and scientific questions that are linked to the specific impacts noted above and draw out how these impacts and the legal and scientific questions attached to them may differ in the Arctic to other oceans. The main discussion is focused upon what may be termed "flaws" in the legal framework and draws out the legal and scientific questions that need addressing. It thus sets an agenda for research in relation to offshore installations in the Arctic.

Flaws in the Framework and New Questions

The Potential for Significant Transboundary Harm

Coastal states have sovereignty over their terrirorial waters and sovereign rights to the hydrocarbon and mineral desposits in their continental shelf and to exploit renewable energy in their exclusive economic zones (UN Convention on the Law of the Sea 1982 (UNCLOS), Articles 2, 56 and 77). These rights underpin the exploitation of oil, gas and renewable energy sources in the oceans. While the rights give states considerable freedom to exploit resources, they do bring with them obligations. These obligations largely reiterate and expand upon customary international law obligations to protect and prevent harm to the marine environment, (Article 192) to prevent transboundary harm (Article 194(2)) and to harmonize their measures to prevent and reduce marine environmental harm (Article 194(1)). In addition, specific obligations to control pollution from offshore installations and to enforce those obligations are found in Articles 208, 210, 215 and 216. Obligations to control pollution from shipping found in Articles 211 and 217 to 221 are also relevant where ships are used to service and support offshore energy activities.

To meet these obligations in the context of potential transboundary harm states must apply the prevention principle (Advisory Opinion on Legality of the Threat or Use of Nuclear Weapons (ICJ 1996)). The prevention principle requires states to prevent "*significant*" transboundary harm and to do so by acting with due diligence. The problem with these obligations in the context of potential oil and gas activities in the Arctic is that what is meant by "significant" is not clear, nor is it clear what acting with due diligence requires.

What is regarded as significant has to be decided in the context of the particular issue. We know that "significant" means more than simply the harm is detectable, and that it need not require the harm to be substantial in nature. But in the context of the Arctic Ocean, where a relatively minor oil spill may linger longer than in temperate waters (Leahy & Colwell, 1990; Atlas et al., 1978), causing lasting damage to the environment, we have yet to fully understand what scale of pollution would count as significant. Would, for example, operational pollution which may accumulate across time amount to significant pollution? Some authors have suggested that incremental accumulation of impacts may not be captured by the term "significant harm" and so would not give rise to potential liability (Duvic-Paoli & Viñuales, 2015). Yet in the context of the Arctic a failure to address operational pollution could have significant (but unforeseen) impacts.

Although there is a substantial amount of information available on the environmental effects of hydrocarbons in the marine environment, relatively few impact studies have been carried out on truly Arctic species (but see Rice et al., 1978). Instead, the majority of research investigating the impacts of oil spills on marine species have focused on temperate waters. It is therefore difficult to predict how well these findings might be applied to the Arctic environment (AMAP, 2010) and while, for example, the Arctic Council takes a leading role in promoting the development of scientific understanding on these and other Arctic issues, significant gaps in understanding remain. With this in mind, existing international agreements on pollution and the marine environment (e.g. UNCLOS, OSPAR convention) may not fully encapsulate what is truly required to protect the Arctic Ocean.

The recovery rate of the Arctic marine environment in response to disturbance is likely to be slow, whether as a result of reduced species diversity, the slow-growing nature of many cold-water

species, or the reproductive importance of the region for many species, for example nesting seabirds (Forsgren et al. 2009). Combined with the fact that Arctic food chains are comparatively short and dependent on key species (Kaiser et al., 2011), pollution, even comparatively low level operational pollution, could have severe impacts on the functioning of the Arctic ocean ecosystem. In addition, a number of factors could exacerbate the severity of an Arctic oil spill. At colder temperatures, for example, the density and viscosity of oil increases, while its degradation time is much slower (Leahy & Colwell, 1990; Atlas, 1981; Atlas et al. 1978). This means that spilled oil may linger on the seabed, under ice, or in coastal environments for longer than it otherwise would in temperate or tropical environments. In the case of the 1989 *Exxon Valdez* spill in Alaska, oil is still detectable in the intertidal environment. It has been suggested that oil trapped in sediment following the 1970 *Arrow* spill in Chedabucto Bay, Nova Scotia, Canada, could persist for as long as 150 years (Vandermeulen & Gordon, 1976). Each of these spills was, however, relatively contained in that the spill came from an oil tanker holding a relatively small volume of oil compared to what might emerge from a major spill at an offshore oil development. The risks of oil, or other chemicals, lingering in the Arctic environment as a result of an offshore accident attached to oil and gas activites are, therefore, significant.

In addition, in considering the impact of pollution in the Arctic we must consider the pollutant/ice interface and its impact on the marine ecosystem. The Arctic Ocean ecosystem is dominated by the seasonal fluctuation of sea ice. Sea ice is an important habitat for photosynthetic algae and sub-ice phytoplankton, the primary producers that form the basis of the Arctic marine food web (Post et al, 2013). Each year as the seasonal sea ice thins, increasing light penetration causes these primary producers to rapidly increase in numbers, in turn fueling the seasonal reproduction and growth of zooplankton such as copepods (Darnis et al., 2012, Gosselin et al., 1997), which serve as prey to higher order consumers including fish and crustaceans. While sea ice algae and sub ice phytoplankton are major contributors to biomass in polar seas, sea ice is also a critical habitat for many charismatic species such as polar bears, walruses, narwhals, and many species of seabirds, who depend on sea ice for reproduction, food, or migration (Hoegh-Gulberg & Bruno, 2010). Thus any impact on zooplankton as a result of pollution has a significant impact on the food chain. Pollutants such as oil may remain on the surface of the sea ice as it forms, or pool beneath it (Payne et al., 1990). Alternatively, sub-ice oil may also move upwards through the ice via brine channels (Petrich et al., 2013) and fissures in the ice, to ultimately appear on the sea ice surface (Lee et al., 2015). In so doing the oil or other pollutant may diminish light penetration or make the sub-ice areas no longer habitable. The short food chains and dependence of those food chains on ice may open the marine Arctic to more vulnerability to pollutants than would be the case in other ocean areas. Add to this the fact that 75% of sea ice volume has been lost since the 1980s (Schweiger et al. 2011, Overland and Want, 2013) and any further diminution of habitable ice area due to (even relatively low scale) pollution may have a severe impact on the Arctic marine ecosystem.

Clearly we are still to understand the extent of these potential impacts, but at the same time these potential impacts raise the possibility that states conducting or permitting offshore operations may be more likely to find themselves in breach of the obligation not to cause significant transboundary harm as a result of activities in the Arctic when similar activities elsewhere would not be predicted to cause significant transboundary harm.

There is a further aspect to this in that scientific evidence points to the possibility that the likelihood of transboundary impacts arising may also be greater in the Arctic than in other oceans because of the relationship (or potential relationship) between pollutants and ice. As we noted above, where released pollutants (e.g., oil, chemicals) interact with sea ice, they may become entrained within the ice in a number of ways, for example in association with the underside of the ice, transportation from the underside to the surface of the ice through brine channels or leads, or direct integration into sea ice formation (AMAP, 1998). Once a pollutant becomes ice-associated, it will often move with the ice as it is transported or dispersed by prevailing winds and currents (Afenyo et al., 2016; Beegle-Krause et al., 2013). It may then travel hundreds of kilometres as the ice moves, before it is released in another location (possibly another state's EEZ) as ice melts. For example, a recent study investigated the spreading trajectories of 'worst case scenario' oil spills in the Arctic, and found that the movement of sea ice had the potential to transport oil greater distances than ocean currents, sometimes over 4000 km, and that contamination from oil spills was in many cases likely to cross international boundaries (Blanken et al., 2017).

Again this raises both legal and scientific questions. Not only does it suggest that transboundary impacts may be more likely, but the relationship between pollutants and ice raises the possibility that causation will be easier to establish. In other words, it is possible that it will be easier to trace the flow of ice in the Arctic Ocean back to the state of origin of the pollution and this possibility may be enhanced by the relative paucity of development in the Arctic. Naturally these legal issues point to scientific questions that should be addressed – how do pollutants interact with ice? How far will such pollutants be transported? How easy is it to trace the pollutant back to source as a result of the pollutant/ice relationship?

States can mount a defense to any claim that they have failed to act with due diligence by showing, in effect, that they have acted reasonably. Due diligence, for example, requires that states take reasonable steps to avoid causing transboundary harm. The question of what is reasonable will be interpreted in light of any relevant international obligations and of the circumstances in which actions take place. Thus a state must show that it has acted in compliance with relevant international treaties or guidelines. Key obligations in this respect are those found in Articles 192 and 194 of UNCLOS which, as discussed above, oblige states to take action to protect and prevent harm to the marine environment and not to permit activities within their jurisdiction which will cause transboundary pollution. Other relevant agreements include global treaties, such as the London Dumping Convention 1972 and its 1996 Protocol which regulate dumping at sea (encompassing disposal of offshore installations at sea); regional treaties such as the OSPAR Convention 1992, Annex III of which in effect requires authorising states to regulate pollution from offshore installations and soft law instruments such as the Code for the Construction and Equipment of Mobile Offshore Drilling Units (IMO Resolution A.1023(26), 2 December 2009) which regulates the design of offshore drilling units to minimize the risk of harm to them or to those working on them. There is also a range of oil-based international treaties that apply to all areas, including the Arctic. These include the 1990 International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC) which requires, for example, operators to have an oil pollution emergency plan in place (Article 4) and states to have effective national pollution incident response systems in place (Article 6). The OPRC applies to any fixed or floating offshore structure engaged in gas or oil exploration, exploitation or production activities and so is highly relevant.

Compliance with these obligations is, in terms of due diligence, assessed in light of the circumstances. These may include factors such as the level of industrial development of the state and its geography. Thus, for example, a densely populated, territorially small state may be expected to have a very good awareness of the occurance of any oil spills on their land territory, whereas a more sparsly populated state with a large amount of land territory could not be expected to have such immediate knowledge. Such distinctions may of course diminish as remote sensing technology develops. In the Arctic context, however, what is key is that the environment is harsh and so responding to incidents may prove difficult. What might start as a minor (and in another location containable) spill, for example, could become a major incident before states are able to effectively respond. Crucially, none of the treaties or guidelines referred to above were developed for the Arctic specific environment and so a question arises as to whether states complying with these treaties, but still causing significant harm to the Arctic marine environment could be said to be exercising due diligence. In other words, do the specific environmental circumstances of the Arctic require the coastal states to behave at a higher standard than is required under the global treaties? The responses of some Arctic states suggest that may be the case.

A key response has been the adoption of some polar specific agreements and guidelines, notably those adopted under the auspices of or by the Arctic Council. These include the Arctic Council's Offshore Oil and Gas Guidelines 2009 (Arctic Guidelines) and the Arctic Offshore Oil and Gas Guidelines: Systems Safety Management and Safety Culture 2014. The Arctic Guidelines call, for example, for the application of the precautionary approach to oil and gas activities and set out guidance on the conduct of environmental impact assessments, monitoring, waste management and more. While at first glance the Guidelines appear comprehensive they do contain gaps. The precautionary approach is, for example, to be applied in accordance with the state's capabilities and how this caveat is to be interpreted is not made clear.

Potentially binding international law for responding to Arctic oil spills has also been adopted in the form of the Agreement on Cooperation on Marine Oil Pollution, Preparedness and Response in the Arctic (ACMOPPRA). However, although the Arctic states have signed this treaty, they have not completed all the steps necessary to bring it into force. A second agreement is the 2011 Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic, which came into force in January 2013. However, this Agreement focuses on protecting individuals at risk through accidents at sea in the Arctic, not on protecting the environment. These Arctic agreements are supported by the International Code for Ships Operating in Polar Waters (Polar Code), which contains various technical requirements designed to ensure the safety of ships (and those working on them) in polar regions.

While these agreements do go a long way to responding to oil spills, in our view compliance with them may not be sufficient to show that the state has acted with due diligence, nor may it be enough to prevent harm to the Arctic. This is largely because of the scientific information on which they are based. As we have shown above, significant questions about the impact of and transportation of pollutants remain. As we will show shortly, questions about the ability of the environment to recover from any pollution damage also arise. In addition, there is evidence of some Arctic states adopting further national Arctic specific measures so suggesting that higher standards yet may be required. For example, the US has adopted the binding Arctic Drilling Rules, which expressly cover exploratory drilling by mobile offshore drilling units and require a higher

standard for drilling in the US Arctic than other areas of the US Outer Continental Shelf. The types of measures covered by the Arctic Drilling Rules include that operators are required to use equipment which can perform safely in locations that have limited infrastructrure and in extreme weather and ocean conditions. They are also required have the ability to track and respond to changing ice conditions and adverse weather. Of perhaps greater import in determining the nature of actions required in the Arctic was the adoption in the December 2016 of the United States-Canada Joint Arctic Leaders' Statement through which Canada instituted an indefinite moratorium on all future oil and gas activities in all Canadian Arctic waters and the USA adopted an indefinite moratorium on all future oil and gas activities in much of its Arctic waters. (Both moratoria are, however, due to be reviewed after 5 years and the US moratorium may be reversed by the current President, Donald Trump).

There is a further element to demonstrating that a state is acting with due diligence: certain procedural obligations must be complied with.

Procedural Obligations: EIA, and Notification and Consultation

States are subject to the well-recognised obligation to notify and consult potentially affected states of a planned activity which may lead to significant harmful impacts on them (Lac Lannoux Arbitration, 1957). The obligation to notify and consult with states potentially harmed by an activity leads to the obligation to undertake an Environmental Impact Assessment (EIA). The EIA obligation applies where a state is considering authorising a project or activity that may have a significant adverse transboundary impact, in particular on a shared resource (Pulp Mills on the River Uruguay (ICJ 2010)), but also in areas beyond state jurisdiction (Advisory Opinion on Responsibility and Obligations of States with respect to Activities in the Area (ITLOS 2011)). The obligation is also found in a number of treaties, most notably the United Nations Convention on the Law of the Sea 1982,[1] requires EIAs to be conducted "When States have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment" (Article 206). Guidance on how to conduct EIAs can be found in a number of guidelines including the 2009 Arctic Guidelines and the Convention on Biological Diversity, Voluntary Guidelines on Biodiversity-Inclusive Impact Assessment.

The objective of an EIA is to provide decision makers with information on the environmental consequences of proposed activities; enable such information to influence decisions and provide a mechanism for public/stakeholder participation. It must therefore take place before the activity or project begins and, as the Court noted in the Pulp Mills case, it places an ongoing obligation to monitor impacts from these same activities on states.

EIA's rely on the existence of or establishment of scientific data on the environmental baseline associated with a particular time-frame and spatial scale. This allows for natural variability to be accounted for within the assessment, and ensures that the spatial extent of the baseline matches the extent of potential effects for the impact being investigated (Wassmann et al., 2011). While the Arctic Council leads in the establishment of baseline information through, for example, its periodic Arctic Ocean review projects, a lack of ecological information in the Arctic and the impact of global climate change remains. This makes it challenging to set sufficiently concrete environmental baselines for comparison across the timescale of resource extraction within, for example, a project

with a potential life of 25-40 years. Despite detailed international guidelines being available (in, for example, the Arctic Guidelines and the CBD Guidelines), they do not provide sufficient detail to address this.

For example, a project developer might record environmental parameters over five years prior to an installation in order to set a 'no impact' baseline for that installation. From the point when installation commences, the pre-installation measurements are used as a frame against which to measure any impacts from the development. However, the background environmental change in the Arctic is so rapid that attributing a change to the project may be problematic. Thus, environmental change within an impacted site could be attributed to that impact, or to ongoing (background) environmental change resulting from climate change and other persistent stressors, or a combination of the two. The current international regime on EIA provides little assistance on how to tackle this issue. For example, the Arctic Guidelines provide "monitoring should preferably be conducted so as to distinguish impacts due to oil and gas activities from other relevant sources" (Arctic Guidelines: 21) but although they also call for natural and other hazards to be taken into account in an EIA they, like other legal documents, cannot or rather do not identify how to address the scientific uncertainties that come with, for example, rapid climate change. In scientific terms this leads to the conclusion that further, extensive and ongoing environmental monitoring in the Arctic is required at both development sites and those free of development. In legal terms this also raises questions of causation. Without robust scientific evidence based on pan-Arctic monitoring, states permitting offshore activities may find themselves open to claims of transboundary environmental harm, imputed to the offshore activity but actually caused by activities elsewhere.

To some extent the need for further research to establish environmental baselines is being met by states acting individually and collectively, in particular through the Arctic Council, to develop understanding of the State of the Arctic Environment. Key reports such as those produced through the Arctic Council Working Groups on Conservation of Arctic Flora and Fauna (CAFF) and Arctic Monitoring and Assessment Programme (AMAP) draw together best scientific understanding. We suggest, however, that further support for the research undertaken by the Arctic Council and others is needed.

To some extent the need to establish baseline information can also be addressed (at least in part) by paying attention to another element of the EIA obligation. The obligation also requires that indigenous peoples be given an opportunity to input into the EIA process (Johnstone, 2014: 168). All EIA processes provide for public participation in some form. The fact that many Indigenous communities rely on Arctic marine resources means that they meet any tests to be counted as public. In the Arctic context this is highly significant as the Indigenous communities will often have a far more sophisticated understanding of the part of the Arctic marine ecosystem they interact with than "traditional" science. At the same time, those conducting the EIA may lack the linguistic skills and cultural understanding to ensure that Indigenous knowledge does feed into the EIA process in an effective manner. Again, the Arctic Council can and does play a role in supporting Indigenous peoples as they feed into the reports produced by its Working Groups and these reports in turn may be of use in informing the EIA process, but this is only part of the story. Further input into EIAs conducted at the national level is also required. Thus legal and scientific questions of how to effectively involve Indigenous and local communities in EIA and other data

gathering processes arise. What procedures are required, for example, to ensure that the Indigenous voice is heard and understood in the EIA process?

The next step will be then to evaluate the impact of environmental stressors resulting from a development. In the Arctic, however, calculating both the potential impact of an event and the relative costs of prevention or mitigation will prove scientifically challenging. For example, experience from previous oil spills suggests that predicting the long-term impacts of spills is associated with high uncertainty of outcomes (Lee et al., 2015). Risk assessments and predicting impact outcomes is even more taxing in the Arctic, as the rapidly changing environment with the advent of climate change adds an additional dimension of complexity (Duarte et al., 2012). In part this is because there has been limited opportunity to test cleanup methods in the Arctic, but the complex dynamics of oil/chemical sea ice interactions make it particularly difficult to track the spread of a spill and to predict where it will be transported and how it may begin to degrade. Uncertainty in this area makes it hard for those assessing risks posed by Arctic pollution to predict both the severity of pollution associated with any particular activity, and to plan effective containment and clean up strategies to mitigate environmental harm.

In addition, in the Arctic the EIA process also raises questions in relation to cumulative impacts. Arguably states are required by the UN Convention on the Law of the Sea and other international agreements, to take account of cumulative impacts in marine EIAs (Oude Elferink, 2012). For example, the Convention on Biological Diversity (CBD) Voluntary Guidelines on EIA, which provide guidance on how to interpret and apply Article 14 of the CBD note that the assessment process should include evaluation of (potential) cumulative impacts. The real challenge is, however, in identifying, or assessing the actual impact of potential cumulative impacts in the Arctic. For example, the noise from one individual vessel travelling to and from offshore production facilities may be short-lived and localised, but the transit of multiple vessels along the same route may displace animal populations, or cause migrating animals to avoid the area and to experience increased metabolic costs in order to swim around the affected area (Moore et al., 2012 and references therein). These types of impacts may be felt in any ocean in which they take place, however, in the Arctic their impact may be compounded by the impacts of rapid climate change also affecting Arctic marine species and habitat.

The substantial gaps in our baseline understanding of the Arctic Ocean are amplified by the fact that it is difficult to project how the ecosystem will change in the future. This suggests that predicting how the cumulative impacts of oil and gas developments in the Arctic are distinct from wider environmental change presents a significant challenge, not only to the environmental scientists carrying out the assessments, but also to policy- and law-makers who must develop adequate instruments to regulate these developments within a context of substantial environmental uncertainty. Must, for example, EIAs be conducted for all Arctic marine projects regardless of size because of the potential for significant harm as a result of cumulative impacts? How do we address the fact that cumulative impacts could be exacerbated by the interaction of, for example, chemical or oil pollution and ice? If it is possible that operational oil spills are "captured" by the ice, transported hundreds of miles and "deposited" in another state's EEZ in a single ice melt event, what liability might the emitting state have and what redress would be open to the receiving state? The possibilities these questions raise also lead one to ask if there might be a case for an Arctic wide strategic environmental impact assessment (SEA) to help identify potential cumulative

impacts. As an Arctic wide SEA it would, in line with the definition of the Arctic Ocean we use in this paper, cover the ocean north of the latitude 66°34', a wider area than the regional SEAs recommended in the Arctic Guidelines and the national SEAs recommended by the CBD Voluntary Guidelines. Adopting one might also fit with the recommendations of the Arctic Council Task Force on Arctic Marine Cooperation which include "extending cooperation throughout the entire cycle of marine stewardship: from the planning of scientific research, to … implementation of policy and, to monitoring and assessment of the policy's effectiveness" (Arctic Council, 2017: 4-5).

The challenges of conducting an "effective" EIA we have outlined point to the need for very full notification and consultation procedures with neighbouring states if a state sponsoring a development is to ensure that it can demonstrate that it has acted with due diligence to prevent transboundary environmental harm. As we suggested above, they also point, not just to the need for further scientific research, but to the potential benefits of an Arctic-wide Strategic Environmental Assessment (SEA) to determine where activities could or should not be permitted. The need for an SEA is also emphasized by the problems associated with clean up and recovery from spills and cumulative impacts in the Arctic.

Redress, Clean-Up and Recovery

The final set of issues to consider in the context of transboundary pollution is the question of redress if one state suffers harm as a result of transboundary pollution. Again, as we demonstrate the costs of and indeed possibility of clean up and recovery from pollution incidents or cumulative pollution may be very different in the Arctic than in other oceans and a series of legal and scientific questions arise.

As we have discussed, in comparison with other marine ecosystems, relatively little is known about the Arctic marine ecosystem. What we do know is that there is consensus within the research community that Arctic species are likely to recover more slowly than temperate species following disturbance because many are long lived and reproduce slowly, are more susceptible to toxins than their temperate counterparts, and because of increased toxicity of pollutants in cold waters. Regardless, the magnitude of this effect is unclear (Rice et al. 1978; Suchanek, 1993).

Ecosystem recovery rates following disturbance events may also be slower in the Arctic than in other marine environments. The Arctic has historically been a relatively pristine environment; individual and population recovery rates have only been investigated for a handful of species. However, it is expected that colder temperatures, reduced light levels during the winter months, a truncated growing season, and low nutrient availability may all reduce the recovery rates of species in the Arctic Ocean, extending the temporal footprint of an impact. Furthermore, biodegredation rates for pollutants in the Arctic Ocean are also likely to be slower relative to other marine environments, suggesting that contaminants such as spilled oil will persist in the environment for long periods of time, particularly in Arctic sea ice (Leahy & Colwell, 1990; Atlas, 1981; Atlas et al. 1978).

This scientific uncertainty raises a number of legal issues. Given the untested nature of cleanup and restoration methods in the Arctic, restitution in kind may not be possible. Equally, however, presenting a robust claim for compensation may prove problematic, particularly given the ruling by the International Court of Justice in the *Costa Rica v Nicaragua* case in early 2018. There the court

was particularly critical of Costa Rica's methodology for calculating its claim for compensation. It would seem then that any uncertainty in costings might undermine a potential claim for harm arising from transboundary pollution.

A potential solution might be to expand the application of, or adopt measures similar to those found in the Fund Convention which is financed through contributions from importers and exporters of oil. In this case operators or importers/exporters might contribute to a fund to address clean up operations resulting from pollution from offshore installations in the Arctic. An alternative would be to follow the model used in the Antarctic Treaty Protocol on Environmental Protection to the Antarctic Treaty under which a fund is maintained to reimburse the reasonable costs of parties to the treaty in responding to environmental emergencies where the emergency was not caused by actions over where they have jurisdiction (Article 12 of Annex VI to the Protocol). In this case the contributions to the fund are from operators which have failed to take remedial action and where the State Party authorising them has failed to take remedial action (Article 6 of Annex VI to the Protocol.) The danger in following the Antarctic approach is, however, that the operators may dissolve or go bankrupt following an emergency and before arrangements are made for them to pay into any fund. To some degree this risk is mitigated by the liability under Article 6 being joint and severally owed by all operators on a project, nevertheless, there is a clear need to examine the most appropriate ways forward.

International Obligations: Cooperation and the Precautionary Approach

International Law has long recognised the obligation to cooperate. It is contained in many treaties, including the UN Convention on the Law of the Sea 1982 and the Convention on Biological Diversity 1992 and it operates at the regional level as well as between neighbouring states. States' willingness to embrace the obligation to cooperate, particularly at the regional level, is seen in the number of regional seas treaties and programmes around the globe. The UN Environment Programme lists 18 regional seas, including the Arctic, and the Arctic states themselves have recognised the need for further cooperation in the form of an Arctic Regional Programme (Arctic Council, 2017). The application of the obligation to cooperate in the context of marine pollution was also recognised in the Mox Plant Case (MOX Plant, ITLOS (2001)) and reiterated in the Land Reclamation in and around the Straits of Johor Case (ITLOS (2003) and its application in the management of marine resources established in the Request for an Advisory Opinion submitted by the Sub-Regional Fisheries Commission to ITLOS in 2015 (Advisory Opinion by Fisheries Commission (ITLOS (2015)).

As discussed above, the Arctic states have been proactive in cooperating to address pollution from oil and gas activities. The question that arises, however, is: does the obligation to cooperate require states to act when the potential impacts of an activity are still uncertain? We know from past experience that scientific uncertainty may be used as a reason not to enter into new agreements and that even where the scientific community agrees on its knowledge and understanding, political and economic considerations hold more weight in the development of further agreements (Kirk, 2011). Yet in the face of uncertainty, the Arctic states have already accepted the obligation to cooperate and, as indicated earlier, have entered into treaties and adopted guidelines to address some (potential) harms in the Arctic and cooperated in relation to the production and collection of scientific data through, in particular, the Arctic Council. They also adopted the 2017 Agreement on Enhancing International Arctic Scientific Cooperation. This agreement will, hopefully, go some

way to help address the gaps in scientific understanding of the marine Arctic. Even so, legal questions arise as to how far the obligation to cooperate requires the Arctic states to work together. Does, for example, the significant risk of harm to the environment coupled with the significant degree of uncertainty around the nature of any impact from oil and gas activities mean that the adoption of a precautionary approach to oil and gas activities is legally or scientifically necessary?

Under the precautionary approach activities presumed to be harmful are not permitted unless they are known not to cause (significant) harm or unless measures have been, or will be taken to prevent harm to the environment. Given the challenges the precautionary approach presents to (international) law, it has not yet been fully accepted as a binding principle of customary international law (Birnie et al., 2009). One might assume therefore that a precautionary approach would not be required. It is, however, found in many treaties aimed at preventing and addressing environmental harm including the Ozone Convention and Montreal Protocol (adopted before there was conclusive proof that the hole in the Ozone Layer was harmful to human health, or to other living organisms (Benedick, 2009)) the London Dumping Convention and its 1996 Protocol, and the 2001 POPs Convention (Sands & Peel 2012). What many of these treaties have in common is that they are addressing particularly harmful activities. One might ask then if the law requires a precautionary approach in such circumstances.

We suggest that these conventions provide good models for the acceptance of a more precautionary approach within the Arctic in relation to oil and gas activities. Alternative sources of oil and gas can, for example, be found elsewhere in the world. Alternative sources of energy such as tide, wind and solar are also becoming more economically viable. Each of these points then to a reason to believe that a precautionary regime to address oil and gas extraction in the Arctic may be a success. The same logic underpinned the success of the Ozone Convention - alternative chemicals existed or could be developed quickly to replace those harming the ozone layer (Benedick, 2009: 24). There is further reason to anticipate success. The Arctic states adopted an Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean, which adopts a precautionary approach by, in effect, placing a moratorium on high seas fishing in the Arctic for 16 years. In addition, and as noted earlier, the US and Canada adopted moratoria on future oil and gas licencing within much of their Arctic waters (all in Canada's case). We argue that the same approach should be taken in respect of oil and gas activities. Adopting an Arctic Ocean wide moratorium on further activities (i.e., allowing existing exploitation to continue) would give time to conduct, for example, a thorough Strategic Impact Assessment at the Arctic Ocean level to better decide where such activities should take place. Given that offshore exploitation of oil and gas activities is already taking place in parts of the Arctic, and notwithstanding the Joint US-Canada "moratorium" it is likely that a moratorium on exploration and exploitation on the extended continental shelf and in areas beyond national jurisdiction would have a more realistic chance of success. Whether that would be sufficient to protect the Arctic Ocean from significant harm is, however, open to question.

A precautionary approach could also be achieved in other ways. For example, the Arctic Council could further enhance its existing guidelines on offshore oil and gas activities to take a more precautionary approach, or the Arctic states could adopt a binding set of standards, perhaps brokered through the Arctic Council, which focus on a precautionary approach to offshore energy activities. These could prohibit all exploration and exploitation unless certain circumstances exist

or unless certain technical standards are met, in much the same way as the 1996 Protocol to the London Dumping Convention addresses dumping at sea. Which approach would be best in terms of environmental protection and in terms of being most likely to attract state compliance is a question for further research.

Conclusions and Proposals

Our discussion has shown that the potential for further oil and gas activities in the marine Arctic give rise to significant scientific and legal questions. These conclusions outline the questions that remain and while we note the important role played by the Arctic Council and other bodies in addressing existing gaps in knowledge and regulation, we do not here propose the location in which the answers to these questions should be developed: we simply set out the questions that remain.

"Significant Harm" – Significant Questions

We have demonstrated the need for further research to establish what "significant harm" looks like in the marine Arctic both in scientific and legal terms. In particular, we question whether the likely slower degradation and dispersal of, for example, oil in cold and, at times, ice covered waters may increase the impact of the pollutants on the Arctic ecosystem relative to temperate waters. Does, for example, the relative fragility of that ecosystem due to the relatively short food chain and the highly specialised nature of its species make it more vulnerable to pollution, thus turning what might be a minor pollution incident in temperate waters into a major incident in the Arctic? In addition we note that the interactions of pollutants with ice might also turn normally "insignificant" pollution into significant pollution through trapping pollutants in the ice, thus preventing dispersion and ultimately transporting pollutants as a single block to be deposited beyond the national jurisdiction of the state in which the emissions occur. These possibilities point to the need for better scientific understanding of the pollutant/ice interface and sea-ice drift patterns, as well as a need for better understanding of the role of the chain of causation in attributing harm under state responsibility. These questions also raise the possibility that the actions required of coastal states to show that they have acted with due diligence may exceed those required in relevant international treaties particularly where those treaties apply globally and not only in the Arctic.

The Challenges of EIA's – Expanding the Evidence Base

As noted earlier, states are obliged to conduct an EIA where major projects are proposed, but there is an urgent need to expand the Arctic scientific evidence base to ensure such EIAs are effective. First, more detailed baseline data on the Arctic marine environment are required if any such assessments are to be meaningful. Second, due to the rapidly changing environment in the Arctic, continuous monitoring of the Arctic marine environment is essential, in addition to monitoring of sites where development takes place. Without a coordinated, pan-Arctic monitoring programme, it will become increasingly difficulty to disentangle the direct impacts of human activity, for example oil and gas development, from background environmental change, particularly at cumulative impact scales. While Arctic wide monitoring is taking place through the Arctic Council Working Groups, we suggest that this programme should be built upon and expanded in scope, and should take a whole systems approach which places species and physical

processes within the wider context of a connected Arctic. This would enable those carrying out EIAs to better evaluate the effects of a development which may be felt across wider spatial and temporal scales, and provide states with a better means to predict transboundary impacts. International programmes such as the Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAiC, www.mosaicobservatory.org) are beginning to provide such longer-term information. However, while fundamental research around ocean processes, species, and the physical nature of the Arctic Ocean environment must continue to fill gaps in our basic understanding, we must also begin to apply these findings to the very real possibility of further industrial development in the Arctic, for example from oil and gas activities. This might take the form of a pan-Arctic Ocean Strategic Impact Assessment for petroleum activities. In doing so, we can move towards EIA processes in the Arctic, which are specific to the Arctic context, and in particular, which are better able to assess the cumulative impacts of development as it progresses, and transboundary effects occurring over time

In addition further understanding is needed of the processes to adopt to ensure that Indigenous and local voices are effectively understood in EIA and other monitoring procedures. This raises questions for legal academics – what form of consultation or engagement is most effective in these circumstances?

Clean-Up and Liability

Finally, we raised a series of questions relating to clean-up and liability. Again we argue that further scientific research is needed into the possibility of and costs associated with cleaning up a pollution incident or cumulative pollution in the Arctic and into the feasibility of extending the existing Fund Convention or adopting a convention similar to it or to the provisions of Annex VI to the Anarctic Treaty environmental protocol to apply to Arctic offshore oil and gas activities. As we noted, further understanding is also needed in legal terms of how states can prove or mount a defence against questions of liability for transboundary environmental harm.

The Need for Cooperation and a Precautionary Approach

We argue that cumulatively these questions point to two things: the need for further cooperation between Arctic states and the need for a precautionary approach to further oil and gas activities in the Arctic. We suggested a number of models to adopt to address the need for further cooperation and the need for a precautionary approach. The questions that these possible approaches raise are focussed on the legal requirements to take further steps to cooperate, the legal requirement to adopt a precautionary approach and the question of what an agreement to establish an oil and gas moratorium, or "precautionary standards" might look like.

Acknowledgments

This paper was developed with support of the AHRC Network Grant 'Science Based Regulation of Offshore Energy Installations in the Arctic'. The authors are grateful to the AHRC for its support. In addition, Raeanne G. Miller was supported by the EU Horizon 2020 Research and Innovation Programme under grant agreement 727852 (Blue-Action).

Notes

1. All Arctic states with the exception of the United States of America are party to the 1982 UN Convention on the Law of the Sea (UNCLOS.) For its part, the USA accepts most of the provisions of UNCLOS as representing customary international law.

References

Advisory Opinion on Responsibility and Obligations of States with respect to Activities in the Area (ITLOS Case No. 17 2011).

Advisory Opinion on Legality of the Threat or Use of Nuclear Weapons (Advisory Opinion) [1996] ICJ Rep 225

Afenyo, M., Veitch, B., and Khan, F. (2016). A state-of-the-art review of fate and transport of oil spills in open and ice-covered water.

Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic, (Nuuk, 12 May 2011 entered into force January 2013).

Agreement on Cooperation on Marine Oil Pollution, Preparedness and Response in the Arctic (Kiruna, 15 May 2013, not yet in force).

Agreement on Enhancing International Arctic Scientific Cooperation (Fairbanks, 11 May 2017, not yet in force).

Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (Washinton, 17 November 2017, not yet in force).

Arctic Council, Arctic Monitoring and Assessment Programme Assessment 2007: Oil and Gas Activities in the Arctic – Effects and Potential Effects. Volume 2 (Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway, 2010). Vii + 277 pp.

Arctic Council, Arctic Monitoring and Assessment Programme, AMAP Assessment Report: Arctic Pollution Issues, Chapter 10: Petroleum Hydrocarbons (Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway1998), pp. 661-702.

Arctic Council, Protection of the Arctic Marine Environment Working Group, Arctic Offshore Oil and Gas Guidelines (Arctic Council, 2009).

Arctic Council, Protection of the Arctic Marine Environment Working Group Arctic Offshore Oil and Gas Guidelines: Systems Safety Management and Safety Culture (Arctic Council, 2014).

Arctic Council Task Force on Arctic Marine Cooperation, (2017) Report to Ministers of the Task Force on Arctic Marine Cooperation (Arctic Council Task Force on Arctic Marine Cooperation, Fairbanks USA).

Atlas, R.M. (1981). Microbial degradation of petroleum hydrocarbons: an environmental perspective. Microbiological Reviews, 45(1), pp. 180-209.

Atlas, R., Horowitz, A., and Busdosh, M. (1978). Prudhoe crud oil in Arctic marine ice, water, and sediment ecosystems: Degradation and interactions with microbial and benthic communities. Journal of the Fisheries Research Board of Canada, 35(5), pp. 585-590.

Beegle-Krause, C. J., Simmons, H., McPhee, M., Daae, R. L., and Reed, M. (2013). Fate of dispersed oil under ice. Final Report 1.4: Literature Review. Arctic Oil Spill Response Technology Joint Industry Programme. 48 pp.

Birnie, P., Boyle, A., Redgwell, C *International Law and the Environment* 3rd ed (Oxford University Press 2009.

Benedick, RE *Ozone Diplomacy: New Directions in Safeguarding the Planet*, Harvard University Press, 2009.

Blanken, H., Tremblay, L., Gaskin, S., and Slavin, A. (2017). Modelling the long-term evolution of worst-case Arctic oil spills. Marine Pollution Bulletin, 116(1-2), pp. 315-331.

Code for the Construction and Equipment of Mobile Offshore Drilling Units (IMO Resolution A.1023(26), 2 December 2009).

Convention on Biological Diversity (adopted 5 June 1992; entered into force 29 December 1993) 1760 UNTS 79.

Convention on Biological Diversity Conference of the Parties 8, Voluntary Guidelines on Biodiversity-Inclusive Impact Assessment, CBD COP 8, Decision VIII/28 UNEP/CBD/COP/DEC/VIII/28 on 15 June 2006.

Darnis, G., Robert, D., Pomerleau, C., Link, H., Archambault, P., Nelson, R. J., Geoffroy, M., Tremblay, J., Lovejoy, C., Ferguson, S. H., Hunt, B. P. V., and Fortier, L. (2012). Current state and trends in Canadian Arctic marine ecosystems: II. Heterotrophic food web, pelagic-benthic coupling, and biodiversity. Climatic Change, 115(1), pp. 179-205.

Duarte, C., Agustí, S., Wassmann, P., Arrieta, J., Alcaraz, M., Coello, A., Marbà, N., Hendriks, I., Holding, J., García-Zarandona, I., Kritzberg, E., and Vaqué, D. (2012). Tipping elements in the Arctic marine ecosystem. AMBIO 41(1), pp. 44-55.

Environmental Protocol to Antarctic Treaty (adopted 4 October 1991; entered into force 14 January 1998) 30 ILM 1455 (1991).

Gosselin, M., Levasseur, M., Wheeler, P. A., Horner, R. A., and Booth, B. C. (1997). New measurements of phytoplankton and ice algal production in the Arctic Ocean. Deep Sea Research II, 44(8), pp. 1623-1644.

Duvic-Paoli, L.-A., and Viñuales, J.E., 'Principle 2 Prevention ' in Jorge E Viñuales (ed), The Rio Declaration on Environment and Development: A Commentary (OUP 2015).

Forsgren, E., Christensen-Dalgaard, S., Fauchald, P., Järnegren, J., and Naesje, T. (2009). Norwegian marine ecosystems – are northern ones more vulnerable to pollution from oil than southern ones? NINA Report 514, 32 pp.

Hoegh-Gulberg, O., and Bruno, J.F. (2010). The impact of climate change on the world's marine ecosystems. Science 328 (5985), pp. 1523-1528.

Illulisat Declaration on the Arctic Ocean, Adopted 28 May 2008.

International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (adopted 27 November 1992 entered into force 30 May 1996) (Fund Convention) UK Treaty Series No. 87 (1996) Cm 3432.

International Convention on Oil Pollution Preparedness, Response and Cooperation (adopted 30 November 1990; entered into force 13 May 1995) 1891UNTS 77.

Johnstone, Rachael Lorna (2014). *Offshore Oil and Gas Development in the Arctic under International Law : Risk and Responsibility*, BRILL.

Jones, E. Peter. (2001). "Circulation in the Arctic Ocean" 20:2 Polar Research, 139-146,

Kaiser, M. J., Attrill, M. J., Jennings, S., Thomas, D. N., Barnes, D. K. A., Brierley, A. S., Hiddink, J. G., Kaartokallio, H., Polunin, N. V. C., and Raffaelli, D. G. (2011). Marine Ecology: processes, systems, impacts, 2nd Edition. Oxford University Press, Oxford, UK.

Kirk, E.A., (2011) "Marine Governance, Adaptation and Legitimacy" 22 Yearbook of International Environmental Law pp. 110-139.

Lac Lanoux Arbitration (France v. Spain) (1957) 12 R.I.A.A. 281.

Land Reclamation in and around the Straits of Johor (Malaysia v. Singapore), Provisional Measures, Order of 8 October 2003, ITLOS Reports 2003, 10.

Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, I.C.J. Reports 1996, 226.

Leahy, J., and Colwell, R. (1990). Microbial degradation of hydrocarbons in the environment. Microbiological Reviews, 54(3), pp. 305-315.

Lee, K. (*chair*), Boufadel, M., Chen, B., Foght, J., Hodson, P., Swanson, S., and Venosa, A. (2015). Expert panel report on the behavior and environmental impacts of crude oil released into aqueous environments. Royal Society of Canada, Ottawa, ON. ISBN: 978-1-928140-02-3.

(London Dumping) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (adopted 29 December 1972; entered into force 30 August 1975) 1046.UNTS 138 and the 1996 Protocol to the Convention on the Prevention of the Marine Pollution by Dumping of Wastes and Other Matters (adopted 7 November 1996; entered into force 24 March 2006) (14 November 1996) IMO Doc. LC/SM 1/6.

Moore, S. E., Reeves, R. R., Southall, B. L., Ragen, T. J., Suydam, R. S., and Clark, C. W. (2012). A new framework for assessing the effects of anthropogenic sound on marine mammals in a rapidly changing Arctic. BioScience 62(3), pp. 289-295.

MOX Plant (Ireland v. United Kingdom), Provisional Measures, Order of 3 December 2001, ITLOS Reports 2001, 95.

Norwegian Petroleum Directorate (2018). Online Fact Directory, https://www.norskpetroleum.no/en/facts/field/. Accessed 31/05/2018.

Oude Elferink, A.G.,'Governance Principles for Areas beyond National Jurisdiction' (2012) 27 International Journal of Marine and Coastal Law 205.

(OSPAR) Convention for the Protection of the Marine Environment of the North-East Atlantic (adopted 22 September 1992; entered into force 25 March 1998) 2354 UNTS 67.

Overland, J. E., and M. Wang (2013), When will the summer arctic be nearly sea ice free?, 40 Geophys. Res. Lett., 2097–2101.

Overland, J., Wang, M., Walsh, J. and Stroeve, J. (2014). Future Arctic climate changes: Adaptation and mitigation time scales. Earth's Future 2(2), pp. 68-74.

Payne, J.R., Mcnabb, G.D., and Clayton, J.R. (1991). Oil-weathering behavior in Arctic environments. Polar Research, 10(2), pp. 631-662.

Petrich, C., Karlsson, J., and Eicken, H. (2013). Porosity of growing sea ice and potential for oil entrainment. Cold Regions Science and Technology, 87, pp. 27-32.

Post, E., Bhatt, U. S., Bitz, C. M., Brodie, J. F., Fulton, T. L., Hebblewhite, M., Kerby, J., Kutz, S. J., Stirling, I., and Walker, D. A., (2013). Ecological consequences of sea-ice decline. Science 341(6145), pp. 519-524.

Protocol on Environmental Protection to the Antarctic Treaty (1991) Annex VI Liability Arising from Environmental Emergencies adopted 2005 not yet in force. Available at https://www.ats.aq/e/ep.htm.

Pulp Mills on the River Uruguay case (Argentina v. Uruguay), (Judgment) [2010] ICJ Rep. 14.

Request for an Advisory Opinion submitted by the Sub-Regional Fisheries Commission, ITLOS Case no. 21, April 2015.

Rice, S., Korn, S., and Karinen, J. (1978). Lethal and sublethal effects on selected Alaskan marine species after acute and long-term exposure to oil and oil components. Outer Continental Shelf Energy Assessment Program. Contract #R7120822 Final Report. Northwest and Alaska Fisheries Center, National Marine Fisheries Service, NOAA. 32 pp.

Philippe Sands and Jacqueline Peel with Adriana Fabra and Ruth MacKenzie Principles of International Environmental Law 3rd ed (Cambridge, 2012).

Schweiger, A., Lindsay, R., Zhang, J., Steele, M., Stern, H., Kwok, R. (2011). Uncertainty in modeled Arctic sea ice volume. Journal of Geophysical Research: Oceans. 116(C8), pp. C00D06.

Stockholm Convention on Persistent Organic Pollutants (adopted 22 May 2001; entered into force 17 May 2004) 2256 UNTS 119.

Suchanek, T. (1993). Oil impacts on marine invertebrate populations and communities 1. American Zoologist, 33, pp. 510-523.

United Nations Convention on the Law of the Sea (adopted 10 December 1982; entered into force 16 November 1994) 1833 UNTS 3.

United States-Canada Joint Arctic Leaders' Statement https://pm.gc.ca/eng/news/2016/12/20/united-states-canada-joint-arctic-leaders-statement.

USA Oil and Gas and Sulfur Operations on the Outer Continental Shelf-Requirements for Exploratory Drilling on the Arctic Outer Continental Shelf A Rule by the Safety and Environmental Enforcement Bureau and the Ocean Energy Management Bureau on 07/15/2016 81 FR 46477.

Vandermeulen, J. H., and Gordon, D. C. (1976). Reentry of 5-year-old stranded Bunker C fuel oil from a low-energy beach into the water, sediments, and biota of Chedabucto Bay, Nova Scotia. Journal of the Fisheries Research Board of Canada, 33(9), pp. 2002-2010.

Vienna Convention for the Protection of the Ozone Layer (adopted 22 March 1985; entered into force 22 September 1988) 1513 UNTS 293 and Montreal Protocol to Vienna Convention for the Protection of Ozone Layer on Substances that Deplete the Ozone Layer (adopted 16 September 1987; entered into force 1 January 1989) 1522 UNTS 28.

Wassmann, P., Duarte, C. M., Agustí, S., and Sejr, M. K. (2011). Footprints of climate change in the Arctic marine ecosystem. Global Change Biology, 17(2), pp. 1235-1249.

Managerial Roles and Structuring Mechanisms within Arctic Maritime Emergency Response[1]

Natalia Andreassen, Odd Jarl Borch & Emmi Ikonen

Emergency response operations include a range of agencies who collaborate closely together. This is especially true in the Arctic regions where resources may be scarce. The participants within emergency response include a range of institutions such as: mission coordination centers, fire and rescue services, police, coast guard and military forces, private organizations, companies, and volunteers. In this paper, we illustrate the managerial roles of the incident commanders who coordinate and control emergency response, and the organizational mechanisms supporting the incident commanders. The purpose of this paper is to explore how the operational conditions found in the Arctic add to the inter-organizational coordination challenges. We build upon several illustrative cases to demonstrate how the managerial roles are influenced by their context. The key operational challenges in the Arctic region include harsh weather conditions, long distances to resource bases, and limited infrastructure. We argue that role flexibility, re-planning capability and authority delegation are critical prerequisites for an efficient crisis response in the Arctic. The capability for role switching is important for all key personnel involved in the maritime incident response. Results from in-depth case studies of maritime emergency operations in Norway are presented in this paper.

Introduction

Dealing with maritime operations and emergencies in the Arctic is challenging due to factors such as unpredictable weather that may hamper operations and reduce equipment functionality, long distances between the distress site and the resource bases, limited infrastructure that may increase mobilization time and create fatigue, and small communities with limited resources available for large scale operations (Marchenko et al., 2016, 2018). As a consequence, the International Maritime Organization (IMO) has introduced the Polar Code stating that the vessels in the polar regions need to introduce safety equipment that will guarantee five-day survival time. Accidents like fire on board a vessel, collisions and grounding of larger vessels in polar waters are among the most difficult tasks for the emergency response systems (Borch, et al. 2016a, 2016b).

Natalia Andreassen is an Associate Professor at Nord University Business School, and Odd Jarl Borch is a Professor at Nord University Business School and Leader of NORDLAB- the Nord University emergency management laboratorium. Emmi Ikonen is a Researcher at Nord University Business School, Nord University, Bodø, Norway.

Large-scale maritime emergency response often includes a broad range of agencies with their own specializations, role structures, functions, plans and standard operating procedures. The participants in emergency response such as search and rescue (SAR) operations may include rescue coordination centers, fire and rescue services, police, coast guard and military forces, paramedics, private rescue organizations, as well as volunteers. Transparent management and coordination between several agencies is a challenging task. In a multi-faceted environment, we may also find a broad range of interlinked stakeholders like commercial interests, local communities, indigenous groups and environmentalists (Borch & Batalden, 2014).

Large-scale emergency response, like mass rescue operations from a cruise ship, are often multi-sectoral involving civilian and military resources as well as several ministries and agencies. These types of incidents are also low-probability, high-consequence events that seldom happen. These "black swans" may overwhelm the preparedness and response system of any country, calling for assistance from the neighboring countries. This is especially the case, if the incident requires special services like firefighting and treatment of complicated wounds, anti-terror, deactivation of explosives, chemical or nuclear operations, or underwater search.

Although the basis for emergency response services in all Arctic countries is the same, the way of organizing the emergency response system can be different. The existing institutional framework, including economic systems, industry standards, as well as political and legislative framework influence on how crisis management is delivered. With more institutions involved in the network and a heterogeneous operational context, the incident commander faces significant integration challenges (Schmied & Borch, 2016).

In this paper, our starting-point focuses on the multi-agency task forces with a complex web of various institutions, bringing their own procedures, command and control systems, competence, and norms and values. The purpose of this paper is to explore how the managerial roles and tasks at different command levels need to adapt to the complexity in the Arctic context. The study builds a theoretical framework from managerial roles and mechanisms for re-structuring and improvisation. We present four ship fire cases with maritime incident response groups assisting the firefighting efforts onboard ships. In the analysis chapter, we take a closer look into the roles of the incident commanders, the management aboard the unit in distress, and the leaders of the supporting units, and analyze how the structuring mechanisms may allow for a flexible and efficient use of heterogeneous resources.

Theory

Within emergency management, coordination between different actors and their incident coordinators may rely on factors such as agency interdependencies, and the established management structures and mechanisms for coordination and control. Coordination is an emergent process, in which different interdependent action trajectories are synchronized (Wolbers et al., 2017). Incident command systems facilitate leadership, coordination and information flow between multiple individuals and organizations (Rimstad et al., 2014). During the response process, incident commanders will coordinate and control the situation through specified routines according to their roles and procedures within the established incident command systems. In case of an unforeseen disaster, the response teams and emergency managers have to act as fast as possible to prevent additional damage. However, Isabelle et al. (2012) argue that coordination is

less dependent on design than on the tasks that emerge in response to coordination challenges. Therefore, there is a need for flexible emergency management capabilities balancing the tasks of the different actors (Roud et al., 2016).

Bigley & Roberts (2001) highlight that the range of managerial tasks has to be matched by adequate coordination and control mechanisms in order to achieve an effective agency interplay. Command structures are the coordination tool for efficient direction of responsibility and authority. In addition, robust coordination between institutions with varied organizational systems and professional platforms calls for more tailor-made managerial role models and inter-organizational structuring tools to face these challenges (Borch & Andreassen, 2015).

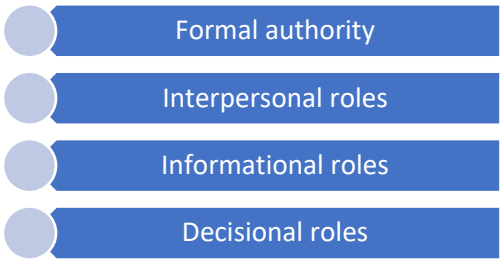
Command Systems

Within emergency management, command and control systems are vital for fast, and coordinated response. When it comes to the structuring of the emergency response organizations, the standardized incident management systems are designed to be consistent with the general principles of organizational management. The coordination and decision-making is executed through well specified roles and functions. As an example, the standardized Incident Control System (ICS) was created in the 1970s to facilitate up-scaling of the emergency response without losing control. The ICS structure was based on experiences from the fire departments fighting wildfires in Southern California. The original ICS approach has been developed and revised since then in order to become suitable for teams across different jurisdictions. The basic ICS includes a standard management hierarchy.

Managerial Roles

Managerial roles are defined by Mintzberg (1973, 2009) as sets of actions types and responsibilities that are assigned for each of the managers in an organization. Mintzberg claims that managerial roles within an organization can be conceptually separated into three main groups: interpersonal, decisional and informational (Figure 1).

Figure 1. Types of managerial roles (Mintzberg (1973).



The starting point for these roles is the formal authority that defines the position of the persons involved. Interpersonal roles include the figurehead whose role is both internally motivate and inspire, but also represent the organization externally to different stakeholders, for example media and interest groups, the leader who performs leadership duties towards subordinates, like hiring and training the staff, and the liaison role, which establishes contacts outside the organization. Informational roles include a monitor who scans the environment and receives all kind of information, a disseminator who passes the appropriate information to subordinates, and a

spokesman who sends s information to people outside the unit. Decisional roles include entrepreneurial action to initiate new development projects based on the information received from the monitor, disturbance handling, which is responding to different pressures and problems, resource allocation decisions, and the negotiator duties and routines (Mintzberg, 2009). Within emergency management, the decisional roles play a critical part in all management functions (Cosgrave, 1996).

By distinguishing the roles, it is possible to better understand the varying nature of tasks inside and outside the units of an organization.

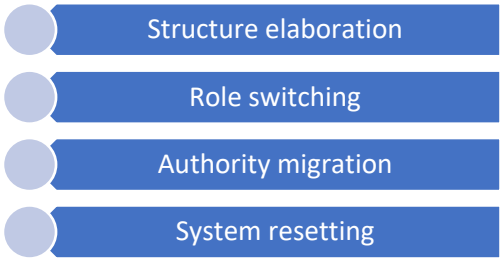
Within emergency management, a specific set of managerial roles have been established. Within the ICS, five major management roles are pinpointed: command, planning, operations, logistics and finance/administration (Lindell et al., 2005). There are also sector-wise roles as a standard NATO structure followed in general by the police. Within aviation and the maritime domain, there are dedicated standards for SAR operations (the IAMSAR manual). Both the governments and the units have to align their operations to these rules set by the International Maritime Organization (IMO) and International Civil Aviation Organization (ICAO). The IAMSAR Manual identifies and discusses four main coordinating roles – the SAR Coordinator, the Search and Rescue Mission Coordinator, the On Scene Coordinator and the Aircraft Coordinator (IMO, 2016a, b). Main tasks and responsibilities of maritime incident response evolve around these roles.

For the Arctic, we may find that these roles are not sufficient enough to deal with the increased complexity and dynamism. Tailor-made roles are thus in demand.

Restructuring Mechanisms

While managerial roles refer to a set of certain types of actions, the coordination mechanisms refer to a set of rules and practices to guide the action procedures (Bigley & Roberts, 2001; Buck et al., 2006; Bharosa et al., 2010). An important element in high complexity environments is to avoid system rigidity. Bigley & Roberts (2001) refer to the structuring mechanisms that represent a set of procedures for assembling and reassembling various organizational elements into a variety of configurations. In particular, they highlight four basic processes; structure elaboration, role switching, authority migrating, and system resetting (Figure 2).

Figure 2. Types of structuring mechanisms (Bigley & Roberts, 2001).



Such techniques are required in order for an organization to cope with a serious situation not expected and planned for (Mitroff, 2004). In such situations, also described as "black swans" and in situations where the complexity of the environment may create a high degree of uncertainty, procedures may prove useless and persons who are qualified for one type of action may have to

take on other roles. Bigley & Roberts (2001) state that the system in use must be able to expand and contract, change strategic orientation, modify or switch tactics as an incident unfolds. Because of the fast-changing working conditions of an emergency, including e.g. possible lack of broadband communication capacities, polar lows etc., coordinators may have to rearrange their roles, authority structures and procedures (Andreassen et al., 2018).

Thus, the coordinative mechanisms in emergency management have to be adapted to the complexity of the disaster response (Buck et al., 2006). Borch & Andreassen (2015) claim that in high complexity – high volatility environments like the maritime Arctic, there is a need for additional coordination roles and mechanisms incorporated into the standard organizational structures such as the ICS, most importantly to deal with contextual complexity and to allow improvisation.

To understand the dynamic balance of management during incident response, when two or more organizations with different managerial systems are involved, it is important to look into the implemented command systems, the set of managerial roles, and structuring mechanisms that guide these roles and functions. Structuring mechanisms influence roles flexibility and thus the inter-organizational operational action pattern and the hierarchy of the task force.

Methodology

This study builds upon in-depth case studies of four ship fire incidents that include the response of Maritime Incident Response Group (MIRG) teams or other firefighting efforts. We examine the following incidents: *Britannia Seaways, Nordlys, Le Boréal*, and *Norma Mary*. These are used as illustrative cases of high-risk events, which have potentially serious consequences for people and for the environment. Data has been gathered from both primary and secondary sources including incident reports, evaluation reports, conference presentations, interviews and examination of standard operating procedures.

The context with weather factors, crisis complexity in terms of challenges experienced by the involved actors, as well as the interdependences between them, are linked up to reflections on the command system, managerial role set, and the structuring mechanisms implemented.

Data

The Maritime Incident Response System

International conventions and standards for maritime and aeronautical SAR services are set by the International Maritime Organization (IMO) and International Civil Aviation Organization (ICAO). The International Convention on Maritime Search and Rescue (IMO, Hamburg Convention) and the Convention on International Civil Aviation with its Annex 12 (ICAO, Chicago Convention), provide the rules and regulations for SAR services. The International Aeronautical and Maritime Search and Rescue Manual (IAMSAR Manual), published by the IMO and the ICAO is based on the Hamburg Convention and the Chicago Convention. The IAMSAR Manual contains practical guidelines for the organization of maritime and aeronautical SAR, mission coordination, operations of search and rescue units (SRUs) and provision of SAR-related training. The manual is not binding but provides internationally accepted foundation for the appropriate provision of maritime and aeronautical SAR services (IMO and ICAO, 2016a,b).

Other international agreements relevant to maritime SAR, are the International Convention for the Safety of Life at Sea (SOLAS), the International Ship and Port Facility Security-code (ISPS) and the STCW Convention – International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, and the Polar Code.

The IMO's recently adopted International Code for Ships Operating in Polar Waters (Polar Code) is *"intended to cover the full range of shipping-related matters relevant to navigation in waters surrounding the two poles – ship design, construction and equipment; operational and training concerns; search and rescue; and, equally important, the protection of the unique environment and eco-systems of the polar regions"* (IMO, 2017).

For the Arctic region, the eight Arctic countries have signed an Agreement on cooperation on aeronautical and maritime search and rescue in the Arctic under the auspices of the Arctic Council in 2011 (Arctic SAR Agreement). The objective of the agreement is to "strengthen aeronautical and maritime search and rescue cooperation and coordination in the Arctic", and each member state has a particular SAR area of responsibility.

Norway's maritime SAR responsibility goes beyond its territorial-, economic- and fishing zones and covers a very extensive area. The Norwegian Rescue Services carry out the Norwegian duty according to the relevant international SAR agreements. The Norwegian maritime SAR service in Northern Norway above 65 degrees, hence in the Arctic maritime regions, is the responsibility of the Joint Rescue Coordination Centre (JRCC) Northern-Norway. The JRCC has at its disposal the dedicated AWSAR helicopters, and may mobilize whatever resources they find necessary including military and voluntary forces, and support from other countries. Emergency response agencies that are involved into incident response may belong to different institutions and have different jurisdictions as well as have different command, coordination and control structures.

Fire safety on board ships is governed by international maritime legislation. After the disastrous Scandinavian Star incident, the maritime authorities have implemented a number of measures, which have strengthened fire safety at sea. Fire safety on vessels is primarily dependent on precautionary measures taken aboard and the ship owner's emergency preparedness plans. According to the conventions of the International Maritime Organization (IMO), the vessel's own crew has to be able to start firefighting during an incident before receiving assistance from a land-based fire department. To support rescue measures and firefighting carried out by the ship's crew Maritime Incident Response Groups (MIRG) operated by the national fire departments have been trained for special maritime SAR situations and smoke diving on board vessels.

The Cases

Britannia Seaways - Western Norway

On 16 November 2013, fire broke out on *Britannia Seaways*, a ro-ro cargo ship that was on a voyage to the south from Northern Norway carrying military equipment, vehicles and a number of tank containers, and flatracks with jerrycans containing petrol and aviation fuel. Personnel from the armed forces were on board as passengers. Outside the Norwegian west coast, the weather deteriorated, with storm and high waves, resulting in severe rolling. The cargo lashing came loose and the cargo shifted. A fire broke out in petrol that was leaking from damaged jerrycans stowed on flatracks on the forepart of the weather deck (Danish Maritime Accident Investigation Board, 2014).

The ship's officers and own crew started a lengthy firefighting effort, assisted later by the military personnel. The master realized that there were 12 trained military passengers on board wearing clothes well suited to withstand the cold and water. Some of the military personnel volunteered to assist with the firefighting efforts and together with the crew managed to contain the fire on the forepart of the weather deck. The Joint Rescue Coordination Centre in Stavanger requested to evacuate all non-essential persons on board the ship. However, in order to evacuate the passengers, the ship would have to change course and expose itself to severe rolling and wind. The master refused to attempt to turn the ship, because this would hinder the ongoing firefighting due to severe rolling, and the flames would be dangerous to the firefighters and the ship's superstructure because of the wind. The master assessed that it would involve a clear hazard to the ship and those on-board (Danish Maritime Accident Investigation Board, 2014).

Later a Norwegian navy frigate arrived to the scene and took the position as the on-scene coordinator (OSC). An offshore supply vessel with firefighting capacity had also been requisitioned by the shipping company's crisis management team. Firefighting efforts were joined by three firefighters from shore and a MIRG team with firefighters specialized in maritime incidents (Danish Maritime Accident Investigation Board, 2014). A report from the Bergen fire and rescue service (2013) stated that neither the emergency call centre nor the MIRG team were notified of the other three firefighters that joined the firefighting efforts, causing some confusion both on board the vessel and with the strategic management of the fire and rescue services on shore as they had not included the additional resource in their plans.

This incident involved several stakeholders, both civilian and military, and inter-organizational action between the master of the vessel, the firefighters, and operative on-shore coordination. The vessel captain's experience-based decision-making and evaluation of bad weather and its effects for firefighting was crucial. Furthermore, the captain's ability to find flexible solutions, such as utilizing passengers from the armed forces in firefighting, maintaining command, as well as keeping the on-scene coordinator, the vessel owner, and the JRCC informed, contributed to a positive outcome (Danish Maritime Accident Investigation Board, 2014). The traditional commander role of the SAR mission coordinator on shore and the on-scene-coordinator was overruled by the vessel captain who made his decision based on the prevailing conditions. He therefore took the role of incident commander himself with a flexible command structure including the military forces on board.

The harsh weather and wave conditions were the cause of the fire, and caused changes in the traditional command system and the managerial roles set for this type of operations. The captain decided against the requests by the SAR mission coordinator as well as the helicopter captain based on his own situational awareness and mobilization of extra resources on board. He also took charge of the next steps of the firefighting action by directing the navy frigate and the professional MIRG team that came onboard. The captain and the crew at Britannia Seaways later received the IMO's medal for bravery at sea.

Le Boréal - Falkland Islands

On 18 November 2015, the cruise ship *Le Boréal* on a route to Antarctica was near Falkland Islands when a fire broke out in the engine room, which led to a complete loss of power. The fire broke out due to a mistake by one of the engineers. The weather was bad, and the fire left the ship adrift

in gale force winds and high waves. The cruise ship had 347 people on-board. Firefighting measures were started. However, as the vessel was drifting towards the coast without power and there were smoke all over the cabins, the master decided to drop the anchor and evacuate all passengers and non-essential crewmembers (IMRF, 2016a; BEAmer, 2016).

The passengers account very chaotic circumstances on board with a crew who were uncertain about their roles and responsibilities; *"Total chaos on board according to passengers in Stanley. Smoke in the accommodation, lifeboat embarkation chaotic and uncontrolled, lifeboats not manned with experienced crew."* Some of the passengers were launched into life rafts although there was life boat capacity for all passengers (Walker, 2015).

The Antarctic region has many of the same challenges as the Arctic region when it comes to emergency response. Distances are often vast, resources are scarce, water is cold, sea is rough, capacities to host and accommodate passengers are limited, and communication lines and networks might not be available. Luckily, *Le Boréal* was close to the British naval base at the Falkland Islands. The Maritime Rescue Coordination Centre (MRCC) Falmouth in the UK, who had received the initial distress alert, coordinated the response. As the island is remote and sparsely inhabited, the response required full-scale marine, air and land response assets from the Falkland Island government, military and private sector. Three helicopters, a fixed wing C130 aircraft and 4 vessels were sent to the incident site. At first, the on-scene coordinator role was given to an OSC on board the first helicopter to arrive to the incident site, but was later transferred to the C130 aircraft so that the helicopter could concentrate to the rescue operation and go refuel. *Le Boréal's* sister ship, *L'Austral*, was also in the vicinity of the incident site and had capacities to take on passengers from *Le Boréal*. (IMRF, 2016a; BEAmer, 2016) Because of the high waves, there were problems with rescuing the passengers from the tenders/life boats onto the frigates. Thus, the frigates had to tow the life boats into calmer waters. This was a tough experience for the passengers on board.

The initial landing point was established at Cape Dolphin and the helicopters took some passengers there. Simultaneously, a reception center was being established at Mount Pleasant military base and *L'Austral* was boarding passengers to be taken to Port Stanley. This caused some confusion with accounting the passengers and identifying their whereabouts. The MRO operation was successful and there were no injuries to the passengers or crew (IMRF, 2016a; BEAmer, 2016).

Regarding the managerial roles, there was some obscurity with the roles of the officers and crew onboard the ship and the life boats during the evacuation. In addition, the rescue operation was very demanding and called for improvisation by the rescue units. This in turn caused some confusion about the whereabouts of the passengers that were brought ashore. This is normally a task for the on-scene coordinator to control. The Commander of British Forces in the South Atlantic Islands characterized the emergency evacuation as *"an extremely complex and hazardous rescue operation in difficult conditions."*

Norma Mary - Barents Sea

Distance to resources is one of the biggest challenges in the Arctic limiting the number of assets that can be sent to a rescue operation, and therefore the ship's own efforts with fire safety are crucial. In the case of *Norma Mary*, a fishing trawler sailing in the Barents Sea in the High Arctic had a fire in the factory area on-board. A coast guard vessel with firefighters was 10 hours away

and two helicopters four hours away at Svalbard. Due to the incident site being so far away, the helicopters would have to be ready to refuel on the way to the site. Another fishing vessel was two hours away from *Norma Mary,* and was asked to assist and follow *Norma Mary,* if necessary. The crew of *Norma Mary* started firefighting efforts however the fire was causing heavy smoke, which prevented the crew from properly inspecting the situation. The master, however, assessed that there was no danger for the crew and no need for evacuation. The master also requested that the other fishing vessel following *Norma Mary* could be released from this duty. The other vessel was asked to follow Norma Mary until meeting with the coast guard vessel regardless of *Norma Mary's* master's assessment.

The coast guard vessel reached the distress vessel after 10 hours. After boarding *Norma Mary*, the firefighters from the coast guard vessel found that the fire had been put out but discovered water in the factory area. The fishing vessel did not have suitable pumps, so pumps were brought from the coast guard vessel. After all efforts, the master wished to return to Iceland for repairs (JRCC, 2015).

In this incident, the crew onboard was totally without support for many hours, but managed to cope on their own. This incident could have had serious consequences, if the fire on board was bigger and the coast guard vessel not sailing conveniently in the area. Ship fires often spread fast, and the distance in this case to any assisting resource was extremely long. This highlights the increased complexity of response, the lack of resource availability in the High Arctic and the vessel's own ability to respond to the fire.

Hurtigruten Nordlys - Ålesund, Norway

The coastal cruiser *Nordlys* from the company Hurtigruten faced a dramatic engine fire near Ålesund, Norway. The weather conditions were fair and the incident site was close to the Ålesund harbor. There were plenty of resources available however the ship fire and the complexity of the incident itself had significant consequences for human life and potential consequences for environmental as well. *Nordlys* was approaching Ålesund on 15 September 2011, when there was a fire in the engine room, which caused both the main engine and the auxiliary engines to stop. Two crewmembers went missing and the captain did not dare to release the fire exhaustion system as he did not know the location of the missing crew. One the missing crewmembers was the chief engineer who plays a vital role in the contingency management organization. The two missing crewmembers both died and two suffered serious injuries. Seven other crewmembers suffered minor injuries. The auxiliary generator failed and the ship faced total black out making firefighting impossible.

A rescue cutter close by heard the MAYDAY call, and went to assist *Nordlys* with emergency towing. The ship was towed to Ålesund harbor and the passengers were evacuated by launching lifeboats. All the 207 passengers on board were evacuated without any physical injuries. A coast guard vessel was appointed as the on-scene coordinator for the SAR operation. As the vessel was being berthed, the starboard stabilizer fin was pressed through the hull, which flooded the cargo holds with water. *Nordlys* developed a 20 degrees list, nearly capsizing, and all personnel onboard had to be evacuated. The hole was later fixed and water pumped out, stabilizing the vessel (AIBN, 2013).

The AIBN's investigation (2013) concludes there were inadequacies in job specifications for equipment and fire safety on board the vessel. The safety management system also lacked procedures for training to deal with loss of personnel. The loss of personnel and injuries were caused by the crew being trapped by heat and smoke with limited possibilities for evacuation. The personnel also lacked training for such situations, which is why some safety critical tasks were not carried out. Among other things, the air supply and fuel supply were not shut off. If the supply of fuel and air had been shut off, the fire could have died down by itself (AIBN, 2013).

As the incident happened near the Ålesund harbor, plenty of resources including the police, fire and rescue service, coast guard, rescue vessel, health personnel, private sector and other rescue crew could be mobilized rather quickly to the harbor (AIBN, 2013). Many of these authorities were involved in the response efforts at the same time, and the JRCC Stavanger led the operative coordination for the SAR efforts. The coordination of the joint response, both operational and tactical, was fluent and effective in this incident. As the vessel was close to the harbor, the fire and rescue services had a chance to gather their whole management team and the MIRG team from Ålesund to the harbor, as well as later send a liaison officer for the fire incident commander together with the MIRG operation commander to the bridge, which would be unusual in normal MIRG operation at sea. This however provided more flexibility and better coordination of the command and control system. The MIRG crew was assisted by the vessel's own smoke divers and a MIRG team from Bergen was also on stand-by in Ålesund. MIRG crew boarded the vessels and found the two bodies while inspecting the spaces and conducing rescue efforts for the missing crewmembers.

In remote areas, heavy weather, and in Winter time such a situation would have been even more dramatic. Luckily, the vessel was close to a town with significant resources available. The incident showed that only having trained for specific roles in the vessel emergency response management team and not having others prepared for entering into this role hampered the initial response. Onshore, the response teams were faced with a situation they had not experienced before. This called for improvisation in the organization. Among other measures, they introduced a new role as liaison together with the MIRG team onboard the vessel to facilitate internal communication. They also needed additional advisors to assess the risk of the ship capsizing. The case shows that improvisation as to the number and types of roles as well as having backup for important managerial roles is crucial.

The Command Systems

Search and rescue (SAR) operations, including firefighting at sea, are conducted in accordance with defined procedures in the International Aeronautical and Maritime SAR Manual (IAMSAR Manual). According to the IAMSAR manual, the SAR system has three levels of coordination; the SAR coordinator (SC), the search and rescue mission coordinator (SMC), and the on-scene coordinator (OSC). The SAR coordinator (SC) has the overall responsibility for establishing, staffing, equipping and managing the SAR system including legal and funding support for the agencies but are not normally involved in the SAR operations (IMO and ICAO, 2016a). The Chief of Police, and ultimately the Ministry of Justice and Public Security, act as the SAR coordinator in Norway. The operational level coordination is conducted by SMCs at the JRCC operational center under authorization by the Chief of Police. The SMC will be in charge of the overall coordination of incidents and allocation of all necessary resource. The tactical level coordination during

operations is delegated to the first vessel on-scene and later to a larger vessel as an OSC. The OSC task is to rescue people and at the same time communicate with the distress vessel, report to the SMC, coordinating the search and rescue patterns of the other vessels, and keep control with the air activity. In reality, the OSC role has to be performed by several people in order to be properly handled. The IAMSAR manual does not address these aspects with a more detailed command system.

Other tasks of the OSC include modifying the action plan received from the SMC based on the prevailing conditions, ensuring that the operations are conducted safely, maintaining a detailed record of the incident, keeping track of the number and names of the rescued people, and providing situation reports to the JRCC. The OSC will liaise closely and act as support for the vessel master (IMO and ICAO, 2016a). The Britannia Seaways case shows that the captain at the distress vessel may take a vital role in the grey zone between the SMC and the OSC, taking over the command based on the prevailing conditions.

The relation between an OSC and SMC is always a joint-effort and a mutual discussion on how much responsibility the OSC can handle and the best way to coordinate the incident. This is based on OSC observations and situational reports. There could be incidents where the SMC has better overview over the situation because of available technology like drone cameras, satellite images and other sensors where the SMC may take on more of the OSC role. Also, the other way round. In the High Artic, the communication north of 70 degrees is occasionally breaking. If the OSC becomes aware of a distress situation directly and communications cannot be established with the JRCC, the OSC may have to assume some of the SMC duties and actually govern the whole operation, including shore mobilization (IMO and ICAO, 2016).

In maritime incidents involving a passenger vessel, it is important to determine the responsibilities and authority of the SAR agencies and the master of the distress vessel (Finnish Border Guard, 2014). The distress vessel management includes the master of the vessel and his officers comprising usually of chief officer, chief engineer, bridge team and the safety crew. Each will have dedicated tasks on the muster list and competences to handle various emergencies. In the Polar Code, there are demands for additional Polar Code courses for the captain and deck officers focusing on safe navigation in polar waters. However, they do not have an obligatory education and training as to emergency contingencies and response in Arctic waters.

The master of the distress vessel is responsible for the vessel and passengers' safety for all types of acute emergency and preparedness incidents, in which the vessel is involved. The master coordinates rescue measures on board a vessel in distress, including giving information and orders to external groups such as the paramedics, the MIRG teams, chemical divers, etc. The master also needs to assess the conditions of the vessel and the incident site in order to make the best decisions for passengers' safety. The Britannia Seaways case illustrates a successful outcome of the master of the distress vessel being in charge. The role sharing mechanisms and the authority between the distress vessel captain and the SMC is a challenge.

The fire and rescue services in Norway follow the Incident Command System which has a different organizational model than the IAMSAR manual. The Incident Command System will be used in mass-rescue operations involving for example the fire and rescue brigades and oil spill response, such as during the *Nordlys* ship fire. Firefighting and MIRG operations at sea will be coordinated from the JRCC following SAR procedures and command system. The MIRG operation

commander acts under the authority of the SMC and is responsible for reporting to both the SMC and the OSC. However, the organizational structure will be different at tactical level. The staff and operations at the fire department will follow the ICS structure. During the *Nordlys* incident, the fire department management gathered in the harbour next to the vessel following the ICS, which increased the situational awareness and efficiency in coordination (DSB, 2011; IMO and ICAO, 2016b). They also introduced liaison and advisory roles in the rescue team to facilitate good communication between the various groups involved.

Similar to any maritime incident, if a fire on board a vessel can be tamed by the vessel crew and danger to the crew and passengers is small, the ship owner is responsible for coordination of the incident. The ship owner can request some assistance such as advice, but may handle the overall coordination while the situation is under control. If the emergency evolves to the point where the ship owner and the ship crew cannot handle the fire, the coordination will be passed to the JRCC and the MIRG crew will be alerted, if necessary (Salten Brann, 2011; Finnish Border Guard, 2014; 2016). Meanwhile, the crew will continue the firefighting measures, and evacuation if needed. Once aboard the vessel, the MIRG team will start firefighting and other MIRG measures led by the MIRG operation commander in cooperation with the captain (Finnish Border Guard, 2016).

Discussion

Arctic Challenges and Inter-Organizational Action Patterns

Arctic maritime operations pose a difficult environment for emergency response, including firefighting operations. Major ship fires or explosions can have significant consequences for both people and the environment, especially in the Arctic where response is challenged by resource scarcity, long distances, difficult weather conditions and poor communication connections.

One of the major challenges with ship fires relates to the decision-making on whether to bring in external firefighting assistance and how long the firefighting measures should be carried out before the passengers are evacuated. In the Arctic region, vast distances, long response times and rough weather conditions may create extra uncertainty about the time span before rescue is possible. Particular attention also has to be paid to the demands that the Arctic environment with ice and icing poses to the firefighters' equipment, operations, training, and safety (Finnish Border Guard, 2014).

As a fire tends to spread fast, dispatching MIRG teams might not be a valid option in the North because of long response times. Fire safety on a vessel is primarily the responsibility of the ship owner and the captain. Fire safety depends on the presence of relevant equipment and countermeasures on board, the effective functions of the ship's preparedness system, and crewmembers' abilities of fire prevention, firefighting, smoke diving, search and rescue, and evacuation. This is especially true for the Arctic waters. However, the need for additional capacity for the crew to be able to operate on their own with firefighting for a longer time period is bad weather conditions, is not included in the Polar Code.

The *Nordlys* and *Britannia Seaways* incidents happened quite close to the shore and relevant resource assets, making it easier to deploy the MIRG team and firefighting assistance. If put in the Arctic context with a longer distance to shore, rough seas, and cold conditions, as it was during the *Le Boréal* incident, deploying MIRG teams would be more challenging, thus leaving the main

responsibility to the vessel crew. This was well demonstrated in the *Norma Mary* case. While the fishing vessels own crew had the fire in control most of the time, in bad conditions with Norma Mary's inadequate equipment, the firefighting efforts might not have been so successful.

Since MIRG operations are part of the SAR system, MIRG procedures and the chain of command is very clear in small scale events. However, in major multinational incidents, there will be challenges in understanding the leadership between various teams, their organizational cultures, structure and procedures. Usually, the fire and rescue services follow the ICS model that differs somewhat from the SAR system. The ICS has more functions and roles within the operational and tactical management and can accommodate various organizations and incident commanders in its unified command. The ICS is quite flexible, but on the other hand can cause some confusion, for example, with which functions are established and who is in command, especially if the incident involves many regions, fire brigades, agencies and other nations that have their own versions of the ICS. The SAR system in turn can be quite overloading for the persons in charge of operational and tactical command as they are put under a lot of pressure and responsibility. However, the command line is clear and established similar in all countries as it is based on the IAMSAR system. Because the MIRG teams have to know both the ICS system for their daily fire and rescue service operations and the maritime SAR system for MIRG operations, education and competence building in both of these areas is very important. In order to fully understand the chain of command, the MIRG teams, especially the operation commander, should be familiar with the SAR system in addition to the ICS.

Flexibility of the On-Scene Coordination, Managerial Roles, and Structuring Mechanisms

The incident with *Britannia Seaways* involved several stakeholders, both civilian and military, and inter-organizational action between the master of the vessel, the firefighters, and operative on-shore coordination. The experience-based decision-making of the on-board management and evaluation of bad weather and its effects for firefighting was crucial for the successful response efforts. Furthermore, the ship management's ability to cooperate, and find flexible solutions and procedures, such as making decisions based on knowhow and keeping relevant parties including the on-scene coordinator outside the ship informed, contributed to a positive outcome (Danish Maritime Accident Investigation Board, 2014).

In terms of the flexibility of the system, the mechanism for structure elaboration can be referred to when discussing demanding operational circumstances. Role switching in *Britannia Seaway*'s case was also an important mechanism, as the ship's crew managed to maintain command and were able to coordinate efforts utilizing the experienced passengers. The operation was successful, and the OSC position was given to a Norwegian navy ship in later stages of the operation. This calls for further attention to informational roles, where the coordinator assesses the prevailing environment and receives information and orders from the on board management at the distress vessel.

In the case with *Le Boréal,* at first the on-scene coordinator role was given to an OSC on board the first helicopter to arrive to the incident site but was later transferred to the C130 aircraft so that the helicopter could concentrate to the rescue operation and go refuel. Distance and the scarce resources in this case also had a direct influence on the interdependence between all the

stakeholders as well as the flexibility of the OSC role. As the aircrafts cannot stay airborne indefinitely, there had to be a transfer of control in the middle of the operation. The OSC and the MRCC should consider sequencing tasks, or dividing responsibilities in order to maintain continuity in or smooth transfer of command, control and understanding of the situation (IMRF, 2016b).

The incident command allocation is highly dependent on the efficient mechanisms of role switching and system reassembling. Coordination between the government authorities, private operators, local authorities as well as dividing responsibilities is extremely important in mass rescue operations and point to the need of a comprehensive MRO plan and standard operating procedure, for example in this case, in establishing evacuation reception centers. The procedure for assignment and reassignment of personnel to different positions according to the functional requirements of the situation is important in this case.

After boarding *Norma Mary*, the firefighters from the coast guard vessel discovered much water in the factory area with a risk for negative vessel stability. They had to mobilize for a new type of action, i.e. salvage of the vessel. This incident highlights the increased complexity of response and the need for multi-skilled crew in the High Arctic, and the vessel's own ability to respond to the fire. In such situation, mechanisms of structure elaboration and system resetting would be critical. On-scene command should be organized under demanding circumstances of scarce resources, and should be able to utilize the available structures, routines, and competences.

Another example illustrating the importance of role switching can be drawn from the *Nordlys* case. The decision-support system on the bridge included a checklist in the event of a fire. In an emergency, the chief engineer was to muster to the bridge and follow up the checklist. However, the chief engineer was one of the persons trapped in the engine room. According to the muster plan on *Nordlys*, the first mate was to take over the chief engineer's tasks in case the chief engineer could not perform his tasks. However, these procedures were not followed and several important tasks initially assigned to the chief engineer and first engineer were not carried out. This led to a deterioration of the situation (AIBN, 2013). In this case, the response flow was affected by unclear roles within the ship's own safety management and the ability to apply flexible command of responsibilities in a very stressful situation.

The *Nordlys* case also illustrates the importance of authority delegation mechanism. During the on-shore phase of the operation, the prevention efforts for possible oil spills were initiated. The police also established a unified command center for tactical coordination and prepared the harbor for response efforts. The priority will always be first on saving lives and conducting rescue efforts, and then handed over to the next responsible authority. According to the Norwegian Directorate for Public Security (DSB), there was some confusion over the ownership of the crisis after the JRCC, the captain and the fire services had completed their duties (Eikrem, 2012). The rescue sub-centre, which usually gathers operative leaders from each relevant organization for coordination, was not established since the police led their response and held communication from the staff room. In this case, the decision for not following standard procedures somewhat affected a transparent communication and coordination between different authorities. System flexibility and alternative procedures may cause confusion in roles and responsibilities with various stakeholders if not taken to the right level of decision-making or if all parties are not aware of the deviation from standard procedures.

Conclusions

In this paper we have examined the inter-organizational coordination patterns and the command structures implemented in the context of Arctic emergency response. The complexity of coordination relates to the various organizations involved with somewhat different command systems and their reciprocal dependencies in a crisis situation. We have highlighted the need for introducing inter-organizational restructuring mechanisms allowing flexible on-scene coordination of emergency response to meet the challenges of the Arctic environment.

Large-scale maritime SAR incidents in the Arctic may result in an overload in the normal emergency response system. Limited resource availability, resource-consuming mobilization time and the lack of experience in these kind of incidents in the High Arctic context may put a heavy strain on the management levels. Deploying specialized services in densely populated areas with high predictability, sufficient capacity and good communication, is potentially fast and efficient. The deployment of sufficient task forces in the Arctic may mean operation in unknown territory and cooperation with different actors than normally trained with. Also, the units in distress have to manage on their own for a longer time, and have to help out the professional forces with their duty. This study has shown that for the units in distress, managerial roles connected to information sharing are crucial for a positive outcome. The involved coordinators should both monitor the operational environment, and share information that would help the overall situational awareness in spite of limitations in information exchange capacities. Flexibility in the decision-making process is important at all management levels including finding new resources and solutions, as well as adapting standard operating procedures to the prevailing environment and using local knowhow and resources.

Role flexibility, re-planning capability, and authority delegation are critical prerequisites for an efficient management response in the Arctic. The mechanisms for assembling and reassembling task forces, role switching, authority coordination and system resetting are also important mechanisms that provide command system flexibility. The capability of role switching is important for all actors involved in the maritime incident response. However, these demands call for further education and competence building in the maritime SAR system for authorities, ship owner management, and the vessel crew.

In this study, we have built upon few illustrative cases. There is a need for quantitative studies demonstrating the contextual elements and their influence on the managerial roles and structuring mechanisms. In particular, one should elaborate on the resource re-configuration with a mix of capacities from various sources, including the resources from neighboring countries. As for the managerial roles, improvisation beyond the standard authority responsibility and role switching among the incident commanders, should be further focused on.

Acknowledgements

This article is written under the international research and development projects MAREC: "Inter-organizational Coordination of Mass Rescue Operations in Complex Environments", MARPART 1: "Maritime Preparedness In The High North - Institutional Partnership and Coordination" and MARPART 2 – Man: "Joint-task Force Management in High North Emergency Response - Cross-border Knowledge Acquisition and Training for Increased Joint-force Effectiveness". We wish to

acknowledge the Research Council of Norway and partner universities for funding the MAREC project, and the Norwegian Ministry of Foreign Affairs, the Nordland County Administration and partner universities - for funding the MARPART projects.

References

Accident Investigation Board Norway (AIBN). 2013. Report on the investigation of a marine accident Nordlys LHCW – fire on board during approach to Ålesund 15 September 2011.

Andreassen, N., Borch, O.J., Kuznetsova, S. & Markov, S. 2018. Emergency Management in Maritime Mass Rescue Operations – The Case of the High Arctic, in Hildebrand, L. P., Brigham, L. W., Johansson, T. M. (Eds.) Sustainable Shipping in a Changing Arctic, Springer International Publishing.

Arctic Council. 2011. Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic (signed 2011).

Bergen Brannvesen. 2013. RITS - innsats ifm brannen ombord på MS Britannia Seaways.

Bharosa, N., Lee, J.K. & Janssen, M. 2010. Challenges and obstacles in sharing and coordinating information during multi-agency disaster response: Propositions from field exercises, Inf Sys Front, 12, pp. 49-65.

Bigley, G. A. & Roberts, K.H. 2001. The incident command system: high reliability organizing for complex and volatile environments. Academy of Management Journal, vol.44, no.6, pp. 1281-1299.

Borch, O.J & Andreassen, N. 2015. Joint-Task Force Management in Cross-Border Emergency Response. Managerial Roles and Structuring Mechanisms in High Complexity-High Volatility Environments, conference paper, 11th International conference TransNav 2015 on Marine Navigation and Safety of Sea Transportation.

Borch, O.J. & Batalden, B. 2014. Business-process management in high-turbulence environments: the case of the offshore service vessel industry. Maritime Policy & Management, Vol. 42, Issue 5, pp. 481-498.

Borch, O.J., Andreassen, N., Marchenko, N., Ingimundarson, V., Gunnarsdóttir, H., Iudin, I., Petrov, S. & Jakobsen, U. 2016a. Maritime Activity in the high North – current and estimated level up to 2025., MARPART project report 1, Utredning nr.7, Nord University.

Borch, O.J., Andreassen, N., Marchenko, N., Ingimundarson, V., Gunnarsdóttir, H., Jakobsen, U., Kern, B., Iudin, I., Petrov, S., Markov, S. & Kuznetsova, S. 2016b. Maritime Activity and Risk Patterns in the High North. MARPART project report 2, FOU-rapport nr.4, Nord Univerity.

Buck, D. A., Trainor, J. E. & Aguirre, B. E. 2006. A Critical Evaluation of the Incident Command System and NIMS, Journal of Homeland Security and Emergency Management, Vol.3, Issue 3, Article 1., Available from: http://www.bepress.com/jhsem/vol3/iss3/1.

Bureau d'enquêtes sur les évènements de mer (BEAmer). 2016. Fire in the engine compartment on board the expedition-cruiser liner Le Boreal on 18 November 2015, off Falkland Islands.

Cosgrave, J. 1996. Decision making in emergencies, Disaster Prevention and Management: An International Journal, Vol. 5 Issue 4, pp. 28 – 35.

Danish Maritime Accident Investigation Board. 2014. Marine Accident Report; BRITANNIA SEAWAYS Fire on 16 November 2013.

DSB. 2011. Veileder om Enhetlig Ledelsessystem (ELS) ved håndtering av hendelser innen brann, redning og akutt forurensning.

DSB. 2018. RITS. Available from: https://www.dsb.no/lover/brannvern-brannvesen-nodnett/artikler/rits/

Eikrem, A. 2012. Skryt for slokking av «Nordlys»-brann (SMP), smp.no, available from: http://www.smp.no/nyheter/article440525.ece

Finnish Border Guard. 2016. Operational guidelines for international MIRG operations. Baltic Sea MIRG project 2014-2016.

Finnish Border Guard. 2014. Baltic Sea Maritime Incident Response Survey. Final report.

Isabelle, B., Cecile, G., Carole, D-G, Pascal, L., Jean, N. & Francois, P. (2012) Coordination practices in extreme situations., *European Management Journal*, 30, pp. 475-489.

International Maritime Organization. 2017. Shipping in Polar Waters. Available online: http://www.imo.org/en/MediaCentre/HotTopics/polar/Pages/default.aspx.

International Maritime Organization and International Civil Aviation Organization.2016a. IAMSAR Manual, Volume I Organization and Management. Tenth edition 2016. IMO: London & ICAO: Quebec.

International Maritime Organization and International Civil Aviation Organization.2016b. IAMSAR Manual, Volume II Mission Co-ordination. Seventh edition 2016. IMO: London & ICAO: Quebec.

International Maritime Rescue Federation (IMRF). 2016a. Le Boréal. Posted in LIFELINE August 2016 – English. Available from: https://international-maritime-rescue.org/indexeducation/general-public-information/182-lifeline-august-2016-english/2184-le-boreal

International Maritime Rescue Federation (IMRF). 2016b. Le Boréal: Lessons Learned. Posted in MRO News. Available from: https://www.imrfmro.org/newsmro/archived-news/1969-le-boreal-lessons-learned

JRCC NN. 2015. 2015-N-2341 - Aksjonsrapport 2.

Kapucu, N. 2005. Interorganizational Coordination in Dynamic Context: Networks in Emergency Response Management, Connections, 26 (2), pp. 33-48.

Lindell, M.K., Perry, R.W. & Prater, C.S. 2005. Organizing Response to Disasters with the Incident Command System/Incident Management System (ICS/IMS), International Workshop on Emergency Response and Rescue Oct31 - Nov1, 2005.

Marchenko, N.; Borch, O. J.; Markov, S. & Andreassen, N. 2016. Maritime Safety in the High North – Risk and Preparedness, Proceedings of the 23rd International Conference on Port and Ocean Engineering under Arctic Conditions.

Marchenko, N.; Andreassen, N.; Borch, O. J.; Kuznetsova, S.; Ingimundarson, V. & Jakobsen, U. 2018. High-risk emergencies in the Arctic seas: assessment and response capacities, International Journal on Marine Navigation and Safety of Sea Transportation, Vol.12 (1) pp. 107-114.

Mintzberg, H. 1973. The Nature of Managerial Work. New York: Harper Row.

Mintzberg, H. 2009. Managing. Williston, VT, USA: Berrett-Koehler Publishers.

Mitroff, I.I. 2004. Crisis Leadership. Planning for the Unthinkable., John Wiley &Sons Inc., USA.

Rimstad, R., Njå, O., Rake, E.L. & Braut, G.S. 2014. Incident Command and Information Flows in a Large-Scale Emergency Operation, Journal of Contingencies and Crisis Management, Volume 22 No. 1, pp. 29-38.

Roud, E. K. P.; Borch, O. J.; Jakobsen, U. & Marchenko, N. 2016. Maritime emergency management capabilities in the arctic. ISOPE - International Offshore and Polar Engineering Conference. Proceedings 2016; Volume 2016-January. pp. 1241-1248.

Salten Brann. 2011. Rutiner; Røyk og kjemikaliedykking Kompetanseenheten, Salten Brann IKS. Bodø 01.03.2011.

Schmied, J. & Borch, O. J. 2016. The Management of the Emergency Response Value Chain in Mass Shooting Incidents - an Arctic maritime perspective. Preparedness and Emergency Response Logistics Conference (PERL).

Walker, J. 2015. Le Boréal Fire and Evacuation More Serious than Disclosed. Cruise Law News. Available from: https://www.cruiselawnews.com/tags/le-boreal/.

Wolbers, J., Boersma, K. & Groenewegen, P. 2017. Introducing a Fragmentation Perspektive on Coordination in Crisis Management. Organization Studies, 1-26.

Can the Civil Liability Convention for Oil Pollution Withstand the Pressure of a Major Oil Spill in the Arctic Ocean?

Ilker K. Basaran

As the Arctic Ocean is becoming a busier place for shipping due to an unprecedented sea ice retreat and integration of the regional resources with the world economy, regulatory challenges for the protection and safety of the region become the top priority. According to the Arctic Council's Arctic Marine Shipping Assessment (AMSA) report "the greatest environmental threat presented by the marine shipping industry pertains to the release of oil into the Arctic waters" (AMSA, 2009). Given the magnitude of the threat and the lack of technology to clean up the spilled oil in the Arctic Ocean, it is not surprising that the prevention measures become the highest priority in Arctic marine environmental protection efforts. To this effect, the Arctic states, through Arctic Council, have already agreed on several legal instruments regionally. The IMO Polar Code has also brought various precautionary measures to avoid oil spills in the Arctic Ocean. However, the civil liability scheme in oil pollution has not been properly examined yet. Civil Liability regimes are not drafted in light of the Arctic's unique environmental conditions and risks; therefore, they require adjustments according to the Arctic shipping realities that we face today.

Introduction

Major disasters, in general, translate to change in legal structures because only after the accident we can test the true functionality of a legal framework set for the given industry. In oil pollution, it was the Torrey Canyon incident causing massive oil pollution in England and France in 1967 that become the turning point for the major change in the civil liability structure of oceanic oil pollution. In the wake of this incident, it became clear that no proper legislation governing liability and compensation for such events existed either nationally or internationally (Jacobsson, 2007: 1). For example, the immediate problems with the Torrey Canyon incident were first how to establish jurisdiction because to establish jurisdiction one needed to arrest the ship, but the ship had sank right after the incident; and second how to compensate the damages because civil actions for oil pollution were limited to common law claims in tort against the vessel owner or other responsible

Ilker K. Basaran is a Ph.D. Candidate at the IMO-International Maritime Law Institute.

parties which required proof of fault (Griggs, 2012). As a result, in order to respond to shortcomings of the system, a global regime addressing these issues was created by means of two international treaties adopted under the auspices of the International Maritime Organization (IMO), at that time the International Maritime Consultative Organization (IMCO) (Jacobsson, 2007: 1).

After decades of existence and evolvement, the three-tier International Civil Liability Convention for the Oil Pollution Damage, consisting of the Civil Liability Convention (CLC), the Fund Convention (The Fund), and the Supplementary Fund Convention is about to face its biggest test against the recent phenomena of Arctic marine transportation. The question is, would this regime withstand a possible major oil pollution damage occurring in Arctic waters?

As for this article, I will only examine the 1992 International Civil Liability Convention as all the Arctic states, except the USA, is party to it.

Brief Review of the Civil Liability Convention for Oil Pollution Damage

A. The CLC

Geographical Scope

According to the CLC Article II, the convention exclusively applies to oil pollution damage suffered in the territory, including the territorial sea and the exclusive economic zone of a Contracting State. Therefore, place of the damage is important to define the geographical application of the convention.

Additionally, the convention also applies to preventive measures, wherever taken, to prevent or minimize such damage within the geographic scope of the Convention. Scenarios where a tanker, for example, is involved in a collision beyond the territorial sea of a Contracting State and threatens to cause pollution within it: measures taken to prevent further oil spillage or collect the already spilled oil will be eligible for compensation under the Convention if all other criteria are satisfied.

The nationality of the ship involved in the oil spill is irrelevant for this purpose.

Ship

Liability is imposed on certain vessels that constitute a "ship" as defined by the Convention.

> Article I (1), 1992 CLC defines ship as:
> "…any sea-going vessel and seaborne craft of any type whatsoever constructed or adopted for the carriage of oil in bulk as cargo, provided that a ship capable of carrying oil and other cargoes shall be regarded as a ship only when it is actually carrying oil in bulk as cargo during any voyage following such carriage unless it is proved that it has no residues of such carriage of oil in bulk aboard."

The definition of a "ship" is narrow, referring to ships that carry oil in bulk as cargo, for example, typical oil tankers. CLC does not apply to spills from dry cargo ships, passenger vessels or other non-tankers despite the fact that large ships in these categories often carry in their bunkers substantial quantities of fuel oil capable of causing considerable pollution damage.

Combination Carriers

Combination carriers, or Oil/Bulk/Ore ships (OBOs), as well as tankers capable of carrying cargoes of persistent oil but also other liquid cargo in bulk, such as non-persistent oil or chemicals, are covered by the definition of "ship" only when actually carrying oil in bulk as cargo or when in ballast following such carriage.

Oil Barges

In general, the CLC does not require the ship to have any means of steering or propulsion. Therefore, an oil barge carrying oil in bulk as cargo from one place to another may actually constitute a "ship" for the CLC and Fund purposes. However, we have to bear in mind that there are also contradicting court rulings regarding the ship status of oil barges (De La Rue & Anderson, 2009: 86-92). For example, in the 1998 Pantoon No 300 Case, in relation to the questions whether the barge constituted a "ship" for the purposes of the Civil Liability Convention 1969, the Executive Committee of the 1971 International Oil Pollution Compensation (IOPC) Fund attached importance to the fact that the barge had been actually transporting oil in bulk as cargo from one place to another and concluded that in these circumstances it was a "ship" for the purposes of the Conventions (IOPC Fund Claims Manual, 2010: 86-87). Other example cases involving oil barges under tow include the Nestucca Incident (Canada, 1998) and the Vistabella incident (Caribbean, 1991), both of which gave rise to claims against the 1971 Fund. In the former case the question whether the barge constituted a 'ship' was not raised, and did not arise in the decision, because it was concluded that the Fund Convention 1971 did not apply to the incident on the grounds that it occurred before the Convention entered into force in Canada (IOPC Fund, 1990). In the latter case, it appears to have been accepted without debate that the barge was a "ship" (IOPC Fund, 1991).

Offshore Floating Storage Units

The situation regarding Floating Storage Units (FSU) and floating production, storage, and offloading units (FPSOs) is not crystal clear. It is agreed by the 1992 Fund Assembly that the offshore crafts should be considered as 'ships' under the 1992 Conventions only when they carry oil as cargo on a voyage to or from a port or terminal outside the oil field in which they normally operate (Attard, Fitmaurice, Martinez & Hamza 2009: 292). Accordingly, the offshore craft would fall outside the scope of the 1992 Conventions when they leave an offshore oil field for operational reasons or simply to avoid bad weather. The circumstances of an incident should be taken into account when assessing the situation.

Anchored Vessels

Permanently and semi-permanently anchored vessels engaged in ship-to-ship oil transfer operations should be regarded as 'ships' under the 1992 Civil Liability and Fund Conventions (Attard, Fitmaurice, Martinez, Hamza 2009:292). The 1992 Fund Assembly decided in 2006 that such vessels should be regarded as ships only when they carried oil as cargo on a voyage to or from a port or terminal outside the location in which they normally operate, but that in any event the decision as to whether such a vessel fell within the definition of ship should be made in the light of the particular circumstances of the case.

State Owned Ships

As stated at CLC Article XI (1), the Convention does not apply to warships or ships owned or operated by a State for non-commercial purposes.

Oil

Under the Article I (5) of the CLC, oil is defined as:

> "any persistent hydrocarbon mineral oil such as crude oil, fuel oil, heavy diesel oil, and lubricating oil whether carried on board a ship as cargo or in the bunkers of such a ship".

The targeted oil in the convention is, therefore, "persistent oil" because it is slow to dissipate when spilled into the water; therefore, it has potential to create widespread pollution that requires an effort to clean up, whereas non persisent oil normally evaporate by itself fairly quickly and does not require a clean up operation. Spills of non-persistent oil include, gasoline, light diesel oil, and kerosene, and they are not covered by the Conventions. Additionally, spills of non-mineral oils, for instance, palm oil and whale oil, fall outside the 1992 Conventions as well.

Notably, there is no definition for persistent oil in the convention. And this omission seems to be intentional and non problomatic as it has not given rise to any difficulties in the application of the Conventions yet (cf. the Maritza Sayalero Incident (Venezuela, 1998)). But it is important to highlight the fact that the Fund Assembly later provided explanation to the term "persistent oil" as:

> "All oils which are not within the category of "non-persistent oil" as defined shall be regarded as "persistent oil". "Non-persistent oil" is oil which, at the time of shipment, consist predominantly of non-residual fractions and of which more than 50 per cent by volume distills at a temperature of 340ºC when tested by the ASTM Method D 86/78 or any subsequent revision thereof" (F.D. Fund/A.4/11, 15/7/81: 17).

Both the operational or accidental oil spill cases are covered under the CLC. An oil spill that occurred while loading and discharging operations, collisions, groundings, hull failures, equipment failures, bunkering, fires and explosions is also in the CLC coverage. Moreover, it is immaterial whether the oil is part of the ship's cargo or escapes from the ship's bunkers. Thus, pollution damage covered by the Convention may arise both where the ship is actually carrying oil in bulk as cargo, where the ship is laden, or during any voyage following such carriage, where the ship is in ballast.

Types of Damage Covered

An oil pollution incident can generally result in six types of damage:

Property Damage

Pollution incidents often cause damage to property; the oil may contaminate fishing boats, fishing gear, yachts, piers, and embankments. Costs for cleaning polluted property are admissible for compensation under the Conventions (Fund Claims Manual, 2008: 12). If the polluted property for example fishing gear cannot be cleaned, the cost of replacement qualifies for compensation, subject to deduction for wear and tear.

297

Preventive Measures

As indicated in the Article 1.6. and 1.7., 'Pollution damage' includes the cost of 'preventive measures' that is reasonable measures to prevent or minimize pollution damage, as well as loss or damage caused by preventive measures. Clean-up operations at sea or onshore have generally been considered to fall within the concept of preventive measures (Attard, Fitmaurice, Martinez & Hamza 2009: 295). For example, clean-up costs occurring on the high seas or within the territorial waters of a State that is not a party to the convention will be covered under the convention.

Consequential Loss

Compensation is payable for the loss of earnings suffered by the owners of property damaged by oil as a result of the spill, for example, a fisherman who is unable to fish while his fishing gear is being cleaned (consequential economic loss) (Fund Claims Manual, 2013:13).

Pure Economic Loss

People whose property has not been damaged can also suffer the loss of earnings. For instance, fishermen who are prevented from fishing in a particular area of the sea because of the oil spill, even though their nets have not been damaged, may be eligible for compensation (Attard, Fitmaurice, Martinez & Hamza 2009: 295). Also, hoteliers who suffer losses because of a downturn in the number of guests due to contamination of a public beach may also have a claim. Such losses are, in common law jurisdictions, referred to as pure economic losses.

Even though the compensation for such losses is allowed, there is an inconsistency in practice because the regime does not specify the criteria that should be applied in order to settle the pure economic damage claims. In common law countries, the matter is left entirely at the discretion of national courts and thus creates a potential for the discrepancy in states (such as Australia, Canada, New Zealand, and the United Kingdom), which have implemented the international regime into their legal systems (Soyer, 2009). The situation in countries outside the common law system is also unclear. In some of these countries, pure economic loss is not considered to be a separate type of damage. The courts in these countries may apply the criterion of foreseeability and remoteness or require that there is a direct link of causation between the damage and the defendant's action and that the damage must be certain and quantifiable in monetary terms (Jacobsson, 2016: 249).

Environmental Damage

Significantly, in accordance with the Article 1.6(a), general claims for damage to the marine environment are not admissible, therefore, they cannot be awarded for claims of a non-economic nature. The marine environment provides environmental services that support the plants and animals that live within it and to the humans who depend on the sea and shoreline for their livelihoods, recreation and enjoyment. The Conventions do not provide compensation for what is sometimes referred to as 'pure' environmental damage; that is, compensation for the loss of environmental services (IOPC Funds, 2018: 8). For example, a father who usually spends time with his children in a particular spot engaging in recreational activities such as fishing and camping for the last two years cannot claim damage because he can not find any other close by place to camp and fish with his children.

However, claims for the economic consequences of such environmental damage can be compensable according to Article 1.6(a). Typical claims for loss of profit resulting from impairment of the environment might include loss of revenue for a marine or coastal park or a nature reserve, for example, due to reduced income from car parking, camping or mooring fees. In the fisheries sector, claims may be admissible for reduced catches of commercial species of marine products. An example might be the disruption of the capture and sale of mangrove crabs and other shell fish due to the contamination of mangroves.

Additionally, compensation for the environmental damage may be available, provided that any compensation claimed, other than loss of profit, is limited to the costs of reasonable measures taken, or to be taken, to restore the environment to the condition that it was in prior to the incident (Claims Manual, 2008: 13). For example, if a response were undertaken on the high seas or within the territorial waters of a State that is not a Party to the Conventions in order to prevent or reduce pollution damage within the territorial sea or EEZ of a State Party, the cost of the response would in principle qualify for compensation. Such compensation includes the reasonable costs associated with the capture, cleaning and rehabilitation of wildlife, in particular birds, mammals and reptiles (2013 Claims Manual, 2013: 14)

Claims for the environmental damage can be presented by anyone who has suffered a financial loss due to oil pollution caused by a tanker. This could be national or regional governments or government agencies mandated to manage natural resources on behalf of the nation or region. Similarly, any claim for the reinstatement can be admissible with the condition to align with the standards set out in the Fund Claims Manual (IOPC Funds, 2018: 8)

Shipowner's Liability

Under the CLC Article 3(1), the registered shipowner is strictly liable for any oil pollution damage caused by his ship unless the circumstances fall within one of the stated exceptions from liability. This also means that the claimant is not under any duty to prove the fault or blame on part of the shipowner or its crew, and the proof of "incident" is not necessary to hold the shipowner liable for the damage that his ship caused.

The shipowner is exempt from liability under the Article 3.2 only if he proves that:

(a) the damage resulted from an act of war, hostilities, civil war, insurrection, or a natural phenomenon of an exceptional, inevitable and irresistible character, or

(b) the damage was wholly caused intentionally by a third party, or

(c) the damage was wholly caused by the negligence of public authorities in maintaining lights or other navigational aids.

Limitation of Liability

Under certain conditions, shipowners are entitled to limit their liability under 1992 CLC Convention to an amount which is linked to the tonnage of the vessel. The limitation amounts under the 1992 Convention are—after increases by 50.73 percent with effect from 1 November 2003—as follows:

(a) for a ship not exceeding 5,000 units of gross tonnage, 4,510,000 Special Drawing Rights

(SDR) (6.2 million USD);

(b) for a ship with a tonnage between 5,000 and 140,000 units of tonnage, 4,510 000 SDR (6.2 million USD) plus 631 SDR (879 USD) for each additional unit of tonnage; and 299

(c) for a ship of 140,000 units of tonnage or over, 89 770 000 SDR (125 million USD).

Constitution of Limitation Fund

In order to be entitled to limitation of liability, the shipowner must, under the CLC Article V.3, establish a limitation fund corresponding to the limit of his liability by depositing that amount in court or by producing a guarantee acceptable to the court. The limitation fund should be constituted with the competent court (or other competent authority) in one of the States parties where an action for compensation has been brought against the shipowner under the Convention or, if no such action has been brought, with any court in one of the States parties where such an action can be brought under the Convention.

In some jurisdictions the courts accept that the limitation fund is constituted by means of a letter of guarantee, for instance by a Protection and Indemnity Association (P&I Club), whereas in other jurisdictions the limitation amount will have to be paid into the court (Attard, Fitmaurice, Martinez & Hamza 2009: 302)

Channeling the Liability

According to the CLC Article III(4)(a)-(f), the shipowner is the only liable party and subject to liability. His servants or agents are outside of the scope of the rule, therefore, they cannot be found liable for the oil pollution damage unless they cause the damage willfully or recklessly.

Following is the list of people exempt from liability:

(a) the servants or agents of the owner or the members of the crew; this exclusion extends to the employees of representatives of the owner, manager, operator and other parties whose liabilities are excluded;

(b) the pilot or any other person who performs services for the ship;

(c) any charterer, including bareboat charterer, manager or operator of the ship;

(d) any person performing salvage operations with the consent of the owner or on the instructions of a competent public authority;

(e) any person taking preventive measures, and

(f) all servants or agents of those persons in subparagraphs (c)-(e).

This system provides a simplified and efficient claims procedure for those who suffer pollution damage, and also allows the insurance market to provide appropriate cover. There are numerous important exceptions to this list: proceeding against the builders of the ship or its classification societies is allowed if there is any defect that causes or contribute to the incident. Similarly, proceeding against the owners or operators of a terminal is allowed if there is any fault on their part; or proceeding against the owners of another vessel is possible if they are involved in a collision with the tanker from which the oil spills.

Compulsory Insurance

The owner of a ship registered in a State, party to one of the Civil Liability Conventions and carrying more than 2,000 tonnes of persistent oil as Cargo, is under Article VII.1 obliged to maintain insurance or other financial security to cover the liability under the applicable Convention.

B. The Fund Convention

The Fund Convention (1992 International Oil Pollution Compensation Fund) is created to be the second part of the two-tier international compensation system. Its main purpose is to provide additional compensation for victims of oil pollution and transfer some of the economic consequences of the damage to the oil cargo owners, as well as the shipowners.

Since the Liability Convention had chosen the shipowner as the liable party on the basis of strict liability, it was considered necessary to shift some of the burden of compensation onto the oil industry, the main beneficiary of the carriage of oil by sea, which led to the idea of a second convention establishing a Fund to which the industry would contribute (Wu, 1996:76).

Payment of Compensation

According to the Fund Article IV.1, there are three situations in which compensation will be payable to any person who is unable to obtain full and adequate compensation under the CLC, these situations are:

a) where there is no liability for the damage arising under CLC;

b) where the owner liable for the damage under CLC is financially incapable of meeting his obligations in full, and any financial security provided under CLC does not cover or is insufficient to satisfy the claims for compensation which result from an incident; or

c) where the damages exceed the amount of the shipowner's limited liability under the 1992 CLC.

It should be noted that the 1992 Fund is only obliged to pay compensation under item c) if the shipowner is entitled to limit his liability.

Fund's Liability Limit

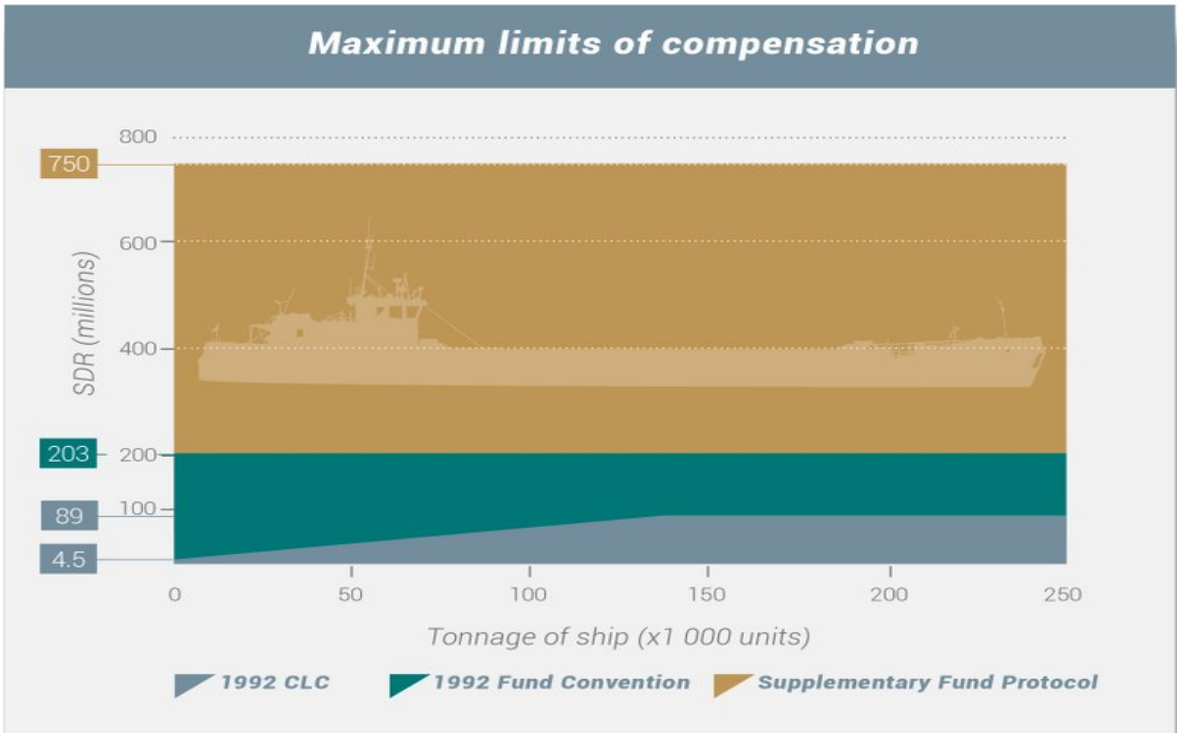
According to the Fund Article 4(4)(a), for incidents occurring on or after 1 November 2003 (Amendment 2003), the liability of the Fund in respect of any one incident is limited to the aggregate sum of 203 million SDR (approximately 313.21 million USD). This amount is available irrespective of the size of the ship and includes any compensation actually paid under the Fund Article IV.4.(a).

C. The 2003 Supplementary Fund Protocol

As a third-tier compensation system, the Protocol on the Establishment of a Supplementary Fund for Oil Pollution Damage adopted on 16th May the 2003 and came into force on 3 March 2005 (Supplementary Fund Protocol).

Limits of Compensation

According to Supplementary Fund Protocol Article IV(2)(a), the aggregate amount of compensation payable by the Supplementary Fund, in respect of any one incident, is limited to 750 million SDR (approximately 1157.1 million USD). This amount is inclusive of any compensation actually received under the CLC and Fund Conventions.



Source: The International Oil Pollution Compensation (IOPC) Funds Website.

Application of the Convention to the Arctic Ocean

Sufficiency of the Monetary Compensation

Aside from the economic damages, the most important contributor to overall oil spill incident cost in the Arctic Ocean will be the cost of preventive measures, including the response and clean-up efforts.

It is difficult to answer the question whether the monetary compensation schemes will be sufficient to meet the cost of responding to a major oil spill in the Arctic Ocean since we have not experienced one yet (CMI, 2017: 51). But it is possible to state that the cost will be considerably higher compared to any other place in the world. For example, in BP oil spill, it has been reported that on a single most demanding day of the response, 6,000 vessels, 82 helicopters, and 47,849 individuals were on the spill site helping with the clean-up efforts (Department of Health and Human Services, 2011: 1)

At the end of the day, the clean-up cost for the BP was $11.8 billion USD (Spear, 2012) which was a sizable portion of the total cost of $62 billion USD (Busso, 2018).

The Gulf of Mexico in BP oil spill represents an ideal environment for oil spill recovery and cleanup operations, therefore, for a closer comparison to actual Arctic Ocean settings, we may need to examine the Exxon Valdez oil spill in Alaska. In 1989 Exxon Valdez oil spill clean-up efforts involved more than 1,000 people and 1,400 vessels, and it was not only about cleaning up the oil but also accessing the spill site. Therefore, there was a substantial land-based infrastructure build up as well (Patrick, 2018). Systematic cleanup operations underwent during the spring and Summer of 1989-1992, and at the end, the overall clean-up cost was about 2.5 billion USD which was an important portion of the total cost of 7 billion USD (Patrik, 2018), As a result, the clean-up factor of the Exxon Valdez oil spill was a lot higher as a proportion of the total cost compared to the BP oil spill.

It is clear that when we go further north, the circumstances change drastically. The remoteness, lack of infrastructure, limited seasonal operation window leading to a multiyear clean-up operation, and the harsh climate conditions will escalate the response and clean-up cost in the Arctic Ocean. Response measures need to be mobilized and brought in from far distances, and in many instances, national response options will likely be inadequate, therefore, they will be supplemented by resources procured on market terms (CMI, 2017: 51).

Overall, the CLC and Fund Conventions will not be enough to cover the cost of oil spill damage in the Arctic Ocean. And as for the Supplementary Fund, it seems that the Arctic oil spill will be a real test. Some claim that the Supplementary Fund is sufficient enough to cover all the costs exceeding the CLC and Fund limits (CMI, 2017: 53), however, given the facts listed above this seems very optimistic and actually unrealistic.

Reasonableness Test

The Article VI (a) of the CLC states that "only reasonable reinstatement costs are admissible for compensation".

The reasonableness concept for reinstatement costs needs further analysis. In order for the preventive measures to qualify for compensation, the measures must be reasonable, and reasonableness should be determined on the basis of objective criteria in the light of the facts available at the time of the decision to take the measures. For example, the Fund has accepted to pay compensation for reasonable costs of cleaning and rehabilitation of contaminated birds and mammals, provided the measures were taken by qualified personnel and there was a reasonable chance that the animals would actually survive the process. It is extremely difficult in the Arctic to apply a reasonableness test. For example, how the reasonableness question will be answered in a salvage situation in the Arctic Ocean. It is difficult to answer this question because there is a high possibility that salvage operations alone will exceed the cost of the ship, or it will not even be possible. The Funds' governing bodies have taken the position that the costs incurred for such operations qualify in principle for compensation under the CLC and Fund Conventions if the primary purpose of the operations was to prevent pollution damage; should the operations have another purpose, such as saving the ship or cargo, they would not fall within the definition of preventive measures and the costs incurred would not be admissible under the Convention (Attard, Fitmaurice, Martinez & Hamza 2009: 298).

Environmental Damage

The CLC does not have environmental damage coverage. In other words, the meaning attached to the environmental damage compensation does not cover all the possible circumstances of an environmental damage. Victims of oil pollution damage in international regime can claim for impairment of the environment, but such claims are limited to property damages and economic aspects. Thus, only economic damage, cleaning, and reinstatement costs may be compensated by the CLC regime. (Attard, Fitmaurice, Martinez & Hamza 2009: 298).

Irreversible damages such as destruction and death of wildlife and flora are considered indirect consequences that are not compensable. In other words, the environmental damage itself, or pure ecological damage, is not addressed by the regime.

The Arctic Ocean sets itself apart from the rest of world's oceans with its unique environment and marine biodiversity. Scientists predict that oil spilled in the Arctic waters may prevail for more than 50 years before natural elimination processes make it disappear (Ostreng, 1999:10) This gives us an overall idea about the magnitude of the environmental damage and difficulty for nature to recover in the Arctic Ocean.

Therefore, we should start considering environmental damage compensation systems where the damage to the environment itself can also be translated into a monetary value and compensated under the CLC regime.

Navigational Aid

Navigational Aid, also known as Aid to Navigation, is described as any device external to a vessel specifically intended to assist the navigators in determining their position or safe course or to warn them of dangers or obstructions to navigation (US Coast Guard). The common types of such aids include lighthouses, buoys, fog signals, and day beacons.

Safe and effective use of the Arctic Ocean for shipping depends heavily on safety systems as such as fixed and floating aids to navigation, long-range aids to navigation (shore-based electronic or satellite-based), as well as safety and navigation information broadcasts (AMSA). While the southern waters and maritime routes are well served by the established systems, northern waters are served by a patchwork of said systems (AMSA). Therefore, ships in this part of the waters have no other option but to use and rely on a combination of satellite positioning and traditional navigation techniques (AMSA). And this situation can create a scenario where the shipowners can exonerate from legal liability for oil pollution by exposing the Arctic coastal state governments to the oil pollution liability.

As indicated above, under the Article III(2)(c), the CLC regulates "Navigational Aid" exemption to shipowners' liability. According to this Article, no liability for pollution damage shall attach to the owner if they prove that the damage "was wholly caused by the negligence or other wrongful act of any Government or other authority responsible for the maintenance of lights or other navigational aids in the exercise of that function." This exemption only applies if the shipowner proves that damage was "wholly caused" by matters falling within the exclusion. Thus, a shipowner would not be able to rely on the exemption in cases where the oil pollution damage was also due to another contributory cause, such as contributory negligence by those on the board the ship (Tsesis Case, 1977). For example, if an oil tanker with maximum draft of 8 meters runs aground

in a Russian Arctic port with the depth of 7 meters by relying on the official draft limitation of 9 meters set by the Northern Sea Route Administration, they can claim to be exonerated from the oil pollution liability if the shipowner can prove that the 7 meters depth was not marked on the chart, or the chart was not up to date.

High Seas

Currently, the high seas area of the Arctic Ocean is not open to marine transportation due to thick, multiyear, sea ice coverage, even in Summer. However, the prediction is that the high seas will be open to trans-Arctic shipping in the near future due to trends in climate change (Humpert & Raspotnik, 2012). Arctic coastal states do not have jurisdiction in the area as this is beyond their EEZ. This issue raises liability questions in case an oil spill occurs in the area. Because a coastal state's authority to regulate foreign shipping does not extend to the high seas, transiting ships would only be subject to global shipping safety, environmental and security rules and standards adopted through the IMO and as may be applied by the flag states (CMI, 2017: 50) Therefore, the question arise as what happens if the oil spill occurs in the High Seas area, outside of the geographical scope of CLC 1992.

The current gap with respect to the High Seas in the Arctic is not a problem at the moment as there is no access to the area, however, in time, this issue needs to be addressed. The vastness of the area is a great challenge from a response perspective and the problem could possibly be managed and resolved to some extent by establishing transport corridors and restricting navigation to certain areas (CMI Report, 2017: 51)

Alternatively, a simpler approach would also be to copy the Norwegian model of extending the application of the CLC 1992 (as impended nationally) to oil pollution on the High Seas as that would benefit both the environment and the polluting ship owner (CMI Report, 2017: 51).

Conclusion

As the Arctic is warming at an unprecedented rate, it is imperative that we review and revisit the legal liability systems for oil pollution damage. With the International Oil Pollution Regime for Oil Pollution, the Arctic Coastal States have in place legislation that deals with the pollution, liability, calculation of losses, responsible parties and funding. However, there are many issues that we need to re-consider in adjusting and applying in Arctic setting. For example, with the lack of infrastructure and difficulty in responding to an oil spill, it's almost certain that the monetary compensation will not be enough to cover the expenses that come with a major oil spill in the Arctic. This may create a particular problem for Russia as it is still not a party to the Supplementary Fund Protocol. The lack of infrastructure will also potentially lead to Coastal State's exposure to liability in oil pollution. Interpretation of some of the articles in Arctic Ocean will be difficult, and we certainly need to have a section that requires compensation for the damage to the environment itself. And lastly, even though it is not an immediate problem, we have to start considering the ways to deal with possible high seas oil pollution scenarios and create the necessary rules.

References

Antarctic Liability Annex: Annex VI to the Protocol on Environmental Protection to the Antarctic Treaty, 1991, Secretariat of the Antarctic Treaty [Liability Annex].

Arctic Marine Shipping Assessment (AMSA) Report, Available at https://www.pame.is/images/03_Projects/AMSA/AMSA_2009_report/AMSA_2009_Report_2nd_print.pdf.

Attard D., Fitmaurice F., Martinez N. & Hamza R. (2009). IMLI Manual on International Maritime Law: Volume III, Oxford.

Buosso, R. (2018) Reuters see https://www.reuters.com/article/us-bp-deepwaterhorizon/bp-deepwater-horizon-costs-balloon-to-65-billion-idUSKBN1F50NL

CMI International Working Group, (2017). Working Paper On the Legal Framwork for Civil Liability For Vessel-Source Oil Spills in Polar Regions, available at http://comitemaritime.org/wp-content/uploads/2018/05/2017-12-15-Civil-Liability-WP-Final.pdf

De La Rue, C. & Anderson, CB. Shipping and the Environment. *Routledge, Second Edition 2009*

Department of Health and Human Services. (2012) The Practical Consequences and Challenges of Oil Spills – Lessons Learned from Deepwater Horizon Incident, available at https://www.cdc.gov/niosh/docs/2012-117/pdfs/2012-117.pdf

Griggs, P. CBE, "Torrey Canyon", 45 Years On: Have We Solved All the Problems?" in Baris Soyer and Andrew Tettenborn (eds), Pollution at Sea Law and Liability (Informa, London 2012).

Humpert, M. & Raspotnik, A. (2012) A the Future of Shipping Along the Transpolar Sea Route. See https://www.thearcticinstitute.org/future-arctic-shipping-transpolar-sea-route/

IOPC Fund Guidelines for Presenting Claims for Environmental Damage. 2018 Edition.

IOPC Fund Claims Manual. 2013 Edition.

IOPC Fund Claims Manual. 2008 Edition.

IOPC Fund Annual Report 2008.

IOPC Fund Annual Report 1990, p.40.

IOPC Fund Annual Report 1991, p.52.

Jacobsson, M. (2007). The International Liability and Compensatoin Regime for Oil Polluotion from Ships – International Solution for Global Problem. *Tulane Maritime Law Journal 32 Tul. Mar. L. J. 1, (1)*

Jacobsson, M. (2016). Liability and Compensation for Ship-Source Pollution in David Attard, Malgosia Fitzmaurice, Norman Martinez, Riyaz Hamza (eds) IMLI Manual on International Maritime Law: Volume III, Oxford.

Navigational Aid, Wikipedia, available at https://en.wikipedia.org/wiki/Navigational_aid

Ostreng, W. (1999). National Security and International Environmental Cooperation in the Arctic – the Case of the Northern Sea Route. Springer.

Shinnefield, P. Clean Up of the Exxon Valdez Spill, available at https://web.stanford.edu/class/e297c/trade_environment/energy/hexxon.html

Soyer, B. (2009). Ship-sourced oil pollution and pure economic loss: The quest for overarching principles. 17 Torts Law Journal.

Spear, S. (2012). Eco Watch, https://www.ecowatch.com/will-u-s-taxpayers-foot-the-bill-for-bp-oil-spill-cleanup-1881643901.html

The Swedish Supreme Court in the *Tsesis* case (Sweden, 1977). For the facts of the case see Dela Rue & Anderson (2009) at 101.

United States Coast Guard Office of Boating Safety, available at http://www.uscgboating.org/

Wu, C. (1996). Pollution from the Carriage of Oil by Sea: Liability and Compensation. *Kluwer Law International, 1996, p.76*

Arctic Hydrocarbon Exploration & Production: Evaluating the Legal Regime for Offshore Accidental Pollution Liability

Sergei Vinogradov & Smith I. Azubuike

The Arctic has enormous hydrocarbon potential which is attracting international oil companies to invest, explore and exploit its reserves. Drilling in this region presents infrastructural, technological and environmental challenges with high accidental pollution risks involved. In the wake of the Deepwater Horizon incident of 2010 in the Gulf of Mexico, there are serious concerns about the effects and legal consequences of a possible major oil spill. This calls into question the adequacy of existing global and regional regulatory frameworks governing accidental pollution, particularly in such important area as oil pollution damage liability and compensation. It is important that an international regime is in place that provides prompt and adequate compensation to the victims of pollution and remedial measures necessary to protect the Arctic environment and innocent third parties. This paper examines and evaluates global and regional regulations pertinent to pollution resulting from offshore petroleum operations in the Arctic, focusing especially on accident pollution liability and compensation from offshore facilities. A regional intergovernmental framework or an industry-wide compensation scheme would be among the most obvious options in addressing the apparent gap in the existing environmental regime of the Arctic.

Introduction

Geographically, the Arctic is defined as the region situated north of the Arctic Circle (U.S Energy Information Administration, 2012). A simple definition is that it is approximately 66 degrees North parallel, enclosing parts of Alaska (USA), Canada, Greenland (Denmark), Iceland, Sweden, Norway, Finland, and Russia (Johnstone, 2015). The economic and hydrocarbon potential of the Arctic region is gradually attracting global interest (Kaiser, Fernandez & Vestergaard, 2016). Viewed as the final frontier for conventional hydrocarbon development, it is likely to become the most promising area for international oil companies (IOCs) in the near future.

The Arctic is portrayed as one of the few unspoiled ecosystems with limited human interaction, although offshore exploration began in the 1970s, with about 10,000 wells drilled to date (Sahu, 2016). It is mostly occupied by Indigenous peoples and has unique environmental characteristics

Sergei Vinogradov is Senior Lecturer, and Smith I. Azubuike is a PhD Candidate, at the Centre for Energy, Petroleum, Mineral Law and Policy (CEPMLP), University of Dundee, Scotland, United Kingdom.

which can be affected by large-scale economic activities (Newman, Biddulph & Binnion, 2014; Scarpa, 2014). There are over four million people including thirty Indigenous groups living in the region (Stouwe, 2017).

An oil spill could damage all aspects of the ecosystem (Gordeeva, 2013). As the Arctic ice cover is gradually decreasing due to climate change, the prospects for hydrocarbon exploration and production (E&P) in places that were inaccessible before are increasing (Osofsky, Shadian & Fechtelkotter, 2016; Ebinger, et al., 2014). The Arctic has valuable marine living resources which could be affected by large scale E&P activities. Presently, there exists no confirmed technology that could remove oil pollution from under the ice, although some areas where petroleum production will be taking place are already ice free. The main environmental concern is about the impact of possible oil spills on Arctic waters and the transboundary dimension this could assume, calling into question the effectiveness of the existing emergency preparedness and response measures in the Arctic, as well as the adequacy of the liability and compensation regime for offshore pollution damage arising from hydrocarbon E&P. These concerns are informed by the Macondo incident in the Gulf of Mexico and the damage it caused to local fishermen, businesses and tourism. The Macondo oil spill impacted the shorelines of about five littoral states in the U.S. and was capped after 87 days (The Guardian, 2010).

With offshore drilling operations significantly benefiting the Arctic countries' economies, it is imperative that an international or an Arctic-specific regime is in place to address accidental pollution liability and emergency response, to adequately protect the Arctic environment and innocent third parties. Although non-binding vessel-focused pollution prevention measures have been developed within the Arctic Council, a rather soft regional institutional mechanism (Sahu, 2016), no Arctic-wide offshore liability regime exists today to address accidental pollution arising from hydrocarbon E&P. The aim of this paper is to examine and evaluate global and regional regulations pertinent to pollution resulting from offshore petroleum operations, focusing especially on liability for accidental pollution damage. This paper suggests that an industry-wide compensation scheme or a binding regional instrument would be two most likely options in establishing an accidental pollution liability regime for the Arctic Ocean.

Hydrocarbon Potential of the Arctic

Global interests in developing Arctic hydrocarbon resources have been growing fast. This attention has been influenced largely by the demand for energy and significant potential oil and gas resources of this frontier region (Kaiser et al., 2016). It is estimated that the entire Arctic holds more than 87% of the earth's oil and natural gas reserves (Murray, 2018). These estimates were based on a probabilistic methodology of geologic analysis and analogue modelling; they are however not final (Bishop, Bremner, Laake, Parno & Utskot, 2011). The US Geological Survey, in 2008, assessed the oil and gas potential of the North Arctic Circle and indicated that it holds about 90 billion barrels of oil and 1,669 trillion cubic feet of natural gas, and a possible 44 billion barrels of undiscovered natural gas liquids, with 84% of these located offshore (USGS, 2008). These estimated figures represent 13% of the world's undiscovered oil resources and 30% of world's undiscovered natural gas resources (Ebinger, Banks & Schackman, 2014).

Similar estimates from Russia support assessment of the significant petroleum potential of the Arctic (Schofield & Potts, 2008; Baev, 2007). Russian scientists used the regression relationship

method to calculate the probabilistic estimate of oil and gas resources of the Eurasia sedimentary basin in the Arctic Ocean (Kontorovich et al., 2010). The findings show that in the second half of the century, the Arctic petroleum super basin could provide the required energy resources that are comparable to those of the West Siberian petroleum basin or the Persian Gulf (Kontorovich et al., 2010). The bulk of the estimated oil and gas can only be retrieved through complex offshore drilling techniques; about 80% of the Arctic energy resources are situated in the areas covered by ice for most of the year (Osofsky et al., 2016). More than 15 oil and gas fields have been discovered in the Kara, Pechora, and Barents Seas of the Russian Arctic region (Bishop et al., 2010).

Recent oil discoveries in the Nanushuk and Torok formations announced during 2015-2017 in the US, indicate that the North Alaska Slope holds significant reserves (USGS, 2017). In 2011, the Prudhoe Bay field in Alaska's North Slope was estimated to hold about 2.1 billion m^3 of recoverable oil, out of the 4.0 billion m^3 estimated. It also has a projected 736 billion m^3 of recoverable natural gas, out of 1.3 trillion m^3 estimated (Bishop et al., 2011). The Drake gas field in the Canadian Arctic has been evaluated to hold 153 billion m^3 of gas, while about 453,160 m^3 of oil was extracted from the Bent Horn field on Cameron Island from 1985-1996 (Bishop et al., 2011). The Norwegian Snohvit field is also estimated to hold significant recoverable reserves.

The territories controlled by the five coastal states of the Arctic Ocean - Canada, US, Norway, Russia, and Greenland (Denmark) - hold more than three-quarters of the Arctic resources (Henderson & Leo, 2014). As ice covered areas diminish due to the increase of global temperatures, these resources are becoming more accessible, opening new opportunities for hydrocarbon development and transportation to world markets, through the Northern Sea routes (ibid). Recent innovations in extraction technologies and ship design enable access to the Arctic resources, thereby increasing energy security in the twenty-first century (Stouwe, 2017). The resource potential of the region has led to the Arctic being branded as the "*new energy province*" (Østhagen, 2013).

Existing and Prospective E&P Activities in the Arctic

Energy companies have made high-profile forays into the Arctic to develop its oil and gas resources. Prior to this recent interest, there had been several rather earlier attempts to develop hydrocarbons in the Arctic. In 1968, Standard Oil and ARCO drilled a well that tapped the largest oil field in Prudhoe Bay on the North Slope of Alaska. Production started in 1977 after the trans-Alaska Pipeline System from Prudhoe Bay to Valdez was completed (Tippee, 2015). As time went on, Shell also discovered oil in the Arctic in 1980, and in 2012, BP found oil at its Liberty field in the Beaufort Sea; but high production costs had led to the abandonment of these discoveries.

In the Far North and the Arctic Norwegian and Russian waters, Gazprom, Statoil and Rosneft carried out E&P activities over several years (Wilson Center, 2014). In the Barents Sea, about 130 wells have been drilled to date with mixed results (Murray, 2018). At the Goliath field in the Barents Sea, Eni Norge AS has been producing for about a year. In January 2017 Statoil discovered oil and gas in the Cape Vulture well, followed by two additional finds in July (Murray, 2018).

In the Russian waters of the Arctic, Gazprom is progressing in the Pechora Sea (Stouwe, 2017). In 2014, the Rosneft-ExxonMobil venture successfully completed the drilling of the northernmost well in the world - the Universitetskaya-1 well in the Kara Sea oil province (Rosneft, 2014). As of January 2017, Rosneft owns 55 licenses in the offshore areas of the Arctic (Rosneft, 2018).

In the Nikaitchuq field offshore the North Slope of Alaska, Eni has attained its production goal of 25,000 barrel per day. In a water depth of 3 metres, the field holds reserves estimated at 200 MMboe (Offshore Energy, 2014).

Exploratory drilling in the Canadian Arctic could be traced to the Canadian Beaufort in 1972. Although activity in the region slowed down in the 1980s, renewed exploratory efforts resumed in the early 2000s. It is Canada's largest offshore oil project and remains an important test case along the Arctic learning curve. Hibernia in the Canadian sub-Arctic waters is one of the biggest resource development projects (Stouwe, 2017).

In Greenland, the first substantial offshore seismic surveys were carried out and experimental wells drilled in West Greenland in the 1970s, and another exploratory well drilled in 2011, albeit, with little success. Despite this, Tullow Oil accepted to buy a 40% stake in an exploration block in the Baffin Bay.

These discoveries have shown that hydrocarbon development in the fragile Arctic environment is gaining pace (Wilson Center, 2014). Experts forecast that by 2030, geological exploration will mainly be carried out on the Arctic shelf, and petroleum deposits in the area will be prepared for further, large-scale development (RIAC, 2015). The exploratory efforts have raised global awareness and concerns about the Arctic environment in the event of a significant oil spill. While IOCs continue to invest in and ramp up exploration, development, and production operations across this frontier region, serious regulatory, environmental, and technological challenges that face hydrocarbon operations must be properly addressed (Tippee, 2015).

Offshore Operations and their Possible Effects

Offshore E&P activities are risky. They involve the extraction of hydrocarbons, require the use of potentially harmful substances and produce various emissions and discharges (E&P Forum & UNEP, 1997). Accidental pollution caused by gas blowouts, oil spills and chemical spills during offshore petroleum development could result in possible or actual harm to the environment, in the form of physical, chemical, and biological disturbances in the water column, on the seabed, and in the atmosphere (Vinogradov, 2013). The Arctic is particularly fragile in this respect, being home to Indigenous populationS and important marine resources, and is characterised by special environmental vulnerabilities. It is exposed to possible impacts from various marine activities (Arctic Council, 2009) such as accidental releases of oil during petroleum extraction and transportation. E&P may cause oil pollution, which is considered one of the six priority environmental problems threatening the Arctic. Others are radioactivity, persistent organic contaminants, noise, heavy metals, and acidification (Koivurova, Kankaanpaa & Stepien, 2015).

The melting of the ice cover has improved access to mineral resource development (Schofield & Potts, 2008) and heightened IOCs interests to explore and exploit this resource-rich region (Stouwe, 2017). An assessment of hydrocarbon activities by the Arctic Council shows that at present the extent of oil pollution in the Arctic is low and is mostly related to natural seepage. However, it was noted that an accidental oil pollution is the largest threat to the marine environment (Arctic Council, 2009). In the event of an oil spill, the response time is substantially slower, as containment crew must wait for temperate seasons to assess damage. Although chemical dispersants could reduce the extent of an oil spill (Lewis & Prince, 2018), they are highly toxic. A combination of crude oil and dispersants significantly increases their toxicity and potential impact

on microzooplankton and planktonic communities (Almeda, Hyatt & Buskey, 2014). Due to tightly interwoven food chains, high north ecosystems are uniquely vulnerable to substantial disruptions resulting from oil spills (Stouwe, 2017).

The apparent vulnerability of the Arctic environment has led to calls for a moratorium on offshore activities in the Arctic (UKPEC, 2012), especially as the Gulf of Mexico oil spill has shown the difficulty of clean-up even in the significantly more favourable climate and weather conditions (Cunningham, 2012). Oil pollution is slow to disappear, while sub-zero temperatures, darkness and sea ice may impede access to spill-covered areas and reduce the effectiveness of clean-up techniques and operations (National Research Council, 2014).

The frontier's biodiversity is unique but not sufficiently understood. The changing climatic conditions may increase the frequency of storm surges, making it more likely for an oil spill to reach coastlines and damage coastal species (Pew Charitable Trusts, 2013). Another challenge is the fact that regulatory enforcement is extremely difficult in the High North. Regulatory agencies are usually *"captured"* by industry interests, whom they depend upon for personnel and technical expertise. Agencies find it difficult to set adequate standards without corporate assistance, and this power asymmetry tilts the scale in favour of IOCs (Stouwe, 2017).

A Macondo-type disaster would be catastrophic for the Arctic. It is the duty of both relevant national governments and the international and business community to take on this challenge. It has been asserted that IOCs and the Arctic coastal states are far from ready to effectively deal with major oil spills in the Arctic (Nunez, 2014). There is no doubt that the impact of oil pollution on the Arctic ecosystems and vulnerable marine living resources could be devastating and long-lasting. This is so as toxic substances could remain in the marine environment for decades and be transported by ice floes over large distances while affecting wildlife and the pristine environment (Cameron, 2015).

Legal Regime of the Arctic: An Environmental Perspective

The legal regime of the Arctic represents a combination of different global and regional environmental treaties and soft law instruments (Sahu, 2016). The protection of the Arctic is achieved using mainstream and side-stream regulations. Some global conventions, primarily related to the law of the sea, and polar-specifics regulations, including those passed by the Arctic Council, constitute the mainstream regime. Individual efforts of the coastal states to protect their northern shores and waters constitute the side-stream regime (Stouwe, 2017).

Applicable hard law comprises customary rules and relevant treaty provisions that are legally binding and define or prohibit the specific states' conduct (Canuel, 2015). When states consent to implied customary law or treaty-based hard law, they are bound by it, albeit, compliance issues arise sometimes when an international norm conflicts with perceived national interest (ASIL & ILA, 1991). It is a customary international law obligation of a coastal state to ensure that hydrocarbon activities within its marine environment do not result in transboundary environmental harm to other states (Bosma, 2012).

International environmental law and its principles play a vital role in governing various economic activities in the Arctic. UNCLOS and other global treaties, such as the Biodiversity, Persistent Organic Pollutants and the Climate Change conventions, are all relevant in terms of environmental

protection of the Arctic. They provide general guidelines for the protection of the environment during petroleum operations.

Regional legal frameworks also govern some economic activities in the Arctic, at least in certain geographic areas. These include the Convention on the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention).

The Arctic Environmental Protection Strategy (AEPS), a *"soft law"* framework for environmental cooperation, and its successor, the Arctic Council, an intergovernmental forum established in 1996, are also part of the Arctic legal regime, although of a non-binding nature (Nowlan, 2001). The Arctic Council is the main regional institutional mechanism intended to provide a platform for cooperation on various issues among the Arctic states. It does not have a legal personality as an intergovernmental organization, and its regulations are simple recommendations (ibid). It has launched several programmes with mandates relevant to environmental protection. As far as accidental oil pollution arising from E&P activities is concerned, the Arctic environmental regime, as will be shown later, is rather piecemeal compared to other regional seas. While coastal states may have sufficiently developed national regulatory frameworks for offshore E&P operations, the Arctic-wide regime for compensating other coastal states and victims of pollution, including Indigenous peoples, is missing. The fundamental question here is which liability and compensation regime should govern compensation for environmental harm, including transboundary damage, caused by accidents in the Arctic either within the coastal states' jurisdiction or beyond it.

UNCLOS and Other Global Instruments

No special international regime applies to hydrocarbon development in the Arctic (Johnstone, 2016). As earlier stated, such activities are governed by general international law, mainly in the form of 1982 UNCLOS and its implementation agreements (Cinelli, 2014). UNCLOS is often referred to as the "*constitution for the seas*" (Fowler, 2012). Art. 192 of UNCLOS obligates states to protect and preserve the marine environment. UNCLOS codifies the rights of various states, determines the limits of various maritime zones, from the territorial sea to the Exclusive Economic Zones (EEZ) and the continental shelf, and establishes applicable rules associated with marine scientific research in the Arctic, and the rights and responsibilities for marine environmental protection (Joyner, 2009).

Under Article 194 of UNCLOS, there exists a duty to take all necessary measures to prevent, reduce and control pollution of the marine environment. Article 194 (3) expressly refers to "*pollution from installations and devices*" used to explore and exploit natural resources from the seabed and subsoil. In particular, such measures must aim at preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, and regulating the design, construction, equipment, operation and manning of such installations or devices. Clearly, this obligation applies to hydrocarbon E&P in the Arctic.

Further to this general obligation, there are two more specific provisions related to offshore operations - Articles 208 and 214, that directly relate to the prevention and control of operational and accidental marine pollution resulting from offshore E&P. Together these articles embrace both aspects of anti-pollution measures: regulation and enforcement. Article 208 obliges states to adopt laws and regulations that will prevent, reduce and control pollution emanating from seabed activities, and to harmonise and cooperate with other states to create a regional framework to

address marine pollution. Article 214 also deals with the issue of pollution resulting from seabed activities under the jurisdiction of coastal states. It complements Article 208 and operates as an enforcement provision (Vinogradov & Wagner, 1998).

There is one Arctic-specific provision in UNCLOS, which however applies to navigation only. Under Article 234, coastal states have a right to make laws that are non-discriminatory to prevent, reduce and control vessel-related pollution in ice-covered areas within their Exclusive Economic Zones. However, Art. 234 does not provide for an adequate legal mechanism to protect the Arctic environment from other sources (Stouwe, 2017). UNCLOS does not stipulate either the content or procedures that should be followed to prevent such pollution of the Arctic Ocean (Rixey, 2016). Russia and Canada have explicitly referred to Article 234 as the basis for their unilateral introduction of additional environmental regulations and, in the case of Russia, icebreaker escort fees to ensure the safety of the environment and seafarers in their respective Arctic EEZ (Fields, 2015). While this provision applies only to navigation, there is nothing in either UNCLOS or general international law which precludes coastal states from establishing and enforcing stricter measures with respect to offshore E&P operations in their Arctic waters.

Finally, Article 197 calls for environmental cooperation, where appropriate, on a regional basis, directly or through competent international organisations. Such cooperation should focus primarily on formulating and elaborating international rules, standards and international practices and procedures for the protection of the marine environment, taking into account characteristic regional features. The Arctic is a particularly sensitive and vulnerable maritime region where cooperation among its coastal states and other countries using it is essential. From this perspective, it is important to analyse and assess the emerging regional environmental regime of the Arctic Ocean to ascertain its effectiveness, especially regarding petroleum E&P. This is essential as UNCLOS strongly encourages regional solutions to prevent, reduce and control pollution in the Arctic (Stokke, 2009).

Apart from UNCLOS, there are several international conventions aimed at protecting the marine environment which were adopted under the auspices of the International Maritime Organisation. The most relevant among them in the context of this paper are the International Convention on Civil Liability for Oil Pollution Damage (CLC) of 1992, the Fund Convention of 1992, and the 2003 Supplementary Fund, which may offer possible solutions for the Arctic. The aim of the CLC 1992 was to ensure adequate compensation for victims of vessel-based accidental pollution damage. The CLC provides for a strict liability regime against a ship owner with limited exceptions for acts of war, third party intentional acts, and the wrongful acts of an authority responsible for navigation (Art. 3, CLC 1992). The strict liability approach was chosen to ensure optimal compensation to the victims of accidental pollution (Hui, 2007).

The CLC requires mandatory insurance to cover ship owner's liability (Art. 7, CLC 1992) essentially to guarantee such compensation (Verheij, 2007). The limit of the ship owner's liability is calculated based on the tonnage of the vessel (Art. 5, CLC 1992), and victims could claim directly from the ship owner's insurer or the provider of the financial security (Art. 7 (8), CLC 1992). After the 2000 amendment, the maximum amount payable by a ship owner is 89,770,000 Special Drawing Rights (SDR). However, the CLC has been criticised for having a low maximum amount which may not compensate for a large-scale damage, thus defeating the goal of prompt and adequate compensation set out by the regime (Mason, 2002).

To accommodate this criticism, the 1992 Fund was established to provide compensation for victims who do not obtain full compensation under the CLC. The 1992 Fund functions as an alternative source of payments and as a second-tier compensation mechanism for claim settlement (Art. 3 (2), CLC 1992). Thus, it provides victims with realistic opportunities of recourse, and a wider scope of claims application (Pavliha & Grbec, 2008). Through contributions from the shipping and oil industry, compensation is available under the CLC and Fund regime, thus facilitating risk spreading between different parties.

Despite the seemingly wide scope of the Fund and substantial amount available, subsequent incidents demonstrated that the CLC and the Fund were inadequate to provide compensations in the most severe cases, as some claims may surpass the liability limit under the two instruments (Hui, 2011). The combined amount of compensation available under the CLC and Fund was 203 million SDR. This limitation paved the way to the adoption of the 2003 Supplementary Fund Protocol to ensure availability of adequate funds for compensation payment. The limit was increased to 750 million SDR (Art. 4, 2003 Fund Protocol). The 2003 Fund operates as an additional tier of compensation and applies when the joint coverage under the CLC and the 1992 Fund is insufficient. It is derived from levies collected from companies situated in the contracting states that receive more than 150,000 tons of oil per year (Art. 10, 2003 Fund Protocol). Yet, the liability limit under the 2003 Fund is still inadequate in addressing potential damage caused by a major spill in the Arctic.

The regime has achieved a balance between various competing interests as it continues to ensure prompt and adequate payment of compensation for pollution damage. The entire CLC regime offers certain options for the Arctic region. The success of the CLC as a model for developing an international liability mechanism for the marine transportation of hazardous and noxious substances is an indication of its likely applicability in the Arctic region.

Regional Environmental Frameworks in the Arctic

It has been earlier mentioned that there is no single regional convention governing the environmental protection of the Arctic Ocean, including offshore oil and gas activities. What is currently in place is a combination of some regional binding and soft law instruments in the form of numerous guidelines and recommended practices. This could relate to the fact that the Ottawa Declaration on the Establishment of the Arctic Council does not impose legally binding responsibilities on any of its members and that the Arctic Council is also not authorised to do so (Koivurova & Molenaar, 2009). The Arctic Council's position and role could and should be strengthened to improve the effectiveness of environmental cooperation.

The most relevant regional environmental regime which applies partly to the areas under the jurisdiction of some Arctic states is the OSPAR Convention. It was open for signature at the Ministerial Meeting of the Oslo and Paris Commissions on 22 September 1992. The OSPAR Convention replaced two instruments concerning land-based pollution and dumping adopted in the early 1970s. It provides a broad normative framework and an institutional mechanism (the OSPAR Commission) for regional cooperation. One important feature of the OSPAR regime is its geographical coverage, which includes Region I (Arctic waters) that constitutes approximately 40% of the OSPAR maritime area.

In addition to the general obligation regarding the prevention and elimination of pollution from "offshore sources" (Article 5), it has Annex III regarding offshore installations. However, neither the OSPAR Convention, nor its Annex III contain technical requirements and standards, leaving this to be developed by the Commission through its agreements, decisions and recommendations. The OSPAR Convention focuses almost entirely on regulating operational pollution and the disposal of disused offshore platforms (Vinogradov, 2013).

Some soft law instruments embrace internationally accepted technical norms, standards and practices that have been institutionalised (Koivurova et al., 2015). Although they influence states' behaviour, they do not create an excessive burden or obligation on the respective states. Soft law instruments play an important role in shaping the actor's behaviour, both in terms of their general conduct and, especially, when it comes to regulating some specific industrial or commercial activities. The Arctic Council has produced important guidelines, including the 2009 Arctic Offshore Oil and Gas Guidelines. The purpose of the guidelines is for the Arctic nations to use them during petroleum operations by applying common policy and practices (Arctic Council, 2009d). The objective is to assist regulators in designing standards, which are applied and enforced consistently for all offshore hydrocarbon operators in the Arctic. The guidelines are non-binding and are intended only to encourage the application of the highest standards of petroleum operations. The Council's various task forces, working groups, and adopted documents aimed at achieving the Council's twin aims - environmental protection and sustainable development of the Arctic natural resources (Canuel, 2015).

In 2013, the Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic was adopted to serve as a legal platform for prompt and effective action and cooperation in the event of an oil pollution incident. In 2015, the Arctic Council approved the "Framework Plan for Cooperation on Prevention of Oil Pollution from Petroleum and Maritime Activities in the Marine Areas of the Arctic" (Framework Plan). The Framework Plan aims to strengthen cooperation, including exchange of information, in the field of prevention of marine oil pollution.

However, both the hard law instruments and soft law guidelines are practically silent on the issue of accidental oil pollution damage to the environment and this question requires more detailed analysis which will follow.

Accidental Oil Pollution Liability and Compensation in the Arctic

Current Status

While accidental oil pollution is one the most serious issues that threatens the Arctic, the region does not have a proper legal regime that addresses liability and compensation for damage arising from E&P activities. Although various national laws govern hydrocarbon E&P in the Arctic waters, these regulations are not harmonised, neither do they provide adequate protection to the victims of pollution in the case of transboundary environmental harm. There are considerable differences in relevant national regimes which can lead to ambiguities and unnecessary delays and inadequate compensation (Lahn & Emmerson, 2012). As states look to address the unique challenges of regulating offshore drilling activities in the Arctic region, a major concern is the liability limits set out in national regulations (Byers, 2012). The liability for offshore pollution damage in Russia, Norway and Greenland is unlimited, whereas that of US and Canada is limited

(Lahn & Emmerson, 2012). The US Oil Pollution Act of 1990 sets the limit of liability at $75 million for economic and natural resource damage, although no limit standard applies for gross negligence (33 U.S.C S2701 of OPA). Liability for offshore pollution damage in the Canadian Arctic is $40 million under the 1970 Arctic Waters Pollution Prevention Act.

A fundamental question with respect to liability for pollution damage in the Arctic is which liability regime should apply. Stakeholders in the Arctic region have expressed divergent views on this issue. Non-governmental organisations in the region argue that the liability cap should be removed. The reason advanced is that the environment is vulnerable, the climate is harsh, and that there is no precedent to base cost assessment for damage caused to the environment (Lahn & Emmerson, 2012). Some scholars posit that liability caps prevent cost internalisation and can facilitate activities that do not make economic sense from an inclusive viewpoint (Byers, 2012). Oil companies and some states hold a contrary view. Unlimited liability is usually assumed to create a risk too great for investors as it does not ensure certainty in insurance, although some investors may accept it as a way of covering for the current and future loss of fishing revenues by locals (Vanderklippe, 2011)

Again, how to address victims' claims where the liability limit is low, and what limit of financial responsibility to apply, is an issue of debate in the Arctic region (Lahn & Emmerson, 2012). In the U.S, the demonstration of financial capacity is set at 150 million USD. In Greenland, the 2010 Baffin Bay licensing rounds required companies to have at least 10 billion USD of equity to qualify, and small companies were required to provide a 2 billion USD bond for clean-up in the event of a spill (Webb, 2010). States and companies may be unable to act alone in the event of a disaster and the liability regime of a state may limit victims' claims as the amounts vary (Lahn & Emmerson, 2012). It therefore seems necessary to harmonise national regimes in the Arctic region for a more effective liability framework.

Under Article 235 of UNCLOS, states are obligated to ensure that recourse is available for adequate compensation or other relief, and to ensure this, it is the duty of states to cooperate in the implementation of existing international law, and the development of the law regarding liability and compensation for marine pollution damage. This provision also emphasises the need for the development of criteria and procedures, such as compulsory insurance or compensation funds, for payment of adequate compensation. This highlights the importance of a robust and streamlined regime that would allow for adequate compensation and a well-considered liability limit in the fragile Arctic region.

At present "existing international law" relating to liability and compensation for oil damage to the marine environment is limited to accidental pollution arising from navigation only. There is a well-established global regime governing civil liability for pollution damage caused by maritime accidents involving transportation of oil. However, nothing of this kind at either the global or regional level exists with respect to petroleum E&P. The 1977 Convention on Civil Liability for Oil Pollution Damage that could have been relevant, is not in force and in practical terms is obsolete. Thus, in view of the advent of large-scale E&P operations in the Arctic there is a clear need to consider adequate liability and compensation schemes and mechanisms with respect to offshore pollution, if not global, at least regional, especially for the vulnerable Arctic Ocean.

Options for Liability and Compensation Schemes

In the face of environmental challenges and increasing economic activities in the Arctic, questions have been raised over the sufficiency of the existing regime to manage and protect this frontier region (Stokke, 2009). This paper identified as one such issue the absence of a regional liability and compensation scheme for damage caused by E&P activities in the Arctic. As IOCs look towards expanding their operations in this region, one may consider various options to fill this obvious gap, including primarily two: an industry-specific private compensation mechanism modelled on the OPOL scheme and a regional intergovernmental civil liability regime.

Using the OPOL-type Framework

One possible solution in addressing the regime gap in the Arctic is an OPOL-type framework for pollution liability arising from the hydrocarbon E&P operations. The Offshore Pollution Liability Association Limited is an industry body in the oil sector, set up as a company limited to administer a voluntary but strict liability compensation scheme known as the Offshore Pollution Liability Agreement (OPOL) (Faure & Liu, 2017). The OPOL is an agreement between several major oil companies, intended to make compensation available to the victims of oil pollution damage emanating from an offshore facility or reimbursement to public authorities for remedial measures carried out following a spill (Clause IV, OPOL). OPOL was designed to fill the gap in the UK pending the ratification of the 1977 Convention on Civil Liability for Oil Pollution Damage Resulting from Exploration for and Exploitation of Seabed Mineral Resources (1977 CLEE) (Rochette, Wemaere, Chabason & Callet, 2014). However, the CLEE was never ratified, and OPOL remains the only instrument at present to address the issue of accidental pollution liability not only in the North Sea and adjacent areas, but globally.

OPOL's origin is traceable to the UK. It entered into force on 1 May 1975 as an agreement between all offshore operators in the UK (Faure & Liu, 2017). Its coverage was extended to offshore facilities within the jurisdiction of other states: Denmark, the Federal Republic of Germany, France, the Republic of Ireland, the Netherlands, Norway, the Isle of Man, the Faroe Islands and Greenland. This means that OPOL applies to some Arctic waters.

The legal nature of the OPOL agreement is a contractual arrangement by offshore installation operators (Bonfanti & Jacur, 2014) and is based on the principle of a strict but limited liability. Membership of OPOL is a condition for the granting of a licence in the UK (Faure & Liu, 2017). Outside the UK, OPOL membership has declined as there is no regulatory duty to be a member in states such as Germany, France or Denmark (Faure & Liu, 2017). Presently, the total liability of an operator under OPOL is capped at 250 million USD per incident, with a requirement for members to "establish and maintain" financial responsibility to ensure that claims are met (Clause II 2c, OPOL), evidenced through insurance or self-insurance (Rochette et al., 2014). Claims to be considered as admissible include clean-up operations on shore or at sea, property damage, disposal costs of collected material, other losses which must be quantifiable, and which must result directly from the contamination. OPOL does not take away a claimant's right to seek redress through the courts for losses exceeding the recoverable maximum, or those beyond the scope of the Agreement.

A commendable feature of the OPOL regime is that it appears to demonstrate the industry's commitment to make available adequate coverage of pollution damage. Again, if a member is

unable to meet its obligation due to insolvency, other members are obligated to contribute in proportion to the number of their offshore facilities at the time of the incident. This guarantees that funds are available to meet claims, thus, ensuring expeditious claims settlement and enhancing mutual risk sharing in the case of insolvency. Furthermore, the strict liability obligation means that there is no need to prove fault, and the fact that liability is channelled to the operator takes away the question of attribution of liability when claims are to be lodged.

There are, however, limitations to OPOL. It is not a fund but a contractual arrangement to compensate losses where a member fails to meet its obligation (Hancock & Stone, 1982). It means that OPOL will not intervene where there is no insolvency. OPOL does not prevent a claimant from suing the operator for other types of damages (Faure & Liu, 2017). Its definition of direct loss or damage appears limited in scope. Whether damage caused to the environment falls under this definition is debateable (Rochette et al., 2014). Finally, OPOL's liability limit pales in comparison with the extent of damage occasioned by the Deepwater Horizon incident in the Gulf of Mexico (Smith, 2011).

Although the OPOL's compensation limit is quite high, it may still be inadequate in the event of a major offshore catastrophe. However, it is unclear whether the industry will be willing to raise the limit to a point that assures adequate compensation. Recalling that the Arctic has a challenging environment and a fragile ecosystem, a major oil spill in its waters could result in huge damage. OPOL has not been tested, and the adequacy of its application in the Arctic may be questionable. Nevertheless, OPOL demonstrates a potential governing option for liability and compensation for E&P activities in the Arctic region, if expended or modelled upon. This is so as it was established by operators (Churchill, 2001). OPOL can be improved by increasing the limit of liability to cover a Macondo-type damage; setting up a fund to address claims in excess of the liability limit. Some OPOL "designated states" are also members of the Arctic Council, thus, the regime will not be entirely new to them.

Creating a Regional Liability Regime

Another possible solution is to create a legally binding Arctic-wide framework establishing a liability regime for the region similar to the 1977 CLEE. The CLEE is restricted to the coastal states of the North Sea, Baltic Sea and the northern parts of the Atlantic Ocean (Sands, 2003). It is based on strict but limited liability channelled to the operator. However, the operator could be exempted from liability where the damage was caused by an act of God or from a well abandoned for longer than 5 years (Churchill, 2001). The Convention applies to petroleum operations on the seabed and covers fixed and mobile facilities offshore. The Convention deals with accidental oil pollution emanating from the coastal state's jurisdiction, damages suffered because of the spill and compensation payable. It imposes a requirement of mandatory insurance for operators.

Under the CLEE regime, there is no provision for a supplementary fund. Yet, it allows states where the offshore facility is situated to prescribe higher or unlimited liability for pollution damage. It must be reminded that the CLEE has never entered into force. This can be explained by disagreements regarding the standard and limitation of liability; lack of political will on the part of states to agree on important aspects of the convention; the absence of a separate fund to provide compensation for claims in excess of the limit of liability; states interest in uniformity of laws as opposed to states interest in stricter regulations for offshore operations; and disagreements regarding the potential magnitude of risk involved, among other reasons (Dubais, 1977).

A look at the regime established by the CLEE reveals some serious shortcomings. The absence of a supplementary fund undermines the effectiveness of the regime where claims exceed the liability limit. The power of states to establish a higher limit of liability could create non-uniformity, contrary to the aim of harmonisation of rules and procedure as stated in the preamble of the Convention. Again, the operators were required to maintain insurance or financial security as a cover for liability, however, states could independently determine the amount, type and terms of the insurance. This could result in non-uniformity as well. The CLEE was criticised for setting a low liability limit of 35 million SDR (Ibid.).

However, all the obvious shortcomings of the CLEE model do not necessarily negate this approach in principle as a possible option for the Arctic. Intergovernmental environmental frameworks adopted at the regional level, albeit not in the area of civil liability for accidental damage, have shown significant advantages due to their legally binding character and uniformity of the regulatory approach.

Conclusion

The analysis of different options discussed above from the viewpoint of an optimal model to be used in the Artic region, reveals that the applicability of a liability and compensation regime for oil pollution damage from offshore E&P operations may depend on several key factors. A strict but limited liability is essential to facilitate prompt and adequate compensation for damage caused by E&P activities. It enables cost internalization, and guarantees compensation irrespective of operator's fault, especially in the oil industry's complex contracting chain. It is also the prescribed standard for ultra-hazardous and high-risk activities such as offshore E&P (ILC, 2003). The strict liability requirement should be balanced with a liability limit to encourage its acceptance by the industry and ensure the availability of insurance to operators. Legal certainty is guaranteed in the insurance market when liability is strict but limited (Faure, 2009).

Again, liability should be channelled to the operator as it enables the victim to identify the responsible party for the purpose of compensation. This is so as the operator is the party that designs the well programme, interfaces with the government, and receives the long-term financial upside from the petroleum operation (Cameron, 2012). The operator could still contractually allocate risks to other participants during E&P operations. Furthermore, the regime should provide for compulsory insurance or evidence of financial security to guarantee claims payment. Offshore energy insurance is one of the prerequisite conditions for the development of an international regime on liability for pollution damage (Shaw, 2012).

The choice of options in terms of the final legal shape of the possible liability regime is rather limited. On the one hand, one may consider developing a proper intergovernmental legal framework analogous to the CLEE. However, the failed attempt to create such a regime in the maritime area famous for a very high degree of cooperation among the coastal states concerned does not bode well for its success in a divided and politically controversial regime such as the Arctic Ocean. Thus, on the other hand, what is more feasible is to apply the OPOL or develop an OPOL-type mechanism. At present OPOL, as a voluntary compensation scheme, provides an adequate platform for remedial action by operators of offshore facilities in the event of a spill. One substantial advantage of this scheme is the fact that it already applies by some of the Arctic or sub-Arctic countries. It will not be particularly hard to extend the territorial scope of the scheme to

other Arctic countries. Or, alternatively, one may contemplate the establishment of a similar compensation scheme for the Arctic waters exclusively. Either option has advantages and shortcomings, which require further deliberation.

An additional tier of compensation in the form of a supplementary fund may also be considered at some point. It would provide a wider scope for settling claims, especially when the damage significantly exceeds the established limit. Its funding could come from the oil industry and states as they are stakeholders too. State contribution could be based on the amount of oil produced or well drilled in a given jurisdiction. The Arctic Council may hypothetically be entrusted with managing such a supplementary fund. The liability regime should be able to facilitate prompt and adequate compensation by removing barriers that may prevent recourse, considering the potential magnitude of the risk and taking a cue from the extent of damage caused by the Deepwater Horizon incident.

The Arctic states should exercise the political will and commit to a regional regime that will be adequate to provide necessary guarantees to both public authorities and juridical and physical persons in the event of an oil spill. Accidental pollution associated with offshore E&P activities, including large-scale discharge of oil, creates a very high environmental risk. In the light of the Macondo incident in the Gulf of Mexico and the Montara spill in the Sea of Timor, the need for a regional regulatory framework designed to deal with liability issues, which arise from oil pollution damage caused by offshore E&P, is obvious. While there are possible options available to the Arctic states, the most realistic would be to develop an industry-wide framework, which would cover all operators engaged in offshore E&P in the Arctic. This regime could be modelled on a modified version of the OPOL scheme and other conventions discussed, taking into consideration their key positive features.

The Arctic states should be able to harmonize their policies at the appropriate regional level, and develop regional rules, standards and recommended practices and procedures to address oil pollution from offshore facilities (Vinogradov, 2013). There have been suggestions to impose a moratorium on offshore activities until a strong civil liability regime, among other things, has been created in the Arctic (Johnstone, 2016). While this proposal may be viewed as extreme, there is indeed a need in a more vigorous cooperative effort to develop international law and adequate mechanisms to deal with the issue of liability and compensative on a regional level in the Arctic.

References

1977 Convention on Civil Liability for Oil Pollution Damage Resulting from Exploration for and Exploitation of Seabed Mineral Resources adopted in London, United Kingdom on 1 May 1977.

Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic, 15 May, 2013, entry into force March 2016. Retrieved from https://arctic-council.org/index.php/en/our-work/agreements.

Arctic Council. (2009a, April 29). Arctic Marine Shipping Assessment 2009 Report. Retrieved from https://oaarchive.arctic-council.org/handle/11374/54

Arctic Council. (2009b, April 29). Arctic Offshore Oil and Gas Guidelines, 2009. Retrieved from https://pame.is/images/03_Projects/Offshore_Oil_and_Gas/Offshore_Oil_and_Gas/Arctic-Guidelines-2009-13th-Mar2009.pdf

Arctic Council. (2009c). Arctic Marine Shipping Assessment 2009 Report. Retrieved from https://pame.is/images/03_Projects/AMSA/AMSA_2009_report/AMSA_2009_Report_2nd_print.pdf

Arctic Council. (2009d). Arctic Offshore Oil and Gas Guidelines, 2009. Retrieved from https://oaarchive.arctic-council.org/handle/11374/63

Arctic Council. (2011). 2011 Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic. Retrieved from https://oaarchive.arctic-council.org/bitstream/handle/11374/531/EDOCS-3661-v1-ACMMDK07_Nuuk_2011_SAR_Search_and_Rescue_Agreement_signed_EN_FR_RU.PDF?sequence=5&isAllowed=y

Arctic Council. (2013). Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic. Appendix IV, p.11 Operational Guidelines, Retrieved from https://oaarchive.arctic-council.org/bitstream/handle/11374/529/EDOCS-2068-v1-ACMMSE08_KIRUNA_2013_agreement_on_oil_pollution_preparedness_and_response_signedAppendices_Original_130510.PDF?sequence=6&isAllowed=y

Almeda, R., Hyatt, C., & Buskey, E. J. (2014). Toxicology of dispersant Corexit 9500A & crude oil to marine microzooplankton. *Ecotoxicology and Environmental Safety*, 106, 76-85.

Baev, P. (2007, October). Russia's race for the Arctic and the new geopolitics of the North Pole. *Occasional Paper, The Jamestown Foundation,* Retrieved from https://jamestown.org/wp-content/uploads/2007/10/Jamestown-BaevRussiaArctic_02.pdf

Baker, B. (2013). Offshore oil and gas development in the Arctic: What the Arctic Council and international law can - and cannot – do. *American Society of International Law Proceedings*, 107, 275-279.

Bishop, A., Bremner, C., Laake, A., Parno, P., & Utskot, G. (2011). Petroleum potential of the Arctic: Challenges and solutions. *Oilfield Review*, *22* (4), 36-49.

Bonfanti, A., & Jacur, F. R. (2014). Energy from the Sea and the protection of the marine environment: Treaty-Based regimes and ocean corporate social responsibility. *The International Journal of Marine and Coastal Law*, 29(4), 622-644.

Bosma, S. (2012). The regulation of marine pollution arising from offshore oil and gas activities – An evaluation of the adequacy of the current regulatory regimes and the responsibility of states to implement a new liability regime. *Australian & New Zealand Maritime Law Journal*, 26, 89-117.

Byers, M. (2012, September 27). Circumpolar challenges: An ambitious agenda for the Arctic Council. *Pre-conference Report*, Retrieved from http://www.rideauinstitute.ca/wp-content/uploads/2012/09/Byers-Arctic-Council-pre-conf-report-web.pdf

Cameron, E. (2015, August 28). The impact of offshore oil drilling in the Arctic. *Peace Palace Library*, Retrieved from https://www.peacepalacelibrary.nl/2015/08/the-impact-of-offshore-oil-drilling-in-the-arctic/

Cameron, P. (2012). Liability for catastrophic risk in the oil and gas industry. *International Energy Law Review,* 6, 207-219.

Canuel, E. T. (2015). The four Arctic law pillars: A legal framework. *Georgetown Journal of International Law*, 46, 5-764.

Christina Nunez. (2014, April 24). What happens when oil spills in the Arctic? *National Geographic*, Retrieved from https://news.nationalgeographic.com/news/energy/2014/04/140423-national-research-council-on-oil-spills-in-arctic/

Churchill, R. B. (2001). Facilitating (Transnational) civil liability litigation for environmental damage by means of treaties: Progress, problems, and prospects. *Yearbook of International Environmental Law*, 12(1), 3-41.

Cinelli, C. (2014). Protection and preservation of the Arctic marine environment. *Italian Yearbook of International Law*, *24*,159-189.

Committee on Arctic Research. (2015, March 31). Arctic Potential: Realising the Promise of U.S. Arctic Oil and Gas Resources. *National Petroleum Council, Pre-Publication Edition*, Retrieved from http://www.npcarcticpotentialreport.org/pdf/AR_Exec_Summary.pdf

Convention for the Protection of the Marine Environment of the North-East Atlantic, (OSPAR Convention) September 22, 1992.

Cunningham, N. (2012, July 17). Offshore oil drilling in the US Arctic, Part Two: The legacy of deepwater horizon. *The Arctic Institute*, Retrieved from https://www.thearcticinstitute.org/offshore-oil-drilling-in-us-arctic-part2/

Declaration on the Establishment of the Arctic Council, Ottawa, (Ottawa Declaration) Canada, September 19, 1996.

Dubais, B. A. (1977). The 1976 London Convention on Civil Liability for Oil Pollution Damage from Offshore Operations. *Journal of Maritime Law and Commerce*, 9(1), 61-78.

E&P Forum, and UNEP. (1997). Environmental management in oil and gas exploration and production: An overview of issues and management approaches. *Joint E&P Forum/UNEP Technical Publication*, Retrieved from http://wedocs.unep.org/bitstream/handle/20.500.11822/8275/-Environmental%20Management%20in%20Oil%20%26%20Gas%20Exploration%20%26%20Production-19972123.pdf?sequence=2&isAllowed=y

Ebinger, C., Banks, J. P., & Schackman, A. (2014). Offshore oil and gas governance in the Arctic: A leadership role for the U.S. *Brookings Institution*. Retrieved from https://www.brookings.edu/wp-content/uploads/2016/02/Offshore-Oil-and-Gas-Governance-web.pdf

Endeavor. (2014, September 3). Offshore Arctic exploration and production: An opportunity with many challenges. *Endeavor Management*, Retrieved from https://www.endeavormgmt.com/wp-content/uploads/2015/03/Offshore-Arctic-Exploration-and-Production.pdf

Faure, M., & Liu, J. (2017). Pooling Mechanism for Offshore Liability. in M. Faure, (Ed.), *Civil Liability and Financial Security for Offshore Oil and Gas Activities* (pp.200-230). Cambridge: Cambridge University Press.

Faure, M. (2009). Regulatory strategies in environmental liability. in F. Cafaggi, & H. M, Watt. (eds.), *The Regulatory Function of European Private Law* (129-148) Cheltenham: Edward Elgar Publishing.

Fields, S. P. (2015). Article 234 of the United Nations Convention on the Laws of the Sea: The overlooked linchpin for achieving safety and security in the U.S. Arctic. *Harvard National Security Journal*, 7, 57-109.

Fowler, D. (2012). Offshore oil: A frontier for international law-making. *Chicago-Kent Journal of International and Comparative Law*, 12 (1), 179-192.

Framework Plan for Cooperation on Prevention of Oil Pollution from Petroleum and Maritime Activities in the Marine Areas of the Arctic. (2015). *IQALUIT 2015 SAO REPORT TO MINISTERS*, Retrieved from https://oaarchive.arctic-council.org/bitstream/handle/11374/609/ACMMCA09_Iqaluit_2015_SAO_Report_Annex_3_TFOPPFramework_Plan.pdf?sequence=1&isAllowed=y

Gordeeva, T. S. (2013). Identification of criteria for selection of Arctic offshore field development concept (Master's Thesis). *University of Stavanger, Norway*. Retrieved from https://brage.bibsys.no/xmlui/handle/11250/183099

Hancock, W. N., & Stone, R.M. (1982). Liability for Transnational Pollution Caused by Offshore Oil Rig Blowouts. *Hastings International and Comparative Law Review*, 5(2), 377-395.

Henderson, J., & Loe, J. S. (2014, November). The prospects and challenges for Arctic oil development. *Oxford Institute for Energy Studies, WMP 54,* Retrieved from https://www.oxfordenergy.org/wpcms/wp-content/uploads/2014/11/WPM-56.pdf

Hui, W. (2007). Shifts in governance in the international regime of marine oil pollution compensation: A legal history perspective. in M. Faure, & A. Verheij (eds.), *Shifts in Compensation for Environmental Damage* (pp197-215) New York: Springer.

Hui, W. (2011). Civil liability for marine oil pollution damage: A comparative and economic study of the international, U.S and Chinese compensation regime. (173-), Netherland: Kluwer Law International

International Convention on Civil Liability for Oil Pollution Damage, 1992.

International Convention on Oil Pollution Preparedness, Response and Cooperation, 1990 (with annex and process verbal of rectification). Concluded at London on 30 November 1990, entry into force 13 May 1995.

International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1992.

International Law Commission. (2003). Report of the International Law Commission Fifty-fifth session (5 May-6 June and 7 July-8 August 2003). *General Assembly Official Records Fifty-eighth session Supplement No. 10 (A/58/10),* Retrieved from http://legal.un.org/ilc/documentation/english/reports/a_58_10.pdf

Johnstone, R. L (2016). Respectful neighbourliness: The United Kingdom's Arctic approach. *The YEARBOOK of Polar Law, .8*, 27 -55.

Johnstone, R. L. (2015). *Offshore oil and gas development under international law: Risk and responsibility*. Leiden: Brill/Nijhoff.

Johnstone, R. L. (2016). Offshore oil and gas development in the Arctic under international Law: Risk and responsibility. (Book note), *George Washington International Law Review*, *48*, 501-503.

Joint Committee Established by the American Society of International Law & the American Branch of the International Law Association., "The Role of the Legal Adviser of the Secretary of State*", American Journal of International Law*, Vol.85, 1991, p.359.

Joyner, C. C. (2012). The legal regime for the Arctic Ocean. *Journal of Transnational Law and Policy*, *18* (2), 195-245.

Kaiser, B. A., Fernandez, L. M., & Vestergaard, N. (2016). The future of the marine Arctic: Environmental and resource economic development issues. *The Polar Journal, 6* (1), 152-168.

Koivurova, T. (2012). The Arctic Council: **A** testing ground for new international environmental governance. *Brown Journal of World Affairs*, 19 (1), 131-144.

Koivurova, T., & Molenaar, E. J. (2009, January). International governance and regulation of the Marine Arctic: Overview and gap analysis. *A report prepared for the WWF International Arctic Programme*, Retrieved from http://re.indiaenvironmentportal.org.in/files/gap_analysis_marine_resources_130109.pdf

Koivurova, T., Kankaanpaa, P., & Stepien, A. (2015). Innovative environmental protection: Lessons from the Arctic. *Journal of Environmental Law*, 27, 285- 311.

Kontorovich, A. E., Epov, M. I., Burshtein, L. M., Kaminskii, V. D., Kurchikov, A. R., Malyshev, N. A., Prisch, O. M., Safronov, A. F., Stupakova, A. V., & Suprunenko, O. I. (2010). Geology and hydrocarbon resources of the continental shelf in Russian Arctic Seas and the prospects of their development. *Russian Geology and Geophysics, 51* (1), 3-11.

Lewis, A., & Prince, R. C. (2018). Integrating dispersants in oil spill response in the Arctic and other icy environments. *Environmental Science & Technology*, 52(11), 6098-6112.

Lahn, G., & Emmerson, C. (2012, April, 1). Arctic Opening: Opportunity and risk in the high North. Lloyd's & Chatam House, Retrieved from https://www.chatamhouse.org/sites/default/files/publications/0412arctic.pdf

Mason, M. (2002). Transnational compensation for oil pollution damage: Examining changing spatialities of environmental liability. LSE Research Online, Retrieved from http://eprints.lse.ac.uk/570/1/RPESA-no69%282002%29.pdf

Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, 16 September 1987, entry into force 1989.

Murray, J. (2018, March 1). Re-examining Arctic Potential. *E&P Magazine,* Retrieved from https://www.epmag.com/re-examining-arctic-potential-1685106#p=full

National Research Council. (2014). *Responding to Oil Spill in the US Arctic Marine Environment*. Washington: The National Academy Press.

Newman, D., Biddulph, M., & Binnion, L. (2014). Arctic energy development and best practices on consultation with indigenous peoples. *Boston University International Law Journal, 32* (2), 449-508.

Nowlan, L. (2001). *Arctic legal regime for environmental protection*. Retrieved from https://www.peacepalacelibrary.nl/ebooks/files/EPLP44EN.pdf

Offshore Energy Today. (2014, June 9). Eni reaches 25,000 bopd production goal at Nikaitchuq field, Alaska. Retrieved from https://www.offshoreenergytoday.com/eni-reaches-25-000-bopd-production-goal-at-nikaitchuq-field-alaska/

Offshore Pollution Liability Agreement ("OPOL") (effective as of 21 June 2017).

Oil Pollution Act of 1990 - Public Law 101-380 (33 U.S.C. 2701 et seq.; 104 Stat. 484.

Osofsky, H. M., Shadian, J., & Fechtelkotter, S. L. (2016). Arctic Energy Cooperation. *University of California, Davis Law Review*, *49*, 1435 – 1510.

Østhagen, A. (2013, April 16). Arctic oil and gas: Assessing the Potential for hydrocarbon development in the Polar Region", *The Arctic Institute, Centre for Circumpolar Security Studies*, Retrieved from https://www.thearcticinstitute.org/arctic-oil-and-gas-hype-or-reality/

PAME. (2014, March). Arctic offshore oil and gas guidelines: System safety management and safety culture. Retrieved from https://oaarchive.arctic-council.org/bitstream/handle/11374/418/Systems%20Safety%20Management%20and%20Safety%20Culture%20report.pdf?sequence=1&isAllowed=y

Pavliha, M., & Grbec, M. (2008). The 2003 Supplementary Fund Protocol: An important improvement to the international compensation system for oil pollution damage. *Zbornik PFZ*, 58(1), 307-332.

Rixey, C. M. (2016). Oil and sustainability in the Arctic Circle. *Denver Journal of International Law and Policy, 44*(4), 441-452.

Protocol of 2003 to the International Convention on The Establishment of an International Fund for Compensation for Oil Pollution Damage, 1992, Retrieved from http://treaties.fco.gov.uk/docs/pdf/2012/TS0048.pdf

Rochette, J., Wemaere, M.., Chabason, L., & Callet, S. (2014, February 1). Seeing beyond the horizon for deepwater oil and gas: Strengthening the international regulation of offshore exploration and exploitation. *Studies N°01/14, IDDRI, Paris, France*, Retrieved from https://www.iddri.org/sites/default/files/import/publications/st0114_jr-et-al._offshore-en.pdf

Rosneft. (2014, September 27). Rosneft discovered a new hydrocarbon field in the Kara Sea. *Rosneft*, Retrieved from https://www.rosneft.com/press/today/item/175413/

Rosneft. (2018). Offshore projects. Rosneft, Retrieved from https://www.rosneft.com/business/Upstream/Offshoreprojects/#a1

Russia International Affairs Council. (2015). Arctic oil and gas resources development: Current situation and prospects. Retrieved from http://russiancouncil.ru/en/arcticoil

Sahu, M. K. (2016). Arctic legal system: A new sustainable development model. *Russian Law Journal*, Vol.4 (2), 83-95.

Sands, P. (2003). *Principles of International environmental law*. Cambridge: Cambridge University Press

Scarpa, F. (2014). EU, the Arctic, and Arctic indigenous peoples. *The Yearbook of Polar Law*, 6, 427- 465.

Schofield, C. H. & Potts, T. (2008). Current legal developments: The Arctic. *International Journal of Marine and Coastal Law, 23* (1), 151-176.

Shaw, R. (2012). Regulation of offshore activities – Pollution liability and other aspects. *The Comité Maritime International (CMI) Yearbook,* 302.

Smith, J. J. (2014). International law and the Arctic: The Law of the Sea and the Polar Regions: Interactions between global and regional regimes. *Canadian Yearbook of International Law*, 52, 653 -665.

Smith, M. (2011). The Deepwater Horizon disaster: An examination of the spill's impact on the gap in international regulation of oil pollution from fixed platforms. *Emory International Law Review*, 25(3), 1477-1516.

Stokke, O. S. (2009). Protecting the Arctic environment: The interplay of global and regional regimes. *Yearbook of Polar Law*, 1, 365- .

Stouwe, E. V. (2017). An Arctic peril: The pitfalls and potential of a fragmentary polar law. *Brooking Journal of International Law*, 43 (1), 191-232.

The Guardian. (2011, July 5). Exhausted global oil supplies make Arctic the new hydrocarbon frontier. *The Guardian Online*, Retrieved from https://www.theguardian.com/environment/2011/jul/05/oil-supplies-arctic

The Guardian. (2010, July 22). BP oil spill time line: Deepwater horizon oil spill. *Guardian Research*, Retrieved from https://www.theguardian.com/environment/2010/jun/29/bp-oil-spill-timeline-deepwater-horizon

The Pew Charitable Trusts. (2013, September 23). Arctic standards: Recommendation on oil spill prevention, response, and safety. A Report, Retrieved from https://www.pewtrusts.org/en/research-and-analysis/reports/2013/09/23/arctic-standards-recommendations-on-oil-spill-prevention-response-and-safety

Tippee, J. (2015). Arctic E&P activity on the rise. *Offshore Magazine*, 75 (5), 23-27.

United Kingdom Parliament Environmental Committee, (UKPEC). (2013). Protecting the Arctic. *Second Report of Session, 2012-13,* Vol. 1, Retrieved from https://publications.parliament.uk/pa/cm201213/cmselect/cmenvaud/171/171.pdf

United Nations Convention on the Law of the Sea, 10 December 1982, 1833 *U.N.T.S.* 397.

United Nations Framework Convention on Climate Change, May 9, 1992, reprinted in 31 I.L.M. 851.

United States Geological Survey (USGS). (2008). Circum-Arctic resources appraisal: Estimates of undiscovered oil and gas north of the Arctic Circle. *USGS Fact Sheet 2008-3049*, Retrieved from https://pubs.usgs.gov/fs/2008/3049/fs2008-3049.pdf

United States Geological Survey (USGS). (2017, December). Assessment of Undiscovered Oil and Gas Resources in the Cretaceous Nanushuk and Torok Formations, Alaska North Slope, and Summary of Resource Potential of the National Petroleum Reserve in Alaska, 2017. *Fact Sheet 2017–3088,* Retrieved from https://pubs.usgs.gov/fs/2017/3088/fs20173088.pdf

United States Energy Information Administration. (2012, January 20). Arctic oil and natural gas resources. Retrieved from https://www.eia.gov/todayinenergy/detail.php?id=4650

Vanderklippe, N. (2011, September 13). Oil drillers willing to accept liability for accidents in Arctic. *The Globe and Mail*, Retrieved from https://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/oil-drillers-willing-to-accept-liability-for-accidents-in-arctic/article4199962/

Verheij, A. (2007). Shifts in governance: Oil pollution. in M. Faure & (eds.), *Shifts in Compensation for Environmental Damage* (pp133-150) New York: Springer.

Vinogradov, S. (2013). The impact of the Deepwater Horizon: The evolving international legal regime for offshore accidental pollution prevention, preparedness, and response. *Ocean Development and International Law,* 44 (4), 337-362.

Vinogradov, S. V., & Wagner, J.P. (1998). International legal regime for the protection of the marine environment against operational pollution from offshore petroleum activities. in Z. Gao (Ed.), *Environmental regulation of oil and gas* (pp.93-141), London: Kluwer Law International.

Webb, T. (2010, November 12). Greenland wants $2bn bond from oil firms keen to drill in its Arctic waters. *The Guardian*, Retrieved from https://www.theguardian.com/business/2010/nov/12/greenland-oil-drilling-bond

Wilson Center. (2014). Opportunities and challenges for Arctic oil and gas development. *Eurasia Group Report for The Wilson Center, Washington, D.C.*, Retrieved from https://www.wilsoncenter.org/sites/default/files/Artic%20Report_F2.pdf

Zborowski, M. (2018, April 1). ExxonMobil exits Russian ventures, continues success off Guyana. Journal of Petroleum Technology, 70(4). Retrieved from https://www.spe.org/en/jpt/jpt-article-detail/?art=3945

Arctic Oil & Gas Development: The Case of Greenland

Birger Poppel

Despite the fact that not a single barrel of Greenlandic oil was ever extracted, refined and consumed in or exported from Greenland, hydrocarbon has nevertheless played a significant role in contemporary economical, environmental, and political. discourses. Not least as a key political issue in Greenland as well as between Greenland and Denmark is the discourse about Greenland's development from a colony to Self-Governance (2009) via status as a Danish county (1953) and Home Rule (1979). One of the article's foci is how the discourse about and the gradual acknowledgement of the Greenlanders' rights to the Greenland subsurface has been an important part of Greenlandic nation building. Furthermore, visions for an independent Greenland have been fuelled by the hopes for 'a shortcut' via discoveries of oil and gas that eventually could compensate for the Danish block grant and pave the way for an independent Greenland. In 2012 Greenland Self-Governance took over the full authority of mineral resources including oil and gas. 2012 was also the year following explorative drillings of eight wells that were all dry. The following years were characterised by a rapidly declining interest from the oil industry in developing hydrocarbon activities in Greenland waters and demonstrated Greenland's dependency on the international market for oil. Greenland being part of a globalised world also became apparent when Greenland was confronted with, for instance, environmental concerns caused by Greenland's wish to be an oil-producing country. Conflicting interests internationally were also reflected in the results based on a national survey on attitudes to, perceptions of as well as hopes and concerns related to oil development. Some results are presented in the article.

Introduction

The Greenland history of petroleum exploration activities dates back to the mid-1970s when the Danish state planned to initiate oil exploration. The plans were met by concerns by many Greenlanders not least because of the potential impacts on the natural environment, on marine mammals and fisheries and on traditional ways of living.

Despite the lack of economic benefits from petroleum exploration activities so far, Greenlandic discourse about oil and gas is, however, significant in different ways – not least because future petroleum exploration activities to some are seen as potential drivers for economic self-sufficiency and thus developing a key precondition for Greenland being politically independent from Denmark and a sovereign state.

The existence of a national oil and minerals strategy from 2014-2018 and the plans of the Greenland government to update the strategy despite the actual lack of interest from the large

Birger Poppel is the Research Project Chief, Emeritus of Survey of Living Conditions in the Arctic/SLiCA and affiliated with Ilisimatusarfik, University of Greenland.

international oil companies indicate that different government coalitions both have been and are determined to include petroleum exploration activities in their economic development strategies. At the same time there is a considerable public concern that petroleum exploration and possibly production in case of a discovery, especially in Arctic waters, might cause environmental disasters and disturbances to the marine environment.

The article will focus on different aspects of Greenland's oil and gas discourse over time including how the focus on oil and minerals has been a key element in Greenlandic nation building, Greenland's oil and mineral strategies and economic development policies. It will further include some results from a Greenland public opinion research study focussing on perceptions, trust and important factors in decision making concerning petroleum exploration activities.

Arctic Oil and Gas Experiences in Brief[1]

The first Arctic oil field was developed in the Canadian Arctic at Norman Wells in the Mackenzie Valley in the 1920s, following which exploration was conducted in Alaska, the Canadian and the Russian Arctic. Several decades passed, however, until commercial production started in other parts of the Arctic as for instance in the Timan-Pechora Basin in the Russian North; the North Slope in northern Alaska (since 1974); Northwest Territories/Yukon in the Canadian Arctic and offshore Norway (the Norwegian Sea and since 2015 the Barents Sea) (AMAP, 2010: 2_13-2_172).

Most Arctic regions have, for a shorter or longer period of time, been affected by petroleum activities; but not necessarily the whole process from exploration to production. In addition the preparatory processes vary between states, countries, and regions but often include public information meetings, hearings or consultation processes based on different kinds of reviews such as environmental and social impact assessments.

Whereas Denmark has been an oil producing country since the 1970s, neither of the Arctic parts of the Danish Kingdom, Greenland and the Faroe Islands, have experiences with petroleum activities beyond oil exploration. The Faroe Islands had a number of exploration drilling activities offshore in the first decade of the 21st century (Denmark, Greenland and the Faroe Islands, 2011).

Greenland has had offshore exploration drilling activities in the 1970's and most recently in 2010 and 2011 in the Davis Strait between Greenland and Canada. Furthermore, onshore explorations have been carried through in Central East Greenland in the 1980s. Neither of the exploration drilling activities, however, led to discovery of hydrocarbons at any commercially viable scale.

Hydrocarbon Exploration in Greenland: Early Days[2]

Hydrocarbon exploration in Greenland dates back to 1939 where the interest was focused on the Nuussuaq Peninsula. The interest in the Nuussuaq Peninsula and Disko Island region, onshore as well as offshore, has remained and manifested in a number of geological exploration campaigns including seismic acquisition, mapping and exploration drillings (1966-1978 and 1993-2000).

Since the late 1960s a number of fieldwork and core drilling activities have been carried out to develop relevant geo-information related to, for instance seabed features and petroleum systems to expand the knowledge and understanding of the Greenland petroleum geology. These activities have been carried out primarily (but not solely) by the Geological Survey of Greenland

(GSGU)/the Geological Survey of Denmark and Greenland (GEUS)[3] to stimulate the interest of the oil and gas industry.

The 1970s: Hydrocarbons and Home Rule

Rights to the Greenland Subsurface: Mineral Resources Including Hydrocarbon – A Key Political Controversy Unsolved in the Act of Home Rule

The ownership of and the rights to 'mineral resources' (including both oil and gas, gemstones and other minerals) has, since the 1970's, been a prominent theme in all discussions about Greenland's road towards still more economic and political self-determination and in the political movement towards Greenland Home Rule it is fair to say that this controversy was a significant driver in its own right.

The judicial point of departure was a Royal Decree from 1935[4] stating that 'All mineral resources in Greenland belong to the State'. The Legal Act of Mining that substituted the Royal Decree in 1965 contained the same wording (Nielsen & Larsen, 1985).

In 1975 the Danish state granted licenses to explorative drillings[5] on the fishing grounds off and north of Sisimiut. This led to protests because of concern that the environment might suffer from exploration activities. Protests also included an occupation of the Ministry of Greenland Affairs in Copenhagen by 'Unge Grønlænderes Råd' (the Association of young Greenlanders) as the young Greenlanders feared that the Danish state might profit from a potential oil development at the expense of Greenland (Sejersen, 2014: 17). 1975 was also an election year and in both the Danish Parliament and the Greenland provincial council election campaigns, the property rights to the subsurface was in focus (Sejersen, 2014: 63).

A unanimous decision by the Greenland provincial council in 1975 following the election stated that the Greenland subsurface should belong to the permanent residents of Greenland. This decision was targeted at the discussions of the, then recently (October 1975), established joint Danish-Greenlandic Home Rule Commission (Skydsbjerg 1999; Frandsen et al., 2017)

The Danish position on the ownership to the subsurface was made perfectly clear by the Danish Premier, Anker Jørgensen who, in an interview with Greenland Broadcasting in 1976, indicated that having the title/proprietary rights to the Greenland subsurface/subsoil would mean a definitive split between Greenland and Denmark and, following, that Greenland would have to become economically self-sufficient (ibid.). The Danish stance was – at least partly – based on the expectation that mineral resource earnings might eventually result in compensating the Danish state part of the expenses related to Greenland.[6] Furthermore, there was a hope that oil discoveries in or around Greenland might contribute to the Danish energy consumption.[7]

The Greenland position was not least based on the quest for being economically self-reliant as a means of becoming more politically independent and the struggle can be seen as an important part of the Greenland nation-building.

The disagreement was discussed at length in the Commission concluding that '(t)he resident population of Greenland has fundamental rights to Greenland's natural resources.' (Act No. 577, 1978: Section 8, 1).[8] This wording was a compromise as the Greenland delegation in the commission had strongly argued for a wording stressing '… **the** fundamental rights …' (author's accentuation) (Dahl 1986: 91-92; Nielsen & Larsen, 1985: 100).

The Commission report stated, however, that the term 'fundamental rights' was merely a declaration of political principles than based on a judicial foundation (Frandsen et al., 2017; Kommissionen om hjemmestyre i Grønland, 1978: bind l: 107) and according to Nielsen and Larsen the chairman of the commission later emphasized that the wording had a moral but hardly a judicial content (Nielsen & Larsen, 1985: 100).

This compromise, concluding the, probably, most complicated and conflictual part of the Home Rule Commission's negotiations, was – as a part of the Home Rule Act – adopted by the Danish Parliament in 1978 and by a Greenland referendum in 1979 whereas all other aspects related to mineral resources in Greenland including rules of procedure, political decisions, and administration was regulated in legislation decided by the Danish Parliament.[9]

The significance of the mineral resource discourse in the 1970s – not least based on the on-going debates about the power to grant oil exploration licenses and the potential environmental impacts on marine resources – was also mirrored in the formation of Greenland parties in the process towards the establishment of Home Rule. Three political parties were founded: Siumut (a social democratic party) in 1977, Atassut (a liberal conservative party), and Inuit Ataqatigiit (IA) (a socialist oriented party) both founded in 1978. The latter of the parties, Inuit Ataqatigiit (IA) advocated for a self-reliant and independent Greenland but campaigned against the Home Rule arrangement because the rights of the people of Greenland to the subsurface/subsoil was not recognised (Skydsbjerg, 1999).

Whereas the Greenland Home Rule Act did not meet the demand for Greenland's right to the subsurface the acknowledgement of 'fundamental rights' and the establishment of a Joint (Danish-Greenland) committee on Mineral Resources in Greenland[10] might be perceived as 'a step forward'. The appointment of a 'Joint Committee' might also be seen as, to some degree, complying with Greenland claims, despite, as emphasized by Dahl, there was still an asymmetric balance of power as the advisory institutions and administrative capacities were all located in Copenhagen (Dahl, 1986: 120).

Apart from the basic demand for the 'right to the Greenland subsurface' several overall problems were in focus in the decades following the introduction of Home Rule including the prospect for Greenland to govern and influence the hydrocarbon policy – including the economic activities ensuring that Greenland society would benefit economically. Furthermore, monitoring, inspection, and safety issues were prominent in the public discourse (Nielsen & Larsen, 1985; Sejersen, 2014: 20-21).

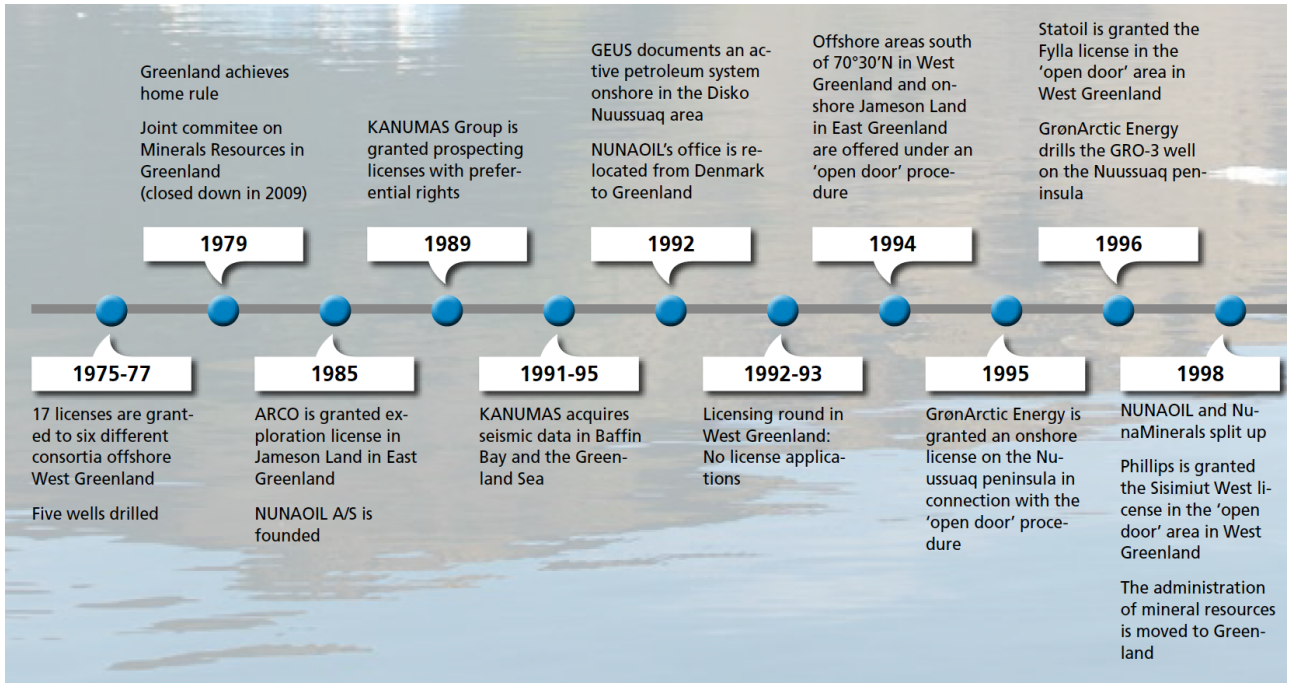
Hydrocarbon Exploration Including Drilling Activities in the 1970s

In 1969 the Danish government appointed an advisory commission on hydrocarbon licensing. The commission delivered its report 'The report of the commission on hydrocarbon licensing' including a 'model concession' for oil and gas. The conclusions and recommendations of the report led to rewarding 13 exploration licenses offshore Southern West Greenland to six groups of companies (19 non-Danish companies (including major oil companies such as Chevron, BP, Mobil and Gulf) and one Danish Consortium) (AG Ekstra, 1975: 7).

The exploration was not least based on pilot studies conducted between 1969 and 1972 on the offshore of Greenland's west coast and concluded in five deep drillings. The five wells were drilled

in 1976 and 1977 in the Davis Strait south of the Disko Island between Maniitsoq and Aasiaat. As all five wells were dry the licenses were surrendered in 1979 (Henriksen, 2008: 238-39; 2015: 64-65). Figure 1 shows a 'Timeline' with key hydrocarbon related activities including granting of licenses and drilling campaigns in Greenland in the period 1975 – 2013.

Figure 1: Timeline – hydrocarbon related activities including granting of licenses and drilling campaigns. Greenland 1975 – 2013



Source: Nunaoil (2013). Annual Report.

Environmental Concerns: Before and After the Introduction of Greenland Home Rule and Beyond

As mentioned above the petroleum exploration drilling campaign offshore West Greenland in the mid-1970s had raised environmental concerns. These concerns were substantiated when the USN tanker Potomac on August 5, 1977 hit a small iceberg and leaked about 380 tons of heavy fuel into the Melville Bay, 100 km south of Savissivik.[11] The local hunters in Avanersuaq reported declining seal catches and marine animals soiled by oil and the hunters thus sued the Potomac but got no compensation[12] (Fægteborg, 2013: 86).

The Potomac incidence influenced the resistance to the Arctic Pilot Project (APP)[13], a proposal to ship liquefied natural gas (LNG) in ice breaking super tankers from Lancaster Sound in Northern Canada through Melville Bay and Davis Strait to North American markets. The concerns were both related to potential leakages and the impacts on the marine mammals from the level of noise produced by the vessels. Furthermore, the disturbance that would be caused by the vessels when sailing through the waters where the hunters hunted marine mammals and fished was of major concern. Not only the hunters perceived the APP as a threat to their living conditions and the traditional livelihood of the citizens and communities of northern Greenland. The governments of both Greenland and Denmark also opposed the project and while environmental hearings of the "northern component proceeded … the project proponents withdrew the project from the regulatory process" (Heginbottom, 2018). According to both Heginbottom (2018) and Fægteborg (2013: 87) the most likely reason for abandoning the APP was, however, the drop in the world market prices on natural gas.

Sailing and navigating in the waters of East Greenland is generally perceived to be as challenging as sailing and navigating in the Baffin Bay. It thus came as a surprise to many Greenlanders that Atlantic Richfield Corporation (ARCO) was granted an exploration license (onshore) in East Greenland in 1985, as the large vessels would have to go through icy waters to and from the exploration site (Fægteborg, 2013: 88). At the same time the exploration activities meant a positive economic impact to a number of households and individuals as well as to the municipality of Ittoqqortoormiit (Scoresbysund) (Larsen, 1989).

Environmental concerns has played and still plays a significant role in the Greenland discourse about mineral exploration and exploitation in general and not least in relation to hydrocarbon activities. As this theme is not the main focus of the article, just one example will be mentioned. Therefore the discourse related to environmental and social impacts assessments, will not be dealt with (see e.g. Olsen & Hansen 2014; Hansen 2016; Hansen & Johnstone 2018) and neither will the debates on, for instance, the use of chemicals in explorative drillings.

Particularly when there is a risk that explorative activities impact local or regional marine mammals and/or fish negatively and thus threaten hunting and fishing and ultimately a way of life, concerns have been raised. This has for example been the case in the Baffin Bay where a consortium led by Shell has carried out a series of seismic site surveys in 2012-2014, some of which overlapped with the narwhal protection zone. After these surveys had finished, hunters from Melville Bay communities reported that narwhal behaviour was different and that the hunt had been influenced negatively due to the seismic activities in the area.

Marine biologists and hunters in Greenland have also begun to express concern over the possible effects of intense seismic survey activities and increased shipping on marine mammals and the future of hunting communities, and are calling for long-term monitoring programmes to be put in place (see e.g. Heide-Jørgensen et al. 2013a). There are concerns that seismic noise affects narwhals, particularly increasing the possibility of ice entrapment (Heide-Jørgensen et al., 2013b).

Home Rule in Action: 1979-2009

Gradual Devolution of Administrative Power to Greenland Authorities and the Establishment of a National Oil Company for Greenland

During the Home Rule period a number of agreements between the Greenland and the Danish governments resulted in changed legislation implying for instance 50% of all revenues from mineral activities to the Home Rule government[14] and a gradual devolution of administrative power and facilitating Greenland's development of expertise illustrated by the foundation of NUNAOIL A/S in 1985 and moving the company to Nuuk, Greenland in 1992: "NUNAOIL A/S is responsible for Greenland's Government's participation in hydrocarbon licenses as well as tasks in and outside Greenland which are naturally connected to this."[15]

NUNAOIL A/S is thus Greenland's national oil company and is a carried partner in the exploration phase in all hydrocarbon licenses in Greenland with an ownership interest in the licenses varying from 6.25% to 12.5%: "NUNAOIL participates in the exploration licenses on behalf of Namminersorlutik Oqartussat (the Government of Greenland) and collaborates with various international oil companies on the exploration of commercial deposits of oil and gas in Greenland".[16]

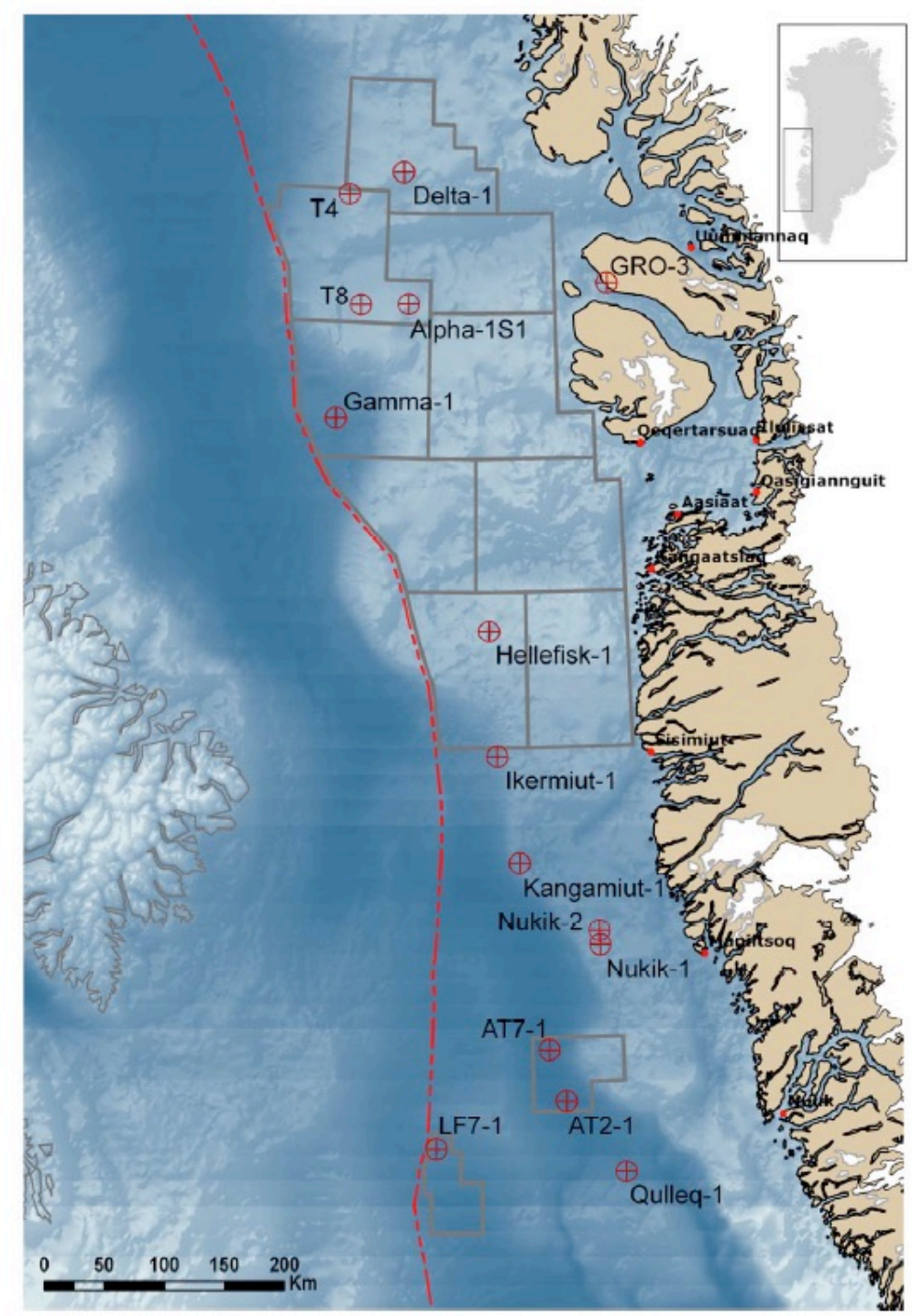
Furthermore, the administration of mineral resources (Bureau of Minerals and Petroleum) and the authority to grant licenses[17] was transferred to Greenland in 1998. This gradual devolution of administrative power to Greenland authorities strengthened the Greenland self-confidence and thus contributed to the nation-building process paving the way for Greenland's ambitions of acknowledgement of the subsurface rights.

Hydrocarbon Exploration Including Drilling Activities in the Home Rule Period

To revitalise the interest of the oil and gas industry following the decline of exploration activities because of, not least, the five dry wells in 1976 and 1977, a number of activities were initiated from the mid 1990s and onwards. One of the most significant was the so-called KANUMAS (Kalaallit Nunaat Marine Seismic – Kalaallit Nunaat is Greenlandic for Greenland) project. The overall goal of KANUMAS was to acquire 22,000 line km of new marine seismic data offshore East, Northeast and Northwest Greenland and re-examine 8,000 line km of seismic data from West Greenland. The project was politically upheld in 1989. Nunaoil was granted an exploration license as a carried partner in a consortium including six oil companies: BP, Exxon, Japan National Oil Company, Shell, Statoil and Texaco that financed the project. The seismic surveys conducted for the KANUMAS project between 1990 and 1996 have provided data for the licensing rounds in 2010 and 2012-2013[18] (Henriksen, 2008: 241, 2015: 131-133).

In 1993 the Geological Survey of Greenland conducted an onshore stratigraphic drilling at Marrat Killiit on the Nuussuaq Peninsula, finding traces of oil. Following this discovery, GrønArctic Energy Inc. carried out four onshore exploration drillings on the Nuussuaq Peninsula in 1995 and 1996 (Henriksen, 2015: 64).

Map 1: Explorative hydrocarbon drillings (15) in Greenland 1975-2011.



Source: Government of Greenland, Bureau of Minerals and Petroleum, 2011: https://www.govmin.gl/en/images/Documents/UulexNewsletter/2011Uulex02.pdf.

Hydrocarbons and Self-Governance: 2009 to 2013

Greenland's Move to Self-Governance and Responsibilities over Hydrocarbon Development

As the Home Rule Act was exhausted (the original goals had been reached) at the beginning of the new millennium a political process towards further Greenland self-determination was initiated. A Greenland Commission on Self-Government[19] prepared a report that became a point of departure for a joint Greenland-Danish Self-Government Commission.[20] The efforts of the joint commission resulted in the Act on Greenland Self-Government that was set into effect June 21, 2009.[21]

Mineral resource rights were high on the agenda in the work of both the Greenland and the joint Commission and among the more prominent achievements for the Greenlanders, following more than 30 years of disagreement with the former colonial power, the Greenlanders' subsurface rights were acknowledged[22] (Explanatory notes to the Mineral Resources Act, 2009).

The Act on Greenland Self-Government listed a number of fields of responsibility that the Greenland Self-Government authorities could decide to assume responsibility over. The 'mineral resource area' was – as the first field of responsibility according to the Self-Government Act – transferred to the Greenland Self-Government on January 1, 2010 as the Inatsisartut (Parliament of Greenland) Act no. 7 of December 7, 2008 on mineral resources and related activities (the Mineral Resources Act) came into force.[23] Finally, Greenland's subsurface rights were recognised and the implications were that the Greenland Self-Government now had the legislative as well as the executive power within the mineral resource area, which included the right to control Greenland's hydrocarbon potential Greenland-Danish Self-government Commission 2008: 193-194).[24] A cornerstone was thus established in the process of nation building.

Mapping Greenland's petroleum systems and making seismic and other relevant data accessible to the petroleum industry has increasingly been accompanied and promoted by the public authorities. Not least the establishment of the Greenland Home Rule in 1979 and the gradual transfer of administrative powers[25], knowledge and eventually also the decision making power which happened as a continuation of the introduction of Greenland Self Governance in 2009[26] has been followed by initiatives – including national oil and mineral strategies (Greenland government, 2009; 2014) and a number of licensing rounds – to attract interest and eventually investments from major international oil companies.

The 2009-2013 Coalition Government and its Strategy Documents

The optimism generated[27] is illustrated by a few examples of how different aspects and the significance of potential mining and hydrocarbon development was portrayed in government documents such as government coalition agreements, the hydrocarbons strategy (Government of Greenland, 2009) and in interviews as well as in a number of well-attended conferences in Greenland.[28]

In the coalition agreement, signed less than two weeks before the introduction of self-governance, the three parties agreed that:

> The prospect of globally rising prices for minerals and fossil fuels has reinvigorated the possibilities of exploiting our non-living resources whose economic reach can be very high. Therefore, it is very important that Naalakkersuisut's (Government of Greenland's) mineral exploration policy is closely coordinated with business policy, labour market policy, environmental policy, education policy, language policy and integration policy (Government of Greenland, 2009b: 16) (author's translation).

A Hydrocarbons Strategy (Hydrocarbons Strategy 2009) was published in December 2009 stating, among other things, that

> (t)here is broad political consensus in Greenland to work towards developing the mineral resources sector into a sustainable industry which will make positive contributions to economic development and create new jobs. The objectives are an important part of the long-term economic policy to support development of alternative business sectors to fisheries, partly with the goal to reduce the large current dependence on the annual block grant from Denmark (Government of Greenland, 2009a: 5).

This is one of several examples that the mineral resource sector including hydrocarbon activities potentially providing the necessary future economic foundation is perceived as an important precondition in the continued Greenland nation building.

Parallel to stating that "hydrocarbon activities should be promoted aiming at increasing employment and earnings" (Government of Greenland, 2009a: 5) in political documents, strategies and interviews it was most often also emphasized that oil and gas activities should be "carried out safely and with due consideration for the environment. The Arctic environment is vulnerable, and the Greenland commercial basis and culture is very much linked to nature and the environment" (ibid.) and furthermore, that ensuring "the direct contributory influence and involvement of the population in decision-making processes" (ibid.: 16) (author's translation) was important.

The political coalition governing Greenland from 2009 to 2013 further elaborated on its political goals and issued a joint vision named 'Our Future – the responsibility of you and me – on the way towards 2025'.[29] On developing hydrocarbon activities a number of initiatives – including 'stable framework conditions', 'comparison and adaptation of taxation systems in relation to other relevant countries', 'efforts to increase corporate and employee competencies' "together with the conducting of new licensing rounds every 2 to 3 years, will ensure that investment in oil and gas exploration is maintained at a high level in order to promote the possibility of a commercial oil and gas fund being made by 2025" (ibid.: 22). It was further added that direct impacts would not be manifest until after 2025 as no economically interesting discoveries had yet been found (Idem.).

In an interview, January 11, 2011 under the heading: 'Greenland steps up its independence calls as oil ambitions grow', Kuupik Kleist (Prime Minister of Greenland 2009-2013) said:

The recent discoveries of possible findings of oil have increased the debate on the issue of independence. It is a goal and every day we are coming closer to that (and he added) "If everything goes as we wish, 5-10 years would probably be the time table for oil production to start" (Stigset, January 11, 2011).

A more in-depth interview[30] with Premier Kleist under the heading 'Greenland is NOT for sale' (Greenland Oil and Minerals, 2011) added, however, nuances to the optimism:

> Fast wealth brings lots of risks. Not only with regard to the environment, but also with regard to an influx of foreign workers. You only have to take a look around the world to see how bad things can turn out. Multinational companies in the oil and mineral business like to try to influence political decisions. We are already finding that companies are trying to gain sway by influencing the public in

> general, so it is important that we are ready, should Greenland become an oil and mineral nation. And there is fortunately wide political agreement about how we should prepare for this (Greenland Oil and Minerals, 2011).

Premier Kleist also addressed the potential economic implications emphasising that,

"(…) an economic boost would make Greenland less financially dependent on the dominating fishing industry and on the annual block subsidy of more than DKK 3.4 billion from Denmark. With increased revenue from, e.g. the oil industry we would have more resources to develop and improve a series of social concerns, including raising the standard of living where necessary. But it is important that this takes place through an economic model we can handle" and Kleist further stated that "like the Norwegians, we will place the money in an oil fund and only use the interest the capital earns (Greenland Oil and Minerals, 2011).

Mineral Resource – Including Hydrocarbon – Activities: Intensified Initiatives

In several ways 2009 and the following years became epoch-making years for Greenland, not least because of:

- The introduction of Greenland Self-Governance and the optimism based on this next step in Greenland's road towards still more political autonomy and even sketching the road map towards independence;
- A general election that resulted in a political regime change just a few months before Self-Governance became a reality, as a coalition between the left-wing party (Inuit Ataqatigiit, IA), the social liberal party (Demokraatit) and a centre party (Katusseqatigiit Partiat) formed the government for the period 2009-2013.

Also in relation to minerals – especially hydrocarbons – marked changes occurred

- A *Hydrocarbons Strategy 2009* was released in December 2009.
- Greenland assumed full responsibility for the minerals including hydrocarbon, January 1, 2010.[31]
- The number of active exploration and exploitation hydrocarbon licenses increased from 2 in 2007 to 13 in the period 2008-2010 and 20 in 2011.
- The Scottish oil company Cairn Energy conducted 3 explorative offshore drillings in 2010 and further 5 in 2011.

Both the Greenland Hydrocarbon strategy 2009 (Government of Greenland 2009a) and the Arctic strategy of the Danish Kingdom (Denmark, Greenland and the Faroe Islands, 2011: 24), jointly developed by Denmark, Greenland and the Faroe Islands in 2011 are generally optimistic when it comes to both oil and gas and mineral activities. The expectations to hydrocarbon activities in Greenland was based partly on a number of successful licensing rounds and not least on the United States Geological Survey's (USGS) assessment for yet unproven oil and gas resources in Greenland territorial waters: 31 billion barrels of oil and gas off the coast of Northeast Greenland and 17 billion barrels of oil and gas in areas west of Greenland and east of Canada could be discovered (Government of Greenland, 2009a; Bird et al., 2008)

In the drilling seasons of 2010 and 2011 the Scottish oil company, Cairn Energy spent roughly 5 billion DKK (573 million USD) on drilling 8 exploration wells in the Davis Strait between Greenland and Canada bringing the total number of drillings in Greenland since 1975 up to a total

of 15.[32] The eight exploration drillings, however, did not find a sufficient amount of hydrocarbon to develop any of the drillings to production. The Greenland government maintained its optimism, and in Greenland's oil and mineral strategy 2014-2018 one of the statements is: "Based on the current assumptions, the establishment of two oil fields – a 500m barrel field from 2020 and a 2bn barrel field from 2025 – would generate more than DKK 435bn to the Mineral Resources Fund[33] until 2060" (Government of Greenland 2014:8).[34] For several reasons, however, this projection did not come true, as the only exploration activities in recent years have been stratigraphic drilling campaigns in the Baffin Bay by a consortium with Shell as operator. (NUNAOIL Annual Reports, 2013; 2014; 2015; 2016; 2017).

Exploration activities, offshore as well as onshore, have generally been set on hold, and all licenses in North and West Greenland have been relinquished or are under relinquishment, primarily because of the decrease in world market oil prices[35], that only recently (since December 2017) have increased to a level above $60. Figure 2 (Holmgreen & Ronnle, 2012) and Figure 3 (NUNAOIL, 2014) illustrate the development of world market prices and hydrocarbon exploration drillings in Greenland and seismic testing respectively. Both figures indicate a close relationship between the petroleum industry's commercial interest in Greenland and the development of crude oil price. Interviews with oil company executives and market analysts confirm this relationship and further point to the generally high operating costs in Greenland (see e.g. Lindkvist 2015 and McGwin 2016) as well in other parts of the Arctic.[36] In an interview in 2016 when Statoil, GDF Suez and Dong hand recently surrendered their Baffin Bay licences, Roy Ledholm, a ConocoPhillips executive and head of GOIA (Greenland Oil Industry Association) was less pessimistic about long term perspectives for Greenland as an oil-producing country but specified that "Clearly the drop in the oil prices entails very real challenges for the industry. Choices have not become easier and companies will indeed only move to drilling in Greenland if the opportunities are competitive within their global portfolios" (McGwin 2016: 20-21).

To some analysts the changed political attitude towards issuing licenses that was reflected in the Coalition Agreement of March, 26, 2013 between Siumut, Atassut and Partii Inuit: "Exploration and extraction permits in the field of hydro-carbons are in force, though further permits will be granted reluctantly" further created an uncertainty among the oil companies (see Nyvold 2014: 32-33).

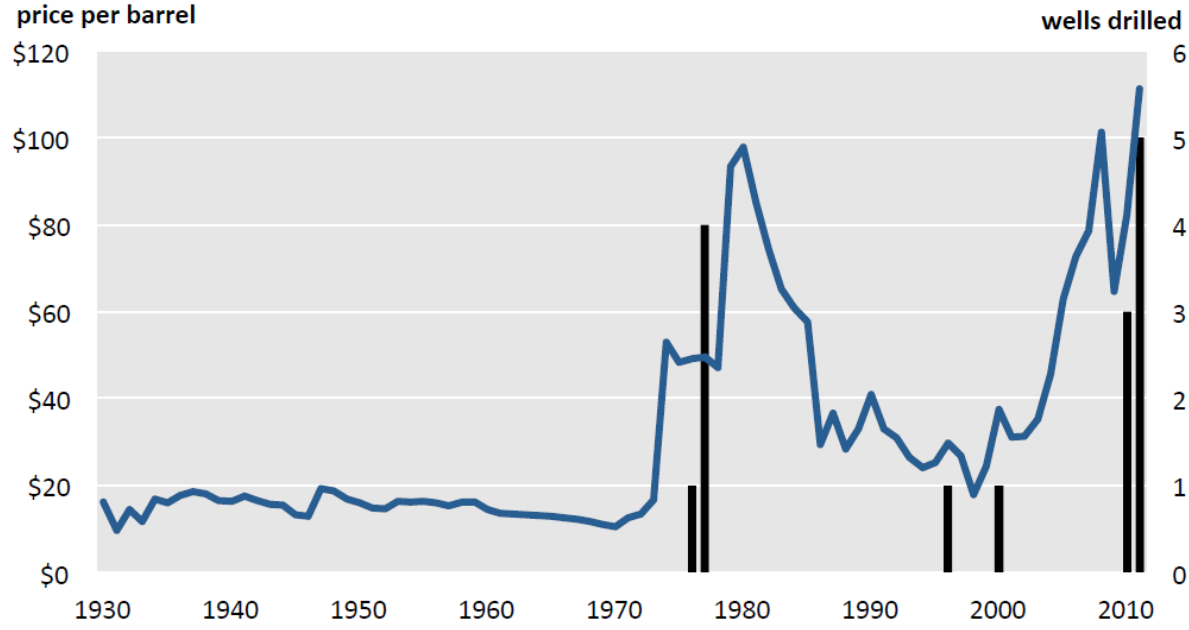
Another, and contributing, reason to the hesitance from the oil industry seems to be the increased international concern about the environmental risks accompanying oil and gas activities in Arctic waters. One of the world's largest oil companies, Total, which in 1976 was among the first companies to drill off the coast of West Greenland warned in an interview in Financial Times (September 25, 2012) against Arctic offshore drilling for oil:

"Christophe de Margerie, Total's chief executive, told the Financial Times the risk of an oil spill in such an environmentally sensitive area was simply too high. "Oil on Greenland would be a disaster," he said in an interview. "A leak would do too much damage to the image of the company" (Chazan September 25, 2012).

Total thus surrendered its licenses. The other licensees did not go that far but Mærsk oil, as an example, emphasized the significance of 'environmental challenges'. When asked about Mærsk Oil's future Greenland exploration activities, the company's Global Head of Exploration, Lars Nydahl Jørgensen, stressed that the company's decision would be based on two things: "… how

attractive it looks in terms of exploration. Secondly, we need to be absolutely convinced that we can control any environmental challenges, which may arise" (Nyvold 2013: 43).

Figure 2: Number of wells drilled in Greenland 1975-2011 and real oil prices (USD/barrel) 1930-2011.



Source: Holmgreen & Ronnle, 2012

The International Petroleum Context

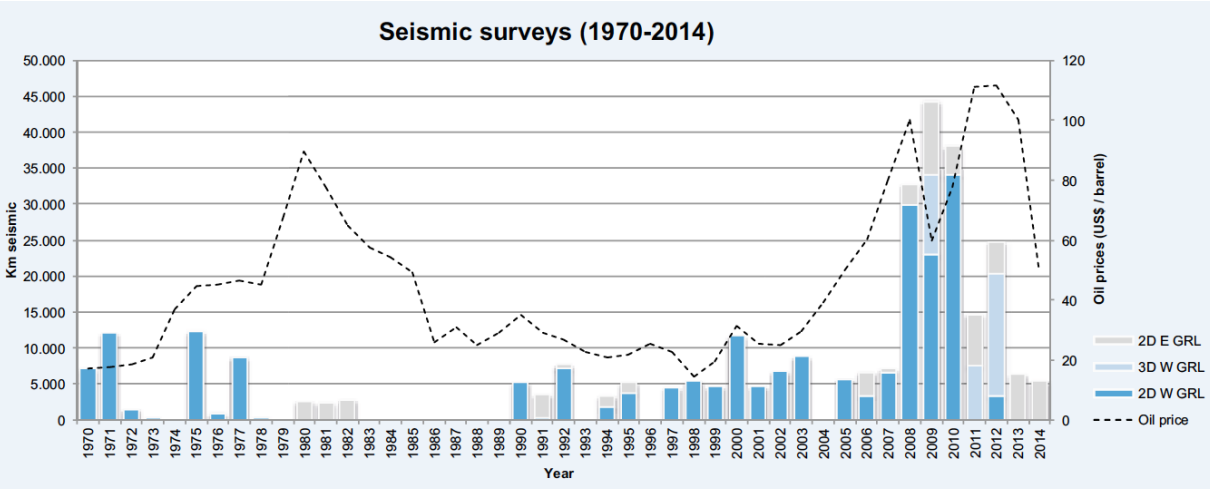
The international 'petroleum context' in which the abovementioned took place was characterised by a number of events and developments that affected international oil companies' interest in the Arctic and not least the Greenland hydrocarbon potential – to mention just a few important occurrences:

- In 2008 the U.S. Geological Survey (Bird et al., 2008) announced its projections of the undiscovered technically recoverable resources in the Arctic. According to the USGS the sea North East of Greenland holds more than 30 billion barrels of oil equivalent and the subsurface under the waters between Canada and Greenland hold 17 billion barrels of oil equivalent (Bird et al., 2008).
- Oil prices peaked in the years 2011-14 reaching, in these years, and going beyond the 100 USD a barrel crude oil level (see Figure 3).

Attitudes Toward Natural Resource Development and the Marine Environment: A 2013 Greenland Public Opinion Study Focusing on Oil and Gas Development

In September and October of 2013 – roughly six months after an election that once again handed over the majority to a Siumut (social democratic) led government – a telephone survey, representative of the Greenland population was conducted among adults age 17 and above.[37]

Figure 3: Seismic surveys in East and West Greenland 1970-2014 and the world market oil prices (USD/barrel)



Acquired 2D and 3D seismic data in East and West Greenland during the period of 1970 – 2014 compared to the world market oil prices (US$ / barrel).

Source: NUNAOIL Annual Report 2014: 10

The focus of the survey was 'attitudes towards natural resource development and the marine environment' and the overall topic was approached via 14 questions about perceptions, views, and attitudes related to for instance the significance of oil and gas development in the waters around Greenland.

Some of the main findings will be presented and discussed below (the number of the question in the questionnaire is noted in brackets).

The telephone survey was conducted at a time when a new political coalition had come into power and had agreed upon limitations in the license policy: "Exploration and extraction permits in the field of hydro-carbons are in force, though further permits will be granted reluctantly" (Greenland government, 2013: 11-12).[38] It was two years since Cairn Energy carried through the company's final explorative drillings, and the price of crude oil was still more than 100 USD/barrel prices.

A few of the overall findings from the survey – not all unequivocal – can be summarized in the following statements:

- A majority finds oil and gas development important to the economic future of Greenland;
- A majority also finds that in the long run most or all Greenlanders would benefit from petroleum development;
- Half of the adult population agreed that 'economic growth should be a priority for Greenland, even if we have to take some environmental risks'.
- Two thirds of the Greenlanders considered oil spills to be the biggest threat to Greenland waters;
- Almost all agree that Greenlanders are a people with a powerful connection to the sea.

Whereas a telephone survey does not necessarily give answers to the reasons why – at least at first glance – some perceptions, attitudes and points of view seem conflicting, some of the answers might contribute to a more in-depth understanding of the mixed concerns and expectations of the

Greenlanders and, following, challenges to the Greenland politicians and other decision makers when it comes to strategic as well as short-term decisions about oil and gas development.

Answers to the question about "factors to consider when making decisions about oil development in Greenland" illustrate some of the conflicting goals among Greenlanders. Almost all – including the majority that finds offshore drilling very or fairly risky and the majority that prioritises "economic growth for Greenland, even if we have to take some environmental risks" – find that "Protecting long-term health and well-being of communities" as well as "Protecting nature and the environment" 'matters a lot' (89 and 87 per cent respectively) and no one finds that it does not matter at all.

All in all, survey results stating some of the hopes, concerns, dilemmas and potential inconsistencies among the general public towards hydrocarbon activities that have been and still are part of the political discourse in Greenland and with stakeholders outside Greenland.

Declining Crude Oil Prices, Environmental Concerns and Diminishing Interest from the Petroleum Industry: 2013 to Present

Coalition Agreements/Government Policy 2013 - 2018

Four government coalitions[39] – all led by Siumut (the social democratic party) – have been in power since the 2009-2013 coalition and all coalition agreements have contained sections on oil and minerals focussing primarily on framework conditions for the minerals resource sector, environmental considerations and ensuring inclusion of and benefits to local communities (Government of Greenland 2013; 2014a; 2016; 2018).

The coalition agreement from 2013 stated that "(e)xploration and exploitation permits in the field of hydro-carbons are in force, though further permits will be granted reluctantly" (Government of Greenland 2013: 12). A combination of eight dry wells in Cairn Energy's 2010-2011 campaign – or at best – discoveries that were not commercially viable, decreasing world market prices on oil, and concerns, internationally, because of the extraordinary risks as well as costs conducting oil explorations in Arctic waters led to a markedly decline in interest from the petroleum industry in applying for new licenses.

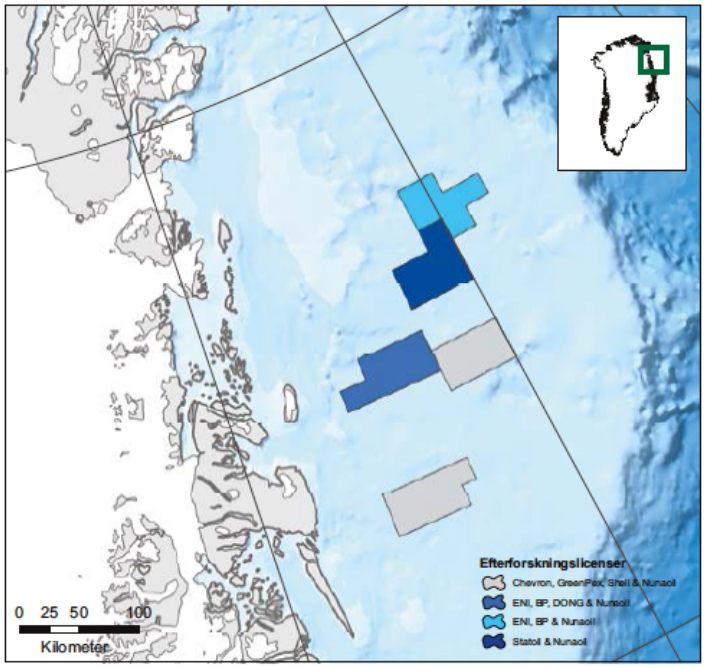
Despite the declining interest from the petroleum industry, the Greenland Oil and Mineral Strategy 2014-2018 was still – and not least seen in retrospect – (overly) optimistic, as the oil price level plummeted in the second half of 2014.[40] The Oil and Mineral Strategy assumed that "(b)ased on the current assumptions, the establishment of two oil fields – a 500m barrel field from 2020 and a 2bn barrel field from 2025 – would generate more than DKK 435bn to the Mineral Resources Fund until 2060" (Government of Greenland, 2014b: 8).[41]

Since the Greenland Oil and Mineral Strategy was published exploration and extraction licenses have been surrendered to the Greenland authorities resulting in just seven active exploration and extraction licenses for hydrocarbon – all in East or North East Greenland (status: June 2018).[42]

In an article from June 7, 2017 entitled 'Last oil company exits West Greenland' the Greenland newspaper AG quoted Deputy Minister for Minerals and Petroleum Jørgen Hammeken-Holm as saying that Cairn Energy as the last oil company had surrendered its licenses on the Greenland West Coast following major former licensees such as Shell, Maersk Oil, ConocoPhillips, Statoil,

Dong and GDF Suez. In the article it was further stated that the only remaining active licenses were five offshore blocks in North East Greenland and an onshore on Jameson Land in East Greenland. (AG June 7, 2017: 12).[43] The active licenses are included in Map 2 below.

Map 2



Source: Nunaoil Annual Report 2017

Current Status of Petroleum Licenses and Hydrocarbon Initiatives

The current status (June 2018)[44] of petroleum exploration, exploitation and prospecting licenses according to the Greenland Bureau of Minerals and Petroleum is listed below:

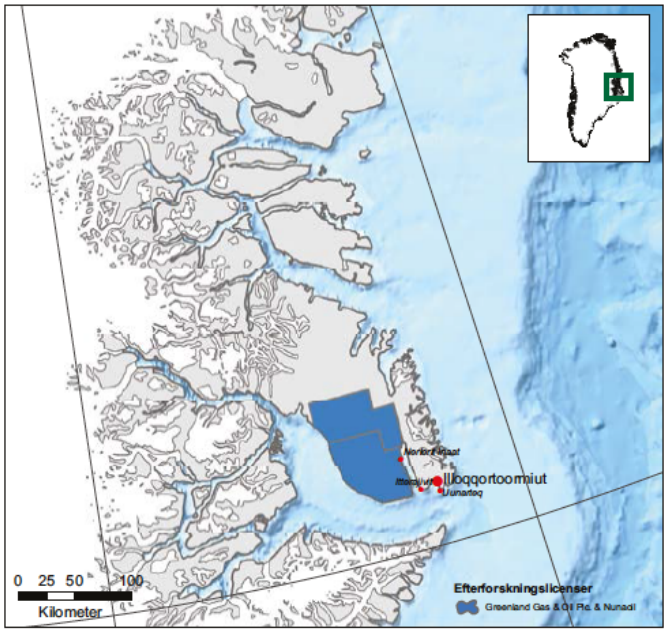
Petroleum exploration and exploitation licenses (exclusive) for hydrocarbons:

- 6 offshore licenses in North and North West Greenland (surrender is on-going)
- 5 offshore licenses in North East Greenland (see MAP 2)
  (the following companies are licensees (with number of licenses): ENI Denmark BV (2); BP Exploration Operating Company Ltd. (2); DONG E&P Grønland A/S (1); Statoil Greenland A/S (1); Chevron East Greenland Exploration A/S (2); Greenland Petroleum Exploration Co. Ltd. (2); Shell Greenland A/S (2); and Nuna Oil (5) as a carried partner.[45]
- 2 onshore licenses in East Greenland (see Map 3 below)
  (Licensees: Greenland Gas and Oil A/S & Nuna Oil A/S)[46]

Petroleum prospecting licenses (non-exclusive) for hydrocarbons:

- 8 offshore licenses (North Greenland (3); West Greenland (3); North Greenland (2)
- 2 onshore licenses (East Greenland)

Map 3



Source: Nunaoil Annual Report 2017

One of the more manifest consequences of the decline in the interest from the international petroleum industry has been a reduction in 2017 in the staff as well as in the number of board members in the national Greenland oil company NUNAOIL A/S.

When the recently elected Naalakkersuisut (government) came into office (May 2018) the administration and management of hydrocarbons was separated from the administration and management of minerals into two departments. No explicit arguments for the separation have yet been shared publicly. The newly published draft Budget for 2019 states, however, that 'Naalakkersuisut, the Greenland Government, has decided to increase focus on the hydrocarbon field (oil and gas) to make the hydrocarbon field an economic potential for Greenland. Therefore 48 million DKK is included in the budget to fund, among other things, acquisition of data' (Government of Greenland 2018: 486).

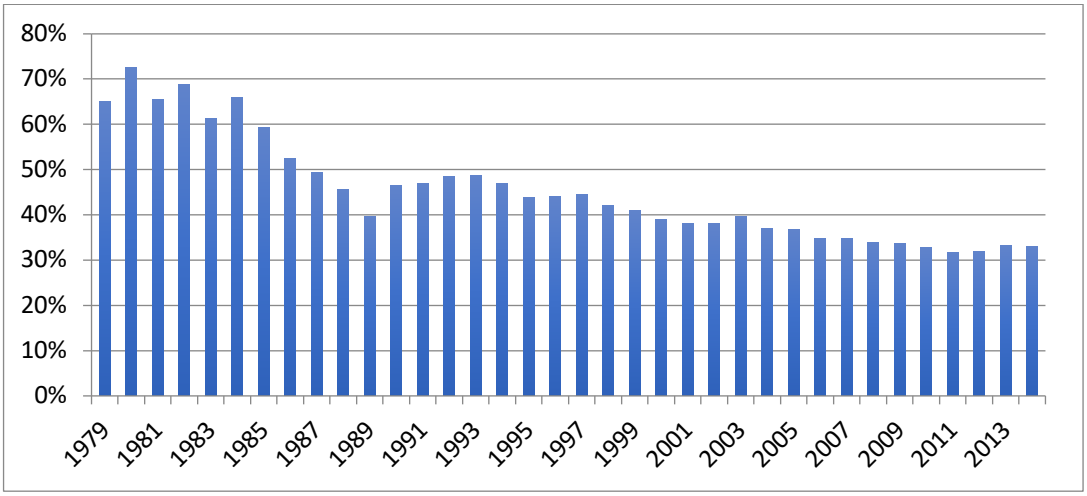
The former government planned to update and publish an Oil and Mineral strategy 2019-2023. It is expected that an oil strategy 2019-2023 is going to be developed to reinforce hydrocarbon activities.

A Digression on the Danish Block Grant & Other Danish State Expenditures in Greenland

One of the core figures in the discourse on 'how far is Greenland to be economically self-sufficient' is the Danish block grant that annually is transferred to the Government of Greenland.[47] The block grant amounted in 2017 to 3.7 billion DKK (equal to roughly 500 million EUR, July 10, 2018). Furthermore, the Danish state has expenditures in Greenland on non-transferred activities amounted to roughly 600 million DKK (equal to roughly 80 million EUR, July 10, 2018). A total of 4.3 billion DKK (equal to roughly 580 million EUR, July 10, 2018) is the annual Danish spending and thus the amount Greenland would have to earn to compensate the block grant and the transfers to become economically independent. Figure 4 shows the total Danish state

expenditure as part of Greenland's GDP and thus the development in dependency, economically. The overall trend is a decreasing dependency rate not least because of an increased Greenland value creation enhanced by the impacts of the mechanisms regulating the magnitude of the block grant.[48]

Figure 4: Total expenditures (block grant and state expenses) of the Danish state related to Greenland. Percentage of Greenlandic gross domestic product (GDP) 1979-2014.



Source: Statistics Greenland 2016.

Greenland as an International Actor in Relation to Hydrocarbons and Climate Change Negotiations – Also a Part of Nation-Building

Greenland, no doubt, was in focus of the international press in the beginning of the century's second decade, and the Arctic Council Ministerial in Nuuk, May 2011 was yet another occasion to call attention to the visions for Greenland.[49]

More frequent participation in international conferences, trade fairs/trade shows, bilateral visits with foreign heads of states etc. definitely expanded the visibility of Greenland, the nation building process taking place, and the vision of an independent Greenland. Greenland's visibility was further promoted as heads of states and international political leaders at several occasions were invited to Greenland by the Greenland and/or the Danish Government – the invitations of the latter were most often for the invitees to watch the retrieving glacier in the Ilulissat Ice Fiord that has been showcased as 'the visualisation' of global warming and climate change.

In one of the abovementioned interviews (Greenland Oil and Minerals, 2011) Premier Kuupik Kleist stated that:

Cairn's test drilling has definitely put Greenland on the map, although all the applications in the 2010 licensing round were received before drilling started. The international press has also shown interest in Greenland and we will, of course, try to exploit this. We will also seek to expand our international relationships (Greenland Oil and Minerals, 2011).

Two internationally reported and much debated occasions - one directly and another, more indirectly - related to hydrocarbon activities highlighted some of the challenges facing the self-governing Greenland when the country, being a nation-in-the-making, deals with 'hot topics' such

as explorative off-shore hydrocarbon drillings (Cairn Energy's 2010 drillings) and global warming/climate change (the Paris 2015 Climate Accord). They are summarised below.

Greenpeace's Campaign Against Cairn Energy's Explorative Offshore Drillings, 2010

During Cairn Energy's first hydrocarbon exploration drilling campaign in August 2010 Greenpeace conducted a campaign entering one of the oilrigs (four campaigners attached themselves to the oilrig). The Cairn Energy drilling campaign took place just a few months after the oil spill disaster in the Gulf of Mexico following explosions and fire that finally sank the Deepwater Horizon oilrig.[50]

According to an article in the Guardian (Carrell, August 31, 2010)[51] Greenpeace had described the drilling site as "an important battleground" and had argued, "that deep-sea Arctic drilling is extremely perilous because of the sea ice and intense weather conditions in the region." Figure 5 depicts the notion 'battleground'. Greenpeace thus believed the risks posed by this operation go "far beyond the Deepwater Horizon oil disaster in the Gulf of Mexico".[52]

Figure 5: - Oil exploration in troubled waters: Greenpeace's MV Esperanza protest ship (left) and a Royal Danish Navy patrol vessel (right) keep near the Stena Don drilling platform off Greenland's West coast.

Photo caption: Will Rose, Greenpeace (http://www.dailymail.co.uk/news/article-1305779/British-oil-company-Cairn-Energys-Arctic-fuels-hope-new-reserves.html)

Greenpeace further argued that "(i)n the Arctic an oil spill would destroy vulnerable and as yet untouched habitats, while the cold water would prevent the oil from breaking down quickly" and that "any emergency operation to tackle a disaster would encounter huge technical and logistical problems in such a remote area." Finally, the Guardian reported, "campaigners warn this will lead to a dangerous rush to exploit one of the world's last major untapped oil and gas fields in one of the planet's most fragile locations" (Carrell, August 31, 2010).

The same article also reported that:

> Kuupik Kleist, the government's socialist prime minister, denounced the campaigners' actions, claiming they were damaging the economy of the country, now largely independent from Denmark, and ignoring the strict environmental and safety regulations Greenland had imposed on oil companies. "This is clearly an illegal act, ignoring the rules of democracy" he said in a statement. Kuupik Kleist further stated, "(t)he cabinet regards Greenpeace's action as very serious and an illegal attack on the country's constitutional rights. It is worrying that Greenpeace, in their hunt for media exposure, violate security rules made to protect human lives and the environment" (Carrell, August 31, 2010).

Greenland at COP21 and the Rights of Indigenous Peoples

Another event that, internationally, brought Greenland centre stage occurred at the United Nations Conference on Climate Change, COP21[53] in Paris, November 30 – December 12, 2015. Although Greenland is a part of the Danish Kingdom, Greenland is not a party to the UN Framework Convention on Climate Change. During the conference, the Greenland delegation, headed by Greenland Minister of Finance, Mineral Resources and Foreign Affairs, Vittus Qujaukitsoq, the government of Nunavut (Canada) and the Inuit Circumpolar Council (ICC) worked to have Indigenous peoples' rights acknowledged and included in the COP21 final document.

In a joint statement from the governments of Nunavut, Greenland and from the ICC (Governments of Nunavut, Greenland and ICC December 8, 2015), they confirmed the need to take "measures … to make certain global temperature increases will remain between 1.5°C and 2°C" stating that "(e)ven slight changes in the temperature cause major disruptions in the way that northern communities live and work". Further stating that "current greenhouse gas emissions are caused by industrialized nations from activities that have taken place outside the Arctic" the two governments and the ICC urged the United Nations member states "to deliver a Paris agreement" that "(e)nsures equal access to the right to development, also for the peoples of the Arctic".

Without explicitly referring to the ILO Convention on Indigenous and Tribal Peoples[54] (ILO 169 1989) or the UN Declaration on the Rights of Indigenous Peoples[55] (UNDRIP 2007) the reference to 'equal access to the right to development' is, in a condensed form, a paraphrase of the content of two key articles in these documents:

> The rights of the peoples concerned to the natural resources pertaining to their lands shall be specially safeguarded. These rights include the right of these peoples to participate in the use, management and conservation of these resources" (ILO 169, 1989: article 151) and "Indigenous peoples have the right to determine and develop priorities and strategies for the development or use of their lands or territories and other resources (United Nations, 2007: article 23).

Apart from claiming the rights of Indigenous peoples, the joint statement from the governments of Nunavut and Greenland with the association of the Indigenous peoples of these countries (as well as of Inuit in other parts of the Arctic) argued that global warming is caused by the industrialised nations and demanded significant financial aid from these industrialised nations.[56] These positions expressed by Arctic Inuit are parallel to the positions taken by developing states in the UN climate negotiations and agreements but the demands were not included in the Paris Accord.

The Greenland economy is based partly on annual transfers (block grants) from the Danish state[57] and it goes without saying that Greenland will have to develop its economic base to be still more

economically self-sufficient. As articulated by Minister of Finance, Mineral Resources and Foreign Affairs Vittus Qujaukitsoq in an interview with the Guardian:[58] "The economic situation gives us no choice but to develop mining and oil. We would most likely [seek] a territorial reservation. It would be very costly if we were to submit to a binding agreement" (Vidal, January 28, 2016). This stance was further emphasized in the same article in the Guardian as the deputy minister Kaj Holst Andersen stated: "If we sign it will cost us hundreds of millions of dollars and we would never be independent". The interview further quoted Andersen as saying: "New emissions restrictions on Greenland would be almost impossible to honour"… "(i)f we want to make a living we cannot afford to make an agreement that will bind us [to cutting emissions]. We are not an independent state. Independence is cancelled if we sign [Paris]" (Vidal, January 28, 2016).

The two disagreements were handled by two Greenland governments with somewhat different political orientations but both governments were prepared for confrontations to emphasize the long-term goal: an economically self-reliant and politically independent nation. The point of departure in both situations was defending Greenland's rights as a self-governing country but also defending Greenlanders' rights as Indigenous peoples. And that included, according to both Greenland governments, the right to develop hydrocarbon activities.

Different 'Battlefields'

Greenpeace's action took place in Greenland waters, where the authority to exercise sovereignty still lies within the Danish Kingdom. Greenland thus had to rely on the Danish state and how the Danish authorities (in this situation: the Danish Police and Arctic Command) interpreted and decided to handle a situation that by the Greenland government was considered "a very serious and an illegal attack on the country's constitutional rights" (Premier Kuupik Kleist in: Carrell, August 31, 2010).

The disagreement about Greenland's demands to the UN climate accord took place at the COP21 in Paris and whereas the allied power of the Greenland government in the conflict with Greenpeace was the Danish police and navy, the allies in Paris were Indigenous partners reflecting the different rules in the different battlefields that Greenland has to master in the process of continued nation-building.

> The two disagreements provided food for thought in several aspects including the stakeholders, the partners, the disputes, and the responses, nationally and internationally, and how Greenland's image was affected. A more detailed analyses is beyond the scope of this article but it is worth noting that among the lessons learned was the need to develop, refine and promote an argument for how to create the preconditions to become an economically self-sufficient nation partly relying on income from non-renewable resources including oil and, at the same time, maintaining 'sustainable development' as the long term development goal.

Concluding Remarks

'Rights to the Greenland subsurface' has been a key political issue in the discussions in Greenland as well as between Greenland and Denmark on Greenland's development from a Danish colony to Self-Governance via status as a Danish county (1953) and Home Rule (1979). In this process hydrocarbon exploration has been of particular interest from a Greenland perspective because oil finds might mean a shortcut to a self-reliant national economy and thus developing the precondition for an economically independent and politically sovereign Greenland. At the same

time both hydrocarbon exploration and exploitation have raised concerns – especially offshore – because of the special challenges in Arctic waters and thus the potential environmental risks including the feared negative impacts on marine mammals and fish stocks.

A process has developed over the last fifty years that in retrospect can be viewed as a key part of Greenland nation-building: from a Danish point of departure where the Greenland subsurface beyond discussion belonged to the Danish state and where decisions about and administration of the subsurface were Danish fields of responsibilities. In continuation of this standpoint earnings potentially generated from mineral exploitation belonged to the Danish state. Gradually, and driven by a persistent political movement and a maturing Greenland administration, devolution of administrative power and influence has been transferred to Greenland until – in 2010 – the Greenlanders' rights to the subsurface was recognised and all political and administrative power was in the hands of Inatsisartut (the Parliament of Greenland) and Naalakkersuisut (the Government of Greenland).

Whereas many Indigenous peoples around the world are opposed to and fight hydrocarbon exploitation for environmental reasons and potential threats to traditional ways of living the Greenlanders (being both an indigenous peoples and the majority population in Greenland) has not only (and successfully) claimed the right to the subsurface but has also claimed the right to mineral development including hydrocarbon exploration and exploitation to pursue the long term goal, an economically and politically independent Greenland.

The official attitude of Greenland governments, so far, towards hydrocarbon activities has been in favour, while some international environmental organisations have warned against engaging in these activities because of the extraordinary difficult conditions for offshore drillings in Arctic waters. Not least because of the relatively low crude oil prices the interest from the petroleum industry has been almost absent during the latest licensing rounds and the public discourse nationally and internationally has not been prominent for the last couple of years.

A national survey on 'attitudes towards natural resource development and the marine environment' was conducted in 2013 when the general rhetoric still talked about Greenland as a country with a hydrocarbon potential. Without jumping to conclusions it seems fair to say that the public opinion expressed through the survey reveals some of the hopes, concerns, dilemmas and potential inconsistencies among the general public towards hydrocarbon activities that have also been and still are part of the political discourse in Greenland and with stakeholders outside Greenland.

The future of hydrocarbon activities in Greenland is, for several reasons – not least due to conditions that Greenland cannot influence – unsure. There is, however, no doubt that the Greenlanders' efforts over several decades to ensure that the subsurface rights were acknowledged have been important in creating a national identity. Likewise, developing the vision of a partly non-renewable resource based foundation for economic self-reliance has contributed to further the nation-building process and the – in recent years – intensified discourse about Greenland as a politically independent nation. It is fair to assume that Greenland participation in international political forums – for instance in relation to minerals including hydrocarbon activities – apart from providing insights and useful experience to the government and its administration also contributes to the general public's perception of Greenland as a nation in the making.

Acknowledgements

This article is a part of the project ARCTICCHALLENGE – Arctic Petroleum Development as a Challenge to Societies: A comparative look at Norwegian, Greenlandic and US/Alaskan Case Sites. Funding for this project came from the Research Council of Norway.

I would like to acknowledge the funding and support from the following: The Research Council of Norway, the Nordland Research Institute (partner and project owner), and Hans Kristian Olsen, former CEO of NUNAOIL A/S for valuable insights and feedback.

Notes

1. For further and more in depth studies on Arctic oil and gas development (activities and perspectives) see e.g. Nuttall & Wessendorf (2006); AMAP (2010); Lindholt and Glomsrød (2017); AMAP (2018).
2. For further and more in depth studies on Greenland oil and gas activities and perspectives see e.g. AMAP (2010); Henriksen (2008); Nuttall (2012); Henriksen (2015); Wilson (2015).
3. In 1995 the Geological Survey of Denmark (DGU) and the Geological Survey of Greenland (GGU) were merged into Geological Survey of Denmark and Greenland (GEUS).
4. Royal Decree no. 153 of April 27, 1935 that in 1965 was substituted by the so-called Legal Act of Mining 1965 (Lov om mineralske råstoffer, 1965).
5. 13 licenses were granted and five explorative drillings were conducted in the Davis Strait in the period 1975-1978.
6. Both before the introduction of Home Rule in 1979 and according to the 1979 Home Rule Act the net earnings from mineral resource extraction in Greenland would revert to the Danish state.
7. It should be noted that the negotiations in the joint Danish-Greenlandic Home Rule Commission took place just a few years after the so-called 'energy crises'.
8. Act No. 577 of 29 November 1978. The Greenland Home Rule Act. http://www.stm.dk/p12712.html retrieved 180602.
9. For a more detailed analysis of the discourse about Greenland mineral resources in the 1970s see: Nielsen & Larsen, 1985.
10. The Joint Committee was closed down in 2009.
11. The resume is based on a more thorough description in Fægteborg (2013).
12. The hunters sued the Potomac for damages as they experienced a severe decrease in the number of seals caught. Two years later the Junior Counsel to the Treasury informed the Ministry of Greenland that a lawsuit could not be raised against a naval vessel according to civil law.
13. The project was formally proposed in 1979 and was relinquished in 1983. Both Fægteborg (2013) and Heginbottom (2018) https://www.climate-policy-watcher.org/canadian-arctic/arctic-pilot-project.html (retrieved July 1, 2018) contain more in-depth descriptions of the APP and its potential implications.

14. In 1988 an agreement between the Home Rule Government and the Danish Government was fleshed out in an amended Mineral Resources Act, adopted as Act No. 844 of December 21, 1988 on Mineral Resources.
15. See (http://nunaoil.gl/en/about-nunaoil/by-laws.html)
16. See (http://nunaoil.gl/en/about-nunaoil.html)
17. An amendment to Mineral Resources Act, effective of July 1, 1998 was included in the Consolidated Act No. 368 of 18 June 1998 on Mineral Resources in Greenland.
18. It should be noted that the KANUMAS project (and its participating oil companies) has preferential rights in the licensing rounds where the project has acquired seismic data.
19. The Greenland Commission was established in 2000 and delivered its report in 2004.
20. The joint Greenland-Danish Self-government Commission was established in 2004 and delivered its final report in 2008.
21. See (http://naalakkersuisut.gl/~/media/Nanoq/Files/Attached%20Files/Engelske-tekster/Act%20on%20Greenland.pdf)
22. Furthermore, and of outmost importance to the Greenlanders, the Act on Greenland Self-Government also acknowledges that the people of Greenland is a people pursuant to international law with the right of self-determination and thus having the right to determine if and when Greenland should be independent.
23. The Mineral Resource Act replaced the Consolidation Act No. 368 of June 18, 1998.
24. The Commission Report emphasized, however, that until Greenland became independent, the sovereignty of the Greenland territory (land, sea and airspace) was still responsibility of the Danish state.
25. In 1998 the administration of mineral resources including hydrocarbon was moved to Greenland.
26. As a part of the Home Rule arrangement a Joint Committee on Mineral Resources in Greenland was established in 1979. The Joint Greenland-Danish committee operated until 2009. When the Act on Greenland Self-Government entered into force on 21 June 2009 the Government of Greenland was given the opportunity to decide taking over authority over a number of fields of responsibility, including mineral resources (The Greenland-Danish Self-government Commission's Report on Self-Government in Greenland, 2008). The 2009 Hydrocarbon Strategy summarized the content of the new legislation on minerals: "With the new Self-Government scheme all proceeds from mineral activities accrue to the Government of Greenland including revenues via Greenland and Danish authorities in the form of licenses, taxes, ownership shares etc." (Government of Greenland 2009a: 7), and further: "On 1 January 2010 the Inatsisartut act no. 7 of 7 December 2009 on mineral raw materials and related activities (Mineral Resources Act) entered into force, replacing the former Danish act on mineral resources in Greenland cf. Consolidated Act no. 368 of 18 June 1998" (Government of Greenland 2009a: 8).
27. It should, however, be mentioned that the optimism related to hydrocarbon development in Greenland was not just a Greenland local fad. This can be illustrated by the following quote from US Geological Surveys 2011 Minerals Yearbook: "Greenland has abundant mineral and natural resources. More areas for exploration are expected to open up if global warming continues, and new mineral deposits are likely to be discovered as a result. Finding new sources of hydrocarbons will continue to be very important for Greenland as possible sources of revenue and offshore exploration is expected to increase as interest in this area increases. The country's independent status and the government's encouragement are

expected to continue to accelerate the development of the mineral industry in Greenland" (U.S. Department of the Interior U.S. Geological Survey, 2013).

28. In the autumn of 2011, as an example, two conferences focussing on oil were convened in Nuuk, Greenland:
    - *Joining Forces 2011. Greenland Conference on Oil and Minerals*. Convened by the Greenland Employers' Association, September 21-22, 2011 http://www.ga.gl/LinkClick.aspx?fileticket=rOr6nZ6F9VQ%3D&tabid=36&language=da-DK &
    - *2011 Arctic Dialogue Greenland. Conference and Workshop*. Convened by Ilisimatusarfik, University of Greenland, September 24-26, 2011. https://www.uni.gl/media/1434044/1112222011arctic-dialogue-greenlandconferenceworkshop-summary.pdf
29. See http://www.ft.dk/samling/20121/almdel/gru/bilag/16/1200391.pdf
30. In: Greenland Oil and Minerals (2011). Greenland is NOT for sale. By Christian Schultz-Lorentzen.
31. On January 1, 2010, the *Inatsisartut act no. 7 on mineral resources and related activities* came into force. The Mineral resource Act replaced the Consolidation Act No. 368 of June 18, 1998.
32. Map 1 includes all 15 explorative offshore drillings since 1975.
33. By Act no. 6 of December 5, 2008 on Greenland's Mineral Resource Fund the Greenland Parliament decided to establish a Fund (the Act has been updated and amended by Inatsisartut Act no. 25 of December 2015; Inatsisartut Act no. 31 of November 28, 2016 and Inatsisartut Act no. 49 of November 23, 2017) of December 5. The Act is inspired by the Norwegian Oil Fund and the overall purpose of the Act is to secure long term Greenland societal interests through the investments and disposals of revenues from hydrocarbon and mineral activities.
34. See http://naalakkersuisut.gl/da/Naalakkersuisut/Departementer/Erhverv-og-Energi/Naalakkersuisuts-strategier
35. See e.g. world crude oil price history: http://www.macrotrends.net/1369/crude-oil-price-history-chart
36. As an example an article in the magazine 'Greenland Oil and Minerals' refers to a number of major oil companies such as Chevron in the Beaufort Sea, ConocoPhillips in the Arctic as a whole, and Statoil in Alaska (Lindquist 2015: 51).
37. The survey: Greenland 2013: Attitudes towards natural resource development and the marine environment. Results of a national public opinion research study survey was conducted by HS Analysis (Nuuk) on behalf of Pew Charitable Trusts between September 8, 2013 and October 14, 2013. A random sample (n=721) would be considered within a +/- 3.62 % statistical uncertainty. Unpublished.
38. Coalition agreement (March 26, 2013) between Siumut, Atassut and Partii Inuit. http://naalakkersuisut.gl/~/media/Nanoq/Files/Attached%20Files/Naalakkersuisut/DK/Koalitionsaftaler/Koalitionsaftale%202013-2017%20endelig%20version%20dansk.pdf
39. Apart from a recently founded party every party now represented in Inatsisartut, the Greenland parliament has at least once been part of a cabinet.
40. See history of oil price for a more detailed overview http://www.macrotrends.net/1369/crude-oil-price-history-chart

41. See http://naalakkersuisut.gl/da/Naalakkersuisut/Departementer/Erhverv-og-Energi/Naalakkersuisuts-strategier
42. See https://www.govmin.gl/images/Documents/CurrentLicencesandActivities/ListofLicences-19-06-2018.pdf
43. See http://m.sermitsiaq.ag/olieeventyr-slut-sidste-olieselskab-ude-vestgroenland
44. See https://www.govmin.gl/images/Documents/CurrentLicencesandActivities/ListofLicences-19-06-2018.pdf
45. See https://www.govmin.gl/images/Documents/Current_Licences_and_Activities/List_of_Licences_17-09-2018.pdf
46. See note 16 above.
47. The block grant was a key part of the Home Rule arrangement from 1979 stating that neither the Greenland Home Rule nor the Danish state should benefit from transfer of responsibilities from Danish to Greenland authorities. Thus, an amount equal to the operating costs of an activity should 'follow' the activity. This principle was not included in the Act of Self-Governance for transfer of future responsibilities but the accumulated block grant from 1979-2009 was frozen at an inflation adjusted 2009 level.

    In the Act of Greenland Self-Governance it is stated that income form mineral – including hydrocarbon - activities beyond 75 million DKK (roughly € 10 million) shall be shared equally between the Government of Greenland and the Danish state (reducing the block grant) until the block grant is reduced to zero. Then negotiations between the Government of Greenland and the Danish state about future economic (and political) relations shall start.
48. Whereas compensation followed every transfer of authority from the Danish state to the Greenland Home Rule Government from 1979 – 2009, the Greenland Self Government has to finance all activities transferred from Danish to Greenland authority since the Act on Self Governance came into effect in 2009. Furthermore, the, since 2009, frozen block grant is regulated by the Danish inflation rate which tends to be lower than the inflation rate in Greenland.
49. An interview on the BBC program 'Hard talk' with Premier Kleist provided an opportunity to expand the preconditions (including earnings from new industries such as oil and minerals) and visions for an independent Greenland.
50. The Deepwater Horizon blowout caused eleven dead, a number of injured and the largest marine oil spill ever, as more than four million barrels of crude oil leaked into the ocean.
51. See https://www.theguardian.com/environment/2010/aug/31/greenland-greenpeace-arctic-oil-rig
52. Greenpeace based their argument on comparing conditions in the Gulf of Mexico that would appear more favourable compared to Arctic waters (shorter distances to search and rescue assistance, warmer weather, no ice bergs, etc.) to conduct emergency operations

and handling major disasters including oil spills. Despite these better conditions it lasted almost three months (87 days) from the explosion and until the well was capped.

53. Conference of the Parties for the United Nations Framework Convention on Climate Change, COP21, December 2015.
54. ILO C169: Convention concerning Indigenous and Tribal Peoples in Independent Countries (Entry into force: 05 Sep 1991) Adoption: Geneva, 76th ILC session (27 Jun 1989) http://www.ilo.org/global/topics/indigenous-tribal/lang--en/index.htm
55. The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) was adopted by the General Assembly on Thursday, 13 September 2007. http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf
56. It should be noted that Greenland is ranked on par with OECD countries in relation to the Kyoto Protocol and the Paris Climate agreement based on the GDP per capita measure.
57. See the subsection on 'Greenland economic dependency on the annual block grant from Denmark'.
58. See http://www.theguardian.com/environment/2016/jan/28/independent-greenland-could-not-afford-to-sign-up-to-paris-climate-deal

References

AG Ekstra (1975). AG ingimiikut/AG EKSTRA. Ministeriet for Grønland: Statusrapport om olie- og mineralaktiviteter December 4, 1975.

AMAP, 2010. Assessment 2007: Oil and Gas Activities in the Arctic – Effects and Potential Effects. Volume I. Arctic Monitoring and Assessment Program (AMAP), Oslo, Norway. vii + 423 pp.

AMAP, 2018. Adaptation Actions for a Changing Arctic: Perspectives from the Baffin Bay/Davis Strait Region. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. xvi + 354pp

Bird, K.J., Charpentier, R. R., Gautier, D. L. (CARA Project Chief), Houseknecht, D. W., Klett, T. R., Pitman, J. K., Moore, T. E., Schenk, C. J., Tennyson, M. E., & Wandrey, C. J. (2008). *Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle*. U.S. Geological Survey. Fact Sheet 2008-3049. http://pubs.usgs.gov/fs/2008/3049/

Bureau of Minerals and Petroleum, Greenland (2011): *Uulex Newsletter 02*, 2011. https://www.govmin.gl/images/Documents/UulexNewsletter/2011dUulex02.pdf (retriewed 180531)

Carrell, S. (August 31, 2010). Greenland's prime minister lambasts Greenpeace for raiding Arctic oil rig. *The Guardian*. https://www.theguardian.com/environment/2010/aug/31/greenland-greenpeace-arctic-oil-rig

Chazan, G. (2012). Total warns against oil drilling in the Arctic. Financial Times, September 25, 2012. Financial Times. https://www.ft.com/content/350be724-070a-11e2-92ef-00144feabdc0

Dahl, J. (1986). *Arktisk selvstyre*. København: Akademisk forlag.

Denmark, Greenland and the Faroe Islands (2011): Kingdom of Denmark. *Strategy for the Arctic 2011– 2020*

Frandsen, N. H., Gulløv, H. C., Heinrich J., Jensen E. L., Marquardt O., Rud S., Seiding, I., Toft, P. A., & Thuesen, S. (2017). *GRØNLAND - DEN ARKTISKE KOLONI. VOL. 5 IN: OLSEN, P., BRIMMES, N. & GULLØV, H. C. (EDS.)* GADS KOLONIHISTORIE. *KØBENHAVN: GAD*. ISBN: 9788712049555.

Fægteborg, M. (2013). *Råstofaktiviteter i Grønland. En historisk introduktion til efterforskning, udnyttelse og følger i en sårbar natur og et samfund i forvandling*. Inuit Circumpolar Council (ICC) & World Wildlife Foundation (WWF).

Government of Greenland, Bureau of Minerals and Petroleum. (2009a) *Hydrocarbon strategy*. (Exploration and exploitation of hydrocarbons in Greenland - Strategy for license policy). Continuous publication of Bureau of Minerals and Petroleum No. 6. Published December 2009. Printed May 2010© ISBN 978-87-91864-15-5. https://www.govmin.gl/images/stories/about_bmp/publications/mineral_strategy_2009.pdf

Government of Greenland (2009b). *Coalition Agreement 2009-2013*: Inuit Ataqatigiit, Demokratit and Katusseqatigiit. http://www.ft.dk/samling/20121/almdel/gru/bilag/16/1200391.pdf (retrieved May 31, 2018)

Government of Greenland (2012). *Our Future – the responsibility of you and me – on the way towards 2025*. https://www.ft.dk/samling/20121/almdel/gru/bilag/16/1200391.pdf (retrieved May 31, 2018)

Government of Greenland (2013). *Coalition Agreement 2013-2017*: Siumut, Atassut, and Partii Inuit. http://naalakkersuisut.gl/~/media/Nanoq/Files/Attached%20Files/Naalakkersuisut/DK/Koalitionsaftaler/Coalition%20Agreement%202013_2017%20ENG.pdf (retrieved May 31, 2018)

Government of Greenland (2014a). *Coalition Agreement 2014-2018*: Siumut, Demokratit, and Atassut. http://naalakkersuisut.gl/~/media/Nanoq/Files/Attached%20Files/Naalakkersuisut/DK/Koalitionsaftaler/Koalitionsaftale%202014-2018%20engelsk.pdf (retrieved May 31, 2018)

Government of Greenland/Naalakkersuisut. (2014b). *Greenland Oil and Mineral Strategy 2014-2018*. Nuuk: Naalakkersuisut http://naalakkersuisut.gl/da/Naalakkersuisut/Departementer/Erhverv-og-Energi/Naalakkersuisuts-strategier

Government of Greenland (2016). *Coalition Agreement 2016-2018*: Siumut, Inuit Ataqatigiit, and Parti Naaleraq. http://naalakkersuisut.gl/~/media/Nanoq/Files/Attached%20Files/Naalakkersuisut/DK/Koalitionsaftaler/Koalitionsaftale_S_IA_PN_eng.pdf (retrieved May 31, 2018)

Government of Greenland (2018). *Koalitionsaftale 2018-2022* (Coalition Agreement 2018-2022; only in Danish): Siumut, Parti Naaleraq, Atassut, and Nunatta Qittornai. http://naalakkersuisut.gl/~/media/Nanoq/Files/Attached%20Files/Naalakkersuisut/DK/

Koalitionsaftaler/040518%20Siumut_Naleraq_Atassut_Nunatta%20qitornai_Final_da.pdf (retrieved May 31, 2018).

Government of Greenland (2018). *Forslag til finanslov for 2019*. https://naalakkersuisut.gl/~/media/Nanoq/Files/Attached%20Files/Finans/DK/Finanslov/2019/FFL2019%20-%20med%20sidetal%20og%20linket%20indholdsfortegnelse%20-%20DK.pdf (retrieved September 25, 2018).

Governments of Nunavut and Greenland & Inuit Circumpolar Council (December 8, 2015). *Joint statement on climate change*. Paris, France.

Hansen, A.M. (2016). Offshore oil exploration and impact assessment in Greenland. In: Northern Public Affairs.

Hansen, A.M. & Johnstone, R.L. (2018). Improving Public Participation in Greenland Extractive Industries In: Hossain, K. & Petrétei, A. (eds.). Current Developments in Arctic Law, 2017 (5), 29-33. University of Lapland.

Heide-Jørgensen, M.P., Guldborg Hansen, R., Fossette, S., Hjort Nielsen, N., Villum Jensen, M. & Hegelund, P. (2013a). *Monitoring Abundance and Hunting of Narwhals in Melville Bay during Seismic Surveys in 2012*, Nuuk, Greenland: Greenland Institute of Natural Resources.

Heide-Jørgensen, M.P., Guldborg Hansen, R., Westdal, K., Reeves, R. & Mosbech, A. (2013b). "Narwhals and seismic exploration: is seismic noise increasing the risk of ice entrapments?" *Biological Conservation* 158: 50-54.

Henriksen, N. (2008). *Geological History of Greenland. Four billion years of Earth evolution.* Copenhagen: De Nationale Geologiske Undersøgelser for Grønland og Danmark (GEUS).

Henriksen, N. (2015). *Grønlands geologi udforskes. Glimt af geologernes arbejde.* København: Geological Survey of Greenland and Denmark (GEUS).

Heginbottom (2018) https://www.climate-policy-watcher.org/canadian-arctic/arctic-pilot-project.html (retrieved July 1, 2018)

Holmgreen, M. & Ronnle, E. (2012). *Hydrocarbons in Greenland – Prospects for the Greenlandic Economy*. Lund: E-husets tryckeri. ISSN 1651-0100.

ILO C169: Convention concerning Indigenous and Tribal Peoples in Independent Countries (Entry into force: 05 Sep 1991) Adoption: Geneva, 76th ILC session (27 Jun 1989) http://www.ilo.org/global/topics/indigenous-tribal/lang--en/index.htm

Larsen, F. B. (1989). Scoresbysund - olieaktiviteterne og lokalsamfundet. *Tidsskriftet Grønland, 37*(6), 185-196.

Lindholt, L. & Glomsrød, S. (2017). Arctic petroleum extraction under climate policies. In: Glomsrød, S., Duhaime, G. & Aslaksen, I. (eds.). *The Economy of the North 2015*. Oslo: Statistics Norway.

Lindquist, A. (2015). The Government of Greenland BUY TIME for oil companies. *Greenland Oil & Minerals 2015(13)*, 50-51.

McGwin, K. (2015). Oil firms in Greenland: We're still here. *Greenland Oil & Minerals 2016(15)*, 20-21.

Nielsen, K. M. P. & Larsen, F. B. (1985). Grønlandsk råstofpolitik - grønlandsk indflydelse? *Politica, 17*(1), 96-113.

NUNAOIL Annual Reports 2013 http://nunaoil.gl/fileadmin/nunaoil/pdf/Annual_reports/Nunaoil_Aars2013_UK.pdf

NUNAOIL Annual Reports 2014 http://nunaoil.gl/fileadmin/nunaoil/pdf/Annual_reports/Nunaoil_Aars2014_UK_web.pdf

NUNAOIL Annual Reports 2015 http://nunaoil.gl/fileadmin/nunaoil/pdf/Annual_reports/Nunaoil_Aars2015_UK.pdf

NUNAOIL Annual Reports 2016 http://nunaoil.gl/fileadmin/nunaoil/pdf/Annual_reports/Nunaoil_Aars2016_UK_web.pdf

NUNAOIL Annual Reports 2017 http://nunaoil.gl/fileadmin/nunaoil/pdf/General_Meetings/2018/Nunaoil_Aars2017_UK.pdf

Nuttall, M. (2012) Imagining and governing the Greenlandic resource frontier. *The Polar Journal* 2(1): 113-124.

Nuttall, M. & Wessendorf, K. (eds.) (2006). Arctic Oil and Gas development. *Indigenous Affairs 2-3/06*. Copenhagen: IWGIA. https://www.iwgia.org/images/publications//IA_2-3-06.pdf

Nyvold, M. (2013). Oil hunters are setting their sights. *Greenland Oil & Minerals 2013(8)*, 40-43.

Nyvold, M. (2014). Coalition on unnecessary erratic course. *Greenland Oil & Minerals 2014(9)*, 31-32.

Olsen, A.-S.H., Hansen, A.M. (2014). Perceptions of public participation in impact assessment: A study of offshore oil exploration in Greenland. In: Impact Assessment and Project Appraisal 32 (1), 72-80. ISSN 1461-5517.

Pew Charitable Trusts. (2013). *Greenland 2013: Attitudes towards natural resource development and the marine environment. Results of a national public opinion research study survey*. Conducted by HS Analysis (Nuuk). Unpublished.

Sejersen, F. (2014). *Efterforskning og udnyttelse af råstoffer i Grønland i et historisk perspektiv*. Baggrundspapir. Udvalget for samfundsgavnlig udnyttelse af Grønlands naturressourcer. København. Greenland Perspective http://www.northernpublicaffairs.ca/index/magazine/volume-4-issue-2/offshore-oil-exploration-and-impact-assessment-in-greenland/

Schultz-Lorentzen, C. (2011). Greenland is NOT for sale. In: *Greenland Oil and Minerals*. Nuuk: Sermitsiaq (publisher). http://www.ggg.gl/docs/GREENLAND-Oil-&-Minerals-Magazine/Greenland-Oil-&-Minerals-1.pdf

Skydsbjerg, H. (1999). *Grønland - 20 år med hjemmestyre*. Nuuk: Atuagkat.

Stigset, M. (January 11, 2011). 'Greenland steps up its independence calls as oil ambitions grow'. Bloomberg News. https://www.bloomberg.com/news/articles/2011-01-11/greenland-steps-up-demands-for-independence-as-oil-revenue-spurs-ambitions

United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) was adopted by the General Assembly on Thursday, 13 September 2007. http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf

U.S. Department of the Interior. U.S. Geological Survey. (2013) Minerals Yearbook (2011) Denmark, the Faroe Islands, and Greenland. The Mineral industries of Denmark, the Faroe Islands, and Greenland.

Vidal, J. (January 28, 2016). *Independent Greenland could not afford to sign up to Paris deal agreement*. Article in the Guardian. http://www.theguardian.com/environment/2016/jan/28/independent-greenland-could-not-afford-to-sign-up-to-paris-climate-deal

Wilson, E. (2015). Energy and Minerals in Greenland: governance, corporate responsibility and social resilience. London: International Institute for Environment and Development, IIED.

Legislation and Commission Reports (chronological ordered)

Royal Decree no. 153 of April 27, 1935 on applying the principles of the Danish Subsoil Act to Greenland.

Legal Act on Mining 1965 (Lov om mineralske råstoffer).

Kommissionen om hjemmestyre i Grønland (1978). Hjemmestyre i Grønland (bel. 837/1978), bd. l and 2.

Act No. 577 of 29 November 1978. The Greenland Home Rule Act. http://www.stm.dk/p12712.html retrieved 180602.

Act No. 844 of December 21, 1988 on Mineral Resources.

Consolidated Act No. 368 of 18 June 1998 on Mineral Resources in Greenland.

The Greenland-Danish Self-government Commission's Report on Self-Government in Greenland, April 2008.

Act no. 473 of 12 June 2009. The Act on Greenland Self-Government. http://naalakkersuisut.gl/~/media/Nanoq/Files/Attached%20Files/Engelske-tekster/Act%20on%20Greenland.pdf

Inatsisartut Act no. 7 of 7 December 2009 on mineral raw materials and related activities (Mineral Resources Act).

Explanatory notes to the Mineral Resources Act 2009. http://naalakkersuisut.gl/~/media/Nanoq/Files/Attached%20Files/Engelske-tekster/Act%20on%20Greenland.pdf (retrieved

Links & Websites

2011 Arctic Dialogue Greenland. Conference and Workshop. Convened by Ilisimatusarfik, September 24-26, 2011. https://www.uni.gl/media/1434044/1112222011arctic-dialogue-greenlandconferenceworkshop-summary.pdf

Crude oil prices' history. http://www.macrotrends.net/1369/crude-oil-price-history-chart

Government of Greenland: 'strategies' including oil and minerals strategies. http://naalakkersuisut.gl/da/Naalakkersuisut/Departementer/Erhverv-og-Energi/Naalakkersuisuts-strategier

Government of Greenland, Bureau of Minerals and Petroleum: https://www.govmin.gl/en/geology/ (180327)

Joining Forces 2011. Greenland Conference on Oil and Minerals. Convened by the Greenland Employers' Association, September 21-22, 2011 http://www.ga.gl/LinkClick.aspx?fileticket=rOr6nZ6F9VQ%3D&tabid=36&language=da-DK

NUNAOIL A/S (http://nunaoil.gl/en/about-nunaoil.html)

Section VI:

Russian Arctic Development & the Environment

Stable Development of the Natural Environment in the Arctic Region of the Russian Federation

Irina Chesnokova, Emma Likhacheva & Aleksandra Morozova

In this work the attention is focused on the necessity of mitigating risks and dangers in the Arctic zone of the Russian Federation, which are associated with extreme climate conditions, the focal character of economic development, remoteness from major industrial centers, and low stability of ecological systems, which is susceptible even to minor climatic and anthropogenic impacts. In warming conditions, one of the main ecological risks is changing climatic conditions affecting permafrost rocks and the potential growth of negative anthropogenic loads associated with the mineral resources mining and infrastructure development. This article deals with modern conditions and potential risks, related to possible further climatic warming in the Arctic zone and economic development of new regions. The main attention is paid to changing geocryological and geomorphological conditions, which lead to the activation of exogenous processes in the continental part of the Arctic zone. Possible changes in the ecology-geomorphological situations of the Arctic zone regions were analyzed. Three groups of subjects with identical tendencies in climate changes were identified: I) regions in which less than 30% of the area was affected by dangerous processes; II) 30-50% of the area were affected by dangerous processes; III) over 50% of the area was affected by dangerous processes.

Introduction

The Russian overland Arctic zone extends from the western boundary in the Kola Peninsula up to the Dezhnev cape in the Chukotka Peninsula in the East of the country, and is represented by diverse natural conditions. The balanced economic development in the Arctic zone of Russia is impossible without due regard to risks of global changes in the natural environment and natural disasters, which cause considerable damage to the economy and mortality to the population (Figure 1).

This zone is characterized by extreme natural conditions: low annual average air temperatures, widespread permafrost rocks that occur at a depth of 0.3 to 2-3 meters, and low biological activity.

Irina Chesnokova is with the Water Problems Institute, Russian Academy of Sciences, Moscow (WPI RAS). Emma Likhacheva is with the Institute of Geography Russian Academy of Sciences, Moscow (IG RAS). Aleksandra Morozova is with the Moscow State University, Geography Department, Moscow (Lomonosov MSU).

Permafrost rocks usually contain underground ice of different geneses (Geocryological, 2000). Ice content in rocks depends on their composition and genesis, and ranges from several to 50% and even to 80-90%. Since rocks are waterproof and seasonal thawing layer is highly humid, flat-land areas are covered by bogs and lakes, whereas many solifluction and thermo-erosion processes are observed on slopes. In this connection, even minor changes in the air temperature and precipitation causes negative influences on the natural environment.

Economic development of new areas and technogenic transformations of the relief are accompanied by destruction in soil vegetation cover, and the arrival of warmth to the soil. Consequently, the depth of seasonal thawing increases by 2-3 times, and runoff conditions change, which often additionally moistens the soil and even leads to the appearance of water reservoirs. Changing geocryological and geomorphological conditions entail the activation of exogenous processes of relief formation. Among them: frost cracking, soil heaving, thermokarst, solifluction, erosion and thermoerosion, abrasion and thermoabrasion, and aeolian processes (Gerasimov, 1996; Relief, 2002; Sukhodrovskii, 1979).

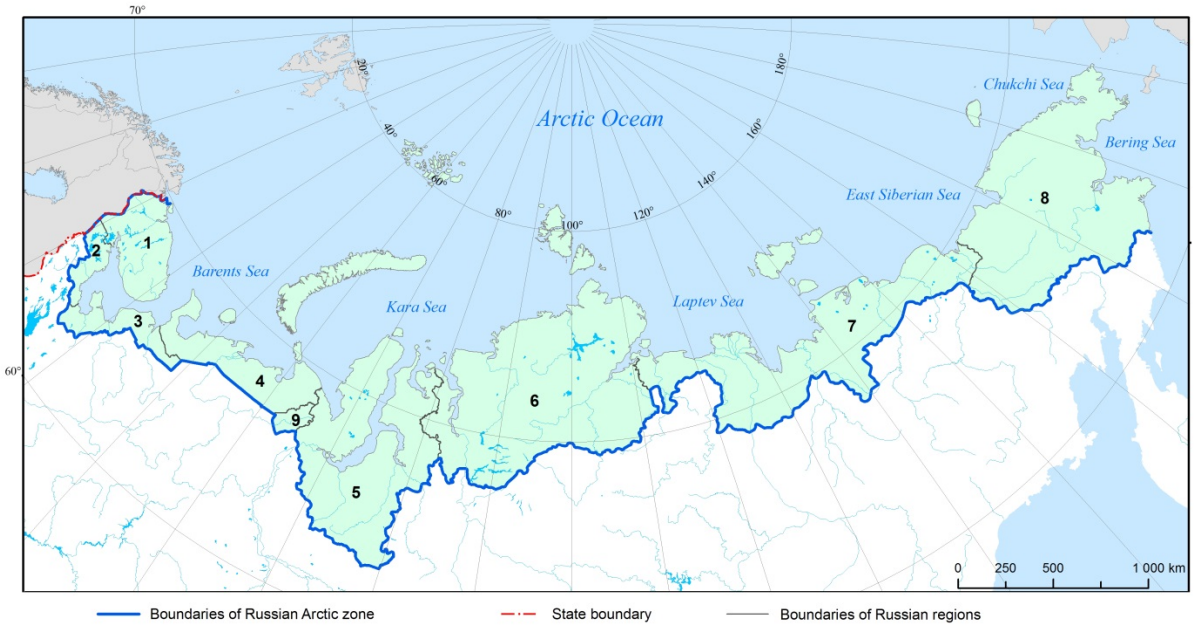


Figure 1. Arctic Zone of the Russian Federation (Morozova & Chesnokova, 2017)

1 - Murmansk region, 2 – Republic of Karelia, 3 – Arkhangelsk region, 4 – Nenets autonomous district, 5 – Yamalo-Nenets autonomous district, 6 – Krasnoyarsk krai, 7 – Sakha republic (Yakutia), 8 – Chukotka autonomous district, 9 – Komi republic (Vorkuta city)

The purpose of our research was to analyze the changes in the eco-geomorphological situation and the development of hazardous natural processes in the territory of the Arctic zone of Russia to justify sustainable development and to develop approaches to the introduction of measures aimed at reducing the possible economic and environmental damages from hazardous natural processes.

Techniques and Materials

It is considered that anthropogenically-conditioned processes in the area of widespread permafrost rocks might be irreversible. But this judgment is not always confirmed by factual data. Once active,

the processes become weaker over time, and the relief stabilizes even in the conditions of continuing anthropogenic influence. Irreversibility may be expressed in appearance of new relief forms, though their development is limited by self-regulation processes. Among anthropogenically-conditioned exogenous processes, which are rapidly evolving in developing northern territories, there are: frost cracking of soil, heaving, thermokarst, solifluction, erosion and thermoerosion, abrasion and thermoabrasion, and aeolian processes. These processes acting in different directions produce significant deformations in oil and gas pipes and related technical facilities. The existing research has shown that the greater the thickness of permafrost rocks, the more heat load they can absorb during economic development activities (Geocryological, 2000; Chigir, 1988).

The data of ROSGIDROMET (Federal Service of Russia for Hydrometeorology and Monitoring of the Environment) monitoring suggest that during the last thirty years (1986-2015) the temperature in all regions of the Arctic zone rose (Figure 2). On the whole, in all regions of the Eurasian sector, the linear growth of average annual temperature was about 2.0°C for 39 years (or 0.68°C/10 years). An acceleration of warming was observed in the West and East Siberian regions from the end of the 1990s (Review, 2016; Report, 2017).

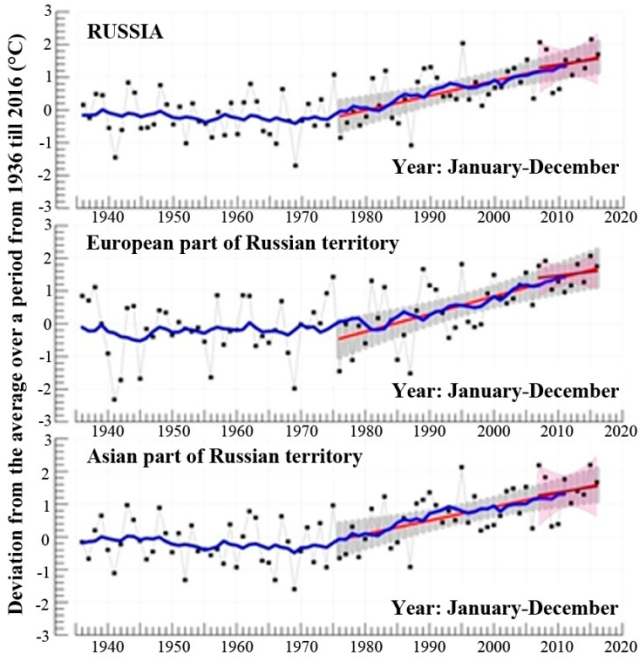


Figure 2. Average annual anomaly of the near-surface air temperature in the Russian territory, its European and Asian parts for 1936-2016. The anomalies were calculated as fluctuations from the average one for the base period of 1961-1990. Shown are also 11-year, average sliding, linear trends for 1976-2016 and 2007-2016 with 95% confidential bands.

Multi-year investigations on annual precipitation amounts for the period from 1936 to 2015 have demonstrated a statistically significant upward tendency with an average speed about 3mm/10 years. Precipitation increase is predominantly noted in the cold season. The precipitation increase is mostly demonstrated in the southern part of the northern European region (15.3mm/10 years for precipitation of the cold period and 18.0mm/10 years for annual precipitation). A minor

downward tendency in precipitation is observed in the Chukotka region throughout the year. But on the whole, this tendency does not affect the natural environment of the region (Figure 3).

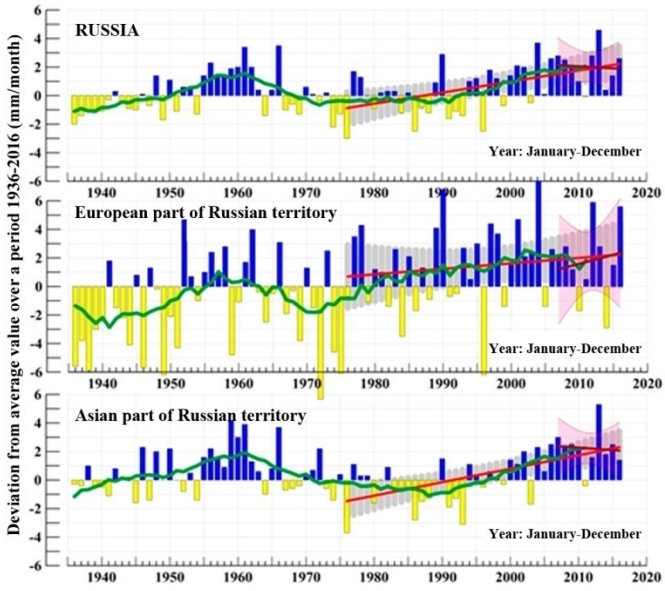


Figure 3. Annual precipitation anomaly in Russia regions for 1936-2016. Anomalies were calculated as fluctuations from the average for the base period from 1961 to 1990. 11-year sliding average, linear trends for 1976-2016 and for 2007-2016 was also shown with 95% confidence bands.

The population of the Arctic zone of the Russian Federation (RF) is over 2.5 million people. However that makes up below 2% of the population of the country. The social-economic area of the Arctic zone of the RF concentrates in urban settlements: more than 80% of the population live in cities and towns with a population of over 5,000 people. The main atmosphere pollution sources in populated localities are oil, gas, and mining enterprises, ferrous and non-ferrous metallurgy, the fuel and energy complex, chemical industry, woodworking, the pulp and paper industry, railway and sea transport. The results of the monitoring, carried out in 2015, suggest that ten cities of the Arctic zone of the RF are characterized by low pollution, two by elevated levels (Arkhangelsk and Nikel cities); and one, Norilsk, which is annually included in the list of Russian cities with the highest pollution levels, at very high (Review, 2016; Chernogaeva, 2017) (Figure 4, Table 1).

The relative content of sulfate-ions from mineralization value amounts to: from 12 to 50% in sediments of the Kola Peninsula; from 11 to 68% in sediments of North Siberia and at the average 15% and 30% in the North of the European part of Russia and in Far East North sediments relatively. Minimal content of bicarbonate-ions was observed in the sediments of Zarechensk locality (0.2 mg/l), in Padun (0.2 mg/l), Palatka (0.6 mg/l), and Deputatskii (1.6 mg/l). Bicarbonate ions prevail in the sediments of most stations of the European part of Russia, and North of Siberia, where the concentration of bicarbonate-ions in 2016 amounted to 30% from the sum of ions.

Figure 4. The content of sulfates, chlorides, nitrates, and bicarbonates in atmospheric precipitation in the Arctic zone of the Russian Federation, 2016 (Review, 2016).

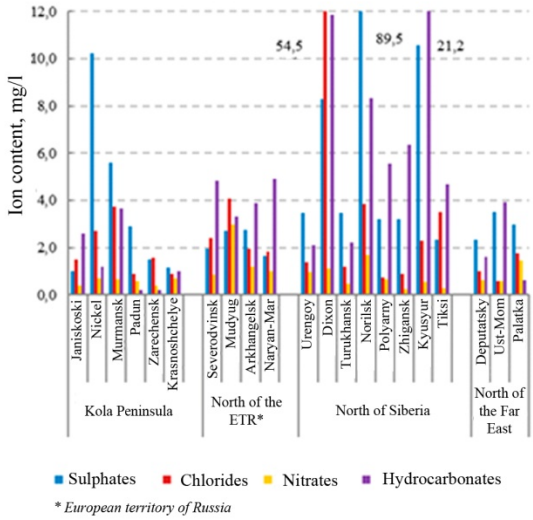


Table 1. Categories of the air quality in populated areas of the Arctic zone of the Russian Federation in 2012-2016 (Review, 2016).

Locality	Category of air quality				
	2012	2013	2014	2015	2016
Anadyr, Chukotka Autonomous region	ND	ND	ND	ND	ND
Apatity, Murmansk region.	L	L	L	L	L
Arkhangelsk, Arkhangelsk.Region	H	H	E	E	E
Vorkuta, Komi Republic	H	H	L	L	L
Zapolyarny, Murmansk region	L	L	L	L	L
Kandalaksha, Murmansk region	L	L	L	L	L
Kirovsk, Murmansk region.	ND	ND	ND	ND	ND
Kola, Murmansk region	L	L	ND	ND	ND
Monchegorsk, Murmansk region	E	E	E	L	L
Murmansk, Murmansk region.	L	L	L	L	L
Nikel, Murmansk region	E	E	E	E	E
Novodvinsk, Arkhangel'sk region.	H	H	L	L	L
Noril'sk,, MO, Krasnoyarsk krai	VH	VH	VH	VH	VH
Olenegorsk, Murmansk region	L	L	L	L	L
Pevek, Chukotka Autonomous Region	ND	ND	ND	ND	ND

Locality	Category of air quality				
	2012	2013	2014	2015	2016
Salekhard,Yamalo-NenetsA,Region	VH	VH	L	L	L
Severodvinsk, Arkhangel'sk region.	E	E	L	L	L
Tiksi, Saha Republic (Yakutia)	ND	ND	ND	ND	ND

Pollution level of the atmospheric air: L – low, E – elevated, H – high, VH – very high, ND - not defined due to insufficient observation data or insufficient amount of measured substances.

Results and Discussion

Preservation of sustainable structures of human settlements, and maintenance of the efficiency of geotechnical systems (especially in the conditions of global climate changes) is an important state objective (Baburin, 2015; Tulupov, 2009).

Based on the data obtained, possible changes in the ecological-geomorphological situations in regions of the Arctic zone of Russia were considered. Three groups of regions with analogous tendencies in climate changes were identified (Table 2):

I. Regions 6-8 (Krasnoyarsk krai, Sakha Republic (Yakutia), Chukotka Autonomous region). Here an increase in temperature of frozen soil by at least 1º leads to a decline in its bearing capacity, an increase in the depth of seasonal thawing, and their irreversible warming and subsidence. All these processes are the cause of deformation of soils and foundations, piles dipping etc. Most dangerous are the consequences of the transformation of frozen soils into thawed ones. The natural results of such dangerous phenomena include both minor and large accidents in engineering structures.

II. Regions 4, 5, 9 (Nenets autonomous region, Yamalo-Nenets autonomous region, Komi Republic (Vorkuta-city). Among the negative consequences of climate changes, most frequently mentioned are the worsening of the engineering-geological conditions in the period of sharpest change of geocryological situations. That may lead to the destruction of industrial and residential buildings, and various constructions.

III. Regions 1-3 (Murmansk region, Karelia Republic, Arkhangelsk region). These are the most developed areas of the Arctic zone, and here with existing tendencies of climate changes, the ecologic-geomorphological situation might deteriorate.

Table 2. Assessment of eco-geomorphological situations on the territory of the Arctic zone of Russia

Subject numbers of the Arctic zone of RF		Basic exodynamic processes and degree of economic damage (e.d.-economic damage) in points (on a five-point scale)	Possible changes in eco-geomorphological situations
1	Murmansk region	On large area there is a complex of natural-anthropogenic processes (planar runoff, erosion, bogging);	*In permafrost zone* less than 30% of the area are affected by dangerous processes, there is minor and medium

Subject numbers of the Arctic zone of RF		Basic exodynamic processes and degree of economic damage (e.d.-economic damage) in points (on a five-point scale)	Possible changes in eco-geomorphological situations
		activation of technogenic processes along mines and pipelines; e.d.=2-3	possibility of activation during warming up. There may be negative processes, associated with permafrost degradation, increase in bogging areas and stabilization of engineering-geological and ecological geomorphological conditions on the localities where permafrost is absent. *Outside of the permafrost zone,* climate conditions and the structure of the earth fund can be improved (favorable ecology-geomorphological situations)
2	Republic of Karelia	- " -	
		- " -	
3	Arkhangelsk region	- " -	
4	Nenets autonomous region	Complex of natural processes (bogging, gravitation), on urbanized areas, activation of exogenous processes: e.d.=2-4	30-50% of the area is affected by dangerous and potentially dangerous permafrost processes; there is the possibility of extreme situations, medium and high, (predominantly activation of thermokarst, thermoerosion, heaving on the urbanized area)
5	Yamalo-Nenets autonomous region	Complex of natural (exogenous and seismic) and anthropogenic processes in developed areas; e.d.=2-4.	Over 50% of the area is affected by dangerous and potentially dangerous permafrost processes, high possibility of their activation during warming up: considerable degradation of permafrost rocks, their subsidence over large areas.
6	Krasnoyarsk region	- " -	
7	Saha Republic (Yakutia)	Complex of natural (exogenous and seismic) processes with elevated danger: e.d. = 1-4	*In mountain* areas a high possibility of activation of ice formation, solifluction, and other dynamic processes, related both to permafrost degradation, elevated relief instability and seismicity
8	Chukotka autonomous region	- " -	
9	Komi republic (Vorkuta-city)	Technogenically activated cryogenic processes: degradation-aggradation of permafrost rocks, thermokarst sinking, cryogenic heaving of deposits	Activation of thermokarst, thermoerosion, and heaving in urbanized territories

* 1 –minor damage, 2 –negligible, 3 - medium, 4 - elevated, 5 – high

The given characteristics provide the general idea about the change of ecological-geomorphological situations (Chesnokova, 2016). The full picture is much more complicated.

It is difficult to properly evaluate the social-ecologic damage. Such damage is expressed in decreasing qualitative and quantitative indicators, first of all of human health, the state of natural systems, biota habitats, the state of the lithogenous basis of agricultural, forest, and water resources, and the state of monuments associated with nature, history, and culture. In the absence of damage cost evaluations, rank and semi quantitative estimates may be applied.

In order to assess the damage from hazardous processes, it is possible to use the approaches that were proposed by us for estimating drills on the roads of the Leningrad Region. Thus, we provide an expert evaluation of the damage-forming effects of frost heave processes (Koff & Chesnokova, 1998) in the territory of the Leningrad Region (Table 3).

Table 3. Permafrost heaving process and its consequences on the territory of the Leningrad region

Source of influence	Demonstration areas	Damage consequences
Permanent structures		
Lightly loaded shallow (rural houses, barracks, transformer substations, purifying plants)	Boxitogorsk, Tikhvin, Volkhov areas, Pikalevo-town and others	Basement skewing, bulging, inclination of the floor. The break in facing of buildings etc.
Temporary structures	Volkhov, Boxitogorsk regions	
Lightly loaded, shallow (construction cabins, canteens etc.)	Smolenka r. embankment, Rzhevka-Porokhovye village	
Bridges	Volkhov-town	Skew and sagging of supports
Power Line (6 кwatt)	Tosno-town	Skew and sagging of supports
	Vyborg-Medyanki region	
	Shugozero region	
Telecommunication lines	Villages: Dymi, Lisichki, Pul'nitsa, Plekhanovo, Volkhov and others	Skew of supports
Metro	Leningrad-city and suburbs	Deformation and sometimes crashes the capital buildings
Roads	Almost over all areas of the region	Destruction of a roadway, the formation of abysses
Landscape-park and other recreation territories	Oranienbaum (Lomonosov)	Rupture of the canvas, the formation of cracks, holes, etc.
	Petrodvorets	

Long-term forecasts for the acceleration of warming are not encouraging either. According to some estimations, by 2050 the temperature of permafrost rocks may rise by 3-6°C, so causing considerable warming up of permafrost rocks, their subsidence over large areas, and their submergence below sea level (Map, 2005; Kruzhalin, 2001). In the Sakha Republic and Chukotka, the activation of geodynamic processes is determined not so much by climate changes as by the seismicity of the territory.

In the third group of regions, ecological-geomorphological situations are most pronounced, including the Yamal Peninsula as a prospective hydrocarbon production area. Hydrocarbon resources in the Yamal peninsula at present are as follows: 44.5 trillion cubic meters of gas, 5 million tons of oil, and 2 billion tons of condensate.

The Yamal Peninsula is characterized by extreme natural conditions including low annual average air temperatures, widespread permafrost rocks, and low levels of biological activity. Precipitation is up to 300mm, increasing southwards up to 400mm; and eastwards, towards the Polar Urals, up to 450mm of precipitation, which mostly occurs in the warm season of the year (from April to October) in the form of rain. In January the average air temperature drops to -48°C in the North of the Peninsula and to -44°C in the South. The absolute temperature minimum is observed in the western coast of Yamal, in Mappe-Sale village, at -50°C. In July the average air temperature increases from North to South and ranges from +4.5°C to 6.0°C. In the northern forest-tundra, it ranges from +10°C to 13°C. Stable frosts persist from 200 days in the South to 220 days in the North. Snow cover stays from 220 to 240 days respectively.

Recent exogenous relief-forming processes are widespread in the peninsula – river and gully erosion, the complex of cryogenic processes (thermokarst, heaving, thermoerosion, thermoabrasion, solifluction, frost cracking), and aeolian processes.

The development of deposits is accompanied by large drilling activities, road construction for various purposes, engineering constructions and living settlements. A forty-year development of the territory was accompanied by active relief-forming processes and, first of all, cryogenic ones. This determined the ecological safety of various constructions. The growing degradation of natural landscapes creates serious problems for the protection of nature in this region.

Permafrost rocks of various ages and thickness react differently to anthropogenic affects. It was established that permafrost rocks of the Holocene Age are more resistant to anthropogenic influence, as there are less icy and devoid of stratified and reveined ice.

Anthropogenic influence on permafrost rocks brings about the activation of processes of heaving, thermokarst, solifluction, thermoerosion, and thermoabrasion. Heaving and thermokarst are typical of subhorizontal water-dividing areas; solifluction, thermoerosion, and thermoabrasion characterize slopes and steep coasts of rivers and water reservoirs.

Heaving is a risk of accidents in linear constructions that determine both material and ecological damage – irreparable consequences for the environment (Essays, 2009; The Map, 2005). Cryogenic heaving is the main cause of deformations in underground pipelines, which cross bogging super humid localities. The parts of the pipelines extending on the floor of non-freezing thermokarst lakes are subjected to heaving due to seasonal freezing of underwater thawed grounds. Heaving is also dangerous for roads, buildings, and communication and power lines, where cracks and

deformations may appear. Seasonal thawing leads to subsidence accompanied by still stronger deformations.

The systematization of exogenous relief-forming processes in the cryolitezone is a complex problem due to a diversity of conditions and an ambiguity of the role of certain factors in their development (Voskresenskii, 2001; Report, 2017). Many permafrost phenomena appear under the influence of some processes; as a rule, two processes (Table 4).

Table 4. Potential damage-producing activity of permafrost and erosion processes

Processes	Activity in points*
Thermoerosion (complex impact)	1
River erosion	2
Frost cracking	3
Sliding (drifting)	3
Planar runoff	3
Solifluction	3
Thermokarst	3
Erosion by temporary water courses	4
Deflation	4
Gully erosion	5

*maximum 5 points

The Yamal Peninsula is already involved in urbanization process. However it should be remembered that Yamal is unique as a natural object and as a specific social ecosystem. It has no analogues either in Russia, or in the World. Therefore we should not apply to it the methods of economic development, even successfully used in other regions. Its uniqueness and all possible negative consequences should be remembered.

Conclusions

Regarding regions of the Arctic zone as territorial resources, it is necessary during their development to carry out complex geocryological, geomorphological and ecological investigations based on:

- Monitoring of the temperature regime in strata of permafrost rocks in different zonal-regional conditions;
- Prognosis of the dynamics of permafrost rocks and geocryological processes under different scenarios of global and regional climate changes;
- The assessment of changes in complicated engineering-geological conditions and the cost of investigations associated with consequences of the global climate changes;
- Assessment of changes in the stability of foundations of existing and projected constructions, conditions of mineral deposits mining; and

- Quantitative assessment of possible economic damage in case of the realization of different scenarios of global climate changes (Geocryological, 2000; Report, 2017).

In conclusion we should mention that regions of the Arctic zone more than other regions of the Russian Federation need protection and insurance (in preparation of protection measures) of the population from negative impacts of natural and natural- anthropogenic processes.

Acknowledgments

A great gratitude to Professor Vladimir Kovalev (Lomonosov Moscow State University). The work was fulfilled with partial financial support of the Russian Foundation for Basic Research (project N16-05-00200) and of the Programme of Fundamental Research of the Presidium RAS N 53 "Spacial Restructurization of Russia with regard of geopolitical, social-economic and geoecological calls."

References

Baburin V.L., Zemtsov S.P. Evolution of the system of urban settlements and dynamics of natural and social-economic processes in the Russian Arctic region./ Regional investigations. 2015. V.50.N4. P 76-83.

Chernogaeva G.M. The Arctic zone of the Russian Federation. Kostroma. ZAO "Line schedule Kostroma" 2017. P. 175-198.

Chesnokova I.V., Lokshin G.P. Technogenic-physical fields – properties of anthropogenic-geomorphological systems/ Ed. Inchief Dr. E.A. Likhacheva. M.: Media-PRESS, 2016. 192 p.

Chigir V.G., Grigor'eva N.N., Panfilova V.K., Grabetskaya N.A. Principles of the quantitative stability of the active layer// North stability investigations. M.: MGU publishing house, 1988. pp. 65-92.

Essays on urbosphere geomorphology/ Ed. in chief Dr. E.A. Likhacheva, Dr. D.A.Timofeev. M.: Media-PRESS. 2009. pp. 244-278.

Geocryological hazards. Thematicvolume, ed. L. S. Garagulya, E.D. Ershova. "KRUK" Publishing Company. 2000. 316 p.

Gerasimov I.P. Constructive geography (collected works) M: Nauka, 1996. 144 p.

Koff G.L., Chesnokova I.V. Information support of insurance from dangerous natural processes. M.: POLTEKS, 1998. 168 p.

Kruzhalin V.I. Ecological geomorphology of land. M: Nauchnyi Mir, 2001, 176 p.

Map of Regions in the Russian territory by degree of extremity development of ecology-geomorphological situations (the authors Kozlova A.E., Lokshin G.P., Chesnokova I.V. M: Institute of Geography RAS, 2005.

Relief of human life environment (ecological geomorphology). Ed. In chief E.A. Likhacheva, D.A. Timofeev, M: Media-PRESS, 2002, 640 p.

Report on climate specific features on the territory of the Russian Federation in 2016. – M., 2017. 70 p.

Review of the state and pollution of environment in the Russian Federation for 2015/Ed. In chief prof. G.M. Chernogaeva. M: Rosgidromet, 2016, 223 p.

Sukhodrovskii V.L. Exogenic relief formation in the cryptolithozone. M: Nauka, 1979. 280 p.

The Map of recent dynamics in North Eurasian relief (within Russia and adjacent countries), Chief ed. Acad. V.M.Kotlyakov. Moscow, 2003. Scale 1:5,000,000.

Tulupov A.S. Damage theory: general approaches and problems of methodological support provision. M.: Nauka, 2009. 284 p.

Voskresenskii K.S. Recent relief-forming processes on plains of the Russian orth. MGU: Moscow 2001, 262 p.

Sustainable Development of the Russian Arctic Zone: Challenges & Opportunities

Daryana Maximova

This paper attempts to consider a fundamental problem of ensuring sustainable development of the Arctic zone of the Russian Federation in the context of expanding economic activity. In August 2017, the new edition of the Russian state program on the Arctic's socio-economic development was released. At present, this is the main document regarding the development of the Arctic territories of Russia. The main idea of this document and the future law "On the Arctic Zone of the Russian Federation" is to create support zones, which will be complex projects of social and economic development of the Arctic territories where the Northern Sea Route will become the main navigable artery and the central project. According to the state program, one of the main tasks of the support zones is the use of best practices for creating favorable living conditions for the residents. This paper will examine the Russian Arctic's challenges and opportunities regarding sustainable development, including an analysis of the recent Russian plans in relation to the territorial development.

Introduction

The 1992 Summit in Rio de Janeiro, following the Brundtland Commission, recognized the so-called sustainable development "that meets the needs of the present, without compromising the ability of future generations to meet their own needs" (WCED, 1987). Since then, the concept of sustainable development has acquired global significance. It is a fundamental problem of our time. This concept is indeed applicable to such an essential region as the Arctic. Since its foundation in 1996, the Arctic Council has aimed to integrate sustainable development to the main areas of its activities. The forum unites the efforts of the eight member states to solve the challenges of the Arctic region to improve the economic, social and environmental well-being of the ecosystems and peoples living in the area. Therefore, the sustainable development of the Arctic is a global objective and requires the establishment of international cooperation.

Finland's Chairmanship platform in the Arctic Council states that "the human dimension of the Arctic Council's work covers such areas as health, water, energy, infrastructure, and Indigenous cultures and languages, and thus contributes to the implementation of the Sustainable

Daryana Maximova is an Assistant Professor, Department of International Studies, Institute of Foreign Languages and Regional Studies, North-Eastern Federal University, Yakutsk, Russia; and Researcher, Department of Canada, Institute for US and Canadian Studies, Russian Academy of Sciences, Moscow, Russia.

Development Goals (SDGs) of the United Nations 2030 Agenda. Finland proposes to explore how the SDGs can be further used in strengthening the economic and social progress and cultural self-expression of Arctic communities" (High North News, 2017). Meanwhile, the current global warming has economic consequences which could be beneficial for the Arctic states. A recent launch of industrial development in the Arctic shows the growing interest toward transport and energy opportunities in the region. Economic indicators are increasing, however the growth of industry could lead to a high degree of negative impacts on the environment and residents.

The concept of the Russian Federation's transition to sustainable development was released in 1996. Since the 2000s, there has not been a single document approved by Russia in the title of which there was a reference to "sustainable development." It is especially interesting because Russia has declared a new stage of Arctic development. The new edition of the state program of 2014 "Socio-economic development of the Arctic zone of the Russian Federation for the period until 2025"[1] (State Program) was published in August 2017. The updated State Program outlines the country's major plans for the Arctic territories, and sets out complex projects for the social and economic development of the region.

Economic Development of the Russian Arctic

The Arctic has always been a reserve of natural resources for Russia. Since the 1930s, during the Second World War and then the Cold War, in connection with the international situation, the country's economy began to need natural resources badly. So in the 1920's and 1930's in the USSR, a program of government events was organized to study and develop the so-called Far North. The Soviet Union was eager to discover the resources of the rich Arctic quickly. There were issued orders for the construction of mines, power plants and factories near the Arctic deposits. Soviet development of the Arctic was intensive, large-scaled and based on free labor. In 1931, the first oil field in the Russian Arctic, Chibyiskoye, was discovered in the Komi Republic. In 1932, the Main Directorate of the Northern Sea Route (Glavsevmorput) was created by the Council of People's Commissars of the USSR. The new directorate was entrusted with the economic development of the Arctic and navigation on the Northern Sea Route (NSR), as well as the organization of geological work, and exploration of minerals in the Arctic. The first head of the Glavsevmorput, Otto Schmidt, was appointed a polar explorer, who in the same year made passage on the NSR on the icebreaker "Sibiryakov" for the first time in one navigation, of 65 days. In 1937 the first flight over the North Pole was made, and the first drifting scientific station "North Pole" was settled. In total, 31 drifting stations were organized in the USSR, and they functioned until 1991. The program relaunched in 2003. In the 1930s Arctic seaports (Igarka (1931), Tiksi (1933), Dixon (1934), Dudinka (1935)), cities and new settlements were constructed. The USSR used prisoners of the Gulag as free labor. Thus, the prisoners built such Arctic cities as Dudinka, Vorkuta, Inta, Pechora as well as such industrial enterprises as the Norilsk Mining and Metallurgical Combine in 1935 and the Kapitalnaya mine in Vorkuta in 1937 and so on. In the second half of the 20th century, the most abundant hydrocarbon deposits were found. In the 1960's and 1970's they were discovered on the coastal territory—Urengoy (1966), Yamburg (1969), Bovanenkovo (1971), etc., in the 1980s hydrocarbons were found on the Arctic shelf—Shtokmanovskoe (1988), Prirazlomnoye (1989), etc. As a result, during the period from the 1920s to the 1980s, the Soviet Arctic has become a circumpolar region with the most significant number of cities in the world.

Today, the Arctic region is one of the priority directions of Russia's internal policy, including social and economic development as well as international cooperation. However, the legal status of the Russian Arctic zone and its borders are not yet defined precisely. The framework law on the Arctic zone in the USSR and then in the Russian Federation was not released despite attempts to accept it. Today legal relations in the Russian Arctic are regulated by more than 500 documents (Ministry for the Development of the Russian Far East, 2017, October 10). A draft law "On the Arctic Zone of the Russian Federation" has been in progress for five years, and its consideration is continuously postponed. However, it may be submitted to the government in 2018.

Today, Russia's Arctic strategy is determined by three documents: Fundamentals of the State Policy of the Russian Federation in the Arctic for the period up to 2020 and beyond (2008); The Strategy of the Arctic zone of the Russian Federation development and national security system for the period till 2020 (2013); The new edition of 2017 of the state program of "Socio-economic Development of the Arctic Zone of the Russian Federation for the period till 2025" (2014).

In Russia, the concept of "sustainable development" is interpreted differently. There is no comprehensive understanding of all aspects of sustainable development. For example, in the State Program on the Arctic, the word "sustainable" is used 16 times on 140 pages of text. Five times the phrase "sustainable development" is used in different contexts: "sustainable development of the nuclear weapons complex," "sustainable development of indigenous peoples," "sustainable development of related industries," "sustainable development goals and human well-being," "sustainable development of regional ecosystems." Thus, the State Program on the Arctic does not define what is meant by the term "sustainable development." The authors of the State Program either did not set the task of articulating the principles of "sustainable development" or there is no clear understanding of what "sustainable development" is. At the same time, the authors consider this term to be applicable in completely different contexts. However, in the Russian terminology the closest term to "sustainable development" is usually the term "socio-economic development."

The main idea of the State Program is a creation of so-called support zones – comprehensive social and economic development projects aimed at achieving strategic interests and ensuring national security. There are eight support zones identified based on the existing administrative-territorial division of the Russian Arctic zone (Government of the Russian Federation, 2017, August 31). It is interesting that Russian regions work out these support zones, not federal authorities. Articles of the State Program about the support zones will be included in the future law "On the Arctic zone of the Russian Federation." As of now the State Program can be considered as the primary document reflecting Russian plans in the Arctic zone.

Here are the different zones and possible economic development as planned by the State Program:

Kola support zone: the mining industry (more than 60 large deposits of various types of mineral raw materials, including apatite, nepheline, kyanite ore, nickel, copper), fishing, tourism, the central logistics hub to supply the entire western part of the Russian Arctic (ports Murmansk, Kandalaksha, Vitino, railway), the Northern Fleet;

Arkhangelsk support zone: timber industry, shipbuilding, fishing, diamond mining complex, natural resources (lead, zinc, silver), railway, it is planned to create a port complex in Bezymyannaya Bay;

Nenets support zone: hydrocarbon production (Timan-Pechora oil and gas province), construction of the Northern Latitudinal Railway, the Naryan-Mar-Usinsk road, railway transport corridors (Belkomur, Barentskomur, Sosnogorsk-Indiga), development of ports in Amderma and Indiga, reconstruction of Naryan-Mar airport;

Vorkuta support zone (Komi Republic): coal mining industry, construction of the Vorkuta-Ust-Kara railway, the Pechora-Vorkuta road which will connect the Komi Republic with the Nenets Autonomous District, construction of the Northern Latitudinal Railway, tourism;

Yamal-Nenetsky support zone: formation of the oil and gas chemical cluster will provide more than one third of the country's gas production (the Yamal Peninsula and Gydan, the shelf areas of the Kara Sea, the Ob and Taz Bay), construction of the Obskaya-Bovanenkovo railway, the Yamal-Ukhta-Europe gas main, a plant for the production of liquefied gas at the South-Tambeyskoye gas field;

Taymyr-Turukhanskaya support zone (Krasnoyarsk region): Norilsk industrial region (nickel, copper, platinum, cobalt), Dudinka Port, in 10–20 years will be coal and hydrocarbons, a coal terminal in the port of Dixon, road construction, modernization of the port Dixon, construction of the Tanalau offshore oil terminal;

Chukotka support zone: mining industry (gold, tin, tungsten, coal, copper, mercury, hydrocarbons), construction of the federal road Kolyma-Anadyr which will provide year-round communication with other regions of the Russian Far East;

North-Yakutian support zone: It must be emphasized that the North-Yakutian support zone is chosen as a pilot project according to the State Program. So far, there is no information on the launch of the project, possibly due to the lack of a law "On the Arctic Zone of the Russian Federation." The first project of the North-Yakutian support zone is the reconstruction of the seaport infrastructure of the NSR in the village of Tiksi, which will ensure the safe entry into the port of sea-going ships with a draft of up to 10 meters (now only 5 meters), to bring the volume of cargo processing to 300,000 tons per year (Ministry for the Development of the Russian Far East, 2017, December 7). Yakutia can be a "bridge" between Asia and the Arctic. One of the main tasks will be the development of the eastern sector of the NSR, including within the framework of the China-Yakutsk-Tiksi-Europe Transport Corridor Project. It will cut the way from Asia to Europe, reducing the risk of falling into a complicated ice situation, which often exists at the exit from the Bering Strait to the Arctic Ocean. Logistics, according to this transport corridor, are as follows: the goods are delivered by rail from Harbin to Yakutsk, then they stow a cargo to river vessels and go to the port of Tiksi, then they stow the cargo to sea vessels and deliver them to European ports. The second project is a construction of a high-tech Zhataisk Shipyard, which is estimated at 5.75 billion rubles, while 4.1 billion rubles will come from the federal budget as part of the State Program. There will be the modernization of the fleet and construction of ships in Yakutia which will provide cargo transportation by inland waterways. It will create about 1,300 new jobs (ibid.). Also, the following projects are planned: infrastructure development projects – reconstruction of airports, construction of roads, modernization of diesel power stations; projects of industrial development of the deposits of gold, diamonds, tin, coal, antimony, tungsten, indium, etc. It is said about investment projects for the development of the Upper-Munsky ore field, the placer deposit of the river Tirekhtyakh, about the geological study and development of the Western Anabar section, the Tomtor deposit of rare earth metals. Besides, in Yakutia, there are 80% of the

world stock of mammoth tusks and the Popigaysky deposit of impact diamonds. The North-Yakutian support zone's strategy is not completed yet. It will still change. At least, the Yakutian government is planning such.

Thus, industrial development is the cornerstone of Russia's Arctic strategy. The primary task of creating the support zones is the exploitation of mineral resources. According to the State Program, "almost two thirds of all projects are directly related to the development of the mineral resource base" (Government of the Russian Federation, 2017, August 31). Mineral raw centers with their infrastructure will be developed within the support zones. The most significant projects are the seaport of Sabetta on the Kara Sea in the Yamal-Nenets Autonomous District, which already began operating in December 2017, and is expected to become the most significant logistics hub of the NSR. One of the essential parts of this hub must be the Northern Latitudinal Railway (707 km), which will connect for the first time the Trans-Siberian Railway with the Northern Sea Route. It should be noted that this is a project of Soviet designers of Stalin's time. The completion of the railway construction launched in May 2018 is planned by 2022. The project also has a social significance: about 300,000 new jobs can be created in the Arctic and the Urals. Another important project in Sabetta is the Yamal liquefied natural gas (Yamal-LNG) plant which opened in December 2017.

The Northern Sea Route will become the most significant project. It should unite all the subjects of the Russian Federation that participate in the development of the Arctic because "the formation and functioning of the support zones are planned to be carried out in close connection with the Northern Sea Route" (ibid). By 2021, Russia plans to build three new nuclear icebreakers of Project 22220. The main icebreaker "Arctic" will float out in 2019, "Siberia" in 2020, and "Ural" in 2021. Russia does not limit the passage of foreign ships on the NSR, but starting in 2017 the right to transport hydrocarbons remains exclusively for Russian vessels (Government of the Russian Federation, 2017, December 26). As Vladimir Putin said in the message from the President to the Federal Assembly of the Russian Federation, by 2025 the cargo traffic on the Northern Sea Route should grow by ten times – up to 80 million tons per year (Ministry for the Development of the Russian Far East, 2018, March 1). In March 2017, the government was instructed to work out the issues of creating a separate institution who will be responsible for the integrated development of the Northern Sea Route and Arctic territories, including the development of infrastructure and all the services required. At the moment, there is no special ministry responsible for the Development of the North and the Arctic in Russia. The leadership over Arctic issues at different times has been exercised by the Ministry of Economic Development and the Ministry of Natural Resources and Environment. However, the creation of a new ministry would require much effort and money, therefore it is uncertain when this will happen. Last year, it was announced that a decision has been made to entrust the Arctic to the Rosatom Corporation, whose structure includes Atomflot with its icebreakers. Rosatom might soon gain control over the development of the NSR and the coastal areas of the Arctic. Moreover, a separate section of the State Program on the Arctic prescribes plans for the development of the Russian Far East, which includes two Arctic regions – Yakutia and Chukotka. This combination is not accidental. After the presidential elections in 2018, Yuri Trutnev was appointed as Deputy Prime Minister of Russia responsible for both regions development—the Russian Far East and the Arctic. He was previously responsible for the development only of the Far East. In September 2018, Trutnev also headed the State

Commission for Arctic Development. In connection with his appointment, we can assume that not only the Far East but also the Arctic will become a megaproject of Russia.

The State Program emphasized that public-private partnership must be a relevant tool for implementing the social and economic development of the Russian Arctic zone. The mechanism of public-private partnership was used in such megaprojects as the APEC meeting 2012 in Vladivostok, the Olympic Games 2014 in Sochi, and the FIFA World Cup Russia 2018; now the same development tool is being introduced for the development of the Russian Far East with the Arctic. The Far East is a priority, and the Arctic has an applied significance. The Ministry of Economy of the Russian Federation does not single out the Arctic in a separate macro-region in the draft of the Strategy of Spatial Development of the Russian Federation for the period until 2025. In this strategy, the Arctic zone of the Russian Federation is distributed among four macroregions - the North, North-West, West-Siberia and Far East. However, in the development of the Far East, the situation is unusual, because Russia is oriented towards foreign investors, primarily Asian ones. Russia's "Turn to the East"[2] (from 2013) as well as Western sanctions[3] (since 2014) predetermined the development of Russia's international cooperation with the countries of Northeast Asia – China, Japan and South Korea. In turn, the interest of Asian countries in the NSR is enormous. Their main attention is paid to the development of the transit possibilities of the Arctic. In this case, the Far East can become an outpost of Russia's Arctic strategy in relations with Northeast Asia. To develop the Far East, Russia should take in consideration the wishes of these countries. Western sanctions on Russia have become an obstacle to possible investment projects, including the Arctic. At the same time, a possibility of cooperation with Russia remains, in the case of interest from the Western partners. Strong examples of this can be the participation of the French Total in the Yamal-LNG project or gold mining in Chukotka by the Canadian company Kinross Gold. Russia is open to collaborating with any potential partner, but the problem lies in excessive bureaucracy and the lack of a unified mechanism. The idea for a "one-window" mechanism is proposed to solve these issues.

Environmental Damage

Of course, there is a constant alarm about the environment in connection with the socio-economic development of the Arctic. The State Program occasionally mentions environmental problems. The list of tasks of the State Program declares that it is necessary to strengthen the coordination of activities of state authorities to "preserve and protect the Arctic environment, eliminate the environmental consequences of economic activity; improve environmental monitoring of the Arctic zone of the Russian Federation" (Government of the Russian Federation, 2014: 34). The basic principles and mechanisms for the implementation of the State Program are based on "maximum environmental conservation (application of the environmental standards and technologies)" (ibid: 35). In 2021-2023 in the list of main activities of the State Program, the construction of an environmental fleet is planned to ensure federal-state environmental supervision in the seas and on the continental shelf in the Arctic zone of the Russian Federation (ibid: 104). However, in the State Program, there are no precise methods for combating environmental risks. At the same time, references to the other state program of "Environmental Protection for 2012–2020" were made. This document includes two subprograms convenient to the Arctic zone: "Hydrometeorology and Environmental monitoring" and the project "Clean Country," which provides measures to eliminate the accumulated environmental damage. Russia

has recognized an accumulated environmental damage (industrial waste, nuclear waste, etc.) as a main environmental problem of the Arctic.

In the twentieth century, priorities of the Soviet policy on the Arctic were industrialization and development of the military-industrial complex. Consequences of the industrialization and the active use of the NSR have become detrimental to the environment. In the 1990s after the collapse of the USSR, the Arctic was hit by an economic crisis: the polar explorers began to leave the Arctic, leaving the infrastructure and waste behind (buildings, cars, unused fuel, spare parts, and building materials). Substantial multi-kilometer dumps originated around scientific stations, military units, settlements, ports. According to some estimates, in the coastal zone of the Arctic Ocean, there are up to 4 million tons of industrial and construction debris, as well as from 4 to 12 million steel barrels (Sokolov, 2013: 18). Also, the nuclear tests conducted at that time on the Novaya Zemlya Archipelago, and flooded nuclear submarines have had a negative impact on the ecology.

The problem of assessing and eliminating the accumulated environmental damage is present in the Arctic Strategy of Russia. Since 2010, as a result of the ex-Prime Minister's indication, a cleaning of the Russian Arctic territories was launched. That year Vladimir Putin became aware of a massive amount of debris from rusted steel barrels with fuel during his visit to Franz Josef Land Archipelago, and he said that it was necessary to organize a "general cleaning" in the Arctic (Rossiyskaya Gazeta, 2010). The Ministry of Natural Resources and Environment of Russia together with the Council for the Study of Productive Forces has developed a draft program for eliminating sources of negative impacts on the contaminated areas of the islands for 2012–2020. According to the survey prepared by the Council for the Study of Productive Forces in 2011–2012, the total clean-up of Franz Josef Land alone will require about 8.5 billion rubles. Practical work on garbage disposal began in 2012 and went on in the summertime each year on the polar islands of the Barents Sea and the Arctic territories.

The Franz Josef Land is a pilot region of the "general cleaning" in the Russian Arctic – 44% of the accumulated damage has already been cleaned up (Lenta.ru, 2017). The Russian Geographical Society joined the cleaning of the Arctic in 2010. They have launched the "Arctic clean-up program" on the islands of the Franz Josef Land, Spitsbergen, Wrangel, and the Novosibirsk Islands. There is a national project "Clean Country," which is reflected in the State Program on the Arctic. According to this project, the accumulated environmental damage will be eliminated in the Franz Josef Land Archipelago, oil pollution in the Kuznetsov water protection zone (Arkhangelsk region), and the tailing dumps of the Kular gold-extracting factory of the Ust-Yansky municipal district in Yakutia. In 2014, the military joined in cleaning up the Arctic. They exported collected garbage from the islands using the Northern and Pacific fleets, as well as other vessels that usually carry out deliveries of goods to the northern territories. Also, in Russia, there is a general federal target program in 2014–2025 "Elimination of accumulated environmental damage"; of 218.7 billion rubles in funding, 22 billion rubles are allocated to the Arctic (Government of the Russian Federation, 2014).

However, this is not enough. It is impossible to cope with this large-scale task without the help of the international community. Russia is attracting volunteers and military personnel for cleaning up the Arctic because of a lack of funds for hiring workers. In addition to the financing problem, there are two more challenges related to the methods of cleaning. Many issues on the elimination of garbage are not legally regulated. In particular, the procedure for determining environmental

damage has not been established. Moreover, the vulnerable Arctic ecosystem is disturbed during the collecting of debris. Therefore, there is a need to act more gently in particularly sensitive places.

Russia most fully addresses issues of environmental protection in the Arctic in its strategic documents (Fundamentals of the State Policy of the Russian Federation in the Arctic for the period up to 2020 and Beyond; The Strategy of the Arctic zone of the Russian Federation development and national security system for the period till 2020). Unfortunately, the Russian environmental legislation does not explicitly mention the Arctic zone. On one hand, mechanisms stipulated by the environmental legislation – federal laws "On Environmental Protection" (2002), "On Ecological Expertise" (1995), "On Specially Protected Natural Territories" (1995) – are potentially applicable to the protection of Arctic ecosystems. On the other hand, none of these documents takes into account the specifics of the natural and climatic conditions of the area and do not establish specific environmental requirements for economic activities in the Arctic zone. The same is in the federal laws "On the Continental Shelf of the Russian Federation" (1995) and "On Subsoil" (1992), where there is not a single norm devoted explicitly to the Arctic zone.

Gaps in the legal regulation on the protection of the Arctic environment in Russian legislation are one of the main topics of discussion. There are two points of view. Some believe that fundamental federal law is needed, the subject of legal regulation of which would be the protection of the environment of the Arctic zone of the Russian Federation (Gladun, 2015: 135). Others believe that the environmental protection mechanisms of the Arctic zone of the Russian Federation do not require the adoption of a particular law, it is mostly necessary to amend the already existing legislation to ensure their implementation (TASS, 2018).

One additional challenge is the lack of eco-friendly technologies or green technologies that are needed in the Arctic. The article 12 (6) in the Executive Order on the Russian Federation Economic Security Strategy until 2030 was released in 2017, and was almost unnoticed. This article states that the development of "green technologies" is one of the main challenges and poses threats to the economic security of the country (Government of the Russian Federation, 2017, May 13). So, Russia is not yet ready to use green technologies in the development of the territories. However, it contradicts Russia's new guidelines, which were defined in the "May decrees" of Vladimir Putin in 2018. On May 7, 2018, a second "May decree" was published, defining a work plan for Putin's fourth presidential term. The full title of the document is "On national goals and strategic development objectives of the Russian Federation for the period until 2024". "May decrees" is the name of a series of decrees signed by Vladimir Putin. The first "May Decrees" were signed on May 7, 2012, on the day when the President of the Russian Federation assumed office, and contained 218 instructions in 11 decrees to the Government of the Russian Federation for implementation during 2012-2020. "May decrees" mostly repeat the theses of Putin's election promises. And ecology is identified as one of the national projects in "May decrees" for a six-year period until 2024. Among the goals of this project are: efficient handling and disposal of waste, reducing the level of atmospheric air pollution in industrial centers, improving the quality of drinking water for residents, and conservation of biological diversity. It is also planned to create 24 protected areas with an area of 5 million hectares (Government of the Russian Federation, 2018, May 7). But it will be in the future. To this day the Code of Administrative Offenses of the Russian Federation and the Criminal Code of the Russian Federation do not include special rules on liability for environmental pollution by economic and other activities in the Arctic zone despite

the fact that the Russian Arctic Strategy stresses the need to increase the responsibility of enterprises that use natural resources in the Arctic.

Residents of the Russian Arctic

In connection with the plans for the development of the Arctic region, there is a need for specialized personnel to implement large-scale investment projects in the Russian Far North. Today, one of the most pressing challenges is the outflow of the Arctic population. The share of Russia's population living in the Arctic zone is small - 1.6% (Fauzer, Lytkina & Smirnov, 2017: 22). The structure of the population of Russian Arctic territories includes groups of Indigenous small-numbered peoples of the North, medium-sized peoples such as the Yakut and Komi, settlers of the period of Soviet industrial development (20–80s of the 20th century), the descendants of the discoverers, and old Russian settlers. Also, rotation workers, scientists on expeditions and military personnel live there on a temporary basis. The population of the Russian Arctic is continually decreasing. In 1989 there were 3.3 million people; in 2016 - 2.3 million people (ibid). Cities with a population of more than 100 thousand inhabitants in different years include: Arkhangelsk, Murmansk, Severodvinsk, Norilsk, NovyUrengoy, Noyabrsk, and Vorkuta. The most urbanized regions of the Russian Arctic are the Murmansk Region and the Yamal-Nenets Autonomous District.

Small-numbered Indigenous peoples are native residents of the Russian Arctic. The peoples who have fewer than 50,000 individuals are named small-numbered Indigenous people in Russia. There are 40 such Indigenous peoples in Russia; according to the last census of 2010, they comprise only 257,900 people (Census, 2010). In the Russian Arctic, there are 19 small-numbered Indigenous peoples (Nenets, Chukchi, Khanty, Eveny, Evenki, Selkup, Sami, Eskimos, Dolgans, Chuvans, Chum, Nganasans, Yukagirs, Ents, Mansi, Veps, Koryaks, Itelmen, Kereks). The number of them is 82,500 people (Tishkov, 2016: 9–10).

In Russia, there are many Indigenous peoples' issues, which challenge their traditional way of life. Among the main issues that can be noted: a low level and low quality of life; alcoholism; high mortality; unemployment and poverty; and a large number of Indigenous people who migrate to cities, and are assimilated. There are imperfections in legal and organizational mechanisms that would need to be addressed to ensure the development of self-government of Indigenous peoples. Some Indigenous communities are not legal entities. Therefore, they cannot count on financial and social support from the state. Since the 1990s, a new problem has been noticed: the reduction in the number of reindeer in personal and collective ownership. Reindeer herding is considered to be the main branch of the traditional economy of the Indigenous peoples of Russia's Northern regions. The Northeast of Russia was the largest region of domestic reindeer breeding in the world. The most telling example is Chukotka because this region formed the basis of reindeer herding. For decades in the 20th century in the Chukotka Autonomous Region, the number of reindeer stably remained at the level of half a million heads, which could be considered "normal" for this region. Since 1991, the reduction of reindeer husbandry, caused by socio-economic reforms, began. The number of domestic reindeers in Chukotka decreased by five times so that in 2002, the total number of reindeer was 94,600 thousand heads. In many farms, reindeer herding was lost entirely. In 2015, the total number of reindeer was 185,000 heads. However, it continued to decrease again. In 2017, their number has decreased to 155,000 heads (EastRussia, 2017). There is a need to create conditions for the restoration of reindeer husbandry, livestock, and fisheries as

the basis for social and economic security of the population, and the development of a traditional way of life.

Moreover, relations between reindeer-herding communities and extractive companies have become urgent. Sometimes the Indigenous communities have no place for their reindeer because of the lack of pasture which is occupied by the extraction of minerals in the traditional territories of nature use of the small-numbered Indigenous people. In this case, the procedure of ethnological expertise can be especially interesting. In 2010, the Republic of Sakha (Yakutia) released a law "On Ethnological Expertise in Traditional Living and Traditional Economic Activities of the Indigenous Peoples of the North of the Republic of Sakha (Yakutia)." There is no such law in any of the subjects of the Russian Federation, but such practice exists in the Yamal-Nenets autonomous okrugs, Khanty-Mansiysk autonomous okrugs and the Sakhalin region. Ethnological expertise in Yakutia must be carried out without fail. However, despite this condition, extractive companies continue to ignore the law of the Sakha Republic, citing the absence of federal law. At present, the process of discussing a federal draft law on ethnological expertise is underway; in March 2018 the first readings were held. Indigenous peoples have the right to enjoy benefits throughout the whole territory of Russia not only on their own territories where they live. The number of inhabitants in the settlements of Indigenous peoples is small. Such settlements in Russia are called "compact places of residence", and their maintenance is costly for the state budget. The discussion on keeping such settlements in the North is growing. There is even an offer to move people from one "compact place of residence" to another bigger one regional center to reduce the number of such small settlements and to consolidate into the bigger groups of population in the enlarge settlements in the Russian Arctic.

Among the challenges, the lack of human resources (rotation workers or residents) and a low level of living conditions in the Russian Arctic can be noted. The advantage of the rotation workers is the possibility to assemble a professional team in a short time. Also, the rotation workers are cheaper than settling new residents in the Arctic who would require a broad infrastructure for living. However, in the Russian Arctic, it would be optimal to involve the residents and develop their human potential, taking advantage of the infrastructure that has remained since the time of Soviet development. Russia has some unique residents having the experience of living in the Far North. Also, it needs to be emphasized that the survival experience of middle-numbered native peoples, such as the Yakut and Komi, is of particular value for the sustainable development of the Arctic region. For hundreds of years, they have been living in harsh northern conditions, and their numbers are increasing. So, in Yakutia in 1917 the Yakut had 224,960 people, growing to 365,236 people according to the 1989 census (Dyakonov, 1993), and up to 466,492 people in 2010 (Census, 2010).

Therefore, to involve the residents of the Arctic zone in the new socio-economic development, there needs to be tools to prepare them for such development and lead them to get the qualification for the professions that are in demand. Along with the labor resources for the development of natural resources (oil, gas, mineral resources), there is a need for professionals who can build buildings and roads in the Far North, work in energy, transport, health, education, and commerce. In 2017, the ex-Chairman of the State Commission for Arctic Development Dmitry Rogozin said that it was planned to develop a federal target program for training personnel to work in the Arctic.

Besides, the conditions for attracting labor resources to the Arctic will be proposed in the future law "On the Arctic Zone of the Russian Federation."

However, the reality is that the residents often cannot find a job, and unemployment is growing. One of the most urgent is the problem of poverty in the northern settlements. For example, in Yakutia, where there will be implemented a pilot project of the North-Yakutian support zone, the unemployment rate in the Arctic regions exceeds the average republican figure, and in some areas, it reaches 37% (Kondratyeva, 2014: 24). It so happens that the northern residents are mainly engaged in the public sphere: health care, education, social services, state and municipal management. The sphere of business, where the northerners could find a job, is not developed. Therefore, in the absence of a sufficient number of vacancies in many northern settlements, a significant proportion of people of working age are unemployed. Also, there is a problem within the framework of the "center-periphery" model, which leads to an increase in hidden unemployment and the emergence of a class of "newly unemployed" in the cities (Gavrilyeva, 2016: 26). In modern Russia, the concepts of "center" and "periphery" have become truly common. There are differences in the levels of the economic and social life of the population of large cities and citizens living in the rest of the country (more than 80% of all Russians) who often feel themselves to be on the outskirts of the "centers" of political, financial, cultural and other activities. Firstly, there is the difference of interests and political decisions of the "center" from the pressing problems of the "periphery"; secondly, there is the belief of the "periphery" that it is impossible to influence "central" interests and decisions. These phenomena are also manifested in the sphere of state administration, where the "center" means the federal bodies of legislative, executive and judicial power, and the "periphery" is the corresponding bodies of the subjects of the Russian Federation (Leksin, 2013: 60). An additional point to emphasize is that such a vertical executive power structure makes it difficult to attract foreign investment in the Russian Federation.

Attracting new residents to the Arctic is one of the challenges of the State Program. Since Soviet times there have been special programs, for example, northern surcharges (incomes) in the salaries of residents, which are considered the primary tool for attracting the population. However, under the current legislation, the northern surcharges for newcomers is accumulated in full only after five years of professional experience in the Far North. There is an opinion that it is necessary to revise this rule and to give the northern surcharges entirely immediately after the person has moved to the Arctic.

Besides, since the 1990s the northern surcharges are now not so high than they were under the USSR. Therefore, if in Soviet times the salary of a northerner was ten times higher than the national average: now it is impossible. Today the air tickets are more expensive. It was suggested that the Russian government revise the northern surcharges exclusively in the direction of increasing them. So, in 2018 it was announced that salaries would rise in the Arctic regions of the country. In addition, the attractiveness of work and living in the Arctic zone needs to increase. For example, the development of the Northern Sea Route is essential not only for industry, but for residents too. During the Soviet period, regular supplies of so-called northern deliveries made through the Northern Sea Route, are impossible to fill today. The old port system of the NSR does not allow the use of infrastructure for these purposes. Almost annually the deadlines for the importation of essential goods, fuel, and food are broken. However, in the light of the future social and economic

development of the Arctic zone of the Russian Federation, there is hope for restoring the northern infrastructure and creating an attractive image of the region.

Conclusion

The primary challenge for both social and economic development of Russia's Arctic zone is an outflow of residents since the 1990s. Russia has set the task of keeping and attracting residents to the Arctic. There are discussions on this topic. Scientific research on human capital and human potential are in progress. It is necessary to increase the attractiveness of the region despite its harsh climatic conditions. Tools of attraction are an improvement of the living standards of the residents (an increase of salaries, benefits, compensations, and so on), and the creation of a comfortable infrastructure for housing and communications, which is impossible without socio-economic development. Therefore, in the State Program, the first object is the improvement of the quality of human life. It appears that Russia figures the development of social infrastructure is closely linked to the creation of industrial facilities. Russia needs to pay attention to the social dimension of sustainable development of its Arctic zone because those northern residents are the guarantor of its national security. Their presence in the Arctic zone provides Russia with its ability to exercise control over these vast territories. Also, more than 2 million residents of the Russian Arctic have a unique experience of survival in a severe climate.

At the same time, environmental security is a pressing issue. Russia recognizes the accumulated environmental damage as a critical problem. Since 2012, the "general cleaning" of the Arctic territories from the debris of the Soviet legacy has been taking place. The fact that Russia's economy sank into a deep depression in the 1990s is one more reason behind the pollution, besides Soviet industrial development. The accumulated environmental damage in the Russian Arctic is not only a result of industrial activity, but also of human activity abandoned by residents after their massive outflow from the Arctic in 1990s. In recent years, the President and the government are monitoring that project. Russia continues to clean up the Arctic, but it is not enough. There is a lack of funds to do it rapidly. We can assume that Russia could associate with the international environmental community to find some solutions to this problem.

Russia has an apparent imbalance preferring economic development, rather than sustainable development as yet. It is very unfortunate that the environmental dimension of sustainable development remains in the shadow of statements about socio-economic development. There are concerns about environmental security arising from a new stage in the socio-economic development of Russia's Arctic zone. Fears arise in particular from the pre-existing experience of large-scale Soviet development of the Arctic. So, it is necessary to establish a special regime for nature management, environmental protection, and pollution monitoring in the Arctic zone of the Russian Federation. However, Russia has an opportunity to engage in the process of developing a concept of sustainable development for the Arctic through the Arctic Council. The Sustainable Development Working Group proposes to consider the Arctic zone as an indicator of environmental conditions which gives a signal to the rest of the world about the impact of global processes (Kharlampyeva, 2010: 214). Environmental aspects should be central to the sustainable development of the Arctic. Current environmental issues exist in all circumpolar countries. Therefore, it is necessary to establish deeper international environmental cooperation. Indeed creating an effective system of sustainable development is possible only with the participation of all eight Arctic states (Young, 1998; Dodin, 2005).

Meanwhile, the Northern Sea Route is the primary goal of the socio-economic development of the Arctic zone of the Russian Federation. First, the NSR will develop as a transport and logistics sector between Asia and Europe. Second, it will act as a service sector in the framework of major energy projects. Russia undertakes to restore its infrastructure on the NSR because it has the longest coastline in the Arctic Ocean. The melting of the Arctic ice cap opens opportunities for Russia regarding the development of the Northern Sea Route. Opening access to the Arctic sea routes may allow Russia to develop as a maritime power. Merchant ships can begin to navigate, accompanied by icebreakers, through the Arctic, including across the North Pole. However, it is necessary to develop international cooperation to build all the logistics, as well as provide opportunities for rapid emergency response, and support commercial activity. In particular, Russia cannot implement its politics in the Arctic region without cooperation with other member states of the Arctic Council. The Arctic challenges are the shared responsibility between the circumpolar states. On the one hand, Russia's State Program notes the importance of international cooperation within the organizations which are mandated to address Arctic issues. On the other, it is already clear that a special place in Russia's international cooperation in the Arctic region will be occupied by the countries of North-East Asia. In particular there are great hopes associated with China. But it's clear that the Arctic is a region of international cooperation for Russia.

Acknowledgments

This work was supported by the Russian Foundation for Basic Research, Grant No 17-02-00619, the research project "Comparative analysis of the sources of incomes and the problem of poverty in traditional communities of northern regions of Russia, the USA, and Canada."

Notes

1. In the new edition of 2017, the term of implementation has changed from 2020 to 2025.
2. Since 2013, the current state of Russia's economic and foreign policy development has been characterized by a strategy called "Turn to the East." The APEC summit held in Vladivostok in 2012 laid the basis of this strategy. Its goal is to expand Russia's political and economic influence in the Asian-Pacific region. In 2013, Vladimir Putin in a message to the Federal Assembly announced the rise of Siberia and the Far East as "a national priority for the XXI century." From then Russia has begun to strengthen its diplomatic cooperation with Northeast Asian countries.
3. Western sanctions (anti-Russian sanctions) are restrictive measures taken by the EU, the United States, and their satellite countries against Russia due to the Ukrainian crisis of 2014. The main types of sanctions are bans on entry for individuals and on the conduct of economic activities for companies.

References

Census. (2010). All-Russian Population Census. Russia. Retrieved (06.10.18) from, http://www.perepis-2010.ru/results_of_the_census/results-inform.php.

Dodin D.A. (2005). Sustainable Development of the Arctic: problems and perspectives. St. Petersburg, 283.

Dyakonov N. (1993). Libra demography. *Ilin.* 1. Retrieved (06.10.18) from, http://ilin-yakutsk.narod.ru/1993-94/12.htm.

EastRussia. (2017, April 11). Sow like a state. Retrieved (18.09.18) from, https://www.eastrussia.ru/material/poseyat-po-gosudarstvennomu/.

Fauzer V.V., Lytkina T.S., Smirnov A.V. (2017). Differentiation of Arctic territories on the degree of the education and economic governance. *Arktika: ecologiya i ekonomika.* 4 (28), 18-31. Retrieved (06.10.18) from, http://arctica-ac.ru/docs/4(28)_2017_Arctic/018_031%20%20Arctic%204_2017.pdf.

Gavrilyeva T.N. (2016). The structure of employment in the settlements of the Republic of Sakha (Yakutia) by Fisher Clark typology. *Arktika. XXI vek. Gumanitarny nauki.* 1 (7), 18–27.

Gladun E.F. (2015). Environmental Regulations of the Arctic in the Period of its Industrial Development: Analysis of the Legislation of the Arctic States. *Bulletin of Tyumen State University. Social, Economic, and Law Research.* Vol. 1. 3, 132-142. Retrieved (18.09.18) from, https://vestnik.utmn.ru/sociology/vypuski/2016-tom-2/1/212972/.

Government of the Russian Federation. (2014). *Federal Targeted Program "Elimination of accumulated environmental damage" for 2014–2025.* Moscow, Russia.

Government of the Russian Federation. (2017, August 31). *The state program of Socio-economic development of the Arctic zone of the Russian Federation for the period till 2025 (2014).* Moscow, Russia. Retrieved (06.10.18) from, http://static.government.ru/media/files/GGu3GTtv8bvV8gZxSEAS1R7XmzloK6ar.pdf.

Government of the Russian Federation. (2017, December 26). *The Federal Law of the Russian Federation No 460 On Amendments to the Code of Merchant Marine Navigation of the Russian Federation and the Recognition of Certain Provisions of Legislative Acts of the Russian Federation.* Moscow, Russia. Retrieved (06.10.18) from, http://static.kremlin.ru/media/acts/files/0001201712290076.pdf.

Government of the Russian Federation. (2017, May 13). *Executive Order On the Russian Federation Economic Security Strategy until 2030.* Moscow, Russia. Retrieved (06.10.18) from, http://static.kremlin.ru/media/acts/files/0001201705150001.pdf.

Government of the Russian Federation. (2018, May 7). *Decree On national goals and strategic tasks of the development of the Russian Federation for the period until 2024.* Moscow, Russia. Retrieved (06.10.18) from, http://static.kremlin.ru/media/acts/files/0001201805070038.pdf.

High North News. (2017). *Op-Ed: The Arctic and Sustainable Development Goals.* Retrieved (06.10.18) from, http://www.highnorthnews.com/op-ed-the-arctic-and-sustainable-development-goals/.

Kharlampyeva N.K., Lagutina M.L. (2010). International Cooperation in the Arctic: Environmental and Political Aspect. *Society. Environment. Development.* 3, 212-217. Retrieved (18.09.18) from, https://cyberleninka.ru/article/n/mezhdunarodnoe-sotrudnichestvo-v-arktike-ekologo-politicheskiy-aspekt.

Kondratyeva V. I., Semenova E.N. (2014). Arctic: perspectives of sustainable development. Ekonomika Vostoka Rossii. 1, 22–28. Retrieved (06.10.18) from, https://elibrary.ru/item.asp?id=25300585&.

Leksin V.N. (2013). "Center" and "periphery" in public administration: channels of interaction. *Questions of state and municipal government*. 4, 59-74. Retrieved (18.09.18) from, https://cyberleninka.ru/article/v/tsentr-i-periferiya-v-gosudarstvennom-upravlenii-kanaly-vzaimovliyaniya.

Lenta.ru. (2017, August 2). *To clean up the Arctic from garbage in 2017 will allocate 1.69 billion rubles.* Retrieved (06.10.18) from, https://lenta.ru/news/2017/08/02/savethearctic/.

Ministry for the Development of the Russian Far East. (2017, December 7). *Yakutia presented a project of creating the North-Yakutian support zone in the Arctic.* Retrieved (06.10.18) from, https://minvr.ru/press-center/news/11055/?sphrase_id=293317.

Ministry for the Development of the Russian Far East. (2017, October 10). *Opinion: need to release a law on the Arctic.* Retrieved (06.10.18) from, https://minvr.ru/press-center/news/8754/?sphrase_id=312642.

Ministry for the Development of the Russian Far East. (2018, March 1). *Vladimir Putin: The Northern Sea Route Should Become the Key to the Development of the Far East.* Retrieved (06.10.18) from, https://minvr.ru/press-center/news/13141/.

Rossiyskaya Gazeta. (2010, September 24). *On the purity of. Retrieved* (06.10.18) from, https://rg.ru/2010/09/24/arctica.html.

Sokolov Y.I. (2013). Arctic: to the problem of accumulated environmental damage. *Arktika: ecologiya i ekonomika.* 2 (10), 18-27. Retrieved (06.10.18) from, http://www.ibrae.ac.ru/docs/2(10)/018_027_ARKTIKA_2.pdf.

TASS. (2018, February 21). Experts believe that the preservation of the Arctic ecology requires amendments to the legislation of the Russian Federation. Retrieved (18.09.18) from, https://tass.ru/v-strane/4975777.

Tishkov V.A., ed. (2016). The Russian Arctic: Indigenous peoples and industrial development. Moscow, Saint-Petersburg. 272. Retrieved (06.10.18) from, http://static.iea.ras.ru/books/Ros_arctica.pdf.

WCED. (1987). *World Commission on Environment and Development: Our Common Future* (Report Brundtland Commission). Retrieved (06.10.18) from, https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf.

Young O.R. (1998, December). Creating an Arctic Sustainable Development Strategy. First Stefansson Memorial Lecture. Akureyri, Iceland. 1-24.

Authoritarian Administration: An Environmental Paradox in the Russian Arctic

Troy J. Bouffard

Throughout the Cold War, the international community often feared the worst concerning environmental behavior in Russia. However, post-Soviet Russia continues to make significant progress in environmental stewardship in one specific region – its Arctic coastline and maritime region. The contrast between on- and offshore priorities remains notably disparate, especially in policies and behaviors. While previous examination remains lacking in this context, it is important to ask – how, and especially why, does Russia maintain a significantly different Arctic offshore emphasis concerning the environment? The argument supported in this article suggests that, while Russia maintains a discernible difference between Arctic land territory versus maritime behaviors, initial intuition behind "why" indicates that Russia might possibly be setting conditions in order to eventually leverage soft powers, and ultimately, jurisdiction of an expanded amount of maritime surface territory in the Arctic. In support of the examination, the use of authoritarian environmentalism provides the framework in which to view the evidence and perspectives. Two case studies provide methodology, including aspects: 1) involving notable environmental problems within Russian Arctic land territory located around Norilsk mining as well as the Usinsk oil pipeline, and 2) focusing on Russian efforts toward offshore environmental remediation, prevention, and protection efforts. The actual differences in policies and behavior seem clear as a result, and perhaps helps establish the start of a discussion concerning the "why" in order to start investigating the potential greater reasoning behind such environmental behaviors, and maybe even what to anticipate.

Introduction

Throughout the Cold War the international community often feared the worst concerning environmental behavior in Russia. Several factors contributed to the decline in environmental quality under the Communist system, including disincentives toward conservationism as well as the nation's enormous size and natural resource wealth supporting a sense of complacency (Henry & Douhovnikoff, 2008: 438-439). The global community's suspicions of the USSR's transgressions ranged from onshore oil and mining issues to severe air pollution through nuclear-related

Troy J. Bouffard, MSG, U.S. Army (Ret.) is a full-time instructor at the University of Alaska Fairbanks in the School of Management with a Master's degree in Arctic Policy. Mr. Bouffard is a U.S. Department of Defense contractor as co-investigator for DoD Arctic regional studies and activities as well as a non-resident Research Fellow with the Centre for Defence and Security Studies, University of Manitoba.

contamination (Bronder et al., 2010: 56). However, since the fall of the Soviet Union, and especially during the last decade, Russia has made significant progress in environmental stewardship of its Arctic coastline and maritime region. The northern coast and waters continue to benefit from strong Russian governmental support, investments, and promotion of environmental issue remediation, prevention, and protection. Conversely, the same focus and magnitude of concern for land territories does not exist. The contrast between on- and offshore priorities remains notably disparate, especially with regard to policies and behaviors. Comparative literature remains lacking on this topic and offers an opportunity to explore the differences in terrestrial and Arctic maritime environmental stewardship policy characteristics of the Russian Federation.

What explains how, and especially why, Russia has such a notable and stewardly emphasis concerning the Arctic offshore environment? The argument supported in this article suggests that Russia not only enables deliberately different behaviors, but could also be setting conditions through its Arctic maritime environmental priorities in order to eventually leverage soft power for the purposes of contesting established international rules. The Russian regime continues to suppress transparency of issues to its civil society, supported largely by state-controlled mass media which helps to ensure how state actors critically shape and narrate legitimate concerns (Poberezhskaya, 2015: 106; Smyth & Oates, 2015; Sundstrom & Henry, 2016). Therefore, to support the hypothesis, authoritarian environmentalism helps provide the theoretical framework from which to view perspectives and evidence – an application not yet applied to Russia based on the available literature. The methodology follows themes based on two post-Soviet case studies. The first involves significant environmental issues within Russian Arctic land territory (figure 1). In particular, this case examines the notable environmental problems associated with Norilsk mining in the central Siberian region (Shiklomanov & Laruelle, 2017: 254) as well as the Usinsk oil field problems in the west (Wilson & Society, 2016: 77-79). The second case focuses on Russian Arctic coastal and offshore environmental remediation, prevention, and protection efforts. Of note, the secondary part of the argument concerning "why" – although necessary to provide a fuller contribution – should be considered and understood only as an initial plausibility probe. This means that the findings hopefully provide an emerging opportunity to begin consideration, however speculative at first, into one of any vast number of possible consequences; perhaps even drawing further interest and perspectives.

Background

Authoritarianism

Progress throughout the 90s to improve Russia's public- and private-sector environmental aspects as well as expanded actor access and influence suffered repressive marginalization. It is important to remember Putin's presidential election victory donned the guise of emerging democratic values, such as greater public access and influence concerning environmental issues, only to begin reversing democratic progress and Western envy after securing the win (Tysiachniouk et al., 2018). This means, in part that, countering Russian desires of the West became necessary to not only undo jealously of Euro-Atlantic progress, but also citizen expectations of government and governance – both wildly different from Putin's vision to establish a superior Eurasian civilization. During the transition, Putin tried to soften the shift by offering an authoritarianism model with personal freedoms, possibly as a way to facilitate incrementalism domestically and appease the

range of generations (Lukin, 2009: 71). This shift ultimately signaled that Russia would not continue to pursue and support the environmental reforms of the 90s, but rather develop into a "vanguard of right-wing authoritarianism" (Feifer, 2018).

Authoritarianism refers to the relationship and dynamics involving both authoritarian *leaders* and authoritarian *followers* (Altemeyer, 1996). The 'right-wing' component represents authoritarian *followers* that willingly submit to authoritarian *leaders* perceived as legitimate powers, and who adopt social norms while acting hostile toward those that do not (Altemeyer, 1981). In the context offered by this article, if environment health needs to be risked or sacrificed for natural resource development in accordance with Kremlin directives, then a supportive constituency would not only be expected to accept such conditions, but also to aggressively counter non-supportive perspectives and activities, such as protests and grassroots initiatives.

Prevention

Preventing environmental disasters and issues usually requires governmental mandates and industrial compliance. Policy is not just the written word or implemented documents; it is also the speech and conduct of the public-sector elites. Profit-maximizing firms tend to disregard the full economic and social costs of their activities, such as increased risk of accident from petroleum extraction, on other stakeholders and on the ecosystem in general (Cole, Izmalkov, & Sjöberg, 2014: 10). Negative externalities remain one of the primary justifications for government intervention through policy and regulation developed to resolve issues. Such externalities, or un/intended consequences of economic enterprise, generally require governmental regulation to mitigate harms to society and the environment. To that end, policy helps to bind and constrain what is known as discretionary authority.

Prevention-related policies normally take form through regulations, embedded throughout various mandates and requirements where preventive intent can be little more than implied directives. With regard to Russia, the later section involving the case studies illustrates the differences in how onshore and offshore regulatory behavior remains significantly unbalanced in reality. Russian legislation provides expectations for both on- and offshore environmental management, yet only the maritime Arctic continues to benefit from meaningful implementation and enforcement.

Remediation

Understanding remediation is not without its difficulties. Contrary to popular belief, remediation involves far more than just simple cleanup of a contaminated site. Numerous aspects illustrate some of the legal ambiguities that add to the complexity of remediation, including - but not limited to - 1) defining contaminated land, 2) scopes of efficacy in remediation, 3) defining the utility of the scientific foundation supporting remediation, 4) specifying differences between short- and long-term risk reduction, 5) determining contamination worthy of remediation, 6) establishing the degree of cleanup that will be judged as satisfactory, 7) developing the role of technology, and 8) overcoming effective methods of remediation management (involving interdisciplinary communication problems, dealing with uncertainty, and policy issues) (Hrudey & Pollard, 1993: 56, 64, 66). In addition to the categories of remediation (isolation, mobilization, destruction), efforts can be considered in categories including containment - namely *in situ*, and *ex situ* (Table 1) (Mulligan, Yong, & Gibbs, 2001: 205). As expected, onshore remediation often differs from

offshore. For example, oil-spill cleanup techniques fall under three categories depending on location, including 1) mechanical, 2) chemical, and 3) *in situ* burning (*Modeling of potential oil spill behavior when operating Prirazlomnaya OIFP (offshore ice-resistant fixed platform). Assessment of Possible Oil-spill Emergency Response*, 2012: 81). Lastly, costs can range from tens to hundreds of dollars per ton of remediated land (Mulligan et al., 2001: 205).

Table 1. Traditional remediation categories and techniques

Category	Techniques
Containment/Isolation	Mechanical separation
	Capping
	Low permeability cutoff walls
	Solidification/stabilization
	Vitrification
Mobilization	Pump and treat
	Permeable treatment wall
	Soil vapor extraction
	Soil heating
	Soil washing
	Pyro Separation
	Electrokinetics
	Phyto remediation
Destruction	Incineration
	Bioremediation

Sources: Content for this table partially developed from Hrudey and Pollard (Hrudey & Pollard, 1993: 64-65; Mulligan et al., 2001: 197-204).

Administration and Regulations

The scope of onshore oil and mining activity remains overseen primarily by the Ministry of Natural Resources and Environment of the Russian Federation. Key federal executive bodies include the Federal Supervisory Natural Resource Management Service and the Federal Service for Environmental, Technological, and Nuclear Oversight. Federal Law No. 2395-1 of February 21, 1992 represents the lead legislation regulating terrestrial oil and mining activity. The early post-Soviet law increasingly fell short of effective though. By the turn of the century, significant shortcomings with the law surfaced and the Putin administration accepted responsibility in pursuit of major reform, which underwent delays and ultimately failed (Adachi, 2009). Instead, the Subsoil

Law of 1992 was amended, to include provisions to strengthen environmental protection. However, federal environmental law, as a potential backstop to natural resource legislation shortcomings, has eroded for over a decade now with decreased jurisdiction limited to projects associated with the continental shelf or conservation areas (Pettersson et al., 2015: 250). Although pronounced, Russian environmental law lacks the resulting substantive rules and enforcement commitment in support of environmental management as maximizing resource exploitation maintains dominance over systems *(ibid*: 252). Far more administration and regulation pertain to oil and mining activities than can be covered in this study. However, this brief introduction should provide the basic context for what will later be discussed concerning institutional path dependency.

Theoretical Framework

Theory

The origins of the concept of authoritarian environmentalism, the antithesis of democratic environmentalism, can be traced to the 1970s to Heilbroner (1974), who proposed a wide consideration of governance and global stresses caused by population growth and resource scarcity. Under such conditions the emerging theoretical development became defined as "a non-participatory approach to public policy making and implementation in the face of severe environmental challenges" (Gilley, 2012: 287). Furthermore, a dimension of authoritarian environmentalism states that it is "a policy process dominated by a relatively autonomous central state, affording little or no role for social actors and their representatives" (*ibid*: 288). Reasons that states invoke authoritarian environmentalism processes include non-state actor difficulties with issue complexity, value conflicts, expert information deficits, and policy legitimacy disagreements as well as state-actor interests involving dominating traditions and structure, leadership choices, and agency (*ibid*: 292-293). Gilley further explains that authoritarian environmentalism often emerges in discussion as either a prescriptive model or descriptive model with regard to environmental issue response. The prescriptive model helps to clarify authoritarian aspects of environmental policy given the highly directive nature of the government toward policy, versus a performance-based approach which allows for roles involving non-state actors, especially with regard to prevention policies and industry innovation.

Authoritarian environmentalism should not necessarily be only thought of as anti-democratically ineffective. Much like the idea of the "benevolent dictator," this non-democratic form of environmental governance earned positive perspectives touting its effectiveness. Possibly the most noteworthy example is the effectiveness of China's application (as the leading proponent) of authoritarian environmentalism via the 1970s one-child policy, which is credited with alleviating global population growth and the impacts to the environment by avoiding what is estimated to be an additional 400 million Chinese (Beeson, 2010: 289). A significant amount of the literature demonstrates the success of authoritarian environmentalism, especially when it comes to resolving substantial environmental problems that democratic environmentalism struggles to address. This association coincides with the conventionally defined understanding of authoritarian environmentalism, which is stated as a public policy model that concentrates authority in a few executive agencies manned by capable and uncorrupt elites seeking to improve environmental outcomes (Gilley, 2012: 288). The application of the theory for this article focuses not only on how the Russian Federation handles environmental issues through prevention and remediation

efforts, but also why the state may leverage authoritarian environmentalism in order to facilitate economic goals (required to support higher-level strategic objectives). In this sense, perhaps a new version of this theory could be established that accounts for the less appealing aspects of authoritarian rule; possibly "counter-benevolent authoritarian environmentalism" or "anti-democratic environmentalism." All models of environmental public policy involve a degree of both authoritarian and democratic environmentalism, but on a continuum, models will tend to lean toward the dominating governing principles and values of the state.

Additionally, the role and sphere of the general public access and influence within an authoritarian regime should be acknowledged. Authoritarian solutions toward environmental issues often comes across as ineffective as understood by narrow instrumentalism of rationalistic management and approaches based on anarchist prescriptions (Torgerson, 1999: xi). Public participation is limited to a confined cadre of scientific and technocratic elites while others are expected to participate in state-led mobilization for the purposes of implementation (Ahlers & Shen, 2018: 300). However, authoritarianism does not automatically mean "no public access or influence," aside from the previously mentioned expectations. Clearly, authoritarian aspects of environmentalism likely restrict unscripted public participation. For example, on the extreme side, in both Burma and Iran, no public space exists where opposition can be legitimately or openly pursued without, in Burma 'inviting severe retribution from the military regime,' or, in Iran, inviting a visit by the state's guardians of Islamic law (Doyle & Simpson, 2006: 752). Less harsh circumstances may exist in China, where citizens now experience a relative decrease in the risk of protesting as sociopolitical activism and popular contention becomes more widespread and tolerated (Steinhardt & Wu, 2016). At the same time, liberal democracy is not simply the opposite of authoritarianism. Time and again the conventional liberal democratic model practices little more than voting in elections, largely devoid of enhanced deliberations and meaningful discourse in the public sphere (Torgerson, 1999). Nonetheless, defining and comparing effectiveness of environmental governance is beyond the scope of this article.

Although authoritarian environmentalism has successfully resolved significant issues in the past, often by deliberately bypassing civil inclusion, this study hopes that a novel application of the theoretical framework normally reserved for China has applied meaning when developing explanatory power concerning the Russian Federation. Authoritarian environmentalism continues to gain expanded application, including approaches that consider, 1) how Korea leveraged it as a democratic state, (Han, 2015) and 2) how Singapore used it as a developing state (Han, 2017). Again, both circumstances view perspectives through a relatively uncorrupt governance lens.

This study offers yet another application of the theory from a view through an ethically questionable governance lens of a developed, semi-democratic (managed democracy) authoritarian state. Nevertheless, the use of authoritarian environmentalism for this study presents limitations. Thorough application toward Russian Federation environmentalism has yet to be established. Although this article considers the premise of the relationship between economic growth and environmental stress, the developed linkages differ from those that follow ecological modernization frameworks (Mol, Spaargaren, & Sonnenfeld, 2014; Tokunaga, 2010). The process-tracing quality of ecological modernization can present a cleaner description of *how*, but the *why* question for this study might ultimately fall short of convincingly effective when discussing the

data. Ecological modernization helps to explain meaningful environmental reform, but for this study it cannot answer how the reverse occurs.

Methodology and Selection Criteria

Case study is a form of qualitative research that can advise evidence-informed decision making in the policy realm. It is one of the basic methods – the others being experimental, statistical, and comparative – of establishing general empirical proposition (Lijphart, 1971: 682). Case study is the detailed examination of an aspect of a historical episode to develop or test explanations that may be generalized to other events (George & Bennett, 2005: 5). It is important to note that the emphasis is on the well-defined aspect of the incident, event or crisis, rather than the historical event itself. Case study is an empirical inquiry that focuses on contemporary phenomena within a real-life context in which the boundaries between the phenomena and the context are not evident (Yin, 2013). Whereas other research methodologies often use strategies meant to reduce data for empirical clarity, case studies can focus on one case while accounting for context encompassing many variables (Johansson, 2003: 4-5).

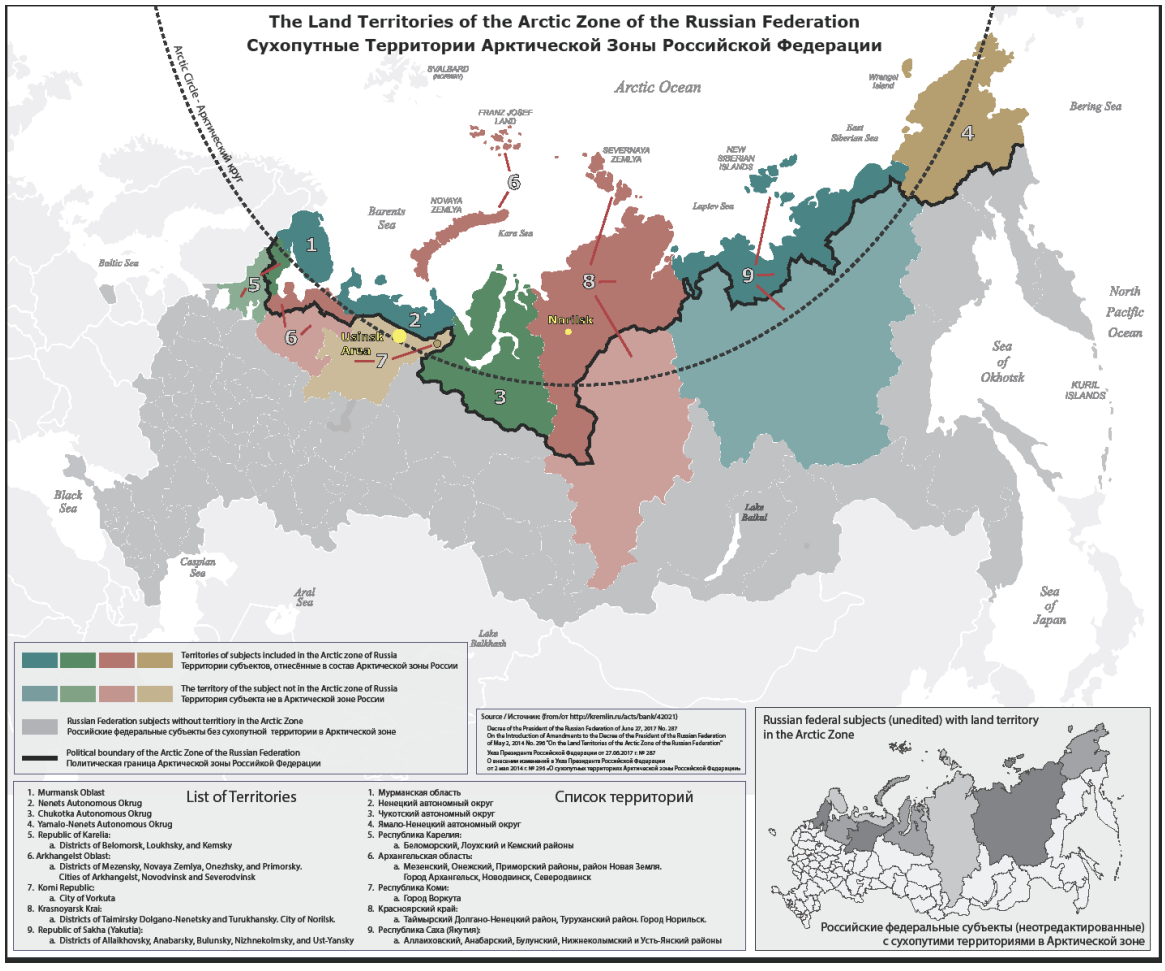
Moscow and St. Petersburg are not representative of the whole of Russia as they are subject to greater forces of economic and social transformation than other areas of Russia, especially with regards to comparative environmental issues (Crotty & Hall, 2013: 7), and as such are deliberately excluded from the case studies. Moreover, this study focuses on northern Russia – those areas designated within the "Arctic Zone (figure 1)," (Glinskiy, Serga, & Zaykov, 2017: 312) especially onshore (currently), that experience a significantly higher level of industrial activity and economic circumstances (Poland, Riddle, & Zeeb, 2003: 380). For this article, the onshore case study emphasizes two globally notable environmental tragedies as examples representative of the state's overall attitude and behavior toward enduring legacy issues while the offshore case, including the Northern Sea Route (figure 2) study presents a far different picture concerning state focus on offshore areas of emerging opportunity.

Case Studies

Onshore - Usinsk

A prime example of an onshore disaster involves an oil spill that occurred just outside of Usinsk, Russia. A pipeline just south of the Arctic Circle had been leaking since February 1994, with the oil contained in a dike constructed for that purpose. However, diurnal temperature differences, snow and rain caused the dike to collapse in October of that year and millions of gallons of oil flowed onto the Siberian tundra. With frozen conditions, the pollution did not soak into the ground at first, so initial efforts focused on containment with hasty snow and earth berms. However, heavy rains in the spring caused these structures to fail and the oil flowed west, reaching the Pechora River and eventually into the Barents Sea ("The Russian Arctic Oil Spill," 1997). The volume of the spill is unknown, but authoritative estimates put the amount between eighteen and ninety million gallons (the *Exxon Valdez* oil spill was eleven million gallons by comparison) (Goldberg, 1994). Another estimate puts the amount spilled between ~600k and 2m barrels, (nearly half of Deepwater Horizon in the Gulf of Mexico), while the oil that did not first end up in the Arctic Ocean-bound Kolva, Usa, and Pechora rivers, spread over 186 square kilometers of marshland and tundra (Bachman, 2010).

Figure 1. Land Territory of the Arctic Zone of the Russian Federation



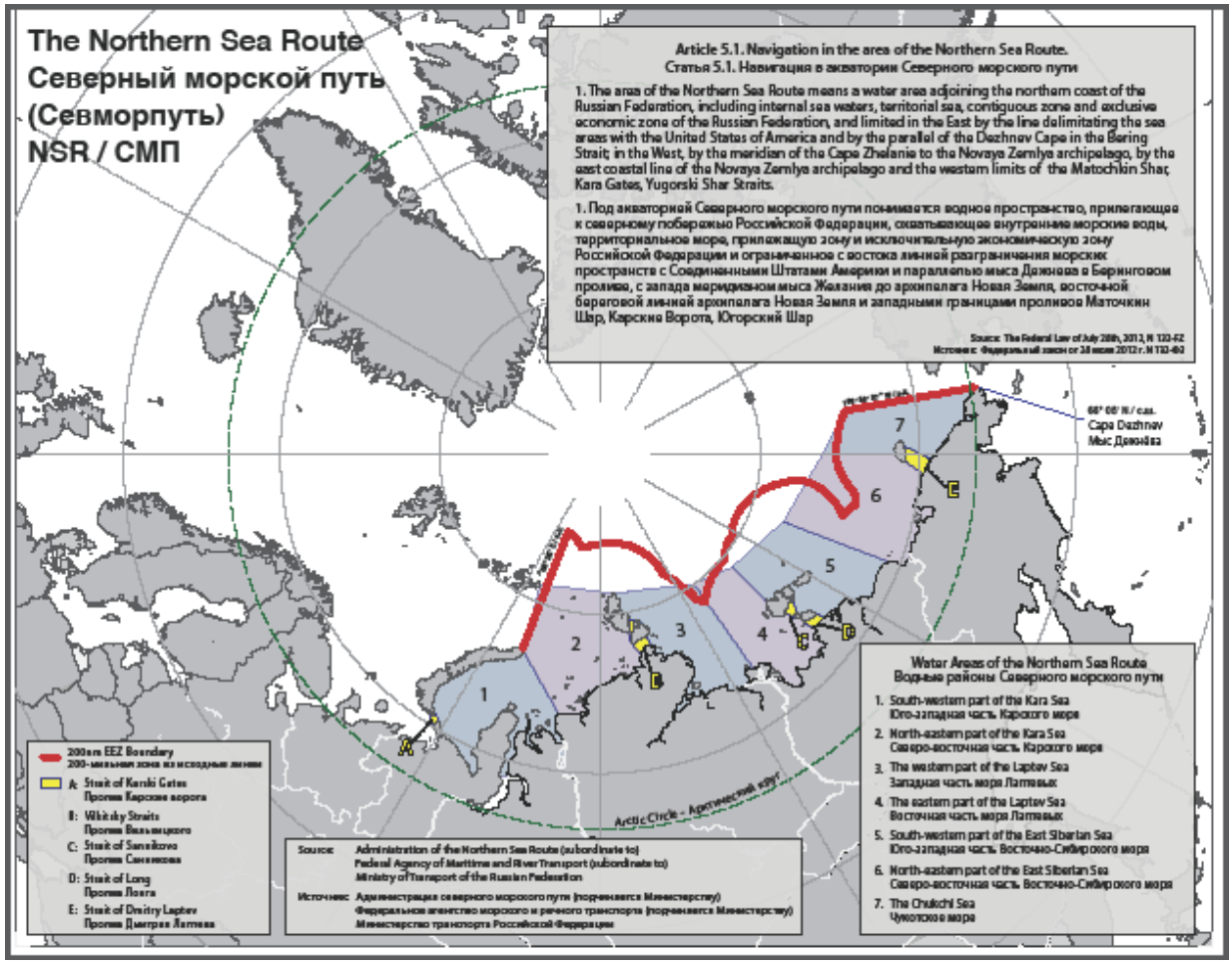
Note: .pdf embedded image, zoom enabled for higher resolution and readability

Greenpeace helped provide global awareness of the incident once oils reached the Arctic Ocean. As a result, the Russian government requested and received a $99 million loan from the World Bank to pay for additional cleanup (Jernelöv, 2010: 359). Efforts toward further remediation fell far short of effective. When the snow that covered over a couple hundred square kilometers of oil-soaked soils melted, the now darkened ground surface layer was able to rapidly thaw the active layer of soil above the permafrost to depths much deeper than normal. Previous observations illustrate the same effect in interior Alaska, where crude oil changed thaw depths to 70cm from the previous average of 57cm in non-impacted areas (Collins, Racine, & Walsh, 1994: 164). The overall effect resulted in the oil creating its own carrier waters which repeated until it reached the Pechora River, flowing north into the Barents Sea. The incident is considered among the top five worst oil spills in history (Jernelöv, 2010).

The Russian company *Komineft* is responsible for this spill as well as several other incidents in the Komi region. The company blamed the West for exposing the incident and went on to deliberately constrain standard procedures used in clean up, as was being overseen by Alaskan companies that had then recent experience with the *Exxon Valdez* incident (Shapiro, 1995). Initial estimates and other figures underwent significant (increased) revisions within weeks once an international team

observed the reality (*Russian Federation Oil Spill Oct 1994 UN DHA Information Reports 1-6*, 1994).

Figure 2. The (actual) Northern Sea Route



Note: .pdf embedded image, zoom enabled for higher resolution and readability

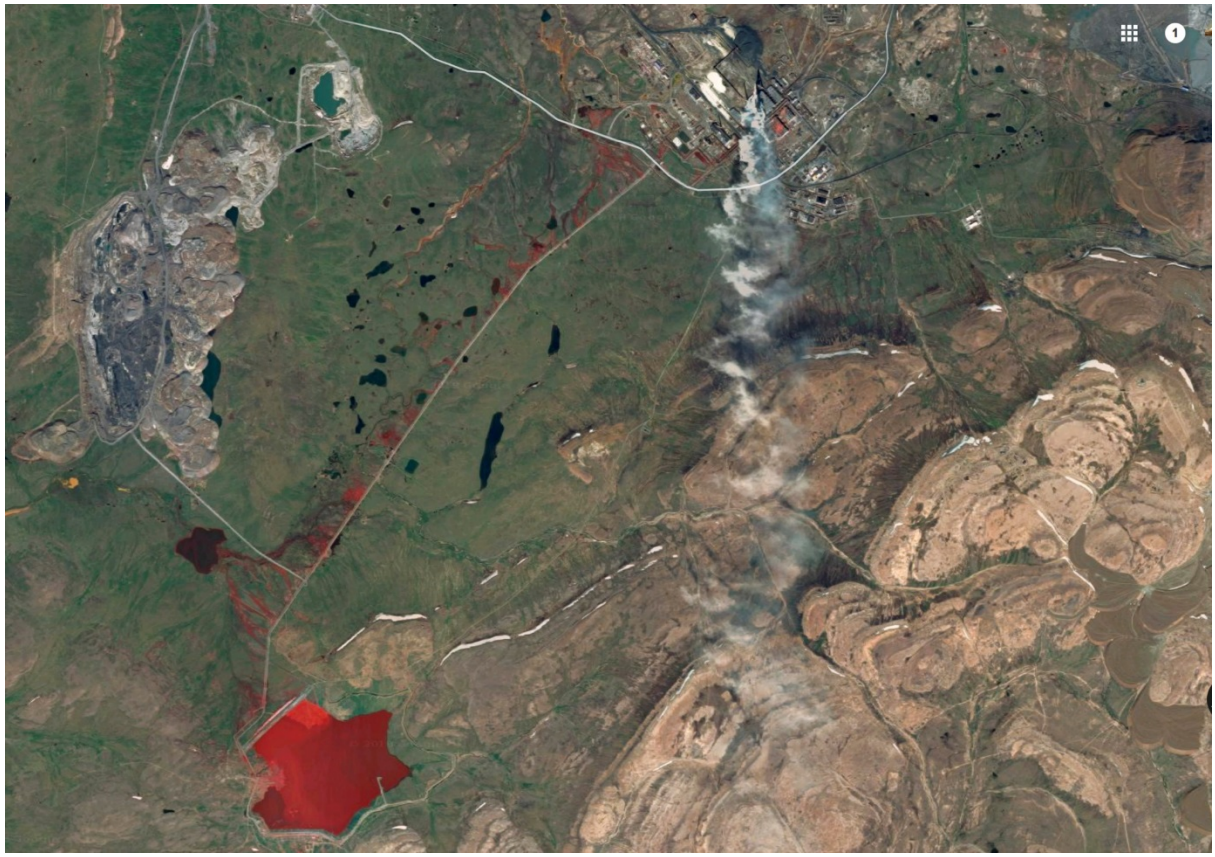
Beyond the single catastrophic event, it is believed that the majority of the Usinsk oil pipeline infrastructure is deteriorating, resulting in thousands of pollution-causing incidents *each year* [emphasis added] that add up to more oil spilled than during the Deepwater Horizon disaster (Luhn, 2016). Although Western Siberian oil reserves are steadily depleting through continued production (and spills), operations continue at full capacity with relatively unknown changes to policies.

Onshore - Norilsk

Norilsk is home to the world's largest nickel producing mine as well as significant reserves of platinum, cobalt, and palladium. The highly industrialized Arctic city provides an example of the order of magnitude effects on the environment associated with large-scale operations. For decades Norilsk has often been the worst air polluter in Russia (figure 3), the Boreal Biome, and the world, in the form of emissions involving large quantities of sulfur dioxide – a main component of acid rain (Karnachuk et al., 2005; Kotov & Nikitina, 1996). Urban development on permafrost has suffered different kinds of failures as well. Pollution from factories help produce acidic

precipitation which in turn affects the active layer of permafrost as a result of an increase in thermal conductivity of soils (Grebenets, Streletskiy, & Shiklomanov, 2012: 112).

Figure 3. Satellite image of the MMC Norilsk factory area.



Source: Google Maps screenshot (satellite view), captured on 01 April 2018 https://www.google.com/maps/@69.2841327,87.8964149,15593m/data=!3m1!1e3

Changes in building bearing capacity worsened with changes in permafrost as measured by safety coefficients, often associated with event-driven structural incidents. However, comparisons acknowledge that civil-engineering standards of the past could not have anticipated or factored in current understanding of climate change impacts to the environment (Grebenets et al., 2012: 114). Road and railways in and around Norilsk continuously suffer significant failures as a result of changing permafrost. In a temporal analysis of environmental information disclosure of the ten largest mining projects, CVRD and MMC Norilsk placed last in offering stand-alone reports and assessments regarding company policies (Jenkins & Yakovleva, 2006). The study indicates that Norilsk consistently failed to voluntarily provide environmental information regarding ethics, indigenous peoples, sustainability and corporate social responsibility in accordance with international guidelines which includes the Global Reporting Initiative (GRI) (Jenkins & Yakovleva, 2006: 280-281).

Ecologically, the circumpolar treeline represents an important area to study the relationship between climate change and ecosystem response where vegetation responds steeply to factors such as temperature and precipitation (Timoney et al., 1992). Laing et al. (1999) studied the effects of anthropogenic activity of Norilsk in waters along the associated treeline and found that air

pollution from the factories impacted microalgae significantly different from similar industrial activity in Canada and Scandinavia. Today, Norilsk continues to operate under the same policies and continues to draw attention as the world's most depressing city – a place where even the local river recurrently runs deep red from pollution (Gigova, 2016).

Offshore – The Russian Northern Coast and Maritime Environment

Building on the progress of groups such as the Arctic Military Environmental Cooperation (AMEC), Northern Dimension Environmental Partnership (NDEP), and the Global Partnership Program (GPP), Russia welcomed a significant contribution of over $130m in June 2003 from the international community to assist with nuclear cleanup in the Kola Region (Digges, 2003). At the time of the funding support announcement at the G-8 summit in France, there were 115 decommissioned nuclear subs and 258 nuclear reactor associated with the Arctic region (Digges, 2003).

Under a government program in 2010, the Russian Geographical Society (RGS) accepted obligations for a full-scale cleaning of the Arctic ("Arctic Cleanup Program," 2013). In 2011, the organization developed environmental pollution estimates, and over the next couple years remediated several affected areas of pollutants, including 1) 52,000 barrels, 2) 2,500 tons of combustible and lubricating material, 3) 5,000 tons of scrap metal, 4) 1,800 tons of solid waste, and 5) 50 hectares of reclaimed land ("Arctic Cleanup Program," 2013).

In 2010, then Prime Minister Putin ordered that a million abandoned barrels be removed from the Franz Joseph Land Archipelago because they were polluting the environment (Bryanski, 2010). As with other Arctic locations, the outlying islands served as Cold War support, where Putin stated caused "a pollution level that is six times higher than normal…with a need to organize a sweeping cleanup of the Arctic" (Bryanski, 2010).

On World Environment Day in June 2014, President Putin reiterated the 2010 Arctic coastal and offshore cleanup program as a "massive spring cleaning effort on our Arctic territories" as "necessary for clearing the consequences of our past attitudes to the Arctic" (President of Russia, 2014). In the same speech, Putin continues to state that "we should not only fix the damage done to the [Arctic] environment…we should also make sure we never repeat these mistakes in the future."

In March 2017, Russia's Federal Medical and Biological Agency together with the Norwegian Radiation Protection Authority began planning a joint project to withdraw all nuclear waste from Adreeva Bay, located on Kola Peninsula near the Russian-Norwegian northern border ("Russia and Norway team up to clean Arctic of nuclear waste", 2017). The facility has a long history of radioactive pollution issues, including a significant accident in 1982 when a serious leak in the spent fuel storage pool in building 5 released highly radioactive water as a result of cracked steel walls because of ice – increasing until the situation was resolved many months later ("Storage of spent nuclear fuel in Andreeva Bay — history", 2003). Over the last two decades Norway has contributed millions in aid toward cleanup. Current estimates project that approximately 3,100 container shipments will be required to empty the three storage tanks of spent fuel assemblies (Nilsen, 2017).

In September 2017, the Prosecutor General's Office of the Russian Federation declared that it was adding a special Arctic department and increasing legislation and oversight of violations involving activities that contribute to pollution, as well as imposed remediation requirements for violators (Staalensen, 2017). Justification for the development comes from various issues, including numerous violations of environmental laws in the Arctic, neglected industrial waste management, economic activities being conducted without required approvals, and use of illegal components and substances (Staalensen, 2017).

Also in September 2017, The Russian Federation's Northern Fleet, the largest and most powerful of its four (including the Pacific, Black Sea, and Baltic fleets), continued a new season of a cleanup project on Kotelny Island to remove six hundred tons of scrap metal ("Northern Fleet begins evacuating scrap metal from Arctic island", 2017). The project compliments previous efforts for the last two years when the Russian Navy removed fifteen thousand empty oil barrels (two hundred liter) as well as two hundred thousand tons of scrap metal. The island is part of the Novosibirsk Archipelago and previously served as a major port supporting Navy operations. As part of these remediation efforts, the Russian government announced that over 90 percent of the project met the 2017 environmental cleanup plan ("Northern Fleet's Platoon Continues Cleaning on Arctic Island", 2018; "Russian Defense Ministry completes over 90 percent of its 2017 environmental cleanup plan", 2017).

The Ministry of Natural Resources and Environment of the Russian Federation announced in October 2017 that it would spend over $3 billion rubles in an environmental protection fleet largely focused in the North ("Russia plans to build an environmental protection fleet worth 3.1 billion rubles after 2021", 2017). Minister Donskoi stated that starting in 2021 the fleet would provide environmental inspections in the sea, and that the program will upgrade the safety level of sea activities and substantially minimize any possible environmental risk to the sea ecosystems ("Russia plans to build an environmental protection fleet worth 3.1 billion rubles after 2021", 2017).

Results and Discussion

Throughout the case studies, a pattern of Russian Arctic environmental behavior is not difficult to discern. Emphasis on the offshore Arctic maritime environment, including coastlines and peninsulas, remains convincingly distinct from the lack of same focus for Arctic terrestrial environmental issues. Onshore, the desire to address environmental issues through prevention and remediation efforts seems stagnantly ineffective and ostensibly deliberate. Efforts to affect industrial activity through policy – the primary means with which to constrain and bind the discretion and behaviors of actors – remains lacking, and often unknown. Some may reasonably attribute onshore environmental issues as entrenched legacy behaviors from Soviet policies and too overwhelming to overturn.

Russian News Agency TASS interviewed the deputy chief of the Ministry of Natural Resources in March 2017, (the Year of Ecology in Russia), citing 40,000 tons of waste cleaned in the Arctic Zone (Керимов, 2017). As discussed, during that same year, Russia launched "Чистая Страна" (Clean Country), with remediation goals set for 2025. Throughout the interview, the deputy acknowledged the sensitivity of the Arctic ecosystems and overall need to protect the environment of the Arctic Zone of Russia. Deputy Kerimov also stated that the majority of pollution occurred from the 30s to the 80s, during a period of "intensive industrialization and natural resource

extraction" (Керимов, 2017). Such a statement implies that the problems and responsibilities originated from previous generations during the Soviet era and should not reflect the efforts of this century so far.

The Usinsk area residents and environment seem relegated to living with constant oil pollution as a result of accidents and rapidly worsening infrastructure. A simple search on Google maps (satellite view) of the Usinsk region and north of the main city reveals an extensive pipeline network and what appears to be numerous large spots of barren earth, spur lines and access roads as well as significant surface oil and scarring. When trying to understand the seemingly blatant disregard for the environment, one thought may be that the government does not want to provide funding for legacy pollution and deferred maintenance issues when there is far more interest in getting new projects online, especially in the offshore Arctic, knowing that the onshore reserves will eventually be depleted.

The Norilsk region provides a strong illustration of the way environmental air quality issues are directly associated earth surface problems caused by industrial activity. Air quality studies provide scientific explanation of both short and long term impacts to the regional ecosystems. On the ground, readily visible evidence shows gross reminders of unmitigated effects to local hydrology (Figure 1). The sulfur content in the precipitation of the Polar Division of Norilsk (MMC) remains the highest not only in Siberia, but all of Russia, while less than 10 percent of the wastewater from all sources go through purification (Bronder et al., 2010: 19-21).

Path Dependency

Partly enabled by Russian censorship, the Komi Republic oil pollution (Usinsk) represents what can happen when resource extraction projects lack proper oversight and suitable technology (Rosen & Thuringer, 2017: 60). Path dependency can further help to explain the onshore problems with regard to insufficient incentives established with the operating firms in Norilsk and Usinsk. Greener (2005) explains that path dependency involves future policy experiencing constraints because institutions and policies tend to succumb to inertia. Considerable evidence exists linking significant availability of commodity resources to marginalization of institutional integrity and vitality, to include the ability to increase profits under weaker institutes (*Diversifying Russia: Harnessing Regional Diversity*, 2012: 14). Revenues generated from the projects in Usinsk and Norilsk, especially during the post-Soviet recession years, clearly and increasingly became more important than reinjecting monies into maintenance and measures to protect the environment, to include the flora, fauna and populace. Another indicator of dependence involves local jurisdiction. Although municipalities cannot own projects, local authorities can ensure compliance with laws and regulations as well as suspend operations as a result of violations (Gjertsen et al., 2018: 44). How and why Usinsk and Norilsk seem to avoid exercising such authorities would likely be valuable studies. To make matters worse, further institutional weakness exists in the form of inherent conflict between the separate federal agencies that manage permits and licenses versus environmental protection (ibid: 45).

The urgency and resolve to address offshore environmental matters significantly differ from the terrestrial policies and behaviors. Russia's concern for remediating Cold War and post-Soviet pollution issues and preventing future violations remains increasingly disparate in comparison to its existing and ongoing onshore environmental issues. Investment in and public-sector advocacy

for coastal- and offshore-focused efforts continues to indicate that inconsistent environmental priorities remain acceptable under the authoritarian regimes that best support state interests.

As previously mentioned, part of the purpose for this article requires an examination of what may explain why a difference in environmental behavior exists. Of course, it is possible that Russia chose to ignore terrestrial issues as a result of cost-benefit analysis and path dependency while leveraging the opportunity to establish a highly managed Arctic maritime environment. Yet, as Russia's geo-economic goals for the Arctic offshore seem clear, the geo-strategic and geo-political objectives remain a mystery for the long term. As a result, asking *why* Russia behaves in certain ways becomes necessary in order to carefully explore potential resolve. Specifically, within the context of contemporary Russian neo/realist defined conduct, what should the international community eventually expect as the end state for the Russian Arctic maritime domain? Intuition tells us something is going on…that Russia has a plan which goes beyond just a clean and well managed northern maritime environment.

Discussion is possible, but without significantly more evidence, it is not possible to demonstrate clear correlation, nor is one being suggested. Instead, this article hopes to provide the beginning of an appropriately engaging idea – that a possible Russian objective toward long-term strategy could rely upon jurisdiction of an expanded amount of maritime territory in the Arctic. In particular, the soft-power approach would seem to support a future opportunity for Russia to depart from international norms, and even hard law, by leveraging environmental efforts as justification for expanded control of surface and water columns beyond current international norms. According to legal experts, international law, including and especially Article 234 of UNCLOS, would seem to have room to argue increased control (Williams, 2017). Whatever the assertion, it's time to start the discussion.

Conclusion

October 1st, 1987, President Gorbachev conducted a speech in Murmansk during an awards ceremony, stating the Arctic needs to be a "Zone of Peace" and went on to describe his vision for the Northern Sea Route and economic opportunity as well as security throughout Russia's maritime Arctic – with almost prophetic vision ("General Secretary Gorbachev's Speech in Murmansk, October 1987", 2014). Little did the West know that Putin's regime would aggressively pursue these objectives even beyond Gorbachev's imagination. Under Putin, exploitation of natural resources expanded. Production often means some degree of environmental sacrifice though. One astute question posed in Stephen Brain's (2016) contribution to the Oxford Research Encyclopedia asks to what extent has the Russian historical tendency toward authoritarianism facilitated predatory policies that have degraded the environment?

The research question for this study required an examination of the differences in on- and offshore environmental issue prevention and remediation in the Arctic Zone of Russia, and why. The theoretical use for this article focuses on how public-sector governance of the environment can be exploited for industrial and national security purposes. The case studies illustrate the significant differences and suggest that Russia's behavior concerning the Arctic offshore might be facilitating conditions that it can leverage as soft power in order to deviate from international norms in the future. One way to view potential outcomes might be to think of Russia's current policies and behaviors in its maritime Arctic as necessary *and* with sufficient conditions (for the Russian

Federation) to eventually claim customary law in order to supersede instruments such as UNCLOS. Such an assertion could greatly expand the amount of maritime surface (and water columns) territory under 'Russian Federation jurisdiction' – a term heavily used in Russia's two primary national Arctic strategies (Presidential Decree, 2008, 2013). Assuming this study provides legitimate perspectives, further research could address the limitations of this article and expand on similar topics. Principles such as "Common but Differentiated Responsibilities" (CBDR) and "Sustainability" both characterize defining methods for environmental management. Yet, even though both principles could be invoked to satisfy international commitments, how they will be achieved at the domestic level depends greatly upon the environmentalism approach – either democratic or authoritarian.[1]

Notes

1. The author wishes to acknowledge Russian language review contributions from Olga Jarrell, who also provided an important source involving an interview with Kerimov (Керимов).

References

Adachi, Y. (2009). Subsoil law reform in Russia under the Putin administration. *Europe-Asia Studies, 61*(8), 1393-1414.

Ahlers, A. L., & Shen, Y. (2018). Breathe Easy? Local Nuances of Authoritarian Environmentalism in China's Battle against Air Pollution. *The China Quarterly, 234*, 299-319.

Altemeyer, B. (1981). *Right-wing authoritarianism*. Winnipeg, Manitoba: University of Manitoba Press.

Altemeyer, B. (1996). *The authoritarian specter*. Cambridge, MA: Harvard University Press.

Arctic Cleanup Program. (2013). Retrieved from https://www.rgo.ru/en/projects/arctic-cleanup-program

Bachman, J. (2010). Oil and ice: worse than the Gulf spill? : Reuters.

Beeson, M. (2010). The coming of authoritarian environmentalism. *Environmental Politics, 19*(2), 276-294.

Brain, S. (2016). The Environmental History of Russia. *Oxford Research Encyclopedia of Environmental Science*. doi:10.1093/acrefore/9780199389414.013.355

Bronder, L., Kudrik, I., Nikitin, A., Jorgensen, K. V., & Nikiforov, V. (2010). *Norilsk Nickel: The Soviet Legacy of Industrial Pollution*. Retrieved from St. Petersburg, Russa:

Bryanski, G. (2010, 29 April 2010). Russian PM Putin orders Arctic cleanup. Retrieved from https://www.reuters.com/article/us-russia-putin-arctic/russian-pm-putin-orders-arctic-cleanup-idUSTRE63S2IM20100429

Cole, S., Izmalkov, S., & Sjöberg, E. (2014). Games in the Arctic: applying game theory insights to Arctic challenges. *Polar Research, 33*.

Collins, C. M., Racine, C. H., & Walsh, M. E. (1994). The physical, chemical, and biological effects of crude oil spills after 15 years on a black spruce forest, interior Alaska. *Arctic, 47*(2), 164-175.

Commander, Simon and Zettelmeyer, Jeronim and Nikoloski, Zlatko and Volchkova, Natalya and Plekhanov, Alexander and Isakova, Asel and Schweiger, Helena (2012) DIVERSIFYING RUSSIA: HARNESSING REGIONAL DIVERSITY. Special reports, European Bank for Reconstruction and Development, London, UK.

Crotty, J., & Hall, S. M. (2013). Environmental responsibility in a transition context: Russian NGO perception and response. *Environment and Planning C: Government and Policy, 31*(4), 667-681.

Digges, C. (2003, 16 July 2003). World Funding Pours Into Russia for Nuclear Cleanup and Sub Dismantling. Retrieved from http://bellona.org/news/nuclear-issues/radioactive-waste-and-spent-nuclear-fuel/2003-07-world-funding-pours-into-russia-for-nuclear-cleanup-and-sub-dismantling

Doyle, T., & Simpson, A. (2006). Traversing more than speed bumps: Green politics under authoritarian regimes in Burma and Iran. *Journal of Environmental Politics, 15*(5), 750-767.

Feifer, G. (2018, 16 March 2018). Putin's Past Explains Russia's Future: What to Expect After the Election. *Snapshot*. Retrieved from https://www.foreignaffairs.com/articles/russian-federation/2018-03-16/putins-past-explains-russias-future?cid=int-now&pgtype=hpg&region=br1

General Secretary Gorbachev's Speech in Murmansk, October 1987. (2014). *Arctic - Primary Sources* (Vol. 2014): Council on Foreign Relations.

George, A. L., & Bennett, A. (2005). *Case Studies and Theory Development in the Social Sciences*. Cambridge, MA: MIT Press.

Gigova, R. (2016, 13 September). Russian river turned red by metallurgical waste, Norilsk Nickel says. Retrieved from https://www.cnn.com/2016/09/12/world/russia-red-river-siberia/index.html

Gilley, B. (2012). Authoritarian environmentalism and China's response to climate change. *Environmental Politics, 21*(2), 287-307.

Gjertsen, A., Didyk, V., Rasmussen, R. O., Kharitonova, G., & Ivanova, L. (2018). Institutional Conditions in Arctic Frontiers: The Case of Mining in Greenland, Russia and Norway *The Will to Drill-Mining in Arctic Communites* (pp. 33-59): Springer.

Glinskiy, V., Serga, L., & Zaykov, K. (2017). Identification Method of the Russian Federation Arctic Zone Regions Statistical Aggregate as the Object of Strategy Development and a Source of Sustainable Growth. *Procedia Manufacturing, 8*, 308-314.

Goldberg, C. (1994, 26 October). Leak in Siberian Oil Field Turns into Massive Spill. *Los Angeles Times*. Retrieved from http://articles.latimes.com/1994-10-26/news/mn-54912_1_oil-spill

Grebenets, V., Streletskiy, D., & Shiklomanov, N. (2012). Geotechnical safety issues in the cities of Polar Regions. *Geography, Environment, Sustainability, 5*(3), 104-119.

Greener, I. (2005). The potential of path dependence in political studies. *Politics, 25*(1), 62-72.

Han, H. (2015). Authoritarian environmentalism under democracy: Korea's river restoration project. *Environmental Politics, 24*(5), 810-829.

Han, H. (2017). Singapore, a Garden City: Authoritarian Environmentalism in a Developmental State. *The Journal of Environment & Development, 26*(1), 3-24.

Heilbroner, R. (1974). An Inquiry into the Human Condition: New York, Norton.

Henry, L. A., & Douhovnikoff, V. (2008). Environmental issues in Russia. *Annual Review of Environment and Resources, 33*, 437-460.

Hrudey, S. E., & Pollard, S. J. (1993). The challenge of contaminated sites: remediation approaches in North America. *Environmental Reviews, 1*(1), 55-72.

Jenkins, H., & Yakovleva, N. (2006). Corporate social responsibility in the mining industry: Exploring trends in social and environmental disclosure. *Journal of cleaner production, 14*(3-4), 271-284.

Jernelöv, A. (2010). The threats from oil spills: Now, then, and in the future. *AMBIO: A Journal of the Human Environment, 39*(6), 353-366.

Johansson, R. (2003). *Case study methodology*. Paper presented at the International Conference on Methodologies in Housing Research, Stockholm.

Karnachuk, O. V., Pimenov, N. V., Yusupov, S. K., Frank, Y. A., Frank, Y. A., Kaksonen, A. H., . . . Tuovinen, O. H. (2005). Sulfate reduction potential in sediments in the Norilsk mining area, northern Siberia. *Geomicrobiology Journal, 22*(1-2), 11-25.

Kotov, V., & Nikitina, E. (1996). Norilsk Nickel: Russia wrestles with an old polluter. *Environment: Science and Policy for Sustainable Development, 38*(9), 6-37.

Laing, T. E., Pienitz, R., & Smol, J. P. (1999). Freshwater diatom assemblages from 23 lakes located near Norilsk, Siberia: a comparison with assemblages from other circumpolar treeline regions. *Diatom Research, 14*(2), 285-305.

Lijphart, A. (1971). Comparative politics and the comparative method. *American Political Science Review, 65*(3), 682-693.

Luhn, A. (2016, 05 August 2016). The town that reveals how Russia spills two Deepwater Horizons of oil each year. Retrieved from https://www.theguardian.com/environment/2016/aug/05/the-town-that-reveals-how-russia-spills-two-deepwater-horizons-of-oil-each-year

Lukin, A. (2009). Russia's new authoritarianism and the post-soviet political ideal. *Post-Soviet Affairs, 25*(1), 66-92.

Modeling of potential oil spill behavior when operating Prirazlomnaya OIFP (offshore ice-resistant fixed platform). Assessment of Possible Oil-spill Emergency Response. (2012). Retrieved from Moscow, Russia: https://www.wwf.ru/resources/publ/book/eng/770

Mol, A. P. J., Spaargaren, G., & Sonnenfeld, D. A. (2014). Ecological Modernisation Theory: where do we stand? In M. Bemmann, B. Metzger, & R. von Detten (Eds.), *Ökologische Modernisierung-Zur Geschichte und Gegenwart eines Konzepts in Umweltpolitik und Sozialwissenschaften* (pp. 35-66). Frankfurt, Germany: Campus Verlag.

Mulligan, C. N., Yong, R. N., & Gibbs, B. F. (2001). Remediation technologies for metal-contaminated soils and groundwater: an evaluation. *Engineering geology, 60*(1-4), 193-207.

Nilsen, T. (2017, 18 May). Nuclear Waste Removal Starts in Andreeva Bay. *The Independent Barents Observer*. Retrieved from https://thebarentsobserver.com/en/ecology/2017/05/nuclear-waste-removal-starts-andreeva-bay

Northern Fleet begins evacuating scrap metal from Arctic island. (2017, 11 September 2017). Retrieved from http://tass.com/economy/965001

Northern Fleet's Platoon Continues Cleaning on Arctic Island. (2018). *Business and Economy*. Retrieved from http://tass.com/economy/1016349

Pettersson, M., Oksanen, A., Mingaleva, T., Petrov, V., & Masloboev, V. (2015). License to mine: A comparison of the scope of the environmental assessment in Sweden, Finland and Russia. *Natural Resources, 6*, 237-255.

Poberezhskaya, M. J. P. U. o. S. (2015). Media coverage of climate change in Russia: Governmental bias and climate silence. *Public Understanding of Science, 24*(1), 96-111.

Poland, J. S., Riddle, M. J., & Zeeb, B. A. (2003). Contaminants in the Arctic and the Antarctic: a comparison of sources, impacts, and remediation options. *Polar Record, 39*(4), 369-383.

President of Russia. (2014). Meeting on the Efficient and Safe Development of the Arctic *News*. Moscow, Russia: Executive Office.

Presidential Decree. (2008). *The Fundamentals of State Policy of the Russian Federation in the Arctic in the Period up to 2020 and Beyond*. September Retrieved from http://www.scrf.gov.ru/documents/98.html.

Presidential Decree. (2013). *The Strategy for the Development of the Arctic Zone of the Russian Federation up to 2020*. Moscow, RF: The International Expert Council on Cooperation in the Arctic Retrieved from http://www.iecca.ru/en/legislation/strategies/item/99-the-development-strategy-of-the-arctic-zone-of-the-russian-federation.

Rosen, M. E., & Thuringer, C. B. (2017). *Unconstrained Foreign Direct Investment: An Emerging Challenge to Arctic Security* (COP-2017-U-015944-1Rev). Retrieved from Arlington, VA:

Russia and Norway team up to clean Arctic of nuclear waste. (2017, 30 March 2017). Retrieved from http://tass.com/world/938493

Russia plans to build an environmental protection fleet worth 3.1 billion rubles after 2021. (2017, 09 October 2017). Retrieved from http://arctic.ru/infrastructure/20171009/682586.html

The Russian Arctic Oil Spill. (1997, 11 January 1997). *Trade and Environmental Database*. Retrieved from http://www1.american.edu/ted/komi.htm

Russian Defense Ministry completes over 90 percent of its 2017 environmental cleanup plan. (2017, 18 August 2017). Retrieved from http://arctic.ru/environmental/20170818/656430.html

Russian Federation Oil Spill Oct 1994 UN DHA Information Reports 1-6. (1994). Retrieved from https://reliefweb.int/report/russian-federation/russian-federation-oil-spill-oct-1994-un-dha-information-reports-1-6

Shapiro, M. (1995, 23 May 1995). N. Russian Thaw Shows Monster Scope of Oil Spill. Retrieved from https://www.washingtonpost.com/archive/politics/1995/05/23/n-russian-thaw-shows-monster-scope-of-oil-spill/c4948a42-bfa8-4112-8050-e917ccd95bdf/?noredirect=on&utm_term=.17369c7d9583

Shiklomanov, N. I., & Laruelle, M. J. P. G. (2017). A truly Arctic city: an introduction to the special issue on the city of Norilsk, Russia. *40*(4), 251-256.

Smyth, R., & Oates, S. J. E.-A. S. (2015). Mind the gaps: media use and mass action in Russia. *67*(2), 285-305.

Staalensen, A. (2017, 17 September 2017). Russian General Prosecutor makes clear pollution of Arctic must stop. *The Independant Barents Observer*. Retrieved from

https://thebarentsobserver.com/en/ecology/2017/09/russian-general-prosecutor-makes-clear-pollution-arctic-must-stop

Steinhardt, H. C., & Wu, F. (2016). In the name of the public: environmental protest and the changing landscape of popular contention in China. *The China Journal, 75*(1), 61-82.

Storage of spent nuclear fuel in Andreeva Bay — history. (2003, 13 February 2003). Retrieved from http://bellona.org/news/nuclear-issues/radioactive-waste-and-spent-nuclear-fuel/2003-02-storage-of-spent-nuclear-fuel-in-andreeva-bay-history

Sundstrom, L. M., & Henry, L. A. (2016). Russian Civil Society: Tensions and Trajectories. In A. B. Evans, L. A. Henry, & S. L. M. (Eds.), *Russian Civil Society: A Critical Assesment* (pp. 305-322). London and New York: Routledge.

Timoney, K. P., La Roi, G. H., Zoltai, S. C., & Robinson, A. L. (1992). The high subarctic forest-tundra of northwestern Canada: position, width, and vegetation gradients in relation to climate. *Arctic*, 1-9.

Tokunaga, M. (2010). Environmental governance in Russia: the 'closed' pathway to ecological modernization. *Environment and Planning A, 42*(7), 1686-1704.

Torgerson, D. (1999). *The promise of green politics: Environmentalism and the public sphere*. Durham, NC: Duke University Press.

Tysiachniouk, M., Henry, L. A., Lamers, M., & van Tatenhove, J. P. (2018). Oil Extraction and Benefit Sharing in an Illiberal Context: The Nenets and Komi-Izhemtsi Indigenous Peoples in the Russian Arctic. *Society & Natural Resources, 31*(5), 556-579.

Williams, L. C. (2017). An Ocean Between Us: The Implications of Inconsistencies Between the Navigational Laws of Coastal Arctic Council Nations and the United Nations Convention on the Law of the Sea for Arctic Navigation. *Vanderbilt Law Review, 70*(1), 379-379.

Wilson, E. J. T. E. I., & Society. (2016). What is the social licence to operate? Local perceptions of oil and gas projects in Russia's Komi Republic and Sakhalin Island. *3*(1), 73-81.

Yin, R. K. (2013). *Case study research: Design and methods*: Sage publications.

Керимов, М. (2017, 29 March) *Мурад Керимов: экологическую политику России в Арктике можно назвать супероответственной/Interviewer: R. N. A. TASS*. ТАСС.

Complex Efficiency Assessment of Development of Arctic Oil and Gas Resources in Russia

Mansur H. Gazeev, Natalia A. Volynskaya & Anatoly B. Rybak

The specific nature of the conditions for the implementation of investment projects in the Arctic zone, in particular, the development of hydrocarbon resources (HCR), requires a national economic approach in assessing economic efficiency. This is due to the high capital intensity, the use and creation of special (innovative) materials, machinery and technologies, the lack of production infrastructure in most of the territories, the increased sensitivity of the natural environment of the Arctic zone to man-caused stresses.

An assessment of economic efficiency based on the indicators of commercial efficiency is insufficient and erroneous. The rationale for investment decisions should be based on comprehensive national economic assessments. In terms of content, such an assessment characterizes the expected magnitude of the full national economic effect of the project and possible environmental damage.

An indicator of the combined economic effect (E_C) of the development of the hydrocarbon resources in the Arctic zone is proposed.

Introduction

The high potential of hydrocarbon resources in the Arctic zone of Russia can have a significant impact on the socio-economic development of both the Arctic territories and the country as a whole. The specific character of economic activities in the Arctic areas as well as natural and technological peculiarities of hydrocarbon developments determine their multisectoral and innovative pattern, and simultaneously, an increased level of risks. Implementing Arctic zone resource development programs suggests an active involvement of the state. This requires adequacy of criteria used for the projections and evaluation of economic efficiency. This paper maintains that classical revenue-based methods are insufficient for assessing hydrocarbon development project efficiency in underdeveloped territories, to which the Russian Arctic zone belongs, including oil and gas resources of the Arctic offshore areas. A methodological approach to the formation of an integral criterion of efficiency is proposed. To implement this task in practical terms, the authors developed tools that were used in the calculation of economic efficiency in developing mineral resources on the continental shelf of the Russian Federation's

Mansur H. Gazeev is Professor at Tyumen Industrial University, Tyumen, Russia. Natalia A. Volynskaya is Director of Fuel and Energy Independent Institute, Moscow, Russia. Anatoly B. Rybak is Head of Dept of Fuel and Energy Independent Institute, Moscow, Russia.

Arctic seas. The results of the calculations show that under the proposed criterion the expected efficiency in hydrocarbon developments differs markedly from the same results obtained by traditional methods. These differences are due to effects induced in related sectors of the economy and potential environmental damage. The proposed criterion allows one to explicitly assess the impact of imports substitution on effects in related industries and, consequently, on the total national efficiency of developing hydrocarbon resources in the Arctic zone of Russia.

The subsoil of the Arctic zone of Russia along with other mineral resources has an exceptionally high potential for hydrocarbon resources, which are in the initial stage of their development and geological study. According to various sources, for example (Shpurov, 2017), hydrocarbon resources of the Russian Arctic sector are estimated at 316 billion barrels of oil equivalent (boe), or about 60% of the total potential Arctic hydrocarbon resources, of which 235 billion boe are situated offshore and 81 billion boe onshore. In the process of exploration this value can increase significantly. This means that the state policy in the field of exploration and development of the Arctic hydrocarbon system is an essential factor of Russian socio-economic and scientific-technological development. Over the last years, the state's attention to the Arctic zone as a strategically important territory of the country has increased, in particular a new version of the state program for its development until 2025 has been adopted. In this regard the relevancy of the investment projects economic efficiency predictive assessment grows with a possibly more complete account of the regional specifics conditions and system macroeconomic consequences, which is necessary for determining the strategic development priorities.

Specific Aspects of Operations in Russian Arctic Zone

Currently a significant part of scientific practical research and methodological developments concerning some project economical efficiency assessment suggests the use of traditional investment analysis tools applying, as a rule, income methods based on the modeling of cash flows taking into account inflation, risk and the minimum rate of return. However in substantiating long-term management decisions on such projects as the development of hydrocarbon resources of the Arctic territories of Russia, it is not enough to handle only the estimates of direct commercial effects of their implementation. The specific conditions of such investment projects, as already mentioned, require a broader national economic approach.

The authors assume that the specific aspects of hydrocarbon development in the Arctic zone affecting the efficiency and approaches used to measure it are characterized by the following:

- harsh natural and climatic environments of the Arctic zone cause the increased risks of any economic activity, especially hydrocarbon resource development which is a complex high-tech process further complicated by high geological risks;
- specific requirements to the technologies/materials used in the Arctic zone and operations' seasonal character lead to higher costs of investment projects;
- low density and patchy character of the Arctic zone's economic development increase significantly the cost and time required to fulfill transport, energy, production and social infrastructure projects. For example, population density (Rosstat, 2017) of the Arctic territories of the North-West (0.2 person/km^2) and Ural (0.7 person/ km^2) administrative districts is drastically less than the relevant average numbers for these districts (2.7 person and 9.9 person per km^2, respectively). Development of hydrocarbons in the Yamal-Nenets

Autonomous Okrug has required the construction of the 525 km long railway line Obskaya-Bovanenkovo, with plans for a massive railway development of Yamal (see https://regnum.ru/news/2466759.html);

- relatively poor degree of geological study of the Arctic zone subsoil, which reduces the reliability of existing estimates of the resource base and increases timing, costs and risks of project implementation (Shpurov I.V., 2017);
- increased sensitivity of the Arctic zone natural environment to man-caused stresses, which leads to stronger environmental restrictions and higher cost components of projects, increases the duration of and makes it more technically difficult to carry out emergency/salvage measures and eliminate the consequences in cases of emergency situations;
- a large share (more than 70%) of the Arctic zone hydrocarbon resource potential is located in the offshore areas (Shpurov I.V., 2017). Developing such resources to a considerable degree is of innovative nature and in many cases requires designing special technologies, equipment and materials. The problem is complicated by the lack of accumulated experience in the development of hydrocarbons in the Arctic shelf;
- high scientific content as well as significant percentage of the infrastructure component in the future costs determines the necessity for direct/indirect participation of the government in the Arctic projects. "Scientific content" shall mean – as the authors understand this term – a share of innovations attached or organic to various techniques and methods of hydrocarbon exploration and production, this requiring not only better related industries but also fundamental research and development;
- uncertainty of economic and legal conditions for the realization of investment projects in the Arctic, this precluding any discussion of the cost and revenue allocation between potential project participants.

Obviously, under these conditions, the economic efficiency estimate based on commercial efficiency does not meet the strategic goals that have been set. The justification for investment decisions and priorities should be based on integral national economic assessments. In meaningful terms, such an assessment must characterize the expected scale of the full national economic effect of the project implementation and cover the risks of possible environmental damage.

Comprehensive Criterion for Estimating Project Efficiency

By now, there are no international or Russian techniques for the complex assessment of such projects that would take into account economic, innovative and environmental parameters within a single (financial) space. The innovation aspect acquires special significance for the Russian economy. In this regard, when estimating the effectiveness of innovative projects, a macroeconomic assessment is needed that characterizes the impact of projects on the national and regional economies. The consideration of environmental consequences (damages) in the development of the Arctic seas shelf is hindered by the lack of sufficient operational experience in such areas of the subsoil, which in particular creates problems of insurance for these risks. And, finally, a low level of geological study of the subsoil areas of the regions mentioned above raises the need for solving the problems of methodological and instrumental supply for accounting for the uncertainty in the economic estimate of hydrocarbon reserves and resources.

In general, the expected complex economic effect (E_C) from the subsoil areas development, as it was shown in Gazeev, Rybak and Volynskaya, 2015, should be formed by three components characterizing various aspects of such development's impact on the social and economic system:

- direct aggregated economic effect occurring in the course of the project implementation, which is quantitatively estimated by the sum of the project' cash flow value before taxes (NPV_0), taking into account risks;
- economic effect occurring in the related industries (E_{RI}) in the process of project implementation; and
- cost estimation of the possible ecological damage (D_E).

According to Gazeev M.H., Rybak A.B. and Volynskaya N.A. (2015), the value of complex economic effects can be represented by the formula (1)

$$E_C = NPV_0 + E_{RI} - D_E. \quad (1)$$

Let us consider in more detail how each of the components of the proposed criterion (1) is shaped.

Direct Aggregate Economic Effect

The first component of the complex criterion – direct aggregate economic effect - is measured by the discounted cash flow value (NPV_0) before taxation. At the stage of predictive assessment and strategic priorities identification there is no information on the economic-legal (including tax) regime, sources of financing and forms of state participation in the project implementation. Consequently, the subject of evaluation at this stage is only the amount of potential of the expected cash flow. The evaluation of commercial efficiency indicators is premature and not provided with the necessary information.

As already mentioned above, the value of project cash flow before taxes (NPV_0), should be calculated taking into account risks. The quantitative risk assessment based on statistical methods is hindered due to poor geological study and economic development degree, as a result of which there is a lack of sufficient technical and economic information array. In light of the exceptional variety of risks of different kinds that arise when investing, for example, in geological exploration and operation in the Arctic conditions, the use of simulation methods is often simply impossible.

Therefore, the application of expert estimates based on the results of geological exploration and operational works and investment activities in the oil and gas sector seems to be justified. For this purpose, it is proposed to use the so-called "method of adjusting the discount rates".

Despite the fact that this method does not provide any information on the degree of risk (the value of possible deviations from the design results), it makes it possible to significantly improve the comparison accuracy of the economic efficiency of objects located in different natural-climatic zones and at the different stages of geological study. Such comparative assessments are an indispensable element in the formation of development strategies and ranking of hydrocarbon assets.

Table 1 sets out the values of the indicative risk adjustments to the basic discount rates. Two types of risks are considered: geological and natural-geographic. The premiums are provided for each type of risk.

Table 1 – The proposed risk premiums to the base discount rate (10%) depending on the exploration degree and economic/geographic location of oil and gas fields. Data on water areas are given according to (Nazarov & Kalist, 2006).

Risk measure	Region characteristics	Location		Exploration degree	Risk premium, %		Total discount rate
		Water area	Onshore		geological	natural and geographical	
Medium	New region with poorly developed infrastructure, bordering on developed regions	-	Murmansk and Arkhangelsk regions, North of Komi, Nenets AO, islands in the Arctic Ocean	Reserves $A+B+C_1$	0 – 1	1-2	11-13
				Reserves C_2	2 – 3		13-15
				Resources C_3	4 – 5		15-17
				Resources D	6 - 8		17-20
High	New region with no infrastructure and/or complicated ice situation	Bering, Pechora, Barents, Kara Seas	North of the Republic of Sakha, Taimyr AO, Kamchatka Region, Chukotka AO, Yamalo-Nenets AO	Reserves $A+B+C_1$	0 – 1	3-4	13-15
				Reserves C_2	2 – 3		15-17
				Resources C_3	4 – 5		17-19
				Resources D	6 - 8		19-22
Very high	Unexplored region with no shore infrastructure, with severe ice conditions, requiring special technical solutions to develop hydrocarbons	Seas of the Eastern Arctic	-	Reserves $A+B+C_1$	0 – 1	5-7	15-18
				Reserves C_2	2 – 3		17-20
				Resources C_3	4 – 5		19-22
				Resources D	6 - 8		21-25

Arctic regions are divided into three groups: with medium, high and very high risk measure. In the Arctic conditions the regions with a low risk level are absent. The premiums for geological risk are determined depending on the degree of exploration of deposits and the reliability of their reserves. For example, for commercial $A+B+C_1$ category reserves the minimum premium value is accepted: 0% - 1%, for C_2 category reserves the premium is in the range of 2% - 3%. The maximum value of the premium for geological risk is established for the predicted and prospective D category resources and makes 6% - 8%. The premium for natural and geographical risk is 1% - 2% for

regions with medium risk, 3% - 4% for regions with high risk and 5% - 7% for regions with a very high development risk.

In general, the total risk premium can vary from 1% to 15%, and the final discount rate – from 11% to 25%. The given values of discount rates can be used in calculating the income received or lost.

Economic Effect in Related Industries

The hydrocarbon resources development of the regions under consideration along with direct sectoral effects is accompanied by a set of systemic effects, in particular: socio-economic, innovation-technological, ecological, regional and geopolitical. Note that the last of listed effects defy the formalized cost valuation, therefore, the procedure for coordinating investment decisions on this criterion, as a rule, is carried out using expert assessment methods.

As a quantitative measuring instrument of systemic effects, it is proposed to use the predicted value of GDP additional growth, caused by the implementation of the relevant project (multiplier effect), which is formed due to the additional development of related industries and manufactures, the corresponding development of infrastructure and social sphere (E_{RI}). The application of the multipliers theory is based on the results of calculating the promising inter-industry balance.

The multiplier in macroeconomics is a numerical coefficient that shows how many times the final indicators of economic development will change with the growth of investment or production in the analyzed branch of activity. Since in our case, the added value is estimated, the multipliers for added value (GDP growth) are used, which arise in related sectors of the economy per unit of investment in the evaluated projects. The magnitude of the multiplier effect depends on the share of imported products, technologies and services used. A decrease in the share of imports increases the values of the multipliers. With a view to current sanction restrictions on Russia and the maximum import substitution policy pursued by the government, below we give the multiplier values which would reflect a total abandonment of imports. In other words, the following values and results calculated on their basis correspond to the maximum estimate of the multiplicative effect. The multiplier values in the main sectors of the economy are given in Table 2 and are discussed in detail in (Shirov & Yantovskii, 2011).

Table 2 – Estimation of operational multipliers in the most important sectors of economy with no account of imports

Activity type	Multipliers (operational)
Crude oil production	1.35
Natural gas production	1.31
Oil refining	1.88
Ferrous metallurgy	1.65
Machinery and equipment manufacture	1.87
Sea vessels and equipment manufacture	2.20

Railway transport manufacture	2.57
Construction	2.05
Transportation and storage	1.75

The high capital intensity of hydrocarbon resources development in the Arctic territories, and in particular in the shelf areas of the Arctic seas, suggests that the effect in related industries should be evaluated not only at the development stage using the production multiplier but also at the investment stage with an estimation and use of the investment multiplier according to Gazeev M.H., Rybak A.B. and Volynskaya N.A. (2015) by the formula:

$$E_{RI} = (M_{IN} \times \frac{\overline{K}}{\overline{D}} + M_P) \times \Delta\overline{D}, \quad (2)$$

where:

M_{IN} – investment multiplier;

M_P – production multiplier;

$\overline{D}$ – average annual discounted gross revenue from hydrocarbon production;

$\overline{K}$ – total discounted capital investments;

$\Delta\overline{D}$ – growth in the annual discounted gross revenue, which is equal to $\overline{D}$ for new investment projects.

The value of the investment multiplier is calculated by the formula:

$$M_{IN} = \sum_1^P \alpha_i \times M_i\ , \quad (3)$$

where:

i - number of identified related industries or industrial complexes, $i = 1,\ldots, P$;

P – number of industrial areas identified within the project's capital costs;

α_i – the share of funds spent on the products of the i-th industry in the structure of project's total capital costs, $\sum_i^P \alpha_i = 1$;

M_i – operational multiplier of the i-th industry.

Due to the fact that the structure of capital costs can vary significantly from one project to another depending on geological, natural and other factors, as well as on the technology for developing the resources of a particular subsoil block, the value of the investment multiplier (M_{IN}) should be determined for each project (block) individually.

Potential Environmental Damage

Let us turn to the issue of quantitative accounting of environmental risks. Securing a zero discharge system during hydrocarbon resource development in the Arctic territories (especially the Arctic shelf) requires the implementation of environmental protection measures in its entirety, including

insurance payments. The expenses in all these mentioned areas are included in the total project investment and costs. Nevertheless, there remains the risk of a major accident, which in its consequences can be attributed as an environmental disaster.

It is especially important to take into account the probability and damages of such an accident in the course of development of the shelf resources, since there is not yet any technology which can preclude catastrophic accidents on oil and gas platforms operating in the severe natural conditions of the Arctic shelf. Of course, the probability of an accident like the one that occurred in the Gulf of Mexico is not high, but it cannot be ruled out. Depending on the degree of exploration and economic and geographic location of the oil and gas fields of the continental shelf, it is suggested, by analogy with Table 1, to classify the objects of the hydrocarbon resources development in different water areas according to the degree of ecological risk.

On the basis of the risk assessment presented in the Declaration of Industrial Safety of the Offshore Ice-Resistant Fixed Platform "Prirazlomnaya" coordinated with the Ministry of Emergency Situations of the Russian Federation on 24.08.2009 № F-03/03-203 and Rostechnadzor (Federal Environmental, Industrial and Nuclear Supervision Service) on 25.09.2009 № 07-07/3146, and a number of other sources, the authors carried out an expert assessment of the probability of an environmental disaster occurrence during the development period for different regions. The results of the analysis are shown in Table 3.

For the Arctic territories, the ecological component is a necessary attribute of valuation of any investment project (Strategy for Development of Russian Federation's Arctic Zone and Provision of National Security up to 2020 approved by President of Russia; Federal Law 'On Environmental Protection' of 10.01.2002 № 7-FZ). The damage caused by environmental pollution is taken into account when making management decisions on any level, especially in view of the commitment by the oil companies to compensate for all the costs incurred in neutralizing the spill consequences which can be enormous in case of the territories under consideration. It is enough to quote the figures in connection with the explosion on the BP oil platform in the Gulf of Mexico in April 2010. The company only managed to stop the oil spill on August 4, 2010. The accident resulted in about 5 million barrels of crude oil spilled over. According to Neft I Kapital (Oil and Capital) e-edition (2013-1) and (2013-2), BP agreed to pay out compensation for the damage caused by the accident in the amount of 42 billion USD, while the total losses exceed 90 billion USD together with additional claims from several states.

Despite the high damage estimates from the accident described above, ecological damage will be much higher in the Arctic shelf environment. First of all, it is technically extremely difficult to ensure a sufficiently complete oil spillage recovery in ice conditions, besides the natural mechanisms of oil residues decomposition do not work in the Arctic latitudes.

Table 3 – Ecological risks classification in relation to economic and geographical location of oil and gas fields

Risk degree	Region characteristics	Location		Probability of major accident, %	Duration of accident, days
		Water area	Onshore		
Medium	New region with poorly developed infrastructure, bordering on developed regions	-	Murmansk and Arkhangelsk regions, North of Komi, Nenets AO, islands in the Arctic Ocean	2 – 3	20 - 60
High	New region with no infrastructure and/or complicated ice situation	Bering, Pechora, Barents, Kara Seas	North of the Republic of Sakha, Taimyr AO, Kamchatka Region, Chukotka AO, Yamal-Nenets AO	4 – 7	60 – 150
Very high	Unexplored region with no shore infrastructure, severe ice conditions, requiring special technical solutions to develop hydrocarbon resources	Seas of the Eastern Arctic	-	8 – 10	150 – 180

In the first approximation the value of ecological damage (D_E) can be estimated from the formula:

$$D_E = k_E \times \bar{q} \times t, \quad (4)$$

where:

k_E – damage (penalty) from a spill of 1 ton of oil,

$k_E = k_u \times p_u$

k_u – unit economic damage from the spill of 1 ton of oil;

p_u – probability of a major accident (oil spill);

$\bar{q}$ – daily oil spill, t/day,

t – duration of the accident, days.

The value of the specific ecological damage from the spill of 1 ton of oil (k_u), taking into account the available actual data, is estimated by us at 60,000 USD per 1 ton of spilled oil in case of an

accident on the continental shelf and 6,000 USD in case of an accident onshore. The remaining parameters are random values. A quantitative assessment of the probable ecological damage resulting from a major accident for each project can be obtained using simulation methods, in particular the Monte Carlo method. It should be noted that depending on the location of the subsoil area, the probability of a major accident can vary from 2-3% for regions with a medium development risk, up to 8-10% for regions with low exploration level and severe ice conditions (very high development risk). Accordingly, the duration of the accident can vary from 20 days to six months. Note that the category of medium development risk does not include any of the Arctic water areas.

Conclusions

Based on the accumulated technical and economic information on subsoil blocks containing hydrocarbon resources and located in different water areas of the Russian Federation Arctic shelf, the authors carried out a large amount of experimental calculations to determine the values of traditional (income-based) and proposed (complex) efficiency criteria of their development. The results of these calculations presented in Table 4 showed an exceptionally high influence of the conjugate effects on the estimates obtained. In addition, not only the values of the efficiency indicator change, but so do the preferences for specific subsoil areas of development. Moreover, taking into account the conjugate effects in a number of cases changes the economic priority of development of the water areas as a whole. Note that for the comparability of obtained results, for each water area average estimates are given for hydrocarbon resources of same groups of exploration level.

It is necessary to stress once again that the estimates presented in Table 4 are obtained from the hypothesis that all imports have been substituted in full in related industries, thus maximizing the value of multipliers, effects in related industries, and consequently, integral economic effect. More imports of technology, equipment, materials, etc. will reduce the multiplier effect. Respectively, the share of possible environmental damage will become higher in the structure of an integrated criterion.

Table 4 – Results of calculating economic efficiency of developing the Arctic seas continental shelf prospective structures

Water areas	Direct aggregate effect (NPV_0) (traditional criterion)	Multiplicative effect in related industries	Probable ecological damage	Complex economic effect
	USD/bbl			
Pechora Sea	42.1	28.8	2.1	68.7
Laptev Sea	0.3	40.0	7.1	33.2
Bering Sea	-1.7	41.6	16.1	23.8
Kara Sea	3.1	22.6	3.5	22.2

Barents Sea (north)	10.0	6.7	4.2	12.5
Barents Sea (south-west)	10.9	5.9	6.3	10.4

The calculations were carried out under the following assumptions:

- price of crude oil 70 USD per barrel;
- exchange rate 60 RUB / USD;
- average values of the discount rate from Table 1 were used for the relevant water area and exploration-degree;
- ecological damage was estimated using the data contained in Table 3.

From the analysis of the data in Table 4, it follows that with regard to the criterion of direct economic efficiency (NPV_0) the development of the Arctic offshore areas in the Laptev Sea, Bering Sea and Kara Sea is least effective. Furthermore, the development of hydrocarbon resources of the Bering Sea shelf is wholly uneconomic, since the specific economic efficiency of their development is negative. However, the development of oil and gas resources of these territories may give a powerful impetus to the development of related sectors (science and industry), thereby increasing the potential of public economic efficiency and the priority of their development.

Therefore, the formation of an assessment criterion taking into account the strategic goals of the state (maximizing GDP and environmental security) can significantly change the outlook on the economic efficiency of Arctic hydrocarbon resources development and its predictive estimate. This means there is a high relevance for the use of such approaches in creating programs for economic development in the Arctic zone of Russian territories. Along with that, the use of domestic technologies and equipment has a great impact on the efficiency. In light of this, the priority of development of the resources should be determined in accordance with the level of readiness of related industries.

References

Gazeev M.H., Rybak A.B, Volynskaya N.A. (2015). Methodical aspects of estimation of oil and gas resources of the continental shelf and Far East. *News from higher educational institutions. Sociology. Economics. Politics*. Tyumen, TSOGU, 1 (44): 45 – 48.

Nazarov V.I., Kalist L.V. (2006). Ekonomicheskaya otsenka neftegazovogo potentsiala arkticheskogo shel'fa Rossii [Economic Assessment of Oil and Gas Potential of the Arctic Shelf of Russia]. *Neft'GazPromyshlennost' [OilGasIndustry],* St. Petersburg, 6(26): 22 – 24.

Regional and local US authorities require 34 billion USD from BP. (2013-1). *Oil and Capital*. oilcapital.ru/company/195904.html.

Required BP expenses caused by the Gulf of Mexico disaster. (2013-2). *Oil and Capital*. oilcapital.ru/company/195940.html.

Shirov A.A, Yantovskii A.A. (2011). Otsenka mul'tiplikativnykh effektov v ekonomike. Vozmozhnosti i ogranicheniya [The estimation of multiplicative effects in the economy. Capabilities and limitations]. *ECO Journal*, Novosibirsk, The editorial board of ECO, 2: 40 – 58. https://ecfor.ru/publication/otsenka-multiplikativnyh-effektov-v-ekonomike.

Shpurov I.V. (2017). Syr'yevaya baza uglevodorodnogo syr'ya rossiyskoy Arktiki i kontinental'nogo shel'fa. Perspektivy osvoyeniya. [Raw materials base of hydrocarbon raw materials of the Russian Arctic and continental shelf. Prospects for development.] rao-offshore.ru/netcat/RAO-2017/1/Shpurov_GKZ.pdf.

Section VII:

The Polar Silk Road & Arctic Maritime Development

China's Arctic Policy & the Polar Silk Road Vision

Kong Soon Lim

On 26 January 2018, China released the much-anticipated White Paper that sets out its policies and position on the Arctic. China understands the economic opportunities and the territorial challenges in the region as it seeks a greater role in Arctic development. The White Paper outlines China's ambitious plan to develop a Polar Silk Road across the Arctic. It also summaries China's policy goals and the principles guiding its conduct. As a non-Arctic state with no territorial sovereignty in the region, China's ambition would be dependent on its cooperation and the alignment of its interest with Arctic states. In considering China's Arctic policy, this paper considers three pertinent questions: (1) what are China's key interests in the Arctic, (2) what are the aims and basis of China's Arctic policy as outlined in the White Paper and (3) how does China's Arctic policy complement with its Polar Silk Road vision as an extension of its Belt and Road Initiative.

Introduction

Global warming is accelerating the transition of the Arctic from an ice-covered region to an ice-free ocean at an unprecedented rate. Estimates suggest a nearly ice-free summer Arctic by 2030 as the region continues to warm at approximately twice as fast as the global average (e.g., Wang & Overland, 2012). The thawing ice has overwhelmingly altered and threatened the region's ecosystem while unlocking its economic potential that was previously inaccessible due to the dense ice. Unsurprisingly, this has led to renewed interests on Arctic governance and attracted the attention of external actors, including China. China's engagement in the Arctic flows from the Arctic's geographical location that provides a range of long-term economic opportunities and a platform for scientific research – in summary the Arctic provides China a shorter and reliable shipping route, access to natural resources and insight on climate change (e.g., Chen, 2012: 361).

Kong Soon Lim is a pupil advocate and solicitor at Messrs. Dorairaj, Low & Teh, Kuala Lumpur.

The admission of China as an observer in the Arctic Council in May 2013 marks the pinnacle of China's Arctic diplomacy. China together with five other states (India, Italy, Japan, Singapore and South Korea) were granted observer status during the Arctic Council's Kiruna Ministerial Meeting, in which the admission of these states was a political decision whose time had come. The exclusion of China would only risk further drawbacks and possibly undermine the Arctic Council credibility and legitimacy, considering China's active involvement in Arctic affairs and its contribution in Arctic research that far exceeds the contribution of Arctic States themselves (Ingimundarson, 2014: 191). The admission of China and the other observer states in the Kiruna Ministerial Meeting was timely to strengthen the Arctic Council position and to discourage the emergence of other regimes or bilateral relations as alternative avenues for interested parties to express their interest in the Arctic (ibid.: 191-194). Nonetheless, politics and diplomacy on the Arctic is now unpredictable and it is more crowded than before with the presence of China and other new observer states (Lanteigne, 2014: 11).

As an external actor outside the region, China's participation as an observer remains an ideal and perhaps the only pathway that allows China to gain formal access to the Arctic's governance and the decision-making process (Graczyk & Koivurova, 2014: 225). Whilst observers are generally perceived as weak actors in the absence of voting rights in the Arctic Council's decision-making process (Chater, 2016: 173), China's observer status would enable Beijing to assert greater influence in the Arctic Council in setting future agendas on Arctic development.

China recognises the Arctic Council as the key policy forum in addressing Arctic-related issues. In acceding to the Arctic Council, China had undertaken a 'laborious process' over the past decade in vying for an approved observer status (Amatulli, 2017: 104). China's admission in the Arctic Council was not immediate. Its application for an observer status in three previous occasions, in 2006, 2009 and 2011 were denied before succeeding in its fourth attempt in 2013, though it was granted an ad-hoc observer status since 2007 whilst its application was being reconsidered. The application for an observer status is assessed against a set of non-exhaustive criteria and it requires a unanimous approval from all Arctic states. Annex 2 to the Arctic Council Rules of Procedure outlines the admission procedure and criteria. Amongst the key criteria imposed are: firstly, the applicant accepts and supports the objective of the Arctic Council, secondly, the applicant recognises the sovereignty and jurisdiction of Arctic states in the region and thirdly, the applicant accepts the framework of the United Nations Law of the Seas (UNCLOS) to govern the Arctic. Despite these criteria, the consideration on the application for observer status discussed during the Kiruna Ministerial Meeting was characterised as 'old-fashioned intergovernmental deal-making' (Ingimundarson, 2014: 190).

Salient issues concerning China's interest in the Arctic have emerged in recent years. The discourses in literature have also attempted to provide a comparative approach on China's Arctic ambitions alongside with the interest of Arctic states (e.g., Lackenbauer et al., 2018; Koivurova et al., 2017). The existing literature has been divided on China's Arctic ambitions. The idealist views China as a cooperative and collaborative partner because it is in its best interest to do so (e.g., Alexeeva & Lasserre, 2012; Liu, 2017). On the contrary, the pragmatist argues that China's position in the Arctic are merely expressed by 'unctuous and circumlocutory diplomatic language' that are inconsistent with its practices (Wright, 2011: 2). Although it is unlikely that the release of the White

Paper would alter these views, the long-awaited policy document is a starting point to understand China's Arctic policy.

The aim of this paper is to examine China's Arctic policy as outlined in the White Paper and its vision for a Polar Silk Road. This paper proceeds in the following three parts. The first section considers China's key interests in the Arctic. The second section examines the White Paper to provide a better understanding on the aims and basis of China's Arctic policy. The third section considers China's vision of the Polar Silk Road as part of its grand strategy under the Belt and Road Initiative. Whilst the release of the White Paper is much welcome as it has shed light on China's Arctic policy, the penumbra of doubt remains visible.

China's Interests in the Arctic

The White Paper describes China as an 'important stakeholder' in the Arctic and a 'near-Arctic State'.[1] China describes itself as 'one of the continental States that are closest to the Arctic Circle' (State Council Information Office of the PRC, 2018) despite the absence of any Chinese territory above the Arctic Circle or an Arctic border. By extension of this self-defined and self-descriptive identity, China views itself as a global power with a stewardship role in Arctic governance. It is also an Arctic stakeholder through its vested interest in the region.

In a press briefing on the release of the White Paper, Chinese Vice-Minister of Foreign Affairs, Kong Xuanyou emphasised two positions that China will adopt in its role as an Arctic stakeholder – firstly, China will not be overstepping and secondly, China will not be absent (Kong, 2018). He emphasised that by 'not overstepping' (*bu yuewei* 不越位), China acknowledges it is a non-Arctic State and will not intervene in the affairs between Arctic States and within the region. Thus, the conduct of Chinese entities and individuals in the Arctic will be based on international law and the respective domestic laws of Arctic States (ibid). In 'not being absent' (*bu quewei* 不缺位),[2] China will participate constructively in cross-regional and global issues concerning the Arctic (ibid). The first position reflects China's assurance on its non-interference on the affairs between Arctic states whilst the second position reflects China's commitment to promote cooperation in Arctic governance. Based on these positions, it can be inferred that despite the growing Chinese presence in Arctic governance, China will retain its neutral approach on contentious matters between Arctic states, especially in relation to the sovereignty claims and disputes concerning Arctic boundaries.

China's admission as an observer certainly does not reflect an absolute recognition by the Arctic Council on its 'stake holding' or interests in the Arctic. Like other observer states in the Arctic Council, China's interests can be summarised into two broad aims: firstly, to contribute to the governance of environmental issues that are of global concern and secondly, to benefit from the economic potential of the Arctic region (Chater, 2016: 173-174). Both aims are summarised in the following paragraph of the White Paper:

> The natural conditions of the Arctic and their changes have a direct impact on *China's climate system and ecological environment*, and, in turn, on its economic interests in agriculture, forestry, fishery, marine industry and other sectors. China is closely involved in the trans-regional and global issues in the Arctic, especially in such areas as *climate change, environment, scientific research, utlisation of shipping routes, resources exploration and exploitation, security and global governance.* These issues are vital to the existence and development of all countries and humanity, and directly

> affect the interests of non-Arctic States including China (State Council Information Office of the PRC, 2018).

In analysing the first limb of China's broad interest on the governance of the Arctic environment, China understands the need to respond to climate change in the Arctic. Chinese researchers have emphasised that the effects of climate change in the Arctic correlate with the changes in China's environment and ecology (e.g., Li & Leung, 2013; Ma et. al., 2014; Chen et. al., 2013). The thinning of the Arctic's sea ice has also contributed to the abrupt climate shift in China due to alternations in atmospheric circulation at high altitudes. For instance, the severe snowstorms that hit central and southern China in 2007 to 2008 are attributed to the warming of the Arctic (Liu et. al., 2012). Likewise, the extreme haze pollution in the East China plains in 2013 was due to poor ventilation conditions caused by the loss of Arctic sea ice in the preceding Autumn and boreal snowfall in the earlier Winter (Zou et. al., 2017).

As the largest developing state in the northern hemisphere, China has experienced the effects of these climate changes that have in turn affected its industrial and agricultural production (Chinese Government Portal, 2010). Whilst the implications of climate change may have an adverse effect on China's economic growth, such effects may alter the political stability of the Chinese Communist Party that relies on strong economic growth as the foundation of its stability (Jakobson & Lee, 2013: 4). Although the anecdotal suggestion may appear far-fetched, the plausibility of social unrest caused by climate change are further amplified by the vast population and landscape of China.

On the second limb of China's broad interest to harness the economic potential of the Arctic region, the Arctic's strategic location boast abundance in energy resources and it is likely to be an important transportation route for international trade. As the world's largest energy consumer, China requires a constant supply of energy resources to sustain its economic growth. The Arctic's untapped supply of natural gas and oil would meet China's demand for energy resources and the need to diversify its energy supply (Gavrilov & Kripakova, 2017: 74). China also seeks to reduce its carbon footprint and address climate change by optimising its energy usage through the reduction of its coal-dominated energy consumption (NDRC, 2017: 10-12). In a joint document released by the Chinese National Development and Reform Commission and the Chinese National Energy Administration, Beijing set out its aim to shift China's energy consumption towards natural gas by 15% by 2030 (NDRC & NEA, 2016: 8). Estimates suggest that China's demand for natural gas will grow by over three percent annually until 2030 (Xinhua, 2017). Beijing has also announced plans to expand the country's pipeline for the supply of crude, refined oil and natural gas to ensure the steady supply of imported energy resources to its inland cities (NDRC & NEA, 2017). Hence, the Arctic's supply of natural gas and oil is crucial in improving China's energy supply.

Additionally, China foresees the economic prospects of the Arctic as the 'golden route' in shipping (Brady, 2017: 63). China favors the opening of the Northern Sea Route that is the shortest shipping route linking East Asia to Europe and North America. The Northern Sea Route would provide China a safe and reliable shipping route, which is crucial in importing the supply of resources and exporting Chinese product. It is estimated that Arctic shipping through the Northern Sea Route would shorten shipping trips between northern Chinese ports and northern Europe as well as the east coast of America by at least 40% as compared to conventional routes via the Suez Canal or Panama Canal (Chen, 2012: 361). As China's foreign trade currently passes through the saturated

and unreliable Straits of Malacca and the Suez Canal, where traffic capacity is at its peak and piracy is rampant, the Northern Sea Route provides China an alternative shipping route and would enhance the economic development of the coastal areas in the northeast region of China (Gavrilov & Kripakova, 2017: 74). Considering the ongoing trade war between China and the United States, the Arctic and the Northern Sea Route would also provide China an assured shipping passage that is not in the control of the United States Navy (ibid.).

China's Arctic Policy

China's Arctic interests as described in the above section demonstrates the proliferation of its global interest beyond its geographical borders as it emerges as a global power. China's White Paper on its Arctic policy was published in early 2018 amidst concerns and debates on China's role as an observer in the Arctic Council. The release of the White Paper may have come as a surprised to those who were unexpecting it (e.g., Jakobson & Lee, 2013: 11),[3] but for others the much-anticipated publication that was expected to clarify China's Arctic policy is long due (e.g., Lanteigne, 2016: 2; Sun, 2013: 6).

Nonetheless, the White Paper should not be viewed as a new revelation on China's Arctic policy but rather an affirmation of its existing policies. The contents of the White Paper have been articulated by Chinese officials in recent years. The policy goals and basic principles of its Arctic participation as stated in the White Paper have been raised by Chinese officials on a few previous occasions. Accordingly, the White Paper reflects Beijing's commitment to the Arctic and growing confidence as it attempts to reduce its Arctic's strategy in writing as an official policy document.

All Arctic states and a few observer states have released their respective policy papers on their Arctic strategy. The culmination of China's Arctic policy is relatively recent compared to other Arctic states and it remains a work in progress (Lanteigne, 2016: 2). Beijing is hesitant to outline its policies in writing unless it is necessary, or it is in its best interest to do so. Unlike its Western counterparts, Beijing has only published official and translated White Papers on pressing and key policy issues over the past decade. Hence, the release of the White Paper demonstrates the significance of the Arctic region among its policymakers. The delay in its release can only be sensibly attributed to Beijing's hesitance to outline its Arctic policy officially as it may restrict its ability to adapt with diplomatic and political changes in the rapidly transforming region.

The White Paper begins with an overview of the current Arctic situation before elaborating on China's goals, basic principles, policies and position on the Arctic governance. The foreword of the document states that the intention of the White Paper is:

> '… to expound its basic positions on Arctic affairs, to elaborate on its policy goals, basic principles and major polices and positions regarding its engagement in Arctic affairs, to guide relevant Chinese government departments and institutions in Arctic-related activities and cooperation, to encourage relevant parties to get better involved in Arctic governance, and to work with the international community to safeguard and promote peace and stability in, and the sustainable development of, the Arctic (State Council Information Office of the PRC, 2018).'

Based on the foreword, the White Paper is not only intended to dispel the negative perception among the international community on China's Arctic interest, but it is also intended as a guidance document for coordination among governmental agencies and institutions. As China does not have a specialised governmental authority in managing its Arctic affairs, the competency of

different issues may fall within several governmental agencies and it would require proper coordination to overcome bureaucracy and to achieve a common goal. It is estimated that there are at least seventeen agencies involved in China's Arctic affairs demonstrating the broad and complex nature of China's policymaking and execution process (Brady, 2017: 114). For instance, the Ministry of Foreign Affairs manages its diplomatic agenda and foreign policy in the Arctic. Matters of national maritime interests are reviewed by the State Oceanic Administration while the Chinese Arctic and Antarctic Administration organises, coordinates and manages Chinese polar exploration. The interactions between these governmental agencies with other scientific institutions and research universities are facilitated by the Chinese Academy of Sciences and the Chinese Academy of Social Science (Gavrilov & Kripakova, 2017: 76). Hence, the White Paper would be a reference point in its internal coordination as it encapsulates the common policy that China intends to push forward in its' Arctic agenda.

The White Paper elaborates on the history of China's participation in the Arctic with the aim to highlight and legitimise its interest in the region. China's earliest participation in Arctic affairs is dated back to 1925 when it ratified the Svalbard Treaty (initially referred to as the Spitsbergen Treaty) that confers it and other contracting States the right to carry out commercial activities and scientific research over the archipelago of Spitsbergen. There were few and insignificant Chinese activities in the Arctic until the late 1990s when China begun to focus its Arctic interest on scientific research. Over the past two decades, China has conducted numerous Arctic expeditions using its icebreaker ship and research vessel *Xue Long*. It has also built the Arctic Yellow River Station in 2004 as a research base. Chinese commentators have emphasised that China's research objectives focus on climate change in the polar region, which has direct impact on China's weather that in turn affects China's ecological environment, agricultural and economic activities (e.g., Tianbao & Miaomiao, 2017: 24; Guoqiang, 2013: 29).

China's policy goals in the Arctic are four-fold: 'to understand', 'to protect', 'to develop' the Arctic and 'to participate' in the Arctic's governance (State Council Information Office of the PRC, 2018, Jan 26). The White Paper describes that these goals are necessary to 'safeguard the common interests of all' and to 'promote sustainable development' (ibid). These goals are correlated and are integral to each other as China needs a deeper understanding of the Arctic to enable the protection of the Arctic's environment, social and economic development as well as its participation in the Arctic governance (Kong, 2018).

In realising China's commitment, the White Paper outlines four basic principles guiding its participation in Arctic affairs: 'respect', 'cooperation', 'win-win result' and 'sustainability' (State Council Information Office of the PRC, 2018). The first two principles of 'respect' and 'cooperation' are reciprocal values that China seeks to push forward while the latter two principles of 'win-win result' and 'sustainability' refer to the nature of the outcome that it intends to achieve through its participation. In acknowledging the values of 'respect' and 'cooperation', China understands that Arctic affairs are multi-faceted and complex involving multiple stakeholders. The outcome of a 'win-win result' and 'sustainability' can be achieved if stakeholders pursue common aims through coordinated development. Hence, these principles demonstrate a utopian view that no stakeholder or the Arctic environment should suffer loss at the expense of development. The White Paper addresses five key policies area that are summarised succinctly as follows (ibid.):

1. Firstly, concerning China's scientific exploration and understanding of the Arctic, China seeks to promote scientific expedition and research in the Arctic.
2. Secondly, in relation to the protection of the Arctic's environment, ecosystem and climate change, China reiterates its commitment to tackle global environmental challenges.
3. Thirdly, on the utilisation of Arctic's shipping routes and the exploitation of its natural resources, China advocates for the protection and rational use of the abundance Arctic resources through cooperation.
4. Fourthly, on China's participation in the Arctic governance, the White Paper emphasises China's commitment to improve and complement the existing Arctic governance regime. China intends to actively engage at global and regional level and promote cooperation in all fields.
5. Lastly, China believes that the promotion of peace and stability in the Arctic is necessary to serve the fundamental interest of all states.

In all of the above policies, the White Paper emphasises on China's reliance on the framework of international law treaties and general international law. For instance, in relation to scientific research in the Arctic, China expresses its respect of the exclusive jurisdiction of Arctic states and the freedom of scientific exploration by all states in the high seas of the Arctic must be respected (ibid). Similarly, it maintains that the development of Arctic shipping routes must be in accordance to UNCLOS, general international law and the freedom of navigation (ibid).

The four basic principles and five key policies elucidated in the White Paper are nothing new. The first three basic principles outlined in the White Paper have been raised briefly by the Chinese Foreign Minister, Wang Yi at the Third Arctic Circle Assembly in October 2015. The brief outline was followed by a keynote speech delivered by Chinese Vice Foreign Minister, Zhang Ming who presented six specific points that have close resemblance with the current policies presented in the White Paper. The six points summarised from his speech are as follows:

Six Specific Policies on China's Arctic Affairs

1) 'further explore and understand the Arctic'
2) 'protect and rationally use the Arctic'
3) 'respect the inherent rights of Arctic countries and the Indigenous people'
4) 'respect the rights of non-Arctic countries and the overall interests of the international community'
5) 'build a multi-tiered Arctic cooperation framework for win-win results'
6) 'uphold the Arctic governance system based on existing international law'

(Chinese Ministry of Foreign Affairs, 2015).

The nearly identical content of the White Paper with the speech delivered by the Chinese minister in 2015 suggests that the White Paper was drafted by the Chinese Ministry of Foreign Affairs.

Whilst the relevant provisions of UNCLOS are not cited in the White Paper, the repeated reference to UNCLOS demonstrates China's reliance on its rights and freedoms of the high seas of the Arctic Ocean to further its interest in the Arctic.[4] Despite citing the intention to safeguard

'common interests' as one of its goals, the White Paper did not draw any references to the term 'global commons'. Although the Arctic boundaries are deeply contested among Arctic states, no state has sovereignty over the high seas of the Central Arctic Ocean – the *terra nullius* area. Hence, China's rights and freedoms in the high seas of the Arctic Ocean are legally justified. As controversially described by Admiral Yin Zhuo of the People's Liberation Army in 2010, 'the North Pole and the sea area around the North Pole belong to the 'commonwealth of the people of the world' and as China has one-fifth of the world's population, its role in the Arctic is 'very much not being absent' (*bu ke quewei* 不可缺位) (Chinanews, 2010).

The White Paper describes a similar position in a softer tone drawing a clear distinction between areas of the Arctic that belong to the sovereignty of Arctic states and those that belong to the global commons.

> *The continental and insular land territories in the Arctic cover an area of about 8 million square kilometers, with sovereignty over them belonging to Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden and the United States respectively.* The Arctic Ocean covers an area of more than 12 million square kilometers, in which coastal States and other States share maritime rights and interests in accordance with international law. These coastal States have within their jurisdiction internal waters, territorial seas, contiguous zones, exclusive economic zones, and continental shelves in the Arctic Ocean. *Certain areas of the Arctic Ocean form part of the high seas* and the Area (State Council Information Office of the PRC, 2018).

Tellingly, the area of high seas or international waters of the Central Arctic Ocean that is of interest to China spans over 2.8 million km^2, nearly the size of the Mediterranean Sea. Like any other state, China may exercise its non-exhaustive freedoms over this area.[5]

China's reliance on UNCLOS as the basis of Arctic governance is tactical. The reliance on UNCLOS is best described as and it is 'the path of least resistance' considering its near universal adoption (Jarashow et al., 2006: 1587). Likewise, international law provides an efficient mechanism for Arctic governance as it is a common ground for cooperation and multilateralism. Koivurova sums it rightly in describing China's Arctic policy as an approach that 'banked so heavily on international law' (Koivurova, 2018). The White Paper cites China's commitment on international agreements such as the UN Charter, rules of the International Maritime Organisation and international agreements on environmental protection including the UN Framework Convention on Climate Change, the Kyoto Protocol and the Paris Agreement (State Council Information Office of the PRC, 2018). From the perspective of governance, Koivurova elaborates that China relies on the framework of international law because it is merely an outsider State of the Arctic region. By relying on the various international regimes and treaties that it is a party, China has effectively placed itself in the driver seat being one of the key players in Arctic governance (2018).

The White Paper must be viewed against the backdrop of Beijing's foreign policy that has evolved over the past few decades. The release of the White Paper is a significant departure and abandonment of the often-cited Deng Xiaoping maxim of 'concealing one's capability from its outward display' (*tao guang yang hui* 韬光养晦). China no longer intends to keep a low-profile diplomacy; slowly but gradually it seeks to challenge existing regimes and norms of international law. The departure should not be viewed with surprise as China has been advocating for greater status in international diplomacy while being mindful of existing rules and norms (Lanteigne, 2014: 5). As China rises to become a global power, it seeks to possess greater influence in international

affairs as it shapes its own foreign policy identity, instead of responding or following the footsteps of other great powers (ibid).

Under the administration of Hu Jintao, Beijing propagated the foreign policy concept of 'peaceful rise' (*heping jueqi* 和平崛起), which refers to China's aim to achieve peaceful economic development without destabilising the existing international order (Glaser & Medeiros, 2007: 293-296). The concept does not challenge or replace the structure of the international community, but it seeks to foster equality in China's rise with other great powers without tilting the global balance of power or hegemony (ibid.). Following from uneasiness provoked by the term 'peaceful rise' outside China, the term was rephrased as 'peaceful development' in Chinese official speeches and documents, despite no changes in the thrust of the concept (ibid: 301). A new phase of China's foreign policy is manifested under Xi Jinping to realise the 'Chinese dream' (*zhongguo meng* 中国梦) of a successful and modernised China. Whilst the principle of 'peaceful development' remains as an interest in Beijing's foreign policy, its core national interests are now of equal or greater importance than ever before to realise the 'Chinese dream' (Zhang, 2015: 9). In protecting the 'Chinese dream', Beijing has expressed that its legitimate national interest would not be sacrificed at the expense of maintaining peace (ibid.).

To a large extent, Beijing's stance is no different from the default foreign policy of other states that generally seeks to safeguard their individual national interest before the pursuit of other international matters. However, the reinterpretation of Beijing's 'peaceful development' in light of realising the 'Chinese dream' has proven difficult. In reconciling both concepts, the notion of 'peaceful development' in achieving the 'Chinese dream' does not refer to the absence of any conflict (ibid). Accordingly, if necessary Beijing may choose to adopt a more confident and tough stance to advance its national interest, including in its role in Arctic governance.

As China's actions in the Arctic are now intensely scrutinised by others, the White Paper demonstrates its proactive diplomacy to ease concerns on its interest in the Arctic. Overall, the White Paper represents a cumulation of China's policies on its various engagement in the Arctic and its strong emphasis on international law in the Arctic governance. China is indeed an enthusiastic participant in the Arctic but its role and presence in the region represents new challenges and opportunities.

The Polar Silk Road Vision

China envisions the Arctic Ocean route to be part of its grand strategy in establishing the Belt and Road Initiative (BRI). The BRI is an ambitious plan under Xi Jinping to realise the great rejuvenation of China through enhanced connectivity and trade flow between across the three major continents of Asia, Europe and Africa (Xinhua, 2015). The grandiose action plan of the BRI unveiled in 2015 aims to establish the Silk Road Economic Belt and the 21st-Century Maritime Silk Road (ibid). In June 2017, the Chinese National Development and Reform Commission and the State Oceanic Administration jointly issued a document entitled Vision for Maritime Cooperation under the BRI that outlines China's vision to synchronise development plans and joint actions for maritime cooperation in propelling the BRI (NDRC & SOA, 2017). The document declared the maritime passageway of the Arctic Ocean as amongst the Chinese 'blue economic passage' that extends China's economic corridor with Central Asia, the Balkans, Russia, Europe and North America (ibid.).

The White Paper is the first official policy document to set out China's vision of the Polar Silk Road in relation to the development of Arctic shipping routes. Despite two brief mentions of the term in the White Paper, Chinese Vice-Minister of Foreign Affairs, Kong Xuanyou in a press briefing elaborated that the Polar Silk Road is also an alignment with the Russian-led Eurasian Economic Union and potentially other Arctic states (Kong, 2018).[6] As a non-Arctic state, China understands the challenges in achieving its vision in the absence of cooperation from Arctic state. In this regard, China's admission as an observer in the Arctic Council would enable Beijing to increase its political and economic influence in the region to ensure its interests are equally considered and respected.

China's Arctic diplomacy with individual Arctic states represents the 'species' of the highly focused bilateral relations, in which the Polar Silk Road is the 'genus' with characteristics of the overarching grand strategy of the BRI. The diplomatic jargons used by Chinese officials in describing the principles of the BRI (i.e., 'mutual respect', 'consensus-building', 'common development', 'common prosperity', 'win-win cooperation' and 'sustainable achievements') are also echoed and encapsulated in the four basic principles of China's Arctic policy as discussed in the above section.

The BRI and the Polar Silk Road vision are the product of globalisation to facilitate global trade and economic integration. The Polar Silk Road would enable China to diversify its maritime routes whilst reducing journey length and fuel cost. China understands the importance in the opening of Arctic shipping routes to boost its export-driven economy. In lobbying for its Arctic shipping agenda, Chinese state-owned shipping company, China Ocean Shipping Company (COSCO) has sent vessels transiting along the Northern Sea Route and expressed interest to increase its engagement in the region (Staalesen, 2016).

Prior to the release of the White Paper, China's vision of the Polar Silk Road has gained grounds in various cooperation with Arctic states. The Chinese and Russians have embarked jointly on the Yamal Peninsula liquefied natural gas (LNG) project. As Russia is among the world's largest energy exporters and China is the largest energy importer, the gas from the Yamal Peninsula is expected to be exported for Asia. The Arctic plant that has three production lines with a fourth planned, has a capacity of 16.5 million tonnes of LNG per year (Mazneva, 2017; Foy, 2017). China through its state-owned China National Petroleum Corporation and the Chinese Silk Road Fund collectively have close to a 30% stake in the project (ibid). China has also pledged to financially support the second phase of the Russian LNG project at the Gydan Peninsula (Foy, 2017). These projects have led to other projects in the pipeline such as the construction of the seaport of Sabetta and the Kotelny Cape offshore oil terminal both located on the Yamal Peninsula to facilitate the transportation of the LNG by sea to Asia (Sørensen & Klimenko, 2017: 18). In Murmansk, Chinese state-owned China Oilfield Services Limited in partnership with Russian state-owned Gazprom have also embarked on mapping out and drilling the Leningradskoye field, located west of the Yamal Peninsula to discover the extent of hydrocarbon reserves in the area (Staalesen, 2018). It is estimated that the Leningradskoye field holds over 1.9 trillion cubic meters of natural gas (ibid.).

In leveraging on the potential shipping traffic along the North Sea, Finland and Norway have unveiled blueprints for an Arctic Corridor, extending the Finnish and Norwegian railway system to the Arctic and an underground tunnel connecting Helsinki and Tallinn (Xinhua, 2018). The planned route will link Rovaniemi, a Finnish town located on the Arctic Circle to Kirkenes in Norway, allowing connectivity from Europe to the ports of the Arctic Ocean and the Northern

Sea Route (ibid). It is estimated that the railway extension project would cost 3 billion EUR while the tunnel project would cost close to 15 billion EUR, with potential investment from China (Breum, 2018). The journey along the Northern Sea Route coupled with the railway will be the shortest route for transporting goods from Asia to Europe and would potentially increase Sino-European economic trade and cooperation.[7] Finland has also commenced preliminary works to implement the Arctic Connect project that aims to lay nearly 10,500km of optical fibre cable through the Arctic to bridge connectivity between Europe and Asia (Lipponen & Svento, 2016). Once completed, the trans-Arctic cable through Finland will be the new landing area for international data traffic (ibid.), strengthening Finland's position as a hub for technology and data operations on the Polar Silk Road.

In the United States, the Alaska Gasline Development Corporation has entered into a joint development agreement with China's leading oil company, China Petrochemical Corporation (Sinopec), the Bank of China and China Investment Cooperation on the Alaska natural gas project (Feng & Saha, 2018). Whilst a definitive agreement has yet to be finalised, the project is estimated to cost 43 billion USD and is expected to receive 75% of its funding from the Bank of China. In exchange for the Chinese financing, Sinopec will retain 75% of the total capacity of the project that is destined to be exported to China (ibid). China stepped into the project after it was side-lined by American oil companies due to its lack of competitiveness with lower cost shale projects (ibid).

The above examples demonstrate Beijing's efforts in intensifying its relations and investments in Arctic states, reflecting its strategic priority in the region. However, Chinese investment in infrastructure projects along the Polar Silk Road have raised concerns over the future of Arctic security. The interest of Chinese construction companies in expanding the three airports in Greenland have received strong opposition from Danish officials (Matzen & Daly, 2018). Similarly, the Chinese had to pull out and abandon their investment plans for the deep-water port in Lysekil, Sweden after concerns were raised about the environmental impact and national security concerns of the project (Suokas, 2018). Chinese investments in Arctic states are also criticised due to the lack of transparency and disclosure, as these investments are generally funded through subsidiaries to hide the identity of the corporate or state-funded investment project (Rosen & Thuringer, 2017: 53).[8] The nature of these investments is blurred with misrepresentations, distortions and differences in value reported to foreign media, arguably with the intention to avoid competition and to enable China to manoeuvre its investment geopolitically (ibid.).

Concerns have also been raised in relation to China's funding on the BRI projects, in which China has fuelled the indebtedness of developing States through large infrastructure investments before seeking to gain control of strategic assets when debtors failed to pay their Chinese state-owned creditors (Hurley et. al., 2018: 19-20).[9] Whilst there has been no reported incident on the default of the Chinese investment in the Arctic region and the indebtedness of developing states are far from comparison with the economic stability of Arctic states, China's risk-taking approach in investing in mega Arctic projects that were previously deemed unrealistic, raises questions on the sustainability and vulnerability of its investments. Although the White Paper may ease concerns on China's interest in the Arctic, China would have to increase its transparency in its Arctic investments to facilitate an open and constructive dialogue with Arctic states.

Concluding Remarks

The White Paper has certainly provided a general overview of China's Arctic policy that guides its Arctic discourse. Looking ahead, China's presence in the Arctic and ambition of a Polar Silk Road bring new opportunities and challenges for Arctic states – as expressed in the Chinese proverb 'good fortune follows upon challenges, challenges lurks within good fortune' (*huo xi fu zhi suo yi, fu xi huo zhi suo fu,* 祸兮福之所倚，福兮祸之所伏).[10]

The success of China's Arctic policy as a non-Arctic state would be dependent on its Arctic diplomacy and ability to strengthen cooperation in the region. Yet, much remains uncertain on aspects of China's key interests that are not addressed in the White Paper, in particular on the role of the Arctic in its national security and defence strategy (Brady, 2017: 117). The release of the White Paper may have cleared some misconceptions about China's Arctic interest, but it lacks concrete steps or measures that China intends to implement in its Arctic policy. Considering China's growing investment and presence in the Arctic, it remains a matter of time before China seeks greater influence or a leadership role in the Arctic beyond its current observer status to safeguard its economic interests. As for now, China has maintained that it respects the political status quo in the Arctic.

Notes

1. The first reference in which China has referred itself as a 'near-Arctic State' was in January 2013, in a speech by Chinese Ambassador Zhao Jun at the 7th Arctic Frontiers Conference, Tromsø, Norway. In his speech the Ambassador emphasised that China's northeast is close to 50 degrees north latitude (Zhao, 2013).
2. The notion of 'not being absent' was previously raised by Admiral Yin Zhuo of the People's Liberation Army in 2010. He noted that China's position in the Arctic is 'very much not being absent' (being present) (*bu ke quewei* 不可缺位) (Chinanews, 2010, March 5). The phrase is often misconstrued and mistranslated as 'indispensable' (e.g., Jakobson & Peng, 2012: 15).
3. Jakobson and Lee opined that the Arctic was 'simply not sufficiently high on the agenda of [Chinese] senior officials' that necessitate the publication of an Arctic strategy (Jakobson & Lee, 2013: 11). The publication of the White Paper has proven the contrary.
4. Article 87(1) of the UNCLOS outlines a list of non-exhaustive freedoms available to all States, comprising *inter alia,* the freedom of navigation, freedom of overflight, freedom to lay submarine cables and pipelines, freedom to construct artificial islands and other installations, freedom of fishing and freedom of scientific research.
5. China has the freedom to exercise any of its right in the Arctic High Seas, except on the right to conduct commercial fishing as China is party to the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean 2017. Parties to the Agreement are Canada, China, Denmark (in respect of Greenland and the Faroe Islands), the European Union, Iceland, Japan, Korea, Norway, Russia and the United States. The Agreement is scheduled to last for 16 years after which it will be automatically renewed for

every five years unless a contracting State objects or a scientific based fishing quota and rules are established.

6. Beijing initially used the term 'Ice Silk Road' to refer to the framework cooperation between China and Russia on the development of Arctic shipping routes.
7. Risto Murto, the Deputy Director General of the Networks Department of the Finnish Ministry of Transport and Communications in commenting on the Arctic Corridor noted that, 'When we think of the new corridors to China, we are in the middle between Europa and Asia. Finland is not an island anymore. We look at our geopolitical position in a whole new way' (Breum, 2018).
8. It estimated that China has invested over 1.4 trillion USD in the economies of the Arctic Five (plus Finland and Sweden) from 2012 to 2017, in which nearly 89.2 billion USD are investment in infrastructure, cooperative agreements and financing for projects located within the Arctic Circle (Rosen & Thuringer, 2017). There are no official data from Beijing or respective Arctic States to verify these estimates.
9. For instance, when Sri Lanka was unable to service its 8 billion USD loan for the construction of the Hambantota Port, parties entered into a debt-for-equity swap, which provides China a 99-year lease in managing the port. 23 out of 68 States that have received BRI-related financing were reported to have unsustainable level of debt, in which eight of them are categorised as high risk of debt distress. Russia is the only Arctic State included in the study and was categorised as low risk of debt distress (Hurley et. al., 2018).
10. Chinese Ambassador Zhao Jun in his speech at the 7th Arctic Frontiers Conference, Tromsø, Norway used a simplified English translation of the above Chinese proverb. He emphasised on the saying 'luck and misfortune come in turn' in describing the opportunities and challenges that are present in the Arctic (Zhao, 2013).

References

Alexeeva, O. and Lasserre, F. (2012). China and the Arctic. *In* L. Heininen, H. E-Pirot & J. Plouffe (Eds.) *Arctic Yearbook 2012* (pp. 80-90). Akureyri, Iceland: Northern Research Forum.

Amatulli, G. (2017). The Role of China in the Arctic: Challenges and Opportunities for a Sustainable Development of the Region. *Jindal Global Law Review, 8*(1), 103-110, DOI: 10.1007/s41020-017-0042-2.

Brady, A. (2017). *China as a Polar Great Power.* Cambridge: Cambridge University Press

Breum, M. (2018, Feb 28). Finland plans 'Arctic Corridor' linking China to Europe. *EU Observer.* Retrieved from https://euobserver.com/nordic/141142.

Chater, A. (2016). Explaining Non-Arctic States in the Arctic Council. *Strategic Analysis, 40*(3), 173-184, DOI: 10.1080/09700161.2016.1165467.

Chen, G. (2012). China's emerging Arctic Strategy. *The Polar Journal, 2*(2), 358-371, DOI: 10.1080/2154896X.2012.735039.

Chen, H., Liu, N. and Zhang, Z. (2013). Severe winter weather as a response to the lowest Arctic sea-ice anomalies. *Acta Oceanologica Sinica, 32*(10), 11-15, DOI: 10.1007/s13131-013-0360-y.

Chinanews (2010, March 5). Naval Admiral: China cannot be absent from the Arctic development (In Chinese). *Chinanews*. Retrieved from http://www.chinanews.com/gn/news/2010/03-05/2154039.shtml.

Chinese Government Portal (2010, June 25). Chen Lianzeng: The Arctic Scientific Research is of great significance to promote sustainable development (In Chinese). Chinese Government Portal. Retrieved from www.gov.cn/jrzg/2010-06/25/content_1637741.htm

Chinese Ministry of Foreign Affairs (2015, Oct 17). *China's contribution: respect, cooperation and win-win (Keynote Speech by Vice Foreign Minister Zhang Ming at Third Arctic Circle Assembly, Reykjavik).* Retrieved from http://www.fmprc.gov.cn/mfa_eng/wjbxw/t1306858.shtml.

Feng, A. and Saha, S. (2018, April 20). China's Arctic Ambitions in Alaska. *The Diplomat*. Retrieved from https://thediplomat.com/2018/04/chinas-arctic-ambitions-in-alaska/.

Foy, H. (2017, Nov 1). China signs up for more Arctic gas from Russia's Novatek. *Financial Times*

Gavrilov, V. and Kripakova, A. (2017). Arctic policy of the North East Asian countries. *Jindal Global Law Review, 8*(1), 69-86, DOI: 10.1007/s41020-017-0039-x.

Glaser, B.S. and Medeiros E.S. (2007). The Changing Ecology of Foreign Policy-Making in China. *The China Quarterly, 190,* 291-310, DOI: 10.1017/S0305741007001208.

Gracyzk, P. and Koivurova, T. (2014). A new ear in the Arctic Council's external relations? Broader cosequences of the Nuuk observer rules for Arctic governance. *Polar Record, 50*(254), 225-236, DOI: 10.1017/S0032247412000824.

Guoqiang, T. (2013). Arctic Issue and China's Policy. *China International Studies, 38*(29).

Hurley, J., Morris, S. and Portelance, G. (2018). Examining the Debt Implications of the Belt and Road Initiative from a Policy Perspective. *Centre for Global Development Policy Paper 121*. Retrieved from https://www.cgdev.org/sites/default/files/examining-debt-implications-belt-and-road-initiative-policy-perspective.pdf.

Ingimundarson, V. (2014). Managing a contested region: The Arctic Council and the politics of Arctic governance. *The Polar Journal, 4*(1), 183-198, DOI: 10.1080/2154896x.2014.913918.

Jakobson, L. and Lee, S. (2013). The North East Asian States' Interests in the Arctic and Possible Cooperation with the Kingdom of Denmark. *SIPRI Policy Paper.*

Jakobson, L. and Peng, J. (2012). China's Arctic Aspirations. *SIPRI Policy Paper 34.*

Jarashow, M., Runnels, M.B. and Svenson, T. (2006). UNCLOS and the Arctic: The Path of Least Resistance. *Fordham International Law Journal, 30*(5), 1587-1652

Koivurova, T. (2018, Feb 13). China & the Arctic: Why the focus on international law matters [Blog post] Retrieved June 15, 2018, from http://www.rcinet.ca/eye-on-the-arctic/2018/02/13/blog-china-the-arctic-why-the-focus-on-international-law-matters/.

Koivurova, T., Tianbao, Q., Duyck, S. and Nykanen, T. (2017). Introduction. In In T. Koivurova, Q. Tianbao, T. Nykanen and S. Duyck (Eds.), *Arctic Law and Governance: The role of China, Finland and the EU* (pp. 1-15). Oxford: Hart Publishing.

Kong, X. (2018, Jan 26). *SCIO briefing on China's policy on the Arctic* (Translation provided by State Council Information office of the PRC). Retrieved from http://www.scio.gov.cn/32618/Document/%201618357/1618357.htm.

Lackenbauer, P.E., Lajeunesse, A., Manicom, J. and Lasserre, F. (2018) *China's Arctic Ambitions and What They Mean for Canada.* Calgary: University of Calgary Press.

Lanteigne, M. (2014). *China's Emerging Arctic Strategies: Economics and Institutions.* Iceland: Institute of International Affairs.

Lanteigne, M. (2016). Not Sopping Cold: China's Emerging Strategies in the Arctic. *Note Observatoire Chine 2016/2017.*

Li, Y. and Leung, L.R. (2013). Potential Impacts of the Arctic on Interannual and Interdecadal Summer Precipitation over China. *Journal of Climate, 26,* 899-917, DOI: 10.1175/JCLI-D-12-00075.1.

Lipponen, P. and Svento, R. (2016). Report on the Northeast Passage telecommunications cable project. *Finnish Ministry of Transport and Communications, Report 3/2016.*

Liu, J., Curry J., Wang, H., Song, M. and Horton, R. (2012). Impact of declining Arctic sea ice on winter snowfall. *Proceedings of the National Academy of Science of the United States of America, 109*(11), 4074-4079, DOI: 10.1073/pnas.1114910109.

Liu, N. (2017), China's emerging Arctic policy: What are the implications for Arctic governance?. *Jindal Global Law Review, 8*(1), 55-68, DOI: 10.1007/s41020-017-0041-3.

Ma, J., Wang, H. and Zhang, Y. (2014). Will typhoon over the western North Pacific be more frequent in the Blue Arctic conditions? *Science China Earth Science, 57*(7), 1494-1500, DOI: 10.1007/s11430-013-4747-6.

Matzen, E. and Daly, T. (2018, March 22). Greenland's courting of China for airport projects worries Denmark. *Reuters.* Retrieved from https://www.reuters.com/article/us-china-arctic-greenland/greenlands-courting-of-china-for-airport-projects-worries-denmark-idUSKBN1GY25Y.

Mazneva, E. (2017, Oct 27). From Russia With Love: A Super-Chilled Prize for China. *Bloomberg.* Retrieved from https://www.bloomberg.com/news/articles/2017-10-26/china-to-get-first-yamal-lng-cargo-as-russia-says-thank-you.

NDRC (2017). *China's Policies and Actions for Addressing Climate Change.* Retrieved from http://en.ndrc.gov.cn/newsrelease/201711/P020171108521968689324.pdf.

NDRC and NEA (2016). *Energy Supply and Consumption Revolution Strategy (2016 - 2030)* (In Chinese). Retrieved from http://www.ndrc.gov.cn/gzdt/201704/W020170425548780357458.pdf.

NDRC and NEA (2017). *Mid & Long-term Oil and Gas Pipeline Network Planning* (In Chinese). Retrieved from http://www.ndrc.gov.cn/zcfb/zcfbtz/201707/W020170712330056512517.pdf.

NDRC and SOA (2017). *Vision for Maritime Cooperation under the Belt and Road Initiative*. Retrieved from http://www.xinhuanet.com/english/2017-06/20/c_136380414.htm.

Rosen, M. and Thuringer, C. (2017). Unconstrained Foreign Direct Investment: An Emerging Challenge to Arctic Security. *CNA Analysis and Solutions,* COP-2017-U-015944-1Rev. Retrieved from https://www.cna.org/cna_files/pdf/COP-2017-U-015944-1Rev.pdf.

Sørensen, C.T.N. and Klimenko, E. (2017). Emerging Chinese-Russian Cooperation in the Arctic. *SIPRI Policy Paper 46*.

Staalesen, A. (2016, Oct 10). COSCO sends five vessels through Northern Sea Route. *The Barents Observer*. Retrieved from https://thebarentsobserver.com/en/arctic-industry-and-energy/2016/10/cosco-sends-five-vessels-through-northern-sea-route.

Staalesen, A. (2018, June 27). The Chinese oilmen are back in Murmansk. *The Barents Observer*. Retrieved from https://thebarentsobserver.com/en/2018/06/chinese-oilmen-are-back-murmansk.

State Council Information Office of the PRC (2018, Jan 26). *China's Arctic Policy*. Retrieved from http://english.gov.cn/archive/white_paper/2018/01/26/content_281476026660336.htm.

Sun, K. (2013) China and the Arctic: China's Interests and Participation in the Region. *The Centre for International Governance and Innovation Paper No. 2.*

Suokas, J. (2018, Jan 31). Chinese investors cancel plans for massive deep-water port in Sweden. *GB Times*. Retrieved from https://gbtimes.com/chinese-investors-cancel-plans-for-massive-deep-water-port-in-sweden.

Tianbao, Q. and Miaomiao, L. (2017). Strengthening China's Role in the Arctic Council. In T. Koivurova, Q. Tianbao, T. Nykanen and S. Duyck (Eds.), *Arctic Law and Governance: The role of China, Finland and the EU* (pp. 19-42). Oxford: Hart Publishing.

Wright, D.C. (2011). *The Dragon Eyes the Top of the World, Arctic Policy Debate and Discussion in China.* Newport: Naval War College.

Xinhua (2015, March 28). China unveils action plan on Belt and Road Initiative. *Xinhua*. Retrieved from www.xinhuanet.com/english/2015-03/28/c_134105372.htm.

Xinhua (2017, June 26). China's demand for oil, natural gas to remain robust. *Xinhua*. Retrieved from www.xinhuanet.com/english/2017-06/26/c_136396547.htm.

Xinhuat (2018, March 10). Finnish-Norwegian blueprint of Arctic corridor unveiled. *Xinhua*. Retrieved from www.xinhuanet.com/english/2018-03/10/c_137030091.htm.

Zhang, J. (2015). China's new foreign policy under Xi Jinping: Towards Peaceful Rise 2.0. *Global Change, Peace and Security, 27*(1). 5-19, DOI: 10.1080/14781158.2015.993958.

Zhao, J. (2013, Jan 21). *China and the High North (Speech by Chinese Ambassador Zhao Jun at the 7th Arctic Frontiers Conference, Tromsø).*

Zou, Y., Wang, Y., Zhang, Y. and Koo J. (2017). Arctic sea ice, Eurasia snow and extreme winter haze in China. *Science Advances 3*(3), e1602751, DOI: 10.1126/sciadv.1602751.

The Polar Silk Road & the West Nordic Region

Lau Øfjord Blaxekjær, Marc Lanteigne & Mingming Shi

In June 2017, China's National Development and Reform Commission officially announced that the Arctic Ocean would be added to the list of "blue economic corridors" comprising a major part of China's emerging "Belt and Road" trade and infrastructure initiatives. In January 2018, this policy was further codified in China's first governmental White Paper on the Arctic. In May 2017, The Nordic Council of Ministers and China formally agreed to strengthen collaboration between China and the Nordic region on five key areas. At the same time, the West Nordic Region (Greenland, Iceland, the Faroe Islands, and coastal Norway) is increasingly being framed as a distinct part of the Nordic region with its Arctic location, maritime and blue bio-economy focus, yet these countries have no joint Arctic strategy or approach to the emerging Polar Silk Road. On the one hand, China's enhanced Arctic engagement and strategic collaboration with the Nordic region, which includes the Arctic, maritime economy, and bio-economy, seem very promising for West Nordic development, on the other hand, geo-political unease about Chinese investments in the Arctic raise questions about what happens when the large-scale geopolitics meet the micro-scale geopolitics of the West Nordic Region. There is a significant gap in both the academic and policy literature on these matters, and as such, this article targets both academia and practitioners seeking to better understand and act according to developments in this region. Theoretically, we frame the article within the English School in International Relations.

Introduction

How can we understand China's Polar Silk Road initiative from a West Nordic perspective? This question is relevant for several reasons. First, Beijing is increasing its engagement in the Arctic primarily through scientific activities, but also through economic collaboration and infrastructure investments as part of Beijing's Belt and Road Initiative (BRI) under President Xi Jinping (习近

Lau Øfjord Blaxekjær is a Researcher at NIAS – Nordic Institute of Asian Studies, Denmark, Associate Researcher at University of the Faroe Islands, and Adjunct Professor at Shanghai Ocean University. Marc Lanteigne is a Senior Lecturer (China, East Asia, Polar Regions) at the Centre for Defence and Security Studies, Massey University, Auckland New Zealand. Mingming Shi is a Project Manager at the *Icelandic Times*, Iceland, and a Master's student in West Nordic Studies at the University of Iceland.

平) since 2013. Second, China and the Nordic countries, represented within the Nordic Council of Ministers, are increasing their strategic collaboration via a so-called "5+1" dialogue. Third, the West Nordic Region is being increasingly framed as a distinct political, economic, social, and environmental region both within and outside the region. Fourth, the West Nordic Region covers the ocean area between the Arctic and Europe, making the West Nordic countries, governments, ports, and other relevant actors, central stakeholders in any Polar Silk Road plans and developments whether or not these actors recognize this. Fifth, there is some (geo-)political unease from the U.S. in relation to Chinese investments in Greenland further complicating internal Kingdom of Denmark relations (DR, 2018). As argued by Eythórsson and Hovgaard (2013: 140),

> the communities of the West Nordic space now find themselves in the middle of a new melting pot, and therefore it is a pressing question whether and how the West Nordic region can address itself to this new agenda.

Despite the above reasons and calls for addressing the new agenda, there is a significant gap in both the academic and policy literature on these matters, and as such, this article targets both academia and practitioners seeking to better understand and act according to developments in this region.

Theoretically, it can be argued that the Arctic resembles an International Society, based on institutions and norms of cooperation as defined by the English School in International Relations (Buzan, 2001). The Arctic is predominantly understood today by its many actors as a milieu of cooperation and knowledge sharing, where the military and economic differences between Arctic states are downplayed and non-state actors, like Indigenous Peoples' organisations, participate in dialogue on equal footing with states, e.g. in the Arctic Council established in 1996 (Young, 2005). The Arctic, not just thawing itself, actually contributed to Cold War thawing via the 1986 Reykjavík Summit and East-West breakthrough (Berkman, 2014). The English School also applies two other key concepts to understand International Relations: an International System based on traditional Realist notions of anarchy and power politics amongst states, and a World Society based on Kantian notions of human emancipation and transcendence of the state system as centre of International Relations (Buzan, 2001: 475-6).

Thus, the main point is that "[i]n the English School perspective, all three of these elements are in continuous coexistence and interplay, the question being how strong they are in relation to each other." (Buzan, 2001: 476). During the Second World War and the Cold War, the Arctic was predominantly understood as a region under the dynamics of an International System and power politics of the United States/NATO on one side and Russia/USSR on the other (Dittmer et al, 2011; Young, 2005). We understand the increasing regionalisation and practices of the West Nordic Region to be an integral part of an Arctic International Society. Further, by exploring new dynamics of China's Polar Silk Road from a West Nordic perspective in an English School framework, we gain a better understanding of the interplay between International System, International Society, and World Society in the Arctic.

In line with the English School's methodological pluralism and historicist approach, to answer the initial research question, we depart from existing academic and policy literature on China's BRI to first describe and analyse the current state of affairs of Beijing's BRI and Polar Silk Road and also current frames of the West Nordic Region. We then continue with analyses of individual West Nordic cases of Chinese engagement in Norway, Iceland, Greenland, and the Faroe Islands. These

case studies are based on text analyses, observations, and interviews. As part of this project, we organised a plenary session on Beijing's BRI and the West Nordic Region at the Arctic Circle Forum which took place in Tórshavn, Faroe Islands, on 8-9 May 2018. The plenary session was opened by China's Special Representative for the Arctic, Mr. Gao Feng, who presented on Beijing's understanding of BRI in relation to the Arctic and the West Nordic Region. We presented the project and preliminary findings from Norway, Iceland, and Greenland, after which the CEO of Faroese Telecom, Mr. Jan Ziskasen, outlined the strategic collaboration between his company and the Chinese communications firm Huawei. These presentations, and feedback from the session, also inform this article. Based on these descriptions and analyses, we summarise our findings and conclude with a few recommendations for further research and policy analysis.

China's Belt and Road Initiative and the Polar Silk Road

When the first blueprints of China's Belt and Road (*yidai yilu* 一带一路) Initiative (BRI) were unveiled by President Xi Jinping in 2013, the policy's focus was well south of the Arctic region, with a concentration on developing trade links with Africa, Europe, Eurasia and Russia via land links as well as through the Indian Ocean and the Mediterranean Sea. To date, more than sixty countries have since signed on to the BRI, which is emerging as less of a concentrated policy and more as a series of components working together under a wide aegis. The "Belt" within the configuration is composed of overland trade routes stretching from China to Europe via Russia and Central Asia, with a primary focus on energy, goods trade, and transportation infrastructure. The grouping of Central and Eastern European countries (CEEC) has also developed as a major link of the Belt resulting from the creation of the "16+1" dialogues between Beijing and the CEEC which began in 2012 and focus on deepened economic cooperation and mass transportation projects (Poggetti, 2017; Zhang, 2015). The "Road" within the BRI is more specifically known as the "21st Century Maritime Silk Road" and until recently has been centred on the Indian Ocean (Blanchard, 2017; Garlick, 2018).

As the BRI began to grow, the question arose of whether the Arctic would eventually be incorporated into the initiative, given Beijing's growing interest in the economic possibilities of the far north in areas of energy, raw materials and shipping. There was a notable focus on the Northern Sea Route (NSR), an emerging Arctic sea route north of Siberia, as a potential conduit for Chinese trade with European markets and beyond. Initial discussion of the "third road" in the Arctic was tempered, however, by geographic and political realities (Hansen *et al.*, 2016; Lanteigne, 2015). First and foremost, the NSR can only be used during summer months, and then still under difficult navigational conditions. In 2016, nineteen vessels were registered using the NSR, with the number increasing slightly to twenty-four ships by the end of 2017. It remains unclear as to when the route will be suitable for higher volumes of traffic, but China has expressed great interest in developing it for increased shipping to Europe (Feng, Woodhouse and Milne, 2018; Zhang, 2018).

Second, developing a northern branch of the BRI would require strengthened political and economic relations with key Arctic states, beginning with Russia. Relations between Beijing and Moscow remain warm, and there has been much enthusiasm about the joint creation of an "Ice Silk Road" (*bingshang sichou zhilu* 冰上丝绸之路) in Siberia and the Russian Far East (RFE) since 2017. However, there is still some unease in Russia about long-term Chinese interests in both the Arctic and the RFE. The diplomatic fallout from the post-2014 Crimea/Ukraine crisis further

highlighted questions as to whether Sino-Russian cooperation remains a "marriage of convenience" as opposed to be burgeoning alliance, especially in light of growing bilateral military cooperation and mutual concerns about the United States (Jia, 2017; Lo, 2017, Lukin, 2018). Another geopolitical complication for Beijing's Arctic interests had been the diplomatic freeze between China and Norway over the Nobel Prize incident in 2010. Although low-level communication between the two countries continued, including in the area of polar affairs, government-to-government contacts were cut until an agreement was reached in December 2016 which restored full relations and paved the way for greater bilateral cooperation, including in the Arctic (Sverdrup-Thygeson & Lanteigne, 2016; Xinhua, 2018).

Third, China is a relative newcomer in the Arctic, and thus has attempted to tread carefully in matters relating to its economic interests in the region to avoid being perceived as trying to act as a spoiler.[1] This message was repeated by Chinese Arctic Ambassador Gao Feng at the May 2018 Tórshavn conference.[2] Although China lacks an Arctic border or an Exclusive Economic Zone (EEZ) in the Arctic Ocean, the term "near-Arctic state" (*jin beiji guojia* 近北极国家) has regularly appeared in Chinese policy papers over the past five years. This created some concerns in the United States and other Arctic actors that Beijing was indeed seeking to construct a revisionist policy in the region (Lundestad & Tunsjø, 2015). However, since becoming a formal Observer in the Arctic Council in 2013, China under Xi continued to stress its interests in science diplomacy, regional partnerships, and support for Arctic legal structures while expressing some interest in investment and other economic activities. In short, China was trying to walk a fine line between being considered as pushing its way into the region to stake a claim on Arctic resources, and being too passive in its Arctic policy and running into a potential "blueberry pie problem", meaning the risk of the region being divided like a pie among Arctic states with those countries outside having limited access. Thus, Beijing has been seeking to stress the idea that some areas of Arctic governance, including economic development, are of international concern in addition to regional (Lanteigne, 2017 and 2018a). Beijing, therefore, was wary of linking the Arctic and the BRI too quickly out of concerns about a further backlash.

Nevertheless, in the months leading up to Beijing publishing its first official governmental policy paper on the Arctic in January 2018, signs of a more comprehensive approach to the region were appearing from different quarters. For example, in a September 2016 speech on China and global governance, President Xi called for greater Chinese participation in creating new rules in the Polar Regions as well as cyberspace, outer space and the oceans (Hua, 2016). In October 2015, speaking at the annual Arctic Circle conference in Iceland, then-Chinese Vice-Foreign Minister Zhang Ming outlined a six-point approach to China's Arctic policy. These included economic development, the rights of Arctic and non-Arctic states, and the need for a 'multi-tiered' cooperation framework in the region, further underscoring Beijing's interests in participating in the development of future Arctic governance. In 2016, China's Central Television (CCTV) showcased a documentary, "*Arctic! Arctic!*" (*Beiji, Beiji* 北极! 北极!), to introduce the region to the Chinese public as well as to indicate the roles the country could possibly play in the region's future (Lanteigne & Shi, 2018).

By 2017, China's Arctic policies had developed to the point where there began to be more direct talk of linking the far north to Beijing's deepening BRI policies. For example, one prominent Beijing-based academic noted that the time had come to add a "Circle" to the Belt and Road structure (Huang, 2017). In June of that year, official government confirmation that the Arctic

would be formally linked to the BRI arrived in the form of a nondescript paper co-published by China's then-State Oceanic Administration (SOA)[3] and the National Development and Reform Commission (NDRC). Entitled "Vision for Maritime Cooperation under the Belt and Road Initiative",[4] it identified three specific "blue economic passages" (*lanse jingji tongdao* 蓝色经济通) crucial for enhanced maritime trade under the auspices of the BRI. The first was the Indian Ocean-Mediterranean route which remains the centrepiece for the Maritime Silk Road and the second an emerging southern tier, a "China-Oceania-South Pacific" route which may extend all the way to Latin America, including new BRI participants Argentina and Chile (Cambero, 2018; PwC, 2018). The third involves the Arctic Ocean, connecting Chinese trade with Northern Europe.

The final confirmation that the Arctic would be an integral part of the Belt and Road Initiative came in the form of the long-awaited governmental White Paper on the Arctic. The document, entitled "China's Arctic Policy" (*Zhongguo de beiji zhengce* 中国的北极政策) brought together the country's previously announced economic, political and scientific interests in the region.[5] In addition to re-affirming China's status as a "near-Arctic state", the paper stressed the need to "advance Arctic-related cooperation under the Belt and Road Initiative," while clarifying China's position in the issue of overall regional engagement:

> States from outside the Arctic region do not have territorial sovereignty in the Arctic, but they do have rights in respect of scientific research, navigation, overflight, fishing, laying of submarine cables and pipelines in the high seas and other relevant sea areas in the Arctic Ocean, and rights to resource exploration and exploitation in the Area, pursuant to treaties such as UNCLOS and general international law.

Specific economic areas which were outlined in the paper included shipping, energy and raw material exploitation, fishing and tourism, with an emphasis on the requirement for China "to understand, protect, develop and participate in the governance of the Arctic". The question now is the direction in which China's Arctic policies within the BRI framework will take from this stage.

Currently, Russia remains the main area of interest for China's Arctic trade and joint investment, especially given the fossil fuel and commodity potential of Siberia and the RFE as well as Russia being seen by Beijing as holding many keys to access the greater Arctic. Among current Sino-Russian Arctic development projects is the Yamal Liquefied Natural Gas (LNG) enterprise in Siberia, co-financed by the China National Petroleum Corporation (CNPC) (Ufimtseva & Prior, 2017). The project, worth an estimated US$27 billion, came online in December 2017, and reached the two million tons mark in LNG exports in May 2018 (Bergman, 2017; Foy, 2017). The Yamal project is expected to be a model for future examples of Sino-Russian energy cooperation in the Arctic. With the NSR continuing to open up to greater shipping for longer periods each year, there is also the potential for enhanced bilateral cooperation to develop the waterway, especially with the Vladimir Putin government continuing to depend on China for economic cooperation in the wake of still-frozen Western relations.

Beyond Russia, China has a number of other economic projects in various stages of development with other major Arctic states, which could be incorporated into the Belt and Road Initiative in the near future. In the Nordic region, there have been discussions about future Chinese investment in port facilities in Iceland as well as Kirkenes in Norway, which could potentially service a growing number of vessels using Arctic sea routes (Kynge, 2017). Arkhangelsk is also the potential site of a Chinese-based initiative, which may include a deep-water port and the Belkomur rail link, which

would connect the city with the Ural Mountain town of Solikamsk. China and Russia are also consulting on the enhancement of the Zarubino Port and adjacent Binhai transport corridors in the Russian Far East, which could also assist with future Arctic sea transportation from both countries (Breum, 2018; Guan and Zhang 2017; Luo, 2017; Staalesen, 2018). These projects have the potential to become part of a larger land-based transportation network, which could not only improve cross-regional trade but also increase economic opportunities along the Russian and Nordic-Arctic coast. In addition to land and sea links, China may also become a major backer of a fibre-optic cable line, envisioned as connecting East Asia and Europe via Siberia (Buchanan, 2018; Shi, 2017). As the Polar Silk Road continues to evolve, it is apparent that China is more comfortable accentuating the economic dimensions of its expanding Arctic policy and wishes to be universally viewed as a serious Arctic player.

As for Beijing's understanding of the Nordic region in relation to the BRI and Polar Silk Road, Chinese diplomats and policy experts attending the China Nordic Arctic Research Centre (CNARC) Symposium in Tromsø, Norway, on 23-25 May 2018, explained that China does not differentiate between Nordic, East Nordic and the West Nordic regions. China works with either the individual countries or the Nordic region as a whole. China takes a more pragmatic approach to projects in the Polar Silk Road, sometimes called the "all in one basket" approach, where existing and new projects with some sort of infrastructure and trade perspective are included even though these projects are not strictly Polar (Interviews, 23-25 May 2018). At the Tórshavn conference, Gao Feng presented the official line, further noting that what China expects from the different potential partners in a Polar Silk Road is that partners first meet amongst themselves and develop ideas and positions, and only then meets with China for negotiations. Gao also stressed in an interview that Beijing does not want to push specific policies, but rather wants the Nordic partners to develop their own ideas, interests, and positions and engage with China in dialogue to develop jointly the Polar Silk Road as a "win-win" (*shuangying*双赢) collaboration (Interview, 9 May 2018). The question therefore is how the Nordic region, the West Nordic region, or the individual Nordic countries can best engage China in the Arctic as the northern branch of the BRI begins to take shape.

Analysis of West Nordic Cases

Following the end of the Cold War and the Arctic dominated by International Society dynamics, the West Nordic Region is increasingly being framed as a distinct part of the Nordic Region and the Arctic,[6] although it is still ambiguous what exactly characterises the "West Nordic" beyond its geography, and how functional it is as a region (Eythórsson and Hovgaard, 2013). However, certain features stand out. Politically, the West Nordic region consists of Iceland, a sovereign country, Greenland and the Faroe Islands, two self-governing, but not fully sovereign, countries within the Kingdom of Denmark,[7] and sometimes Norway or only coastal Norwegian municipalities are included. In the West Nordic Council (WNC),[8] established in 1985, Norway is not included, but in the North Atlantic Cooperation (NORA),[9] coastal Norway is (OECD, 2011). Compared to the "East Nordic" countries, the four West Nordic countries are not members of the European Union, but are members of NATO.[10] However, Norway and Iceland are members of the European Free Trade Association (EFTA) and the European Economic Area (EEA), the Faroe Islands and the European Union (EU) have a Free Trade Agreement, and Greenland, which left the EU's precursor, the European Economic Community, in 1982, is associated with the EU under the

Overseas Association Decision protocols. Economically, the West Nordic countries are based much more on fishing, aquaculture, shipping, and maritime services, etc. and with small and dependent economies are much more at risk from external shocks. The West Nordic countries have small populations, totalling 2,750,000 people, compared to the East Nordic total population of 24,200,000 people (NORA, 2017: 20-21).

Despite growing awareness and framing of a West Nordic Region, no joint West Nordic Arctic strategy or approach to the Polar Silk Road exists. The West Nordic Council does recognise China's geopolitical interest in the region, but has not developed any analysis or recommendations in relation to China. The Nordic Council of Ministers has developed a joint strategic partnership with China.[11] In recent years, however, Greenland and the Faroe Islands have not always felt represented within the Nordic Council of Ministers, e.g. when the five Nordic Prime Ministers from Finland, Sweden, Norway, Iceland, and Denmark meet, they cannot participate, but are represented by Denmark's Prime Minister. In matters of foreign and security policy, Copenhagen represents the Kingdom of Denmark including Greenland and the Faroe Islands. Each West Nordic country has some degree of foreign relations with China, which will be elaborated below. According to our observations, the different West Nordic countries and their approaches to the Arctic are best understood through what can be termed "micro-scale geopolitics", where local and personal history and interests are more important than large-scale developments and long-term strategies. In the Arctic dominated by International Society dynamics, this gives room for further regionalisation and participation by diverse actors. The "West Nordic-ness" is further motivated by intra-Nordic and intra-Kingdom of Denmark political and economic interests of independence and self-determination.

Norway

After six years of frozen relations between Beijing and Oslo as a result of the Nobel Prize incident in 2010, Norway was anxious to make up for lost time in re-engaging the Chinese economy, especially in the energy and shipping sectors (Chan, 2016). During the period immediately after the diplomatic freeze, high-level bilateral relations between Beijing and Oslo were suspended. Instead, most official contacts took place either in multilateral fora such as the World Trade Organisation and the Group of Twenty/G20 meetings, or via Track II conferences[12] including those such as Arctic Frontiers in Tromsø, the CNARC based in Shanghai, or through the networks and projects of the Nordic Institute of Asian Studies (NIAS) (own observations). Although there were some economic effects to the diplomatic freeze, including periodic stoppages of Norwegian salmon, the overall economic relationship continued to grow and there were few negative effects seen in many sectors, including Chinese tourism in Norway (Lanteigne & Sverdrup-Thygeson, 2016). Norway was also allowed into the Beijing-founded Asia Infrastructure Investment Bank (AIIB) in April 2015 with no political interference from Beijing (China Daily, 17 April 2015). Diplomatic relations were fully restored in December 2016 after a joint statement was signed, which included a promise by Oslo to "do its best to avoid any future damage to bilateral relations" (Government of Norway, 2016).

In light of the restored diplomatic situation, China restarted FTA negotiations with Norway in April 2017 after diplomatic ties were restored, with the eleventh and most recent round of negotiations completed in Oslo in May 2018 (Ministry of Commerce of the People's Republic of China, 2018). Should the Sino-Norwegian FTA be successfully completed in the short term, this

would mean that Beijing will have free trade pacts with each of the four EFTA economies.[13] Beijing is also interested in further engaging with Norway in Arctic-related projects, and China has maintained an Arctic research station at Ny-Ålesund in Svalbard since 2003.

As China's Belt and Road continues to develop in the Arctic, there is the possibility of a Beijing-backed port project in Kirkenes as well as Chinese assistance with developing a section of a polar railroad, which would link northern Norway to China via Finland and Russia. It was also announced in June 2018 that an existing China-Finland rail rink for cargo shipping was planned to be extended to Narvik in northern Norway, a move that could further strengthen Arctic overland shipping (Kynge, 2017; Staalesen, 2018; Suokas 2018). Several Norwegian businesses, including in the energy, seafood and shipping sectors, are hoping to expand their partnerships with China as the BRI continues to develop in the Arctic (Xinhua, 7 April 2017, Foreign Ministry of China, 2017b).

Iceland

Relations between Beijing and Reykjavík have remained close, and Iceland became the first European state to complete a free trade agreement with China. Beijing completed these FTA talks with Iceland in 2013, after a delay in 2009 caused by the island country's banking crisis (Lanteigne, 2010; Joy, 2013). Since that time, Iceland has been interested in developing an identity as a primary gateway to the Arctic for non-Arctic states, including in East Asia, with China as a major partner. There had been a fossil fuel partnership between the China National Offshore Oil Corporation (CNOOC) and Iceland's Eykon since 2013, to explore for oil and gas in the Dreki region of the North Atlantic, but disappointing initial findings prompted the Chinese firm to withdraw from the arrangement in January 2018 (RÚV, 22 January 2018). However, there are other areas of joint energy cooperation which are also looking promising, including cooperation in thermal power projects in China (Kottasová, 2018), given Icelandic expertise in that area. There is also the growing possibility of Sino-Icelandic cooperation in Icelandic data storage facilities as well as other green initiatives (Turner, 2018; Whitlock, 2018).

In 2012, Iceland and China signed agreements promising to collaborate on other areas of Arctic and maritime scientific affairs and related areas (Foreign Ministry of China, 2012). In the same year leading up to the scientific agreement, RANNÍS (The Icelandic Centre for Research) and Arctic Portal from Akureyri in northern Iceland facilitated the visit of China's polar research vessel, *Snow Dragon* (*Xuelong*雪龙) to Reykjavík and Akureyri. These events lead to the first annual China Nordic Arctic Research Symposium, and CNARC was established in 2013 (Arctic Portal, 2016). Chinese policymakers and researchers have since 2013 been active within the Arctic Circle conference, one of the largest Track II meetings in the region and which is hosted annually in Reykjavík. A major scientific collaboration in the works is the joint Sino-Icelandic aurora research centre at Kárhóll in northern Iceland, which is expected to be fully open by the end of 2018. The main partners and initiators of the aurora research centre are RANNÍS, Arctic Portal, and the Shanghai-based Polar Research Institute of China (PRIC), again with strong ties to CNARC and with PRIC funding a large part of the centre. The aurora centre combines many activities, including research, education, tourism, technology, and intercultural exchange (conversation with Arctic Portal, 24 May 2018).

In September 2018, Mr Guðlaugur Þór Þórðarson, Minister for Foreign Affairs of Iceland, paid a diplomatic visit to Beijing in order to further develop the relationship between the two states in

the areas of trade, tourism, geothermal energy, and climate change. The visit also conveyed a message of Reykjavík's welcoming attitude towards Beijing's BRI strategy (Foreign Ministry of China, 2018). Iceland will be assuming the chair of the Arctic Council in 2019, and given the smooth Sino-Icelandic relationship thus far, it is reasonable to assume that China will wish to expand its presence in Iceland, seeing the country as a window to the greater Arctic region.

Greenland

Beijing has developed various interests in Greenland, including in areas of scientific research, but also wishes to develop partnerships with Greenlandic economic interests, including in the area of natural resources along with other related sectors. Greenland, as the largest island in the world, with most of its land covered by ice and glaciers, provides a potential site for a Chinese research station. At the Arctic Circle conference in Reykjavík, Iceland in 2017, Yong Yu, the Vice-Director of the Shanghai-based Polar Research Institute of China (PRIC) first confirmed China's ambition to establish a research station in Greenland (Breum, 2017). Even though the exact location of the station has yet to be announced, there is reportedly interest in establishing the facility in north-eastern Greenland.

Chinese firms have also been active in Greenland, including in the island's emerging mining sector. Three such projects include a potential rare earth elements (REE), uranium and zinc mine in Kvanefjeld, overseen by Greenland Minerals of Australia in cooperation with China's Shenghe Resources (*Shenghe ziyuan* 盛和资源) which owns a 12.5% stake in the project (Birney, 2018). The Kvanefjeld project is a prime example of China's pursuit of rare earth elements, which are essential in many high-technology sectors, as well as green technology. Kvanefjeld, located in southern Greenland, is one of the biggest potential REE sites in the world. According to a completed Kvanefjeld feasibility study published by the Greenland Minerals in 2015, the Kvanefjeld project represents a current net value, after taxes, of US$1.4 billion, and supports an initial mine life of thirty-seven years (Greenland Minerals, 2015). There is also a zinc mine planned at Citronen Fjord, in Greenland's far north being overseen by Perth-based Ironbark, in cooperation with China Nonferrous Metals. Third, General Nice, a Hong Kong-based company, has held the rights since 2015 to a potential iron mine at Isua in western Greenland (Fouche, 2016; Shi & Lanteigne, 2018).

In March 2018, a Chinese firm, China Communications Construction (*Zhongguo jiaotong jianshe* 中国交通建设), was placed on the shortlist for a contract connected to the expansion of three major Greenlandic airports, despite misgivings expressed by members of the Danish government. However, in June 2018, the governments of Denmark and Greenland announced that there would be negotiations about possible financial support for the airports from Copenhagen, a move seen as forestalling the Chinese bid (Berlingske, 2018; Reuters, 2018). The matter moved closer to a settlement in September 2018, when an agreement was struck in Nuuk by the Prime Minister of Greenland, Kim Kielsen, and visiting Prime Minister of Denmark Lars Løkke Rasmussen, which included a promise by Copenhagen to provide 450 million DKK (70 million USD) in funds for the project as well as access to supplemental loans.

This deal came at a steep political cost, however, as one of the parties within Greenland's governing coalition, *Partii Naleraq*, withdrew out of protest of what it saw was an unacceptable policy overreach on Denmark's part, forcing the Kielsen government into a potentially unstable minority position (Al-Jazeera, 2018; Jensen, 2018; Lanteigne, 2018b). Even if the airport agreement does go

forward, it is unlikely that this will be the end of the story in regards to Chinese interests in Greenland beyond mining. Adding to the complexity of this issue was an announcement later that month that the United States government was also interested in "strategic investment" in Greenlandic airports for potential "dual use" purposes, further underscoring the emerging geopolitical importance of Greenland, as well as concerns about Chinese interests there (US DoD, 2018).

The question of Chinese investment in Greenland lies right in the middle of the debate about the possibility of independence as Greenland's economic interests have expanded from seafood to natural resources and potentially tourism. A self-rule agreement between Greenland and Denmark has been in force since 2009 (Lyall, 2009), which gives Nuuk greater space to expand its diplomatic relationships with other states. However, Denmark still assumes authority over Greenland's security and foreign policy. Therefore, China's approaches to Greenland have been viewed warily by Denmark, (and its main security partner, the US). In 2012, Hu Jintao (胡锦涛), the then-President of China, paid a visit to Denmark, the first time that a Chinese leader had ever visited that country since bilateral ties were established in 1950 (Acher, 2012). The visit was widely seen as a sign of Chinese interests in strengthening its relationship with Denmark, partially with a view to securing greater economic access to Greenland. In October 2017, Prime Minister Kielsen paid a visit to Beijing, and his government has been open to the possibility of more investment from China in Greenland (Foreign Ministry of China, 2017a).

There remain questions and considerations about China's future involvement in Greenland, both from the domestic politics and external actors, including Denmark and the greater European Union. A (then-)four-party coalition government was established after Greenlandic parliamentary elections in April 2018 (Government of Greenland, 2018), an administration which is seen as both pro-foreign investment and open to the possibility of eventual independence. Danish officials have conveyed their apprehension towards potential Greenland separatism and China's economic participation and investments in Greenland, especially given the possible airport expansion projects cooperating with a Chinese company. A December 2017 report by the Danish Defence Intelligence Service (DDIS) included concerns about Chinese investment having a detrimental effect on Greenland given the island's small economic base (DDIS, 2017; Finne, 2018). The airport debate further underscored the political sensitivities both within Greenland and between Copenhagen and Nuuk over to what degree Chinese investment might be a security challenge for Greenland. As Greenland continues to debate the possibility of greater autonomy, or even independence, from Denmark, China will likely be a major factor in its expanding foreign policy and trade interests.

The Faroe Islands

In 2013, the Faroese Prime Minister's Office published an assessment of the country's strategic interests in the Arctic. The six areas of interest are "Arctic cooperation", "Northern Sea Route", "Fisheries in the Arctic Ocean", "Research and Education", "Environment", and "Maritime Safety and Emergency Response" (Prime Minister's Office, 2013).[14] The assessment recommended that in relation to the Arctic, the Faroe Islands and Greenland be given a more independent voice, and that a "joint West Nordic approach to Arctic cooperation, together with Iceland, Greenland and Northern Norway, should be promoted and enhanced," (ibid: 13). It does not include any

recommendations specifically mentioning China, although it recognises China's strategic interests and plans related to economic activities in the Arctic connected with opening up of the Northern Sea Route. The following recommendations are of relevance to possible collaboration with China in the Arctic in general and in the Polar Silk Road specifically. It is recommended that "[c]onnections to other relevant places should also be developed, for instance through business trips" (ibid: 19); that research projects with external international co-funding are supported more strategically (ibid: 26); and that Faroese maritime governance be strengthened, e.g. through the establishment of a Faroese EEZ,[15] and participation in relevant maritime agreements (ibid: 31 and 35).

Trade relations between the Faroe Islands and China has increased in recent years, and in 2017, China ranks seventh on the list of biggest trade partners after Denmark, Russia, Germany, Norway, Britain, and the United States. Exports to China, a little bigger in value than imports and almost entirely represented by farmed salmon, has grown from 359 million DKK (5%) in 2015 to all-time high of 569 million DKK in 2016 (7%), dropping to less than 500 million DKK in 2017 (Hagstova Føroya, 2017 and 2018). When a Chinese state delegation visited the Faroe Islands in 2012, it was to learn more about food safety and regulations and to increase China's import of Faroese fish products (Ministry of Foreign Affairs and Trade, 2012). In October 2016, the Faroese Minister for Foreign Affairs and Trade, Poul Michelsen, led a trade delegation to China with a range of Faroese companies visiting Chinese health authorities and China Fisheries and Sea Food Expo, but also Danish shipping giant Mærsk and the Confederation of Danish Industry in China as well as telecom giant Huawei (House of Industry, 2016). Cultural relations have also increased with more people exchanges, although in small numbers, and in 2017, a Faroese-Chinese friendship society was established in the Faroe Islands (KVF, 2017).

Faroese collaboration with Huawei is especially relevant in relation to the Polar Silk Road. The story begins in Denmark in 2013, when Huawei replaced the Swedish firm Ericsson to run and develop the Danish mobile phone infrastructure from 2014. At the same time, the Faroese telecom infrastructure needed a full and expensive modernisation, and in 2015, after an international tender in competition with other American, European, and Chinese companies, Huawei was chosen as the new strategic partner to develop Faroese telecom infrastructure to 4G-/LTE. The choice of Huawei in the Faroe Islands was not met by security concerns, as there had already been a debate about cyber-security and espionage in Denmark in relation to Huawei. The Danish Defence Intelligence Service had analysed and approved Huawei, and Huawei Denmark even employed the Head of IT Security from the Danish National Police (Berlingske Business, 2015; Kildebogaard, 2015).

As explained by the CEO of Faroese Telecom (FT), Jan Ziskasen, at the Tórshavn conference, the strategic partnership with Huawei has not only delivered one of the world's best telecom infrastructures and mobile coverage, it has developed into an equal partnership, where the huge size difference between the countries and companies is not understood as a problem. The developed solutions tested and implemented in the Faroe Islands have since been implemented in Huawei's own system in China, and in 2016 a new strategic partnership was signed. Today, FT and Huawei are implementing 4.5G technology in the Faroe Islands working towards 5G, also participating in a 5G pilot project in the Scottish Isles funded by the British Government, and the plan is to have all businesses and homes connected with fibre-optic cables by 2022. Jan Ziskasen

also mentioned that the first year of collaboration was marked by cultural differences and misunderstandings which have since been addressed. FT and Huawei have held a series of intercultural workshops which significantly improved collaboration and communication focusing on treating each other as equal partners and common themes such as being hardworking, dedicated, but also enjoying recreational and social activities.

Conclusion

This article has explored and analysed how China's Polar Silk Road initiative can be understood via a West Nordic perspective, and within an English School framework. The work first described and analysed Beijing's Belt and Road Initiative and its northern and Arctic part, the Polar Silk Road. This analysis has demonstrated that Beijing is trying to walk a fine line between being seen as a "spoiler" in the Arctic and being seen as an outsider, instead concentrating on being widely viewed as a partner. Theoretically, China seeks to adhere to the existing International Society dynamics of the Arctic, and downplays the huge differences, including in size and economic power, between China and West Nordic actors. China approaches the Polar Silk Road with a focus on partnerships and, as Chinese officials have commonly phrased it, "win-win" outcomes between China and Arctic actors. For example, Beijing seeks to play down the idea of big country-small country relations, with a preference for negotiations between "partners" with mutual interests, expecting the Nordic partners to first develop own ideas and positions before negotiations on specific Polar Silk Road projects can commence. This was also confirmed in the case studies of Iceland and the Faroe Islands. On the other hand, China does not really distinguish between the East and West Nordic, but approaches the region as one Nordic region and through individual partnerships in a pragmatic "all in one basket" perspective.

The article found that there is no joint West Nordic strategy or approach to China and the Polar Silk Road, although there is recognition of China's interests in the Nordic Arctic. From the Norway and Iceland case studies, it can be determined that science diplomacy and networks like CNARC play an important role in developing relations with Beijing. It is also evident that there are both positive and negative examples, and perceptions, of China's engagement in and with West Nordic countries. Especially in relation to Chinese investments in Greenland, there have been some tensions including American warnings to Denmark of security issues tied to China. In other words, the United States is closely watching China's engagements, and interferes at least in Greenland, but has not done so in relation to Huawei's strategic partnership and telecom projects in the Faroe Islands (and in Denmark). The Icelandic example of the new aurora research centre, and FT's collaboration with Huawei show that positive collaboration is possible to develop in relatively short time, through mutual respect and a focus on intercultural communication and understanding. Across the case studies, the West Nordic countries are framing this region more within an intra-Nordic and intra-Kingdom of Denmark context than in relation to the Arctic and other actors like China. The West Nordics are not very coordinated as such, and still mostly driven by economic interests.

However, as the Arctic and the West Nordic Region further develops and opens up for economic opportunities for China, from an English School perspective, International System dynamics begin to play a larger role. We argue that stressing and practicing cooperation, dialogue, and knowledge sharing – characteristics of International Society – is in the interest of China and the West Nordic

countries alike. It is thus recommended that further research attention is given to the role of science diplomacy in the Nordic Arctic, and that especially Greenland, the Faroe Islands, and the West Nordic Council undertake such analyses of the potential of science diplomacy and more strategic participation in conferences like the Arctic Circle and Arctic Frontiers. China, in turn, is showing signs of taking a more varied approach to European engagement, maintaining strong relations on the EU level but also recognising the emerging roles of key individual players, such as Germany, as well as sub-regions such as the CEEC (Sverdrup & Lanteigne, 2018). A window is therefore opening for the West Nordic region to create its own distinct identity in the midst of deepened Chinese diplomatic and economic engagement in Europe. Finally, the West Nordic countries should seek to move beyond the small-scale geopolitics of intra-Nordic and intra-Kingdom of Denmark relations and seek a more coordinated understanding and distinctly Nordic approach to China and the Polar Silk Road. This should obviously be done under the 2017 agreement between the Nordic Council of Ministers and China. At the same time, China is advised to pay more attention to the "West Nordicness" of certain partners in Nordic Arctic.

Notes

1. In a predominantly International Society setting, China has to act accordingly. Any perception of power play will spoil the sense of cooperation based on dialogue and institutions.
2. Own observations, Arctic Circle Forum, Faroe Islands, 8-9 May 2018.
3. In March 2018, it was announced that the SOA would be absorbed into China's newly created Ministry of Ecology and Environment (*Shengtai huanjing bu* 生态环境部). http://www.mep.gov.cn.
4. Full Text: 'Vision for Maritime Cooperation under the Belt and Road Initiative,' *Xinhua*, 20 June 2017, http://www.xinhuanet.com/english/2017-06/20/c_136380414.htm.
5. Full Text: 'China's Arctic Policy,' *Xinhua*, 26 January 2018, http://www.xinhuanet.com/english/2018-01/26/c_136926498_4.htm.
6. For a discussion of regionalism in the Arctic including West Nordic cases see Huppert & Chuffart (2017).
7. Whereas Denmark is not part of the West Nordic Region.
8. The official website of The West Nordic Council (n.d.) is www.vestnordisk.is/english/.
9. The official website of NORA (North Atlantic Cooperation, n.d.) is www.nora.fo.
10. Greenland and the Faroe Islands as part of the Kingdom of Denmark.
11. The agreement as stated in the joint press release from Foreign Ministry of China and the Nordic Council of Ministers (2017) can be accessed here http://www.norden.org/en/nordic-council-of-ministers/international-co-operation/international-co-operation-documents/strengthening-sino-nordic-cooperation.

12. Track II diplomacy refers to diplomatic activities by non-state actors (see also Homans, 2011).
13. Liechtenstein is *de facto* covered, under free trade in goods, as part of the Sino-Swiss free trade agreement completed in 2013, as Switzerland and Liechtenstein have maintained a customs union since 1923 (FDFA Switzerland, 2018).
14. In September 2015, the Foreign Service was moved from the Prime Minister's Office to the Ministry of Foreign Affairs and Trade.
15. Currently, the Faroe Islands has a FFZ (Faroese Fisheries Zone) under its jurisdiction with less rights than an EEZ, whereas Greenland has its own EEZ.

References

Acher, John (2012), China's Hu Seen Boosting Trade on Denmark Visit, *Reuters*, 13 June 2012.

Al-Jazeera (2018), Airport project on world's largest island sparks sovereignty row, 11 September, https://www.aljazeera.com/news/2018/09/airport-project-world-largest-island-sparks-sovereignty-row-180910150304404.html.

Arctic Portal (2016), Chinese-Icelandic Aurora Observatory Presented at Arctic Circle Assembly in Reykjavík, *Arctic Portal: The Arctic Gateway*, 10 October 2016, https://arcticportal.org/ap-library/news/1792-chinese-icelandic-aurora-observatory-presented-at-arctic-circle-assembly-in-reykjavik.

Berkman, Paul Arthur (2014), Stability and Peace in the Arctic Ocean through Science Diplomacy, *Science & Diplomacy*, Vol. 3, No. 2 (June 2014).

Blanchard, Jean-Marc F. (2017), Probing China's Twenty-First-Century Maritime Silk Road Initiative (MSRI): An Examination of MSRI Narratives, *Geopolitics* 22(2): 246-68.

Bergman, Jamey (2017), Yamal LNG project hits 2M Tonne Milestone, *LNG World Shipping*, 8 May 2018, http://www.lngworldshipping.com/news/view,yamal-lng-project-hits-2m-tonne-milestone_51710.htm.

Berlingske (2018), Løkke advarer Grønland mod at lade Kina bygge lufthavne, *Berlingske*, 24 May 2018, https://www.b.dk/politiko/loekke-advarer-groenland-mod-at-lade-kina-bygge-lufthavne.

Berlingske Business (2015), Huawei rykker til Færøerne, *Berlingske Business*, 19 June 2015, https://www.business.dk/digital/huawei-rykker-til-faeroeerne.

Birney, Matt (2018), Rare Earths Permitting Hurdle Ready to fall for Greenland, *The West Australian*, 4 April 2018, https://thewest.com.au/business/public-companies/rare-earths-permitting-hurdle-ready-to-fall-for-greenland-ng-b88794571z.

Breum, Martin (2017), Kina afslører: Vil bygge forskningsstation i Grønland, *Sermitsiaq*, 14 October 2017, http://sermitsiaq.ag/kina-afsloerer-bygge-forskningsstation-i-groenland.

Breum, Martin (2018), Finland plans "Arctic Corridor" Linking China to Europe, *EU Observer*, 28 February 2018, https://euobserver.com/nordic/141142.

Buchanan, Elizabeth (2018), Sea Cables in a Thawing Arctic, *The Interpreter*, 1 February 2018, https://www.lowyinstitute.org/the-interpreter/sea-cables-thawing-arctic.

Cambero, Fabian and Dave Sherwood (2018), China Invites Latin America to Take Part in One

Belt, One Road, *Reuters*, 23 January 2018, https://www.reuters.com/article/us-chile-china/china-invites-latin-america-to-take-part-in-one-belt-one-road-idUSKBN1FB2CN.

Chan, Sewell (2016), Norway and China Restore Ties, 6 Years After Nobel Prize Dispute, *The New York Times*, 16 December 2016.

Danish Defence Intelligence Service (2017), Intelligence Risk Assessment 2017, *Danish Defence Intelligence Service*, 20 December 2017, https://fe-ddis.dk/SiteCollectionDocuments/FE/EfterretningsmaessigeRisikovurderinger/Risikovurdering2017_EnglishVersion.pdf.

Dittmer, Jason, Sami Moisio, Alan Ingram, and Klaus Dodds (2011), Have you heard the one about the disappearing ice? Recasting Arctic geopolitics, *Political Geography,* Vol. 30, No. 4, May 2011, Pages 202-214.

DR (2018), USA advarer Claus Hjort om kinesisk entreprenør på Grønland, *DR Politik*, https://www.dr.dk/nyheder/politik/usa-advarer-claus-hjort-om-kinesisk-entreprenor-pa-gronland.

Eythórsson, Grétar Thór and Gestur Hovgaard (2013), Vestnorden A Functional Region, *Icelandic Review of Politics and Administration* Vol. 9, Issue 1: 139-154.

Federal Department of Foreign Affairs (FDFA) Switzerland (2018), Bilateral relations Switzerland–Liechtenstein, https://www.eda.admin.ch/eda/en/home/representations-and-travel-advice/liechtenstein/switzerland-liechtenstein.html.

Feng, Emily, Alice Woodhouse and Richard Milne (2018), China Reveals Arctic Ambitions with Plan for "Polar Silk Road", *Financial Times*, 27 January 2018, https://www.ft.com/content/c7bd5258-0293-11e8-9650-9c0ad2d7c5b5.

Finne, Arne (2018), Intense Airport Debate in Greenland, *High North News*, 30 May 2018, http://www.highnorthnews.com/intense-airport-debate-in-greenland/.

Foreign Ministry of the People's Republic of China (2012), Wen Jiabao Meets with Icelandic President Grímsson, *Foreign Ministry of the People's Republic of China*, 21 April 2012, http://www.fmprc.gov.cn/mfa_eng/topics_665678/wjbispg_665714/t925281.shtml.

Foreign Ministry of the People's Republic of China (2017a), Ambassador Deng Ying meets Premier of Greenland Self-Government 2017/10/31,' *Foreign Ministry of the People's Republic of China*, 31 October 2017, http://www.fmprc.gov.cn/ce/cedk/eng/zgxw/t1506254.htm.

Foreign Ministry of the People's Republic of China (2107b), Wang Yi Meets with Minister of Foreign Affairs Ine Eriksen Søreide of Norway 2017/11/21, *Foreign Ministry of the People's Republic of China*, 21 November 2017, http://www.fmprc.gov.cn/mfa_eng/zxxx_662805/t1512924.shtml.

Foreign Ministry of the People's Republic of China (2018), Wang Yi Holds Talks with Minister for Foreign Affairs Gudlaugur Thór Thórdarson of Iceland, *Foreign Ministry of the People's Republic of China*, 06 September 2018, https://www.fmprc.gov.cn/mfa_eng/zxxx_662805/t1593570.shtml.

Foreign Ministry of the People's Republic of China and the Nordic Council of Ministers (2017), Joint Press Release Strengthening Sino-Nordic Cooperation, 25 May 2017, http://www.norden.org/en/nordic-council-of-ministers/international-co-operation/international-co-operation-documents/strengthening-sino-nordic-cooperation

Fouche, Gwladys (2016), Chinese Firm Unlikely to Develop $2 billion Greenland Iron Ore Mine

Soon: Minister, *Reuters*, 27 January 2016, https://www.reuters.com/article/us-greenland-mining-china/chinese-firm-unlikely-to-develop-2-billion-greenland-iron-ore-mine-soon-minister-idUSKCN0V425D.

Foy, Henry (2017), Russia Ships First Gas from $27bn Arctic Project, *Financial Times*, 9 December 2017.

Garlick, Jeremy (2018), Deconstructing the China–Pakistan Economic Corridor: Pipe Dreams Versus Geopolitical Realities,' *Journal of Contemporary China*, 15 February 2018, DOI: 10.1080/10670564.2018.1433483: 1-15.

Government of Greenland (2018), Koalitionsaftale 2018, http://naalakkersuisut.gl/~/media/Nanoq/Files/Attached%20Files/Naalakkersuisut/DK/Koalitionsaftaler/040518%20Siumut_Naleraq_Atassut_Nunatta%20qitornai_Final_da.pdf.

Government of the Kingdom of Norway (2016), Statement of the Government of the People's Republic of China and the Government of the Kingdom of Norway on Normalization of Bilateral Relations, December 2016, https://www.regjeringen.no/globalassets/departementene/ud/vedlegg/statement_kina.pdf.

Greenland Minerals and Energy (2015), Kvanefjeld Feasibility Study Completed May 2015, http://www.ggg.gl/docs/ASX-announcements/Kvanefjeld-Feasibility.pdf.

Guan, Zhaoyu and Zhang Tingting (2017), Drilling Row Brings Sino-Russian Ties in Glare, *Global Times*, 1 June 2018.

Hagstova Føroya (2017), Útfluttu fyri 8 mia, út við helvtin er laksur, *Hagstova Føroya*, 17 February 2018, http://www.hagstova.fo/fo/tidindi/2017/02/utfluttu-fyri-8-mia-ut-vid-helvtin-er-laksur.

Hagstova Føroya (2018), Seldu mest til Russlands og keyptu mest úr Danmark, *Hagstova Føroya*, 2 March 2018, http://www.hagstova.fo/fo/tidindi/2018/03/seldu-nogv-mest-til-russlands-og-keyptu-nogv-mest-ur-danmark.

Hansen, Carsten Ørts, Peter Grønsedt, Christian Lindstrøm Graversen and Christian Hendricksen (2016), Arctic Shipping – Commercial Opportunities and Challenges, *Copenhagen Business School (Maritime)* (January 2016), https://services-webdav.cbs.dk/doc/CBS.dk/Arctic%20Shipping%20-%20Commercial%20Opportunities%20and%20Challenges.pdf.

Homans, Charles (2011), Track II Diplomacy: A Short History, *Foreign Policy*, June 20 2011, https://foreignpolicy.com/2011/06/20/track-ii-diplomacy-a-short-history/.

House of Industry (2016), Vinnuferð til Kina, *House of Industry*, http://www.industry.fo/ti%C3%B0indi?Action=1&NewsId=1758&PID=11933.

Hua, Xia (2016), 'Xi Calls for Reforms on Global Governance,' *Xinhua*, 28 September 2016, http://www.xinhuanet.com/english/2016-09/28/c_135720719.htm.

Huang, Kristin. Will the Arctic Be the Next Stop on China's New Silk Road? *South China Morning Post*, 21 May 2017, http://www.scmp.com/news/china/diplomacy-defence/article/2095078/will-arctic-be-next-stop-chinas-new-silk-road.

Huppert, Verena Gisela and Romain François R. Chuffart (2017), Collaboration Across the Arctic: A Tool of Regionalization or Simple Pragmatism? *Arctic Yearbook*, 2017. https://www.arcticyearbook.com/images/Articles_2017/scholarly-articles/8_Collaboration_Across_the_Arctic.pdf.

Jensen, Teis (2018), Greenland Government Loses Majority as Airport Funding Row Resurfaces,

Reuters, 10 September, https://www.reuters.com/article/us-greenland-politics-denmark/greenland-pm-loses-majority-as-pro-independence-party-quits-coalition-idUSKCN1LQ0N3.

Jia, Xin (2018), Interview: "Silk Road on Ice" to Enhance Russia-China Cooperation in Arctic: Russian Expert, *Xinhua*, 27 November 2017, http://www.xinhuanet.com/english/2017-11/27/c_136782902.htm.

Joly, David (2013), Iceland and China Enter a Free Trade Agreement, *The New York Times*, 15 April 2013.

Kildebogaard, Jesper (2015), Portræt: Kinesisk topchef elsker den danske åbenhed, *Finans Tech*, 16 July 2015, https://finans.dk/finans/tech/ECE7849089/portraet-kinesisk-topchef-elsker-den-danske-aabenhed/?ctxref=ext.

Kottasová, Ivana (2018), Iceland is Bringing Geothermal Heating to China, *CNN Money*, 26 March 2018, http://money.cnn.com/2018/03/26/news/china-iceland-geothermal-energy/index.html.

KVF (2017), Góðir møguleikar at økja samhandilin við Kina, *Góðan morgun Føroyar*, 31 January 2017, http://kvf.fo/gmf?sid=64342.

Kynge, James (2017), Chinese Purchases of Overseas Ports top $20bn in Past Year, Financial *Times*, 16 July 2017.

Lanteigne, Marc (2010), Northern Exposure: Cross-Regionalism and the China-Iceland Preferential Trade Negotiations, *China Quarterly* 202 (June 2010): 362-80.

Lanteigne, Marc (2015), One of Three Roads: The Role of the Northern Sea Route in Evolving Sino-Russian Strategic Relations, *NUPI Policy Brief* 2(2015), https://www.files.ethz.ch/isn/187750/NUPI%20Policy%20Brief%202-15-Lanteigne.pdf.

Lanteigne, Marc (2017), "Have You Entered the Storehouses of the Snow?" China as a Norm Entrepreneur in the Arctic, *Polar Record* 53(2)(March 2017): 117-30.

Lanteigne, Marc (2018a), Northern Crossroads: Sino-Russian Cooperation in the Arctic, *National Bureau of Asian Research*, 27 March 2018, http://www.nbr.org/research/activity.aspx?id=853.

Lanteigne (2018b), And Then There Were Three: Greenland's Government Loses a Partner (And Its Majority), *Over the Circle*, 10 September 2018, https://overthecircle.com/2018/09/10/and-then-there-were-three-greenlands-government-loses-a-partner-and-its-majority/.

Lanteigne, Marc and Bjørnar Sverdrup-Thygeson (2016), Towards the Thaw: Seeking Clarity of Sino-Norwegian Relations, *The Diplomat*, 16 January 2016, https://thediplomat.com/2016/01/towards-the-thaw-seeking-clarity-in-sino-norwegian-relations/.

Lanteigne, Marc and Mingming Shi (2018), China Stakes Its Claim in the Arctic, *The Diplomat*, 29 January 2018, https://thediplomat.com/2018/01/china-stakes-its-claim-to-the-arctic/.

Lo Bobo (2017), *A Wary Embrace: What the China-Russia Relationship Means for the World*, Sydney: Random House Australia / Penguin.

Lukin, Alexander (2018), *China and Russia: The New Rapprochement,* Cambridge and Medford, MA:, Polity Press.

Lundestad, Ingrid and Øystein Tunsjø (2015), The United States and China in the Arctic, *Polar*

Record 51(259): 392-403.

Luo, Yingjie (2017), China-Russia Relations Enjoy 'New Normal' of Closer Cooperation, *RT*, 8 July 2017, https://www.rt.com/op-ed/395695-china-russian-relations-new-normal/.

Lyall, Sarah (2009), Fondly, Greenland Loosens Danish Rule, *The New York Times*, 21 June 2009.

Ministry of Commerce of the People's Republic of China (2018), The 11th Round of China-Norway FTA Held in Oslo,' *Ministry of Commerce of the People's Republic of China*, 18 May 2018, http://fta.mofcom.gov.cn/enarticle/ennorway/ennorwaynews/201805/37887_1.html.

Ministry of Foreign Affairs and Trade (2012), Kinesisk sendinevnd á vitjan, *Ministry of Foreign Affairs and Trade*, http://www.uvmr.fo/fo/kunning/tidindi/kinesisk-sendinevnd-a-vitjan/.

NORA (North Atlantic Cooperation) (n.d.), About NORA, https://nora.fo/what-is-nora?_l=en

NORA (2017), Annual Report, *NORA*. https://ipaper.ipapercms.dk/Nora/aarsrapport-2017/?page=1.

OECD (2011), *OECD Territorial Reviews: NORA Region 2011: The Faroe Islands, Greenland, Iceland and Coastal Norway*, OECD Publishing.

Poggetti, Lucrezia (2017), China's Charm Offensive in Eastern Europe Challenges EU Cohesion, *The Diplomat*, 24 November 2017, https://thediplomat.com/2017/11/chinas-charm-offensive-in-eastern-europe-challenges-eu-cohesion/.

Prime Minister's Office (2013), *The Faroe Islands – a Nation in the Arctic: Opportunities and Challenges*, The Government of the Faroe Islands, April 2013, https://d3b1dqw2kzexi.cloudfront.net/media/10243/f%C3%B8royar-eitt-land-%C3%AD-arktis-uk-web.pdf.

PwC (2018), Belt and Road Initiative: A Strategic Pathway,' *New Zealand China Council*, March 2018, https://nzchinacouncil.org.nz/wp-content/uploads/2018/04/NZCC-BRI-report-19-Mar-18.pdf.

Reuters (2018), Denmark, Greenland Agree to look at Airport Funding, Putting Chinese Investors on Ice, *Reuters*, 14 June, https://www.reuters.com/article/us-china-arctic-greenland/denmark-greenland-agree-to-look-at-airport-funding-putting-chinese-investors-on-ice-idUSKBN1J92Y2.

Reuters (2018), Greenland Picks Denmark as Airport Project Partner over Beijing, Reuters 11 September, https://uk.reuters.com/article/uk-china-silkroad-greenland/greenland-picks-denmark-as-airport-project-partner-over-beijing-idUKKCN1LQ2CB.

RÚV (2018), *Óvíst um framhald rannsókna á Drekasvæðinu*, *RÚV*, 22 January 2018, http://www.ruv.is/frett/ovist-um-framhald-rannsokna-a-drekasvaedinu.

Shi, Tian (2017), 10,000 Kilometers of Fiber-Optic Cable Show China's Interest in Warming Arctic, *Bloomberg*, 14 December 2017, https://www.bloomberg.com/news/articles/2017-12-13/undersea-cable-project-shows-china-s-interest-in-warming-arctic.

Staalesen, Atle (2018), Barents Town Envisions Arctic Hub with Link to China, *Barents Observer*, 6 February 2018, https://thebarentsobserver.com/en/arctic/2018/02/barents-town-envisions-arctic-hub-link-china.

Shi, Mingming and Marc Lanteigne (2018), The (Many) Roles of Greenland in China's Developing

Arctic Policy, *The Diplomat*, 30 March 2018, https://thediplomat.com/2018/03/the-many-roles-of-greenland-in-chinas-developing-arctic-policy/.

Staalesen, Atle (2018), New Arctic-bound Railway Eyes Eurasian Investment,' *Independent Barents Observer*, 31 May 2018, https://thebarentsobserver.com/en/industry-and-energy/2018/05/new-arctic-bound-railway-eyes-eurasian-investment.

Suokas, Janne. China-Finland Cargo Train Link Extends to Norway and Sweden, *GB Times*, 15 June 2018, https://gbtimes.com/china-finland-cargo-train-link-extends-to-norway-and-sweden.

Sverdrup, Ulf, and Marc Lanteigne (2018), Conclusion: Sino-Nordic Sub-Regional Diplomacy and the 5+1 model. *China and Nordic Diplomacy*, ed. Bjørnar Sverdrup-Thygeson, Wrenn Yennie Lindgren and Marc Lanteigne, London and New York: Routledge, 121-32.

Sverdrup-Thygeson, Bjørnar and Marc Lanteigne (2016), China and Norway: Unpacking the Deal, *The Diplomat*, 25 December 2016, https://thediplomat.com/2016/12/china-and-norway-unpacking-the-deal/.

The West Nordic Council (n.d.), Information in English, *Vestnordisk Råd*, http://www.vestnordisk.is/english/

Turner, Zeke (2018), Iceland Takes Hard Look at Tech Boom Sparked by Its Cheap, Bountiful Power, *Wall Street Journal*, 19 April 2018.

Ufimtseva, Anastasia and Tahnee Prior (2017), Developing Hydrocarbon Resources in Arctic Russia: The Role of Sino-Russian Collaboration, *Arctic Yearbook,* 2017, https://www.arcticyearbook.com/images/Articles_2017/briefing-notes/4_Developing_Hydrocarbon_Resources_in_Arctic_Russia.pdf.

US DoD (2018), *Statement of intent on defense investments in Greenland by the Department of Defense of the United States of America*. U.S. Embassy Denmark, 16 September 2018, https://twitter.com/usembdenmark/status/1041695240686632960.

Whitlock, Robin (2018), 'Members of New Clean Energy Geopolitics Commission announced,' *Renewable Energy,* 18 April 2018, https://www.renewableenergymagazine.com/panorama/members-of-new-clean-energy-geopolitics-commission-20180418.

Xinhua (2017), 'Interview: Norway's PM eyes new opportunities for stronger cooperation with China,' 7 April, 2017, http://www.xinhuanet.com/english/2017-04/07/c_136189881.htm.

Xinhua (2018), 'China, Norway to Boost Cooperation in Arctic Climate Research,', 19 April 2018, http://europe.chinadaily.com.cn/a/201804/19/WS5ad8aaa0a3105cdcf65195c8.html.

Young, Oran R. (2005), Governing the Arctic: From Cold War Theater to Mosaic of Cooperation.*Global Governance: A Review of Multilateralism and International Organizations*: January/March 2005, Vol. 11, No. 1, pp. 9-15.

Zhang, Lirong (2015), The "Sixteen Plus One" Cooperation Will Take China-EU relations to a New Level, *EU Observer*, 25 November 2015, https://euobserver.com/stakeholders/131270.

Zhang, Yiqian (2018), Chinese commercial ships explore Arctic routes amid 'Polar Silk Road' ambitions, *Global Times*, 8 February 2018, http://www.globaltimes.cn/content/1088825.shtml.

Arctic Blue Economic Corridor: China's Role in the Development of a New Connectivity Paradigm in the North

Vasilii Erokhin, Gao Tianming & Zhang Xiuhua

During recent years, growing exploration of natural resources and development of transport routes have reemerged in the Arctic as a scene for political and economic collaboration between Nordic and non-regional states. Being a non-Arctic country, China nevertheless has played an active role in the elaboration of international regulations and the establishment of governance mechanisms in the Arctic. The country has recently released a White Paper on the Arctic Policy and thus prioritized scientific research, underscored the importance of environmental protection, rational utilization, law-based governance, and international cooperation, and committed itself to maintaining a peaceful, secure and stable Arctic order. Diversified transportation routes and economic corridors are of paramount importance to such global trading nations as China. However, an extension of the economic corridors to the Arctic is viable only in the case of development of satellite trade, production, and research opportunities along the potential transport routes. In this study, the authors discuss the critical points in the implementation of China's paradigm of collaboration and connectivity in the Arctic, as well as focus on the promotion of bilateral win-to-win investment and trade projects with the countries along the potential Arctic Blue Economic Corridor (ABEC). The authors conclude that the ABEC may be efficiently incorporated into China's Belt and Road network, but emphasize that specific technological and economic challenges have to be considered and met before a sustainable connectivity between the markets of Asia and Europe is established in the Arctic.

Introduction

International collaboration in the Arctic and the challenges of Arctic connectivity for economic development and trade have been attracting increased attention by many scholars worldwide. One of the most comprehensive comparative studies of Arctic strategies and policies of different countries has been made by Heininen (2012), who summarized the priorities, priority areas, and objectives of major actors in the Arctic. Involvement of non-Arctic states into the Arctic governance and growing roles of China, Japan, Republic of Korea, and other non-regional actors in the Arctic issues has been studied by Ivanov (2016), Coates and Holroyd (2017), Lanteigne (2014), Leifer (2013), Peng and Wegge (2015), Streltsov (2017), and others. Most of the

Vasilii Erokhin, Gao Tianming and Zhang Xiuhua are affiliated with the Harbin Engineering University.

publications include contemporary issues of international cooperation in the Arctic in the formats of the Arctic Council and the Nordic Council. However, it is important to consider the roles of various trans-Arctic interactions between Nordic and non-Arctic countries, particularly, China, to address the specific implementations of China's Belt and Road Initiative (BRI) and China-Nordic diplomatic model for achieving sustainable development in the region.

The themes of China's involvement in the Arctic governance and growing role of the country in the Arctic issues have been addressed by both Chinese and international scholars. Lanteigne (2014) studied the evolution of China's Arctic strategies in terms of their distinct paths, institutions, and political and economic dimensions. Joelsen (2016) focused on the study of China's engagement with the Arctic Council, particularly, strategic goals of China's observer status in that organization, principal interests of the country in the Arctic, and peculiarities of contemporary China's diplomacy with the Arctic countries. Lanteigne (2017), Stokke (2013), and Gavrilov and Kripakova (2017) determined the prerequisites for the formation, analysis of the current state and of the future development of the Arctic policy of China and the countries of Northeast Asia and provided a description of current opportunities for China to participate in the institutional and rule-making mechanisms of the Arctic governance.

Bennett (2014), Stephenson et al. (2013) paid special attention to the ports linking resources in the North Pacific and wider Arctic region to destinations in Northeast Asia, particularly, the effects of the development of the shipping lanes in the Arctic Ocean for the increase of commercial ties between Asia and Nordic countries. Special attention has been given to the investigation of transport corridors in the Arctic. Meng et al. (2017) focused on navigation conditions and commercial features and reviewed the existing studies that had examined the necessary conditions and requirements for transarctic shipping routes to be viable. Guy and Lasserre (2016) studied perspectives, challenges, and regulations of commercial shipping in the Arctic. Jorgensen-Dahl (2010) investigated the perspectives of economic development and shipping in the Arctic along the Northwest, Northeast, and Transpolar passages. Farre et al. (2014) focused on the perspectives and challenges of commercial Arctic shipping through the Northeast Passage, including Russia's part of the Northern Sea Route (NSR). Ruksha et al. (2013), Xu et al. (2011), and Verny and Grigentin (2009) studied the perspectives and challenges of development and exploration of the NSR for bulk and container shipments between China, Russia, and Europe. Dunlap (2002) studied the possibilities of transit transportation along the NSR by Russian and foreign vessels. Kikkas (2015) and Zalyvsky (2015) discussed the potential of the NSR and other transport corridors in the Arctic and conducted an analysis of major factors affecting the performance of transport and economic projects in the High North. Fisenko (2013, 2014) and Zelentsov (2012) focused on the political, economic, and transport aspects of the development of the NSR in terms of competition for resources in the Arctic and search of new ways of shipping.

China has recently published its Arctic policy and incorporated the Arctic shipping lanes into the BRI transport network. Contemporary approaches of the country to the development of the region and exploration of its resource and transport potential require thorough study in the light of the collaboration with Nordic countries. However, as to the involvement of the Nordic countries in the implementation of the announced Arctic Blue Economic Corridor (ABEC) initiative, there have not been any comprehensive studies of the issue so far. Perspectives on the development and commercial use of transport and trade routes in the Arctic, polar logistics, and development of

infrastructure in the High North are among the hot topics to investigate. This paper attempts to bridge the gap and assesses the challenges and perspectives of turning the ABEC into an economic and transport corridor between China and Europe. This study discusses the major challenges China faces in exploring new maritime ways in the Arctic and collaborating with Nordic countries and Russia in the development of the ABEC.

China's Arctic Aspirations

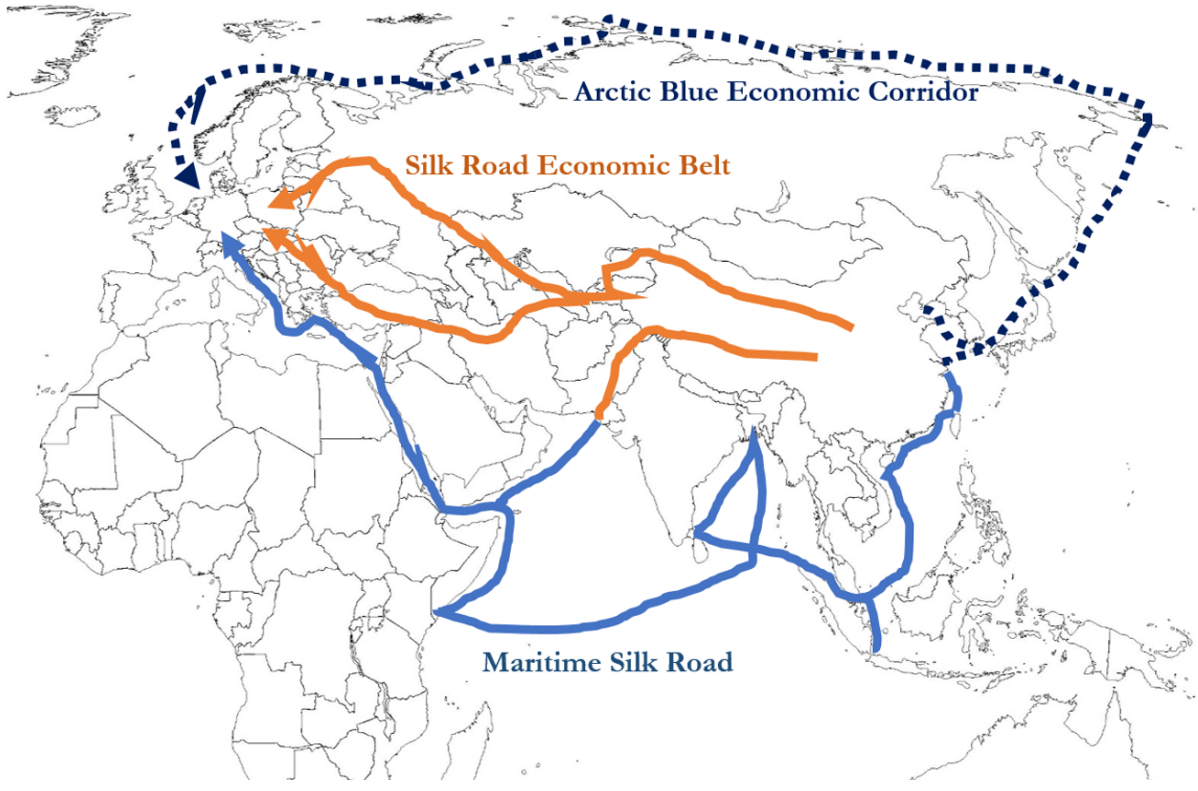
In recent decades, international northern cooperation between the Nordic and non-Arctic states has become more institutionalized and dynamic. Various formats are used – from the multilateral international cooperation within the Arctic Council to the cooperation with and between international organizations and forums, in addition to bilateral inter-state relations (Heininen, 2012). Non-Arctic states are keen to strengthen their role in the Arctic. They assert that their participation in international cooperation in that region is as useful as it is warranted and legitimate (Bartenstein, 2015). One of the most active players in the Arctic region is China. Being a non-Arctic country, China though is closely involved in the trans-regional and global issues in the Arctic, especially in such areas as climate change, environment, scientific research, utilization of shipping routes, resource exploration and exploitation, security, and global governance. The role of the country in the Arctic grows as China explores the possibilities of opening the Arctic passages as alternative routes for its BRI and investigates the social, economic and political implications of this engagement in the Arctic.

China's engagement with the Arctic has been driven by multiple concerns, particularly, strategic interests and trade interests (Peng & Wegge, 2015). Under the presidency of Xi Jinping, there has been a significant shift in Chinese cross-regional diplomacy towards subregional approaches (Lanteigne, 2014), particularly, a "5+1" dialog between China and the five Nordic states. The "5+1" dialogues cover various issues including economic cooperation, security concerns, and regional cooperation. China is paying increasing attention to the Arctic. The country pursues economic interests in the oil-and-gas sector and the exploration of resources of the Arctic territories of Russia and Northern Europe, as well as pays special attention to the development of Arctic shipping (Schulze, 2017).

China is also concerned about the effects of climate change and ice melting happening in Arctic waters. By 2050, climate fluctuations may dramatically change the conditions of navigation in the polar waters (Ratnikov, 2016). According to Mokhov and Khon (2015), by 2025, with less than 15% of water area covered by ice during Summer, the average duration of navigation period may increase up to 3-4 months, by 2050 – to 4-5 months, and by 2100 – to 5.5 months. Due to such a radical change of climate and ice situation, there may happen the changes of wind and cyclonic regimes in the atmosphere along the shipping route, as well as sea waves and iceberg dislocation in the seas of the Arctic Ocean (Khon et al., 2010). Mao et al. (2011), Zhang et al. (2006), and Liu et al. (2016) studied the effects of climate change in the Arctic and discovered the association between the sea ice concentration and ice melting in the Arctic Ocean and weather conditions in the northern parts of China. Kelmelis (2011) and Hong (2012) investigated the impacts of climate change in the Arctic on the exploration of transport routes in the Arctic Ocean, particularly, on China's maritime transport.

However, despite the economic, trade, investment, and research interests in the Arctic and its observer status in the Arctic Council, China was reluctant to officially incorporate the Arctic into the BRI. Arctic did not play a role in the initial structure of the BRI which involved creating maritime corridors through the Indian and Pacific Oceans (Erokhin, 2017). The BRI is a development initiative which focuses on the improvement of connectivity and collaboration among the countries of Eurasia through the increase of China's role in global affairs. The pursuit of strategic interests in the Arctic exactly conforms China's multifaceted, multilevel, and multidimensional diplomatic concept of development. With the release of the Vision for Maritime Cooperation under the BRI, China incorporated the Arctic shipping lanes into the BRI transport network. The document considerably altered the initial vision of the BRI's transportation infrastructure across the Eurasian landmass (Silk Road Economic Belt, or SREB) and the Indian Ocean (Maritime Silk Road, or MSR) by adding the Arctic passages (State Council of the People's Republic of China, 2018). Particularly, China outlined its interest in working with Nordic countries and Russia to improve sea transit conditions and survey for new resources. Concrete steps within the new vision of the policy include China's efforts on the development a blue economic passage linking China and Northern Europe via the Arctic Ocean. China has actually formalized its involvement in the development of the Arctic Blue Economic Corridor (ABEC) as one of the three passages within the BRI (Figure 1).

Figure 1. ABEC in the BRI network of corridors



Source: Authors' development.

The initiative of the extension of the BRI to the Arctic and participation of China in the development of the ABEC means that China is open to working with both Arctic and non-Arctic countries to build the ABEC through developing the Arctic shipping routes. Within the ABEC initiative, China expects its involvement in the infrastructure construction for the ABEC routes in the Nordic countries and Russia and conduction of commercial trial voyages in the polar waters to pave the way for Chinese commercial, exploration, transport, and logistics operations. China also attaches great importance to navigation security along the prospect routes of the ABEC, particularly, in the seas of the Arctic Ocean controlled by Russia. As economic activity in the Arctic region grows, there is a potential for 5+1 dialogue on promoting collaboration between China and Nordic states in the areas of polar transportation, logistics, investments, as well as the development of infrastructure along the Arctic sea routes and connectivity in the region. China is willing to work with all parties in conducting scientific surveys of navigational routes, setting up land-based monitoring stations, carrying out research on climatic and environmental changes in the Arctic, as well as providing navigational forecasting services (Erokhin & Gao, 2018).

The approaches to the development of the ABEC are supposed to be based on three main pillars of China's Arctic policy, which are respect, cooperation, and "win-win" solutions.

China respects the rights of the Arctic countries and Indigenous people as enshrined in international law and supports the peaceful settlement of disputes over territory and maritime rights and interests in line with such treaties as the UN Charter, the United Nations Convention on the Law of the Sea (UNCLOS) and international law (State Council of the People's Republic of China, 2018). The position of China is that the management of Arctic shipping routes should be conducted in accordance with international law and that the freedom of navigation enjoyed by all countries in accordance with the law and their rights to use the Arctic shipping routes should be ensured.

Within the second pillar, China wants to be involved in collaboration for Arctic development. Being committed to the existing framework of international law and rules, China aims at the maintenance of a reasonable and well-organized Arctic governance system and steadily advancing international cooperation on the Arctic. The priorities of such cooperation under the BRI are policy coordination, infrastructure connectivity, unimpeded trade, financial integration, and closer people-to-people ties. In the Arctic, China wants to coordinate development strategies with Nordic countries and encourage joint efforts to build the ABEC linking China, Russia, and Europe via the Arctic Ocean and Russia's NSR (State Council of the People's Republic of China, 2018).

As to the "win-win" type of collaboration in the Arctic, China has the funding, technology, and the market to be of interest to Nordic countries. Chinese enterprises are encouraged to participate in joint investment projects in the Arctic, in the extraction of hydrocarbons and minerals, in infrastructure development for the ABEC, as well as to conduct commercial trial voyages along the transport corridors in the Arctic Ocean. China wishes to participate in the development of oil, gas, mineral resources and other non-fossil energies, fishing and tourism in the region, and scientific collaboration, jointly with Nordic states, while respecting the tradition and culture of Arctic residents, including indigenous peoples, and conserving the natural environment (State Council of the People's Republic of China, 2018).

Sea Routes in the Arctic Relevant for ABEC

Climate change and ice melting open up new opportunities for navigation in the Arctic Ocean through the three major passages which have been existed so far, i.e. Northwest Passage, Transpolar Passage, and the NSR, a part of the Northeast Passage (Ostreng, 2013).

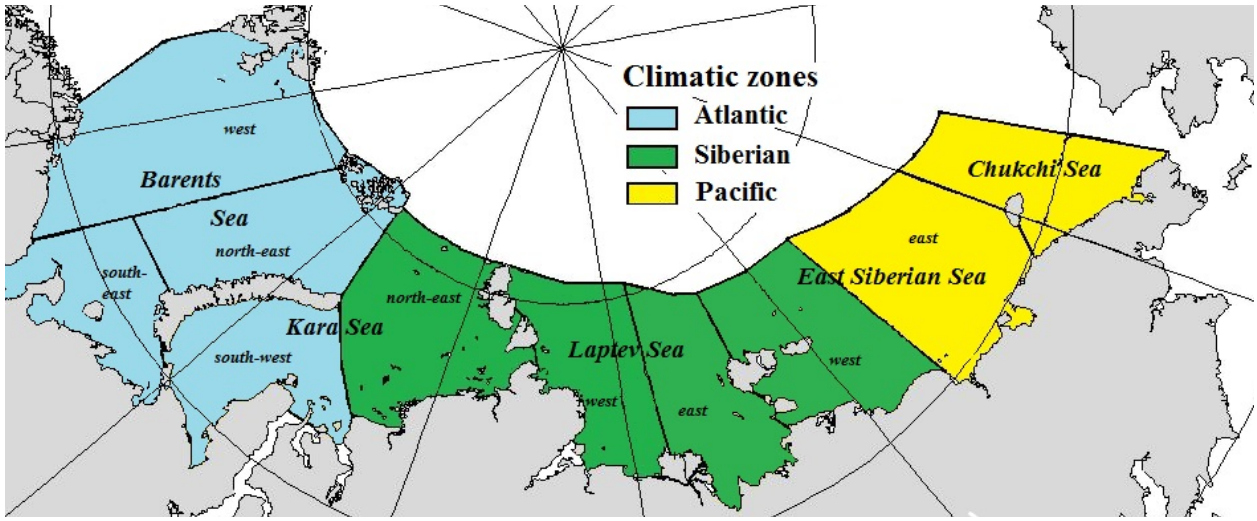
The Northwest Passage is a network of various possible ways between 19,000 islands of the Canadian Arctic Archipelago. Legal status of the Northwest Passage has not been formalized by any international agreement. However, because the route passes within the territorial waters of Canada, the sovereign regulations of Canada are applied. The Northwest Passage is relatively deep to accept supertankers and container carriers which draft is too big to pass through Panama Canal. In the light of the establishing ABEC, Northwest Passage cuts both the distance and time for Chinese vessels compared to other transport corridors. Thus, the distance between Shanghai and New York via Panama Canal is 10,500 nautical miles and only 8,600 nautical miles via Northwest Passage (savings of almost 2000 nautical miles and 7 days). However, in terms of its commercialization in the near future, the passage is of no interest due to the extreme unpredictability of climate conditions of Canada Arctic Archipelago. Other factors against the immediate commercialization of the Northwest Passage and building any economic corridor in that part of the Arctic are underdeveloped infrastructure and passing of the route along the underpopulated and unexplored territories in terms of extraction of mineral resources and any other kinds of economic activities (in contrast to the NSR) (Jorgensen-Dahl, 2010). Thus, the passage may be used only for transit between dispatch and destination points without an additional load in transshipment points.

The Transpolar Passage (TP) is the shortest way from Europe to Northeast Asia through the North Pole. Sailing along this route requests passing heavy and perennial sea ice. However, as of Smith and Stephenson (2013), ice conditions may become easier, and optimal transport routes between Asia, Europe, and North America may move to the central parts of the Arctic Ocean. Apart from a substantial cut of a path length, the advantage of this route for Chinese vessels is that they do not have to enter territorial waters of Russia or Canada. In the near future, commercial shipping along the TP will require not only icebreaker assistance but also the usage of ice-strengthened cargo vessels. Apart from the technical complexity of sailing along the TP, there are certain legal issues to be solved. It is highly likely that any country willing to establish a navigation in the central part of the Arctic Ocean will have to negotiate with Russia and all the Nordic states. Delays are quite possible. It may happen that no vessel can avoid entering the territorial waters of Russia and all the Nordic states because of heavy and changing ice conditions and other emergencies.

Compared with the Northwest and TP, the NSR has the best potential in terms of the development of commercial shipping, extraction of mineral resources, production, and other kinds of economic activities. In terms of the establishment of the ABEC, the opportunities include transit shipping (cargo transportation between non-Arctic ports of Europe and Asia through the NSR) and special-purpose shipping (activities that start and/or end in the Arctic). Availability of energy (oil, gas, and coal) and mineral (iron, non-ferrous and rare-earth metals, and phosphates) resources has made special-purpose shipping focused on the transportation of resources from the Arctic to Asia and Europe the most economically attractive kind of commercial activity along the NSR and, potentially, the ABEC.

As regards the climate conditions for navigation, the NSR may be divided into three climatic zones (ABS, 2016) (Figure 2):

Figure 2. Climatic zones along the NSR



Source: Authors' development

The Atlantic zone includes the Barents Sea, the western part of the Kara Sea, and part of the Arctic Ocean to the North. There are frequent storms in Winter and cloudy weather with frequents fogs and rain in Summer. In the Barents Sea, the average temperature is +7°C in Summer and -20°C in Winter. Wave height up to 7 m. In the Kara Sea, the average temperature is +6°C in Summer and -28°C in Winter.

The Siberian zone includes the eastern part of the Kara Sea, the Laptev Sea, and the western part of the East Siberian Sea. Winter temperatures are lower compared to Atlantic and Pacific zones, while Summer ones are usually higher (in the southern coastal part of the zone). In the northern part of the zone (Arctic Ocean) Summer is cold (+1°C in the northern part of the Laptev Sea in Summer and down to -34°C in Winter).

The Pacific zone includes the eastern part of the East Siberian Sea, the Chukchi Sea. The Pacific Ocean influences the climate of the zone in Winter, consequently, air temperature is higher, winds are stronger, and precipitation is heavier compared to Atlantic and Siberian zones. In the East Siberian Sea, the average temperature is +7°C in Summer and down to -33°C in Winter. There are frequent storms, air temperature fluctuations, and heavy fogs in Summer.

ABEC, NSR and Russia

Until recently, the NSR had been used exclusively for internal Russia's transportation, i.e., provision of Russia's regions of High North and commercial cargo shipments by Russian oil-and-gas and mining companies. Arctic zone of Russia accounts for over 10% of Russia's GDP and 20% of export revenue (Heininen et al., 2014). With over 200 oil and gas continental and offshore deposits, Arctic territories of Russia hold most of the Arctic's hydrocarbon reserves. The region is the most prolific producer of Russian gas (95%) and oil (about 70%), primary and placer diamond

(99% of total Russian production), platinum-group elements (98%), nickel and cobalt (over 80%), chromium and manganese (90%), copper (60%), antimony, tin, tungsten, and rare metals (from 50 to 90%), and gold (about 40%) (Sergunin & Konyshev, 2016).

With the development of exploitation of natural resources and construction of new production facilities along the potential ABEC route, Russia is very keen to increase the contribution of Arctic territories to the domestic product. Over the last few years, the total cargo turnover of the NSR (domestic Russia's transportations plus Europe-Asia transits) has increased substantially from 2.0 million tons in 2011 to almost 7.3 million tons in 2016 (Administration of the Northern Sea Route, 2018). The growth has been contributed by the launch of big projects on infrastructure construction (Sabetta seaport) and resource extraction projects (Yamal-LNG plant for production of liquefied natural gas) by Russian oil-and-gas companies and international consortiums. However, international transit shipments have been decreasing. In 2016, the entire route from Europe to Asia or back was passed by 19 vessels with 214,500 tons of cargo (compared to 2013, when the transit cargo turnover almost reached 1.2 million tons carried by 73 foreign-flag vessels) (Administration of the Northern Sea Route, 2018). The major cargo was coal (155,000 tons, or 70% of the total transit turnover in 2016).

There are several reasons for such a decrease in transit shipping. On the one hand, during the period of growth of transit shipping in 2011-2013, Russia almost failed to develop the infrastructure of the NSR apart from the continuous construction of new seaports and marine surveys (Bai & Voronenko, 2016). On the other hand, due to the drop in oil prices, the economic conditions of usage of the NSR have changed dramatically (Erokhin, 2018). Cheaper fuel has erased the cost advantage of a shorter distance compared to the traditional southern routes via the Suez Canal, especially since sailing through ice fields assumes increased fuel consumption. The oil price gap between European and Asian markets has also narrowed thus decreasing the profitability of intercontinental transportation of hydrocarbons.

ABEC and the Nordic Countries

Despite the short-term deterioration of the economic environment, China expects to redirect up to 1% of its foreign trade to the northern routes by 2020 (Erokhin, 2018). China looks forward to developing the ABEC as a link between Chinese and European markets and therefore expects the involvement of the EU countries, particularly, Nordic ones, to the development of this initiative. EU member states combined have the world's largest merchant fleet that is why the EU's policies in the Arctic are focused on transportation (Ostreng, 2010). Extending from Europe to Asia, the ABEC could shorten the time taken by cargo vessels to travel between the Pacific and the Atlantic by about one third which may save energy, reduce emissions, promote trade, and diminish the pressure on main trans-continental navigation channels. In the sphere of Arctic shipping, the EU wants to maintain its competitive lead in developing the technology required for Arctic conditions, i.e. specially designed icebreakers and cargo vessels. Nordic countries, however, have different interests and expertise to bring to the table in the China-Nordic cooperation (Table 1).

Table 1. Priority areas and expertise of the Nordic countries in the China-Nordic cooperation

Country	Priority areas	Expertise
Denmark	Self-sustaining growth and development	Exploitation of mineral resources
		Exploitation of renewable energy potential
		Knowledge-based growth and development
	Development with respect to climate, environment, and nature	Vigorous and ambitious knowledge building on climate change in the Arctic and its consequences in order to foster global and local adaptation to far-reaching change
		Environment and nature management based on the best possible scientific knowledge and standards for protection
Finland	Construction and infrastructure	Offshore and maritime industries
		Shipbuilding and shipping
		Generation and distribution of electricity
		Energy saving and energy efficiency
	Knowledge	Internationally-recognized expert in the Arctic
		Knowledge-based service provider
		services and new business models for the Arctic
Iceland	Information society, human resources, and new opportunities	Access to a cost-effective telecommunications system with sufficient carrying capacity for the residents of the Arctic region
		A hub for Nordic and Chinese institutions, companies, and research facilities
	Trade	Free Trade Agreements
	Energy	Development of renewable energy
Norway	Industry	Exploration and exploitation of oil and gas offshore fields
		Fishing
	Business development	Economically, socially and environmentally sustainable business development
		Value creation based on the region's resources
	Infrastructure	Reliable, efficient and environmentally sound transport system
		Secure and efficient power supply
		Broad access to good digital infrastructure
		Reduction of greenhouse gas emissions and local pollution, reduction of negative environmental impacts of infrastructure development
Sweden	Science and technology	A supporting country by providing services, scientific research, and public information
		Human development
		Research in the sphere of climate change and its effects on transport routes, industries, and people
	Economy	Promotion of free trade and industrial development in the Arctic

Source: Authors' development.

Denmark's priorities in the region are formalized by the Kingdom of Denmark Strategy for the Arctic 2011-2020. They include self-sustaining growth and development; development with respect for the Arctic's vulnerable climate, environment, and nature; and close cooperation with international partners (Government of Denmark, Government of the Faroes, & Government of

Greenland, 2011). Being one of the leading shipbuilding and shipping states in the world, Denmark devotes much attention to the development of Arctic transport corridors. Many Denmark's territories, especially Greenland, are favorably located in relation to both the EU and the US. Therefore, the country may consider its involvement in the development of the ABEC and expansion of trade with Asian markets. Greenland is interesting for China for its natural resources and as a hub on the ABEC route (Seaman et al., 2017). Mortensen et al. (2016) and Tetu and Lasserre (2017) report that China plays an important role in mining development and is often considered one of the most important partners for Greenland in mining its abundant natural resources, primarily, rare earth elements, uranium, and zinc. According to Shi and Lanteigne (2018), China's interests in Greenland have not only included emerging mining opportunities, but also the areas of infrastructure planning, tourism, and scientific cooperation.

One of the core priorities of Finland in the region is an achievement of a statue of an internationally-recognized expert in the Arctic. Though Finland does not have a direct access to the seas of the Arctic Ocean, the country pays much attention to the development of the transport corridor from Europe to Asia and North America through Lappeenranta, Russian cities of Saint Petersburg and Moscow, Sweden, and Norwegian seaports. As of Schulze (2017), the country seeks a role as a knowledge-based service provider and invests in research and development of technologies, services and new business models for the Arctic. In the light of Finland's participation in the ABEC, major areas may include offshore and maritime industries, shipbuilding and shipping, construction and infrastructure, mining and minerals, generation and distribution of electricity, energy saving and energy efficiency, and others. Consequently, economic interests of Finland in the ABEC are focused on shipbuilding (particularly, icebreakers), mining, and construction of the related industrial, transport and distribution infrastructure (Telegina & Morgunova, 2012).

Similar to Finland, Sweden has no direct access to the Arctic Ocean. Therefore, in the ABEC format, Sweden should establish itself as a supporting country by providing services, scientific research, and public information. Chinese investment in Sweden is partly directed towards production, but technology and innovation stand out as the main driving factors in attracting investment (Seaman et al., 2017). Sweden's priorities in the Arctic include climate, biodiversity, and environmental protection; economic development and promotion of free trade and industrial development in the Arctic; human development, health issues, and influences of climate change and hazardous substances on the population, indigenous cultures, and industries.

The prospects of Iceland's participation in the ABEC are logically suited to its position as a small state in a sensitive and geographically central setting (Bailes et al., 2014). Iceland is located by the Arctic Circle and within the Arctic more than other countries rely on the fragile resources of the Arctic region (fishing, tourism, and renewable energy). Iceland's Arctic strategy is embedded to the context of the general European approaches to polar activities. Iceland may contribute to the ABEC by promoting trade relations in the Arctic, including in the format of free trade agreement with China, and developing itself into a hub for Nordic and Chinese institutions, companies, and research facilities. Guschin (2015) expects that commercial shipping offers a broad perspective on the cooperation between Chinese COSCO and Icelandic Nesskip in the segment of container carriage, implementation of energy saving solutions, and reduction of CO_2 emissions.

For Norway, the overarching goals in the Arctic are peace, stability, and predictability; integrated, ecosystem-based management; international cooperation and international legal order; and stronger basis for employment, value creation, and welfare (Norwegian Ministries, 2017). In terms of Norway-China collaboration on the economic development of the Arctic, the major areas are the exploration and exploitation of oil and gas offshore fields, fishing, and tourism. Among the five priorities which have been identified as crucial for Norway in the Arctic (Norwegian Ministries, 2017), at least two (business development and infrastructure) correspond with ABEC's areas. Particularly, Norway should develop a reliable, efficient, and environmentally sound transport system in the Arctic; ensure that the transport system is able to meet the business sector's international transport needs; ensure a secure and efficient power supply and broad access to good digital infrastructure; promote economically, socially and environmentally sustainable business development; increase value creation based on the region's resources.

Major Challenges of the ABEC

There are many specific technological and economic challenges to be considered and met before the ABEC may become any viable alternatives to southern maritime routes used by China. High insurance expenses, low speeds, stringent security regulations, high environmental risks, unpredictable ice, wave, and wind conditions, varying routes, lack of qualified and experienced staff to facilitate safe sailing in polar waters are just a few challenges to the intensification of China's shipping and economic activities in the Arctic (Fisenko, 2014). In terms of its economic viability, major downsides the ABEC project are its unsuitability for containerized cargo shipping (Farre et al., 2014), underdeveloped infrastructure, and seasonality of transportation.

While the NSR may provide a viable alternative for liquid and bulk cargo shipping (e.g., oil, coal, and ore) in the near future, it may be of limited value for container shipping. Container carriers need schedule adherence along with predictable climate conditions and unified operations on cargo loading and discharging at the port terminals (Lasserre, 2014). So far, the MSR has been the more sustainable route for China's container vessels even in the light of long distance and possible delays due to the heavy traffic in the Malacca Strait and Suez Canal. As against the MSR, navigation conditions in the polar waters are far less predictable because of seasonal fluctuations of ice cover and diurnal variations of wind and wave regime. Any change in the weather may either break the delivery schedule (delay, extra operational costs, and risk of penalty payments) or request icebreaker assistance (an increase of freight cost, additional expenses due to icebreaker support). Consequently, despite the bright long-term perspectives of the ABEC development, in the foreseeable future China's cargo container flows will continue moving southward – not only because of easier navigation conditions but also due to the proximity of southern transport corridors to the emerging markets of India, Pakistan, Middle East, and East Africa (Fisenko, 2013).

Economics of the ABEC requires massive cargo flows by many carriers. Current sporadic shipments with the involvement of only several dozens of vessels (taking into account the decreasing number of transits since 2014) are economically unviable. In terms of economic benefits, for China, the ABEC project is attractive in case of high oil prices, when saving time by shipping a shorter route may cause essential saving of fuel and, consequently, money. Only, in this case, the costs associated with sailing by the NSR may be recuperated by shorter distance and time. To take a ship from a logistic chain and forward it through the NSR, Chinese shipping companies

need massive investments to the development of the Arctic fleet, the year-round availability of the route, and the possibility to deliver cargo without delays.

One of the keystone ideas of the ABEC, at least in the first instance, is that cargo flow is created by means of export of hydrocarbons and other natural resources produced in the Arctic. However, sectoral sanctions against Russia forced most of the Western companies to quit from the projects in the Arctic, primarily, from oil and gas extraction. Being under the Western sanctions, Russia has neither financial resources nor technological solutions for effective exploitation of natural deposits in the Arctic, particularly, in the shelf areas (Gao & Erokhin, 2017). Russia would like China to invest in an exploration of Russia's Arctic shelf. Particularly, Russia expects China to participate in the investigation of shelf areas in Barents and Pechora seas (with Rosneft), to exploit Shtokman gas field and Prirazlomnoe offshore oilfield (Smirnova et al., 2016). Russian Government provides favorable treatment regime for Chinese investors, including tax holidays. Nornickel is interested in China's involvement in the exploitation of the deposits of rare-earth metals, vanadium, molybdenum, and wolframite in the Kola Peninsula, Taimyr Peninsula, and northern parts of the Republic of Sakha (Yakutia) (Ivanov, 2016).

One of the critical challenges to the commercial viability of the ABEC is the necessity of icebreaker assistance to pass along the NSR. The high cost of assistance provided by Russia nearly evens the distance and time advantages of using the NSR instead of the southern routes of the MSR. Without high-capacity icebreakers, navigation along the maritime routes of the ABEC is unsustainable. Ice is not the only challenge for Chinese cargo vessels to face in the Arctic. Low predictability of weather conditions, heavy storms, extreme temperature, drifting icebergs, and the fields of thin first-year may either disrupt deck machinery and navigation equipment or even damage the vessel. Observed climate change and ice melting are not quite simplistic. Many experts warn that shrinkage of ice cover in the Arctic Ocean may drive uncontrollable changes of weather and thus make navigation even less predictable than it is today. Major risks are strong winds, extreme waves, detachment of icebergs, erosion of the coastline, and damage of inland port and transport infrastructure (Overeem et al., 2011; Ogorodov et al., 2016). In view of all those problems and challenges, implementation of the ABEC initiative requires substantial investment to the construction and renovation of the infrastructure for production and extraction of resources, cargo shipping, icebreaking assistance, and safer navigation and rescue.

Solutions

To ensure stable and on-schedule navigation along the ABEC maritime routes, construction of modern icebreakers is required. Russian nuclear-powered fleet is outdated and predominantly not suitable for piloting large-capacity vessels. China needs construction of nuclear-powered icebreakers able to pilot large-capacity tankers, bulkers, and container carriers through thick ice. The major challenge of the ABEC in terms of the commercialization of the polar shipping and decrease of icebreaker assistance costs is how to ensure the maximum available load of the route by cargo vessels during the four-month navigation window.

Most of the territories along the prospective ABEC, primarily, along the Russian part of the NSR, have inadequate infrastructure to support shipping. This includes such infrastructure components as the availability of ports and port facilities needed for different types of vessels operating in Arctic waters, the accuracy and availability of information needed for safe navigation and

availability of search and rescue assets. Berthing facilities need overhaul renovation and reconstruction. Seaports need dredging to be able to receive modern large-capacity vessels. In most of the ports, there should be constructed and developed facilities for reception and utilization of shipboard wastes. It is necessary to develop infrastructure for berthing, loading, and discharging of vessels at various points of the ABEC throughout the year. Communication systems are generally adequate for the lower parts of the Arctic, but data transmission becomes problematic when the vessels have to move to higher areas of the NSR because of the ice situation.

Taking into account the integrated and comprehensive nature of the ABEC initiative, activities in this field has to become increasingly international. The principal areas for collaboration between China and Nordic countries and Russia are:

- Geography (the study of the continental shelf of Nordic countries and Russia potentially involved in the ABEC, delineation, and amendment of maritime boundaries).
- Geology (geological surveying of hydrocarbons and mineral resources, evaluation of potential deposits for their exploration).
- Ecology (analysis of climate change and environmental problems with emphasis on the negative environmental effects of resource exploration, shipping, and other kinds of economic activities in the Arctic).
- Economy (economic evaluation of discovered deposits of hydrocarbons, mineral, biological, and other resources of the Arctic; perspective directions of the development of commercial shipping in polar waters).
- Sustainability (elaboration of effective solutions on the convergence of economic benefits from exploring the Arctic with the urgent need for sustainable development a fragile Arctic environment, conservation of resources, biodiversity, and food security).
- Security (development of the mechanisms for collaboration between the Nordic countries, Russia, and major non-Arctic actors for peaceful and secure development of the region).

Specific interests of China in the region include surveying of the mineral resource potential of the territories along the future ABEC routes. Mineral resources have not yet been extensively explored and developed. China's long-term goals is to focus on maintaining a high level of exploration activity for oil and gas in Norway to increase the possibility of making commercial discoveries. With regard to minerals in Greenland, China aims to maintain the development of mineral exploration and increase the level of knowledge regarding attractive geological areas in Greenland. Mining is not the only area on which the ABEC may be built. A number of other areas include energy-intensive industries based on potentially available hydro and thermal power (Greenland and Iceland), infrastructure and related industries (Finland and Russia), commercialization of maritime transport routes (Russia), research and development (Sweden and Iceland), tourism (Nordic countries and Russia), and the fishing industry (Iceland and Norway).

Contemporary policies of principal actors in the region should be focused on the following major areas:

- protection of fragile Arctic environment, reduction of greenhouse gases, preservation of biodiversity, and protection the Arctic Ocean from pollution;

- establishment of scientific networks, international cooperation, and expansion of research funding with a focus on interdisciplinary polar research on the climatic changes and sociocultural developments in the Arctic;
- provision of an access of the local population to education, e.g. through modern communication technologies and distance learning; building-up training and study programs and the establishment of Arctic education programs in schools and universities (in non-Arctic countries too);
- exploration and exploitation of oil and gas in the Arctic, mining of mineral resources, in particular, rare earth elements, iron ore, precious metals, and diamonds, expansion of the required off- and onshore infrastructure in a sustainable and ecologically responsible way;
- expansion of transport routes to link the region to major markets of the world (Europe, Asia, North America); development of new shipping routes and the intensification of maritime traffic on the transport corridors on the Arctic Ocean (NSR and Northwest and Transpolar passages);
- development of marine technology and the expansion of the maritime infrastructure (ports, access roads, and container terminals);
- expansion of the technical infrastructure such as energy supply and communication;
- exploration and exploitation of existing and new fishing grounds for marine resources;
- expansion of tourist facilities, accommodation and targeted marketing for Arctic destinations.

Arctic region is now changing at an unprecedented pace, in the ways that fundamentally affect ecosystems, people, biodiversity, and sustainability. Such changes are driven primarily by external factors: climate and environmental change, rapid social and economic developments, and industrialization. Increasingly frequently, business interests (extraction of mineral resources, cargo shipping, extensive fishing, tourism, etc.) interfere with the sustainable development goals. Arctic social and environmental systems are deeply intertwined with both the environmental systems and economic development of other regions of the world, so rapid changes in this sensitive region are likely to be felt elsewhere. That is why the cooperation for sustainable development has to be put at the top of the China-Nordic ABEC agenda.

Conclusion

The initiative of the establishment of an economic corridor in the Arctic is an integral element of the long-term vision of the region by China. Despite the strategic orientation of the BRI to the southern transport corridors, China is rather dependent on the situation in Malacca and Suez (Sun, 2014; Lanteigne, 2013). The ABEC initiative is as an attempt to diversify maritime transport routes and ensure long-term security trading for China. The resource-rich Arctic offers new possibilities in China's global search for energy and strategic engagement in the region. However, the prospective vision of the ABEC is not only about securing trade routes. The overarching goal is to facilitate connectivity between China and Nordic countries, to ensure sustainable economic and social development of the Arctic, and to bridge the gap between traditional industries in the Arctic

and China's market. Chinese shipping in polar waters in the coming years will form the backbone of the BRI process in the Arctic, which will require collaboration with Nordic countries and Russia, on the co-development of transport infrastructure and cargo-generating facilities along the Arctic routes.

For the Nordic countries, Russia, and other stakeholders involved, there are certain geopolitical and commercial advantages of the ABEC initiative, as well as risks. Nordic countries and Russia look forward to attracting investment to the mining and infrastructure projects in the Arctic, increase export of hydrocarbons and minerals, and benefit from serving transit navigation along the opening maritime routes. China would like to ensure its presence in the Arctic projects, get access to economic resources and shipping routes in the region, and incorporate the entire region into the BRI network. However, there are many specific technological and economic challenges to be considered and met before the ABEC may become a viable alternative to the MSR. Development of the ABEC requires extensive construction and reconstruction of the infrastructure along the entire route from Russian Chukotka in the east to Iceland and Greenland in the West: deep-water seaports with modern logistics and service, transport hubs, support and rescue points for safe and stable transarctic shipping, and refueling points for transit vessels passing the route from China to Europe and back.

The success of the ABEC is only possible with the attraction of foreign investments. In such a situation, future development of the ABEC and China's position in the initiative depend on the willingness of Nordic countries and Russia to attract China's investment. The economies along the potential ABEC have a wide range of assets and features that Chinese investors seek, i.e. hydrocarbons and maritime transport in Norway and Russia, shipbuilding in Finland, research and development in Sweden, mining in Denmark (Greenland), renewable energy and rare-earth metals in Iceland, among others. However, the magnitude and certain patterns of China's activities in the region have also raised concerns as Chinese companies have begun to buy what some consider critical infrastructure (Seaman et al., 2017). To overcome challenges of strategic mistrust, China should further engage Nordic countries and other stakeholders to reassure them of its intentions (Liu, 2018). China should not solely rely on its economic largesse to win the support of its potential ABEC partner nations. Over the long term, China will need to highlight the less visible benefits of the ABEC, such as sharing of development experience and expertise, the promotion of regional cooperation, and the delivery of more global public goods.

Acknowledgments

This study is supported by the National Social Science Fund of China (grant no. 18BGJ004).

References

ABS. (2016). *Navigating the Northern Sea Route: Status and Guidance*. Houston, TX: ABS.

Administration of the Northern Sea Route. (2018). *Statistic Data*. Retrieved from http://www.nsra.ru/.

Bai, J., & Voronenko, A. (2016). Lessons and Prospects of Sino-Russian Arctic Cooperation. *Advances in Polar Science, 3*, 185-192.

Bailes, A., Sela, M., Kjartansdottir, K., & Schram, K. (2014). Iceland: Small but Central. In A. Spruds & T. Rostoks (Eds.), *Perceptions and Strategies of Arcticness in Sub-Arctic Europe* (pp. 75-98). Riga: Latvian Institute of International Affairs.

Bartenstein, K. (2015). The "Common Arctic": Legal Analysis of Arctic and non-Arctic Political Discourses. In L. Heininen, H. Exner-Pirot, & J. Plouffe (Eds.), *Arctic Yearbook 2015* (pp. 264-280). Akureyri: Northern Research Forum.

Bennett, M. (2014). North by Northeast: Toward an Asian-Arctic Region. *Eurasian Geography and Economics, 55*(1), 71-93.

Coates, K. S., & Holroyd, C. (2017). Non-Arctic States and their Stake in Arctic Sustainability. In K. Keil & S. Knecht (Eds.), *Governing Arctic Change* (pp. 207-228). Amsterdam: Springer.

Dunlap, W. (2002). *Transit Passage in the Russian Arctic Straits*. Durham: International Boundaries Research Unit, University of Durham.

Erokhin, V. (2017). How to Shape the Market: China's One Belt One Road Initiative. *In* M. Malovic & K. Roy (Eds.), *The State and the Market in Economic Development: In Pursuit of Millennium Development Goals* (pp. 144-156). Brisbane: The IIDS Australia Inc.

Erokhin, V. (2018). Northern Sea Route as an Infrastructure Framework of the Russia-China Arctic Blue Economic Corridor. *Marketing and Logistics, 15*(1), 12-29.

Erokhin, V., & Gao, T. (2018). Northern Sea Route: An Alternative Transport Corridor within China's Belt and Road Initiative. In J. Chaisse & J. Gorski (Eds.), *The Belt and Road Initiative: Law, Economics, and Politics* (pp. 146-167). Leiden: Brill Nijhoff.

Farre, A. B., Stephenson, S. R., Chen, L., Czub, M., Dai, Y., Demchev, D., … Wighting, J. (2014). Commercial Arctic Shipping through the Northeast Passage: Routes, Resources, Governance, Technology, and Infrastructure. *Polar Geography, 37*(4), 298-324.

Fisenko, A. (2013). Geopolitical, Transportation and Economic Aspects of Development the Northern Sea Route in Russia. *Transport Business in Russia, 107*(4), 235-238.

Fisenko, A. (2014). Prospects and Problems of Development Sea Freight Transport and Icebreaker Support Northern Sea Route. *Contemporary Problems of Science and Education, 2*, 450.

Gao, T., & Erokhin, V. (2017). One Belt One Road and Northern Sea Route: Perspectives and Risks for China to Participate. In *Proceedings of the International Conference "Collaboration between China and Russia: One Belt One Road Initiative"*. Moscow: Moscow University of Finance and Law.

Gavrilov, V., & Kripakova, A. (2017). Arctic Policy of the North East Asian Countries. *Jindal Global Law Review, 8*(1). doi: 10.1007/s41020-017-0039-x.

Government of Denmark, Government of the Faroes, & Government of Greenland. (2011). *Denmark, Greenland, and the Faroe Islands: Kingdom of Denmark Strategy for the Arctic 2011-2020*. Copenhagen: Ministry of Foreign Affairs of Denmark; Nuuk: Department of Foreign Affairs of Greenland; Tinganes: Ministry of Foreign Affairs of the Faroes.

Guschin, A. (2015). *China, Iceland and the Arctic.* Retrieved from https://thediplomat.com/2015/05/china-iceland-and-the-arctic/.

Guy, E., & Lasserre, F. (2016). Commercial Shipping in the Arctic: New Perspectives, Challenges, and Regulations. *Polar Record, 3*(1), 1-11.

Heininen, L. (2012). *Arctic Strategies and Policies. Inventory and Comparative Study.* Akureyri: The Northern Research Forum; The University of Lapland.

Heininen, L., Sergunin, A., & Yarovoy, G. (2014). *Russian Strategies in the Arctic: Avoiding a New Cold War.* Moscow: International Discussion Club "Valdai".

Hong, N. (2012). The Melting Arctic and its Impact on China's Maritime Transport. *Research in Transportation Economics, 35*, 50-57.

Ivanov, S. (Ed.). (2016). *Asian Players in the Arctic: Interests, Opportunities, Prospects*. Moscow: Russian International Affairs Council.

Joelsen, N. (2016). *China's Engagement with the Arctic Council – Seeking Natural Resources and International Status*. Aalborg: Aalborg University.

Jorgensen-Dahl, A. (2010). *Future of Resources and Shipping in the Arctic.* Kirkenes: Centre for High North Logistics.

Kelmelis, J.A. (2011). Arctic Warming Ripples through Eurasia. *Eurasian Geography and Economics, 52*, 56-78.

Khon, V., Mokhov, I., Latif, M., Semenov, V., & Park, W. (2010). Perspectives of Northern Sea Route and Northwest Passage in the 21st Century. *Climatic Change, 100*(3-4), 757-768.

Kikkas, K. (2015). International Transport Corridors and the Arctic. *Modernization. Innovation. Research, 6*(3), 178-184.

Lanteigne, M. (2013). Fire Over Water: China's Strategic Engagement of Somalia and the Gulf of Aden Crisis. *Pacific Review, 26*(3), 289-312.

Lanteigne, M. (2014). *China's Emerging Arctic Strategies: Economics and Institutions*. Reykjavik: University of Iceland.

Lanteigne, M. (2017). Walking the Walk: Science Diplomacy and Identity Building in Asia-Arctic Relations. *Jindal Global Law Review, 8*(1), 87-101.

Lasserre, F. (2014). Case Studies of Shipping along Arctic Routes. Analysis and Profitability Perspectives for the Container Sector. *Transportation Research, 66*, 144-161.

Leifer, M. (2013). *Singapore's Foreign Policy: Coping with Vulnerability*. New York: Routledge.

Liu, N., Lin, L., Kong, B., Wang, Y., Zhang, Z., & Chen, H. (2016). Association between Arctic Autumn Sea Ice Concentration and Early Winter Precipitation in China. *Acta Oceanologica Sinica, 35*(5), 73-78.

Liu, W. (2018). *The Belt and Road Initiative: A Bellwether of China's Role in Global Governance.* Retrieved from https://carnegietsinghua.org/2018/09/10/belt-and-road-initiative-bellwether-of-china-s-role-in-global-governance-pub-77204?mkt_tok=eyJpIjoiTldObVpEQmpaVGN6WWpVeiIsInQiOiJKeG00UWpGVGd1M

2JaazJSS1hFcVhCWXJpUmlSaWYrNkhBNGlUZDd4RDBaanhtZ1JQdldiQkpDc1wvU3Bpbk9JTjRybXlMY1hUbzJvOW50SW04OUprWkFZTWgyR0I4c1doZURSQVZcL3JhM3hPOUNoeW5EVGFycHZQVllQV3ozR1owIn0%3D.

Mao, R., Gong, D., Bao, J., & Fan, Y. (2011). Possible Influence of Arctic Oscillation on Dust Storm Frequency in North China. *Journal of Geographical Sciences, 21*(2), 207-218.

Meng, Q., Zhang, Y., & Xu, M. (2017). Viability of Transarctic Shipping Routes: A Literature Review from the Navigational and Commercial Perspectives. *Maritime Policy and Management 44*(1), 16-41.

Mokhov, I., & Khon, V. (2015). The Duration of the Navigation Period and Changes for the Northern Sea Route: Model Estimates. *Arctic: Ecology and Economy, 18*(2), 88-95.

Mortensen, B.O.G., Su, J.J., & Mouyal, L.W. (2016). Chinese Investment in Greenland. *Advances in Polar Science, 27*, 192-199.

Norwegian Ministries. (2017). *Norway's Arctic Strategy – between Geopolitics and Social Development*. Oslo: Norwegian Ministry of Foreign Affairs, Norwegian Ministry of Local Government and Modernisation.

Ogorodov, S., Baranskaya, A., Belova, N., Kamalov, A., Kuznetsov, D., Overduin, P., … Vergun, A. (2016). Coastal Dynamics of the Pechora and Kara Seas under Changing Climatic Conditions and Human Disturbances. *Geography, Environment, Sustainability, 9*(3), 53-73.

Ostreng, W. (2010). *European Union's Arctic Policy*. Retrieved from http://www.arctis-search.com/European+Union%E2%80%99s+Arctic+Policy&structure=Arctic+Policies+and+Governance.

Ostreng, W. (2013). Recent Trends in Arctic Geopolitics Affecting the Opportunities for Issue-Area Cohabitation and Cross-Border Collaboration. In U. Wrakberg (Ed.), *Futures of Northern Cross-Border Collaboration* (pp. 17-30). Tromsø: University of Tromsø.

Overeem, I., Anderson, R.S., Wobus, C.W., Clow, G.D., Urban, F.E., & Matell, N. (2011). Sea Ice Loss Enhances Wave Action at the Arctic coast. *Geophysical Research Letters*, 38, L17503. doi:10.1029/2011GL048681.

Peng, J., & Wegge, N. (2015). China's Bilateral Diplomacy in the Arctic. *Polar Geography, 38*(3), 233-249.

Ratnikov, A. (2016). *From the North. Will Russia Be Able to Use Advantages of the Northern Sea Route.* Retrieved from https://lenta.ru/articles/2016/03/15/northsearoute/.

Ruksha, V., Smirnov, A., & Golovinskiy, S. (2013). Problems of Northern Sea Route. *Arctic: Ecology and Economy, 1*, 81-82.

Schulze, V.-G. (2017). *Arctic Strategy Round-Up 2017*. Bremerhaven: Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research.

Seaman, J., Huotari, M., & Otero-Iglesias, M. (Eds.). (2017). *Chinese Investment in Europe. A Country-Level Approach*. Paris: French Institute of International Relations.

Sergunin, A., & Konyshev, V. (2016). *Russia in the Arctic: Hard or Soft Power?* Stuttgart: Ibidem-Verlag.

Shi, M., & Lanteigne, M. (2018). *The (Many) Roles of Greenland in China's Developing Arctic Policy*. Retrieved from https://thediplomat.com/2018/03/the-many-roles-of-greenland-in-chinas-developing-arctic-policy/.

Smirnova, O., Lipina, S., Kudryashova, E., Krejdenko, T., & Bogdanova, Y. (2016). Creation of Development Zones in the Arctic: Methodology and Practice. *Arctic and North, 25*, 148-157.

Smith, L.C., & Stephenson, S.R. (2013). New Trans-Arctic Shipping Routes Navigable by Midcentury. *Proceedings of the National Academy of Sciences of the United States of America, 110*(13), 1191-1195.

State Council of the People's Republic of China. (2018). *China's Arctic Policy. The State Council Information Office of the People's Republic of China*. Beijing: The State Council of the People's Republic of China.

Stephenson, S.R., Brigham, L., & Smith, L.C. (2013). Marine Accessibility along Russia's Northern Sea Route. *Polar Geography, 2*, 1-23.

Stokke, O.S. (2013). The Promise of Involvement: Asia in the Arctic. *Strategic Analysis, 37*(4), 474-479.

Streltsov, D. (2017). Japan's Arctic Policy. *Comparative Politics, Russia, 8*(1), 93-103.

Sun, K. (2014). Beyond the Dragon and the Panda: Understanding China's Engagement in the Arctic. *Asia Policy, 18*, 46-51.

Telegina, E., & Morgunova, M. (2012). *Finland's Strategy in the Arctic Region*. Retrieved from http://russiancouncil.ru/en/analytics-and-comments/analytics/finland-s-strategy-in-the-arctic-region/.

Tetu, P.-L., & Lasserre, F. (2017). Chinese Investment in Greenland's Mining Industry: Toward a New Framework for Foreign Direct Investment. *The Extractive Industries and Society, 4*(3), 661-671.

Verny, J., & Grigentin, C. (2009). Container Shipping on the North Sea Route. *International Journal of Production Economics, 122*, 107-117.

Xu, H., Yin, Z., Jia, D., Jin, F., & Ouyang, H. (2011). The Potential Seasonal Alternative of Asia-Europe Container Service via Northern Sea Route under the Arctic Sea Ice Retreat. *Maritime Policy & Management, 38*(5), 541-560.

Zalyvsky, N. (2015). The Northern Sea Route: The Potential of Expectations and the Real Functioning Problems. *Arctic and North, 20*, 32-50.

Zelentsov, V. (2012). Development of Arctic Transportation in Russia. *Asia-Pacific Journal of Marine Science and Education, 2*(2), 9-16.

Zhang, J., Peng, J., Huang, M., & Zhang, S. (2006). Are Dust Storm Activities in North China Related to Arctic Ice-Snow Cover? *Global and Planetary Change, 52*(1), 225-230.

The Polar Silk Road in the Popular Press: Global Media Framing of China's 2018 Arctic Policy White Paper

Derek Moscato

China's issuance of its 2018 Arctic Policy white paper, calling for a "Polar Silk Road," provides a unique lens into how narratives about China are fostered in global news outlets. The white paper, garnering headlines from international media outlets, provided the kind of foreign policy milestone that allowed journalists to develop a narrative about the country's interest and actions in the polar sphere. Drawing from media framing theory, this study seeks to establish how three prominent media outlets from North America, Europe, and Asia covered China's high-profile Arctic publication. Using news stories and a qualitative analysis, this paper's analysis offers a glimpse into the dynamic interplay of global media and policy at a time when China's interests converge with the Arctic's increasingly prominent place in international affairs. China's self-identification as a "Near-Arctic State" has created an inevitable focal point for the press and subsequent dialogue highlighting the convergence of Chinese and Arctic affairs.

Introduction

China's ascent as a global political and economic power has been accompanied by much scrutiny from the West about its developing agenda in the Arctic. The country's interest in the polar region is buoyed by a combination of environmental concern and economic opportunity (Lanteigne & Ping, 2015). On January 26, 2018, China's State Council Information Office published the country's first Arctic white paper. The document formalized a series of oral statements from Chinese officials about the country's policy positions and aspirations in the decade previous (i.e. SIPRI, 2012; Rylander, 2015; Liu, 2016). Entitled *China's Arctic Policy,* it called for, among other things, greater international cooperation over shipping and infrastructure in the Arctic—a so-called "Polar Silk Road" (Xinhua, 2018). International media headlines from publications such as *Newsweek,* the Financial Times, AND THE South China Morning Post were quick to latch onto the moniker in covering the development and providing assertions of what this meant for the region and the world.

Derek Moscato is an Assistant Professor in the Department of Journalism, Western Washington University.

China's white paper highlights how the country envisions its future in the Arctic— not as a remote or separate site of ecology and geopolitics, but rather a strategic location for the country's future interests in logistics, resources extraction, scientific exploration, and climate policy. As a result, the Arctic Policy white paper emerges as an important media artifact in understanding China's motivations and aspirations in the polar sphere, and serves as a subsequent story angle for journalists or what is known as a "news peg." For example, China's September 2018 launch of the *Xuelong 2* polar research vessel, also known as *Snow Dragon II*, set off a number of articles in the international press about China's Arctic ambitions. These articles continued a polar narrative about China already highlighted in previous stories about the earlier-launched *Snow Dragon* icebreaker. Media coverage about China's Arctic white paper, then, is the inevitable outcome of a journalistic process that ties larger stories to events, incidents, or publicity announcements and missives that editors considers newsworthy.

White papers exist as a hybrid of organizational expertise, journalistic-styled communication, and institutional advocacy (Perez, 2011). However, while white papers and like-minded policy documents are well-read by scholars, technicians, specialists, politicians, and journalists, they are not necessarily created for mass consumption. The job of relaying the messaging from a white paper beyond a first-level audience to a larger public often falls to news reporters, whose audiences can number in the thousands or even millions. In the case of China's Arctic Policy, as with similar scenarios, a majority of those made aware of the document's assertions did not read the publication itself, but rather interpretations of it from intermediaries, including the popular press. Thus, media take on a heightened role in disseminating information between nations and publics. Because of their mass reach and influence on both audiences and policymakers, national and global news outlets can serve or undermine nation-state interests.

At the same time, China's arrival in existing Arctic discourses has provided an opportunity for circumpolar nations such as Canada to press for greater international cooperation in the region and provide the Arctic with more prominence on the national political agenda (Lasserre, 2010). In other words, because of its national heft China brings an inevitably larger spotlight to the entire polar sphere. This study seeks to establish how three prominent media outlets in North America, Europe, and Asia covered China's publication of its Arctic Policy white paper. Drawing from news stories, and using a qualitative framing analysis to assess how the white paper was conveyed to global audiences, this paper offers a glimpse into the dynamic interplay of global media and policy, at a time when China's interests converge with the Arctic's increasingly prominent place in international affairs. China's self-identification as a "Near-Arctic State" has created an inevitable media focal point and subsequent dialogue highlighting the convergence of Chinese and Arctic affairs. Yet the media's central role in constructing a narrative about a polar China deserves further scrutiny.

Literature Review

China and the Arctic

The emergence of China as a country of interest in scholarship about the Arctic has coincided with the region's growing significance in the global consciousness—particularly in the realms of ecological and economic affairs. Significant milestones have also led to more scholarly and media interest. In 2013, following years of negotiation, China was admitted to the Arctic Council as an

observer nation, along with other Asian states, including Japan, Singapore, India, and South Korea. While a global perspective has been present in public dialogue about the Arctic over the past decade, especially in relation to environmental issues and social/economic development, China's 2013 inclusion emphasized further the confluence of the Arctic with globalization (Rainwater, 2013), marking a new era for international Arctic politics.

One polar view that has emerged from within China is that the Arctic is a region for all of humankind. However, according to Wright (2011), such a perspective contradicts the country's emphasis on sovereign state rights as a basis for international relations. Related to this is the belief that China would be less inclined to pursue an exploration strategy characterized by aggression or confrontation, in great part because such an approach might harm China's standing related to disputes in the South China Sea (Alexeeva & Lasserre, 2012).

More often, China's Arctic aspirations are understood through an economic lens, including transportation and logistical concerns such as shipping routes. China stands to benefit from lower regulatory costs as a result of shorter trips through the less-congested waters of the Northeast Passage—this in spite of the potential for technical challenges and the country's relatively limited experience in polar navigation (Campbell, 2012). A policy of collaboration and cooperation is therefore the most optimal path forward for China in the region because it benefits the country's economic and strategic positions (Alexeeva & Lasserre, 2012).

A corresponding yet distinct perspective sees China's interest in the Arctic as a direct extension of its overarching focus on science and innovation. The country's interest and involvement in Arctic science—which can be categorized by the disciplines of oceanography, biology, glaciology, and atmospheric science—is predicated on developing the kind of scientific policy and leadership that matches its global political and economic aspirations (Lasserre, 2018). Thus, China's Arctic engagement to date, and its policy moving forward, represents a much longer-term investment comprising economic and scientific innovation. Tonami (2014) situates the country's interests, along with other Asian powers such as Japan, as being aligned closer to economic security and development rather than traditional security concerns.

However, a much wider range of views about China's aspirations continue to circulate in international discourses. Diverging perspectives between China and the West have given way to an emerging "clash of identities" narrative, one that is sometimes based on earlier myths and misconceptions (Lanteigne & Ping, 2015). Such a constructivist perspective puts the spotlight on a key global conduit of information and ideas: The news media.

Coverage by the U.S. and Global Press

Since the 1980s—a time of growing international influence, diplomatic engagement, and economic ties for the country—China has seen an accompanying upswing in international media exposure. Even as China emerged as an inevitable economic rival to the United States at the turn of the millennium, the country's reputation cultivated by the media largely rested on the whims of American news outlets (Peng, 2004). Some scholars have suggested that the rise of interest in China has aligned with the need to make the country the inevitable enemy of the United States—with attention switching to China in the 1990s after the demise of the USSR (Stone & Xiao, 2007). Regardless of the motive, the growth of coverage about China in the U.S. media was not

insignificant, as it came during a time when international coverage from the press was trending downwards on the whole (Peng, 2004).

Such extensive media treatments of China are not necessarily extended to the rest of Asia. A content analysis of media coverage of the SARS outbreaks connected to China and Vietnam in international newspapers (the *Washington Post*, the *Times of London*, the *Sydney Morning Herald*, the *Globe and Mail*, the *Straits Times*, and *Newsweek*) found that Western news coverage emphasized China as the negative other, a media treatment not extended to Vietnam (Leung & Huang, 2007). Meanwhile, country of origin difference was found in media coverage of SARS between Chinese and U.S. newspapers (Luther & Zhou, 2005).

International media coverage critical of the Chinese government is a sharp contrast from the pro-government coverage in the country's domestic, state-owned publications. A comparison of news coverage of HIV/AIDS in China by the *Associated Press* and *Xinhua News Agency* found the latter to be sympathetic to the government's efforts—suggesting that news is a socially constructed phenomenon that reflects national values or agendas (Wu, 2007). A similar study, this time comparing media depictions of the Chinese gold medal-winning swimmer Ye Shiwen during the 2012 Summer Olympics in both the U.S. and Chinese media, highlighted an "us versus them" dichotomy that is strongly influenced by national ideology (Bie & Billings, 2013).

Visual media such as photojournalism also drives coverage of global events like the Olympics. Huang and Fahmy (2011), looking at the anti-China protests at the 2008 Beijing Summer Games, showed that the U.S. media focused on images of Chinese government suppression, as well as pro-Tibet demonstrations. However, online news sites from six countries, including China and the U.S., ultimately showed neither overt nationalism nor sporting bias during coverage of the subsequent London Summer Olympics (Eagleman, Burch & Vooris, 2014). The aforementioned studies underscore one reality of contemporary global media: The variety of such outlets creates a much more complex journalistic ecosystem than the one that existed even a decade previous.

Yet China garners a particular kind of media treatment because of its institutions, economic heft, and foreign engagement. So-called "elite media" play an especially critical role in shaping coverage of China from abroad. The *New York Times'* coverage of China's ascent as the world's second largest economy was embedded with three themes highlighting an interplay of Orientalism and neoliberalism, according to Ban, Sastry, and Dutta (2013): consumption as national duty, personal hyper-consumerism and luxury goods shopping, and China as a place that operates with disregard to international law.

Similarly, the *New York Times*' discourses about Chinese government policy between 1990 and 2000 have featured three "ideological packages" within its stories: globalization, engagement, and containment (Lee, 2010). The notion of China as international threat emerges in other studies, including those connecting media coverage to individual level cognition and beliefs. One survey of American views on China based on U.S. media coverage found that the country was viewed as an economic and social threat, even as Chinese nationals individually were viewed as hardworking and intelligent (Zhang, 2015). The analysis points to another broader theme within media studies: while news stories and television programs may not accurately reflect the on-the-ground reality of world events, they shape a perceived reality for those who consume such media.

The tone and content of international media stories about China carries over into the polar sphere. Such stories reflect negativity or suspicion of Chinese activities. In turn, Chinese scholars argue that a media rhetoric of threat and suspicion have served to slow down China's active engagement in the Arctic (Bradie, 2017). Within geopolitics, an "imagined geography" can be both produced and reinforced by news media and other popular culture offerings. Mass media representations of Arctic geopolitics are often imbued with a "polar orientalism" that simultaneously emphasizes Eurocentric worldviews while obscuring key geographic and historiographic facts (Dodds & Nuttall, 2016). As some East Asian states, including China, reorient themselves toward the Arctic, they are vulnerable to news coverage that points to their polar interest as unconventional or suspicious.

Media coverage of China, like other topics in the global public sphere, is therefore subject not only to an emphasis or de-emphasis of certain themes, narratives, issues, and viewpoints. It is also rendered by journalistic values and practices embedded within the newsroom cultures of different nations, which in turn dictate the role of story variables such as conflict, responsibility, leadership, economy, and human-interest (Luther & Zhou, 2005). To this end, media framing endures as an appropriate lens for understanding how nations such as China, or their national events, are covered by journalists domestically or abroad.

Media Framing and the Interpretation of News

A well-established approach to analyzing global political discourses in the press is framing. Media framing helps audiences interpret the world around them in new or different ways, and involves the selection of information to provide different perspectives of reality. Entman (1993) highlights four functions within this framework: defining problems, diagnosing causes, making moral judgments, and suggesting remedies. Within broader public discourses, media framing draws from symbolic acts as well as cognitive processes—which in turn help audiences form positions on social or policy issues (Gamson & Modigliani, 1989). Specific devices—namely metaphors, catchphrases, exemplars, depictions, and visual images—enable the producers of discourse and media content to imbue content with meaning, which in turn can shift public opinion (Gamson & Modigliani, 1989).

Thus, the variables involved in the construction of frames help establish their salience. A framing analysis of the 1999 Seattle WTO Conference and subsequent "Battle in Seattle" showed that the Australian media highlighting of official sources and specific dramatic characteristics of public protest helped to demonize anti-WTO protesters (McFarlane & Hay, 2003). However, media framing can be a fluid entity—even within single events. Protesters at the G-20 Summit in Pittsburgh successfully generated their own frames through the media such as "First Amendment/right to protest" and "nonviolence" even as some news commentators and city officials characterized their activity as "violence" and "anarchy." Different framings, and therefore different meanings, can be generated by the same global media event.

Aligning with the view that information by itself doesn't translate into newsworthiness, Cox (2012) suggests an outsized role for emotional appeals, tropes, narrations, and argumentation in environmental media controversies. A public media event (which can also be construed as a public relations or public diplomacy event), such as the publication of a national white paper, therefore exists as an interpretive construction fostered by audience and journalist perceptions.

Newsworthiness can thus be socially constructed—contingent upon features, meanings, and consequences of a story or topic (Lester, 1980). Breaking through to the audiences served by national and international media outlets with the right kind of news coverage becomes paramount for nations—which risk public disinterest/alienation or international opposition with the wrong kinds of coverage. Media framing of China has toggled between a developing and threatening China, as well as the 'Red' China and the authoritarian, Tiananmen Square China (Peng, 2004). Therefore, China comes in for both favorable and unfavorable treatment by outside news outlets. Because media coverage tends to pivot around major global events and issues, this study seeks to understand what media frames emerged during coverage of the country's Artic Policy white paper.

Method

To address the research question, the study employed a qualitative content analysis design. In the context of journalism and media studies, qualitative data can be used to assess the appeals, narratives, and themes of textual documents or other mediation, while connecting such artifacts to overarching conceptual or thematic frameworks (Meyers & Abrams, 2010). Furthermore, Altheide (1996) situates qualitative research as a means to understanding the traits and significance of documents, including their meaning in a larger social arena. To this end, and because this study is concerned with the construction of news messaging about China's Arctic engagement for a global audience, the author sought out widely-consumed news media artifacts that were distributed and consumed outside of China. Using a combination of Lexis-Nexis and Google News, the researcher used the search terms "China," "Arctic," and "White Paper" to locate relevant articles. The coverage timeframe was January 26, 2018 to February 14, 2018—representing the first three weeks after the publication of the white paper. While further coverage of the white paper was produced in the months following, the researcher felt the first three weeks captured a critical mass of voices that were focused on the document in isolation from other events; whereas subsequent coverage has placed the white paper alongside larger events and policies, thus diluting coverage of the white paper itself.

The Lexis-Nexis database located over 200 articles about the white paper's release during this period. However, many of these stories were simply reproductions of existing wire service stories or press releases. Most of these media pieces were produced by official communication arms of the Chinese government, including the Xinhua News Agency. The author further narrowed the search criteria to newspapers only, which produced 51 articles. This number overstates actual coverage of the Arctic white paper in international media, however: A majority of stories were published in the Africa, European, and U.S. editions of *China Daily*. While this coverage is noteworthy, *China Daily's* "state-owned" status in China (Smith, 2013, para.1) means these stories served aims of public diplomacy and public information more than as, ostensibly, independent or third-party journalism.

Given some of these distortions in global media coverage, the author chose to focus on corporate (non-government) news stories emanating from three of the world's prominent centers for media and capital markets activity: New York, London, and Hong Kong. As global media centers, these jurisdictions are home to journalistic production that is consumed by audiences beyond their immediate metropolitan regions. Furthermore, as centers for commercial activity and trade, their media are inherently interested in geopolitical and global economic activity. Related to this, the

author looks to assessments of the growing literature devoted to China's Arctic interests, which see the country through lenses of geopolitics but also political economy (Lackenbauer, Lajeunesse, Manicom & Lasserre, 2018). Similarly, media have focused not only as China the political entity, but the transformative economic and financial story as well. Thus, publications with an emphasis on geopolitics, international relations, and global business/economics are a key and influential part of the international China dialogue.

From the initial search on Lexis-Nexis and a subsequent search on Google News, three online publications were identified. Part of the so-called popular press, including newspaper and television media, they are New York area-based CNBC, the London-based *Financial Times*, and the Hong Kong daily *South China Morning Post*. CNBC is an American basic cable channel focused on economic, financial, and political affairs. It is part of the New York City-headquartered NBC Universal News Group, which is owned by Comcast. The Financial Times, which also focuses on economic and business affairs, is owned by Nikkei Inc. The *South China Morning Post*, Hong Kong's English-language daily, is owned by Alibaba, which purchased the publication in 2015. The new ownership group sees the newspaper as an international source for Chinese affairs (Hoffman Agency, 2018). Unlike *China Daily* and other official Chinese media outlets, the *South China Morning Post* offers a view of China from Hong Kong, simultaneously independent yet existing within China's borders.

Noteworthy here is the relatively minimal attention paid to the white paper publication from other leading media in the U.S., in particular the *New York Times* and the *Washington Post* (the former's coverage was lumped in with coverage of the World Economic Forum and China's broader Belt and Road Initiative, while the *Post* did not provide any coverage at the time).

A total of four stories were retrieved from *South China Morning Post*; while two each were collected from CNBC and the *Financial Times*. These were exclusively news and feature stories. Letters to the editor and social media messages (such as tweets or blog posts) were not included. The author coded each article for the dominant frames used to explain China's engagement with the Arctic, as well as variables and devices (such as expressions, clichés, and numbers) within the content.

Results

Collectively, the articles collected developed a discourse about international interests in the Arctic, and specifically created frames about China and its Arctic engagement. The frames that emerged for the highlighted publications will be briefly described.

Resources, Partnerships, and Passages

A key emergent frame, one that featured prominently in media coverage, focused on the economic drivers and outcomes of China's Arctic interests. This frame corresponds closely with China's original white paper. References to the "Polar Silk Road," an expression that originally appeared in the white paper itself, emphasized China's desire to tap into the region's hydrocarbon and mineral natural resources, including natural gas reserves. "Polar partnerships"—with Russia, Iceland, Finland, and Norway—were observed. The *Financial Times* highlighted China's interest specifically in Greenland, including its interest in "rare earth metals and possible rights to Arctic ports" according to an expert. The *South China Morning Post* described China's ambition to exploit shipping routes to Europe, and its interest in not only natural resources, including fishing, but also

developing Arctic tourism. CNBC tied China's Arctic engagement to the Belt and Road Initiative, the country's attempt to "construct a massive, multi-national zone of economic and political influence that has Beijing at its core."

Some references to economic aspirations in the region painted China in a decidedly more positive light. CNBC explained that capital and joint venture opportunities would benefit China's national partners that lacked necessary funding for such activities on their own.

Territorial History and Ambitions

In this frame, China was situated as a nation intent on growing its geographic footprint. This coverage reflected existing tensions between China and its Asian neighbors, such as Japan-China disagreement over the Senkaku archipelago. The *South China Morning Post*, for example, emphasized how geopolitical tensions with Japan would be exacerbated if it were to deploy warships northward—through the Soya, Tsugaru, and Tsushima straits—to the region. It also quoted an editorial from Japan's *Yomiuri* newspaper arguing for the world to be wary of China's Arctic advances, because the country's Belt and Road Initiative is "aimed at securing military footholds."

China's history with previous territorial disputes was asserted, including disputes in the South China Sea. CNBC's coverage spoke to "red flags" about potential boundary disputes and Chinese aggression, noting that in the South China Sea, "China has ignored maritime law and a legally binding tribunal by building islands there." Noted also was how the country's Arctic ambitions fit in with the Belt and Road initiative, and that China wished to connect itself to Europe, the Middle East, and beyond via massive infrastructure projects across dozens of countries. At the same time, the global leadership ambitions of President Xi Jinping were also highlighted. One example of this was the emphasis on the development of shipping lanes opened up by global warming. The encouragement of companies and governments to build infrastructure and even conduct trial voyages—"paving the way for… routes that would form a 'Polar Silk Road'"—can be framed simultaneously as territorial ambition or national innovation.

China the Global Innovator

In this third frame, China's engagement with the Arctic emerges as the inevitable outcome of a nation transformed as a result of its growing political, economic, and scientific clout. Highlighting the white paper's assertion that the Arctic represents "a shared future for mankind," CNBC explained China's concern over climate change and its implications for the region and the planet. Other publications, however, positioned China's interest in climate change exclusively in terms of the melting of sea ice opening up new passages for shipping as well as previously inaccessible, resource-rich areas.

The *South China Morning Post* relayed China's interest in emergent areas of innovation and science—polar, oceanic, space, and digital/technology—that had advanced alongside China's global influence and clout. Also noted was China's ability to potentially play the role of peacemaker in the region. The *Financial Times*, for example, noted that China had set up a joint research center in Shanghai with institutes from five of the Arctic nations with sometimes overlapping claims and interests. The *Financial Times*, while describing the "slow-motion race for the control of the region", highlighted the first transit of the Northwest Passage by a Chinese research ship in 2017, thus speeding up travel time by seven days (even as it also noted tensions with Canada over this). To

this end, China is held up as a global power using its political and economic strength to develop solutions to existing international challenges—even as geopolitical tensions sometimes arise over them.

Analysis and Conclusion

News coverage of China's Arctic Policy white paper demonstrates how media can collectively construct a perceived reality of the nation-state in different contexts. This is true even of a tightly-controlled communication document such as the international white paper. Even as it is produced within China's controlled media environment, the white paper is subjected to the whims of the relatively uncontrolled global media ecosystem. Media can frame, and reframe, ideas through the inclusion of symbolic devices (Gamson & Modigliani, 1989), rhetorical variables, or editorial approaches such as emphasis or repetition.

At the same time, through frames this media process helps weave a narrative about the arrival of the world's arguably most robust economy to the Arctic. Frames that emerged from the news about this key geopolitical milestone developed some of the same themes that are seen in coverage of China outside of the Arctic. For example, the frame of resources, partnerships, and passages picked up on a narrative about China that has been well told over the past two decades: China's economic engine continues to drive the country's growth, aspirations, actions, and relationships.

At the same time, negative portrayals of China as the "other"—this time in the context of the Arctic—are also seen. The "clash of identities" narrative described by Lanteigne & Ping (2015) is seen when China's Arctic strategy is juxtaposed against China's track record in the South China Sea, situating the country in potential opposition to established Arctic nations, to its Asian rivals such as Japan, and to international law. Indeed, the inclusion of China's territorial disputes in the South China Sea allowed media stories to preview one potential (and aggressive) pathway for China in the Arctic. This theme in particular was espoused by the *South China Morning Post*: While different international media might uniformly frame an initiative such as the white paper as "suspicious", the construction of such a threat can be different based on regional or contextual factors. What one country identifies as aggression might be perceived as less menacing in another.

Nonetheless, a concurrent theme emerging from China's Arctic interest is that of the global innovator, although a media dialectic of nautical, geographic, and environmental advances toggles between enthusiasm and fear. However, global media coverage ultimately highlighted China's desired or established partnerships with multiple countries as a basis for economic but also political cooperation. Such reporting echoes the view of Alexeeva and Lasserre (2012) that a policy of collaboration and cooperation is the best strategic path forward for China.

Climate change, unsurprisingly, factored extensively into the news coverage. However, while some reporting did focus on China's global role in reducing carbon emissions, this environmental framing variable was linked extensively to China's economic ambitions—specifically by explaining how melting ice would give way to enhanced transportation corridors. This shows one of the key challenges for China as it increasingly tries to influence the media narrative about its political rise: Even when it takes a leadership role in globally pressing areas such as climate change, such actions are subject to interpretation by some media as a pathway to political or economic advantage.

While this study did not analyze all stories about China's Arctic Policy white paper, it did provide a snapshot of how some media coverage from outside of China coalesced to provide distinct narratives about China's Arctic Strategy white paper and its polar engagement. Such articles are not produced in isolation, and broader contextual factors need to be considered when one analyzes such coverage. For example, at the time of the announcement, China's economy had enjoyed strong growth over the past 12 months. At the same time, the country was the focus of aggressive trade banter from U.S. President Donald Trump; and the country continued to reaffirm its commitment to the Paris climate accord, from which the United States had recently departed. While these factors might not have directly influenced how stories about the country's Arctic engagement were written, they did help to inform a much larger discourse about China's international relations and global aspirations. At the same time, as noted in the methodology, China itself produced much of the global public discourse through its official communication arms, including its *China Daily* international editions. A future study might compare and contrast commercially-owned media's framing of China's Arctic milestones with the state-controlled coverage produced within China's borders, including its official news channels and government communication agencies.

Lastly, it is worth noting that China's publication of a white paper served to both broadcast policy and promote the country's national interests in the polar sphere. As a public document, it invited mass consumption through media coverage—as national white papers exist as informational and publicity conduits between policy and publics. Thus, China would have expected media coverage to inevitably follow its Arctic Policy publication. This sequence of media events hints at a China that is actively aware of how global media can influence and shape narratives abroad, and how China's interests in the Arctic are ultimately better served by more favorable news treatment and audience sentiment. The framing of international policy in the media is more than just discursive phenomena in the global public sphere; it represents a strategic communication pathway and opportunity for nations intent on reclaiming media narrative, public opinion, and policy outcomes.

References

Alexeeva, O. V., & Lasserre, F. (2012). China and the Arctic. *Arctic Yearbook 2012*. Retrieved from: http://corpus.ulaval.ca/jspui/bitstream/20.500.11794/855/1/Arctic%20Yearbook%202012%20OA%20FL.pdf.

Altheide, D. L. (1996). Qualitative media analysis. Thousand Oaks, CA: Sage Publications.

Ban, Z., Sastry, S., & Dutta, M. J. (2013). "Shoppers' Republic of China": Orientalism in Neoliberal US News Discourse. *Journal of International and Intercultural Communication*, *6*(4), 280-297.

Bie, B., & Billings, A. C. (2015). "Too good to be true?": US and Chinese media coverage of Chinese swimmer Ye Shiwen in the 2012 Olympic Games. *International Review for the Sociology of Sport*, *50*(7), 785-803.

Brady, A. M. (2017). *China as a Polar great Power*. Cambridge University Press.

Campbell, C. (2013). *China and the Arctic: objectives and obstacles*. US-China Economic and Security Review Commission. Retrieved from: http://library.arcticportal.org/1677/1/China-and-the-Arctic_Apr2012.pdf.

Cox, R. (2012). *Environmental communication and the public sphere*. Sage publications.

Dodds, K., & Nuttall, M. (2016). Opening up the poles. In *The scramble for the poles: The geopolitics of the Arctic and Antarctic*. John Wiley & Sons.

Eagleman, A., Burch, L. M., & Vooris, R. (2014). A unified version of London 2012: New-media coverage of gender, nationality, and sport for Olympics consumers in six countries. *Journal of Sport Management*, *28*(4), 457-470.

Entman, R. M. (1993). Framing: Toward clarification of a fractured paradigm. *Journal of Communication*, *43*(4), 51-58.

Gamson, W. A., & Modigliani, A. (1989). Media discourse and public opinion on nuclear power: A constructionist approach. *American Journal of Sociology*, *95*(1), 1-37.

Hoffman Agency (2018, April 21). Can a HK daily become an international read? *The Hoffman Agency: Ishmael's Corner*. Retrieved from: https://www.ishmaelscorner.com/scmp-elon-musk-steve-wozniak-grab-bag/

Huang, Y., & Fahmy, S. (2011). Same events, two stories: Comparing the photographic coverage of the 2008 anti-China/Olympics demonstrations in Chinese and US newspapers. *International Communication Gazette*, *73*(8), 732-752.

Kutz-Flamenbaum, R. V., Staggenborg, S., & Duncan, B. (2012). Media framing of the Pittsburgh G-20 protests. *Research in Social Movements, Conflicts and Change*, *33*, 109-135.

Lasserre, F. (2010). *China and the Arctic: threat or cooperation potential for Canada?*. Toronto, ON: Canadian International Council.

Lanteigne, M., & Ping, S. (2015). China's Developing Arctic Policies: Myths and Misconceptions. *Journal of China and International Relations*, *3*(1). 1-25.

Lee, C. C. (2002). Established pluralism: US elite media discourse about China policy. *Journalism Studies*, *3*(3), 343-357.

Lester, M. (1980). Generating newsworthiness: The interpretive construction of public events. *American Sociological Review*, 984-994.

Leung, C. C., & Huang, Y. (2007). The paradox of journalistic representation of the other: The case of SARS coverage on China and Vietnam by western-led English-language media in five countries. *Journalism*, *8*(6), 675-697.

Liu, N. (2016, December 14). China's Emerging Arctic Policy. *The Diplomat*. Retrieved from: https://thediplomat.com/2016/12/chinas-emerging-arctic-policy/.

Luther, C. A., & Zhou, X. (2005). Within the boundaries of politics: News framing of SARS in China and the United States. *Journalism & Mass Communication Quarterly*, *82*(4), 857-872.

McFarlane, T., & Hay, I. (2003). The battle for Seattle: protest and popular geopolitics in The Australian newspaper. *Political Geography*, *22*(2), 211-232.

Meyers, C., & Abrams, K. (2010). Feeding the debate: A qualitative framing analysis of organic food news media coverage. *Journal of Applied Communications*, *94*(3), 3.

Peng, Z. (2004). Representation of China: An across time analysis of coverage in the New York Times and Los Angeles Times. *Asian Journal of Communication*, *14*(1), 53-67.

Perez, M. (2011, May 17). White papers: What you need to know. *PR Newswire*.

Retrieved from: https://www.prnewswire.com/blog/white-papers-what-you-need-to-know-1452.html.

Rainwater, S. (2013). Race to the North. *Naval War College Review*, *66*(2), 62.

Rylander, Y. (2015). China in a heterogeneous and complex Arctic. *Arctic Council: Arctic Resilience Report*. Retrieved from: https://arctic-council.org/arr/china-in-a-heterogeneous-and-complex-arctic/.

SIPRI: Stockholm International Peace Research Institute (2012, May 10). China defines itself as a 'near-arctic state', says SIPRI. Retrieved from: https://www.sipri.org/media/press-release/2012/china-defines-itself-near-arctic-state-says-sipri

Smith, D. (2012, May 14). China Daily to publish African edition as Beijing strengthens voice abroad. *The Guardian*. Retrieved from: https://www.theguardian.com/world/2012/may/14/china-daily-newspaper-launches-african-edition.

Stone, G. C., & Xiao, Z. (2007). Anointing a new enemy: The rise of anti-China coverage after the USSR's demise. *International Communication Gazette*, *69*(1), 91-108.

Tonami, A. (2014). The Arctic policy of China and Japan: multi-layered economic and strategic motivations. *The Polar Journal*, *4*(1), 105-126.

Wright, D. C. (2011). *The dragon eyes the top of the world: Arctic policy debate and discussion in China*. China Maritime Studies Institute, US Naval War College.

Wu, M. (2006). Framing AIDS in China: A comparative analysis of US and Chinese wire news coverage of HIV/AIDS in China. *Asian Journal of Communication*, *16*(3), 251-272.

Xinhua. (2018, January 26). Full text: China's Arctic Policy. The State Council Information Office of the People's Republic of China. Retrieved from: http://english.gov.cn/archive/white_paper/2018/01/26/content_281476026660336.htm.

Zhang, L. (2015). Stereotypes of Chinese by American College Students: Media Use and Perceived Realism. *International Journal of Communication*, *9*, 20. 64-71.

Commentary

China's Polar Ships and Future Operations

Lawson W. Brigham

China significantly upgraded its polar marine operations capacity with the launch of a second polar research ship, the *Xuelong 2*, on 10 September 2018. Construction began on the new ship in December 2016 at the Jiangnan Shipyard in Shanghai and this vessel is China's first domestically-built polar research icebreaker; the ship is scheduled to come into service during 2019. The propulsion is diesel-electric and provides the ship with 15 megawatts of power (20,115 horsepower) to two Azipod propulsion units, or rotating, steerable pods. *Xuelong 2* is a Polar Class (PC) 3 ship (the highest class in the international classification system is PC1 and the lowest is PC7) and is designed to break 1.5-metre thick ice moving at continuous speeds of two to three knots (with icebreaking capability both moving ahead and astern). Owned by the Polar Research Institute of China, the new ship can operate comfortably in both polar regions as a logistics-supply vessel and a research ship conducting a full range of oceanographic and surveying operations. The total complement is 90 researchers and crew.

One of the keys to the design of *Xuelong 2* is the role of Finnish marine technology. China's Polar Institute awarded a contract to Aker Arctic in Finland for concept and basic design phases in 2012. Most would agree that Aker Arctic is among the world's leading icebreaker design firms and China has opted for the latest technological advances in polar ship design. Ice and open water model tests were conducted in Aker Arctic's Helsinki ice tank and laboratory. Due to the requirements for long, open water transits of modern polar research vessels, especially on voyages to the Southern Ocean, good seakeeping characteristics are essential for *Xuelong 2*. The ship is designed to carry two helicopters, has extensive wet and dry laboratories, multiple cranes, large cargo spaces, and spacious working decks for scientific operations. One special feature is a 'moon pool' ~ an opening through the ship's hull where scientific instruments can be lowered during operations with difficult ice conditions surrounding the ship. One icebreaking feature, unique to a number of Aker Arctic designs, is the ability of the ship to break ice effectively in both ahead and astern

Lawson W. Brigham is a distinguished fellow and faculty member at the University of Alaska Fairbanks and a fellow at the U.S Coast Guard Academy's Center for Arctic Study and Policy. Dr. Brigham is Chair of the Arctic Yearbook's Editorial Board. Funding for this research has been supported by U.S. National Science Foundation grant 1263678.

directions, dubbed by Aker Arctic a 'dual-acting icebreaker.' *Xuelong 2* is smaller in tonnage and physical size than *Xuelong 1*, but is more capable as an icebreaker due to higher propulsion power and a more efficient, icebreaking hull form.

Xuelong 1 (*Snow Dragon*) has been the principal polar research vessel for Chinese Arctic and Antarctic research expeditions since being acquired by China's government in 1993. *Xuelong I* was completed in March 1993 by the Kherson Shipyard in Ukraine as an icebreaking supply and cargo ship for the Russian maritime Arctic. Shanghai's Hudong-Zhonghua Shipbuilding firm converted the ship from a cargo vessel to polar research support ship by 1994. Extensive rebuilds of the ship were conducted in 2007 (with a new superstructure and pilothouse) and in 2013 (with new main engines). *Xuelong 1* is a physically large polar ship (21,025 tons displacement and 167 meters in length) and can accommodate 128 scientists and crew. However, the key limitation of this ship is that it is relatively under-powered (13.2 megawatts or 17,700 horsepower for propulsion) for the large size of the ship, and if it would be considered a fully capable icebreaker. Its original design as an ice class cargo ship with a single shaft and controllable pitch propeller limits its icebreaking capability. However, the ship has crossed the Arctic Ocean in summer on several research cruises and operated successfully in the Antarctic on numerous expeditions. *Xuelong 1* has been an impressive, Chinese national presence in both polar regions, and has been operated safely and effectively by highly competent polar mariners.

It is important to keep these ship developments in Chinese polar research in context. These two polar research ships, both government-owned and operated, provide China's research and sovereign presence at both ends of the world. They are excellent polar ships, and appropriate for the tasks at hand, but are far from being high end, large polar icebreakers with high propulsion and icebreaking capabilities. *Xuelong 1 & 2* are not naval vessels, nor do they have apparent security or law enforcement roles (as U.S. Coast Guard icebreakers have); both ships do have the endurance and capability to effectively carry Chinese officials on Antarctic Treaty inspections around the Continent. Neither ship has an envisioned role in the ice escort of commercial ships such as occurs along Russia's Northern Sea Route. They are purpose built and operated in support of China's expanding research efforts in Arctic and Antarctic waters. They have no commercial or escort function related to China's Polar Silk Road proposed in its January 2018 Arctic policy white paper. The only obvious link to a Polar Silk Road is the conduct of Arctic Ocean research to expand our knowledge of the profound changes underway in the region, and to support applied research related to potential Arctic marine transport routes. Tables in the media equating China's polar research ships to the large polar icebreakers of Russia, the United States and Canada, for example, are misleading and overstate China's current, national icebreaking capability.

The potential building of a Chinese nuclear icebreaker would be an intriguing game changer and wildcard factor from several strategic perspectives. The Chinese press in June 2018 reported that the China National Nuclear Corporation was welcoming bids from domestic shipyards to build a nuclear-powered icebreaker and comprehensive polar support ship. Such a nuclear icebreaker would provide China with an extraordinary maritime capacity with unlimited endurance, mobility and self-sufficiency to: potentially escort ships on Arctic waterways; conduct polar scientific operations in remote regions for extended periods; and, perform a broad range of complex logistics support in both polar regions, possibly in all seasons. Such a nuclear ship could conceivably provide support to naval operations. But a number of technologies would have to be harnessed

and meshed to construct a Chinese civilian, nuclear-powered ship. Russia operates the world's only nuclear icebreakers and they have pioneered their use since 1959, the year of completion and early operation of the icebreaker *Lenin* (the world's first nuclear-powered surface ship in service 1959-89). The Russian nuclear ships employ a steam turbine-electric power plant: the nuclear reactors produce hot water and steam which in turn drive turbine generators; the electricity produced by the generators power electric motors which rotate the ship's shafts and propellers. Rosatomflot, Russia's nuclear icebreaker operator, could provide China with a wealth of experience and Russian shipyards could export nuclear marine technology and expertise. Is it plausible the renewed era of Russia-China cooperation might extend to a collaboration in the design and construction of a Chinese nuclear icebreaker?

The potential construction and operation of a (civilian) nuclear icebreaker would provide a useful test platform for China's future development of nuclear-powered naval ships (such as an aircraft carrier and other surface warships), and possibly for future commercial cargo ships. However, construction, manning and operation of such a nuclear ship would require a lengthy and complex project requiring close cooperation among several industries and government agencies. The entire project would be a costly enterprise. Importantly, a nuclear icebreaker is realistically *not required* in the Antarctic for research or logistics. A Chinese nuclear icebreaker would be built for Arctic operations and roles supporting commercial ships that are unclear. China's ambition and call to build and operate a nuclear icebreaker leave many unanswered questions, including an abundance of strategic implications for the Arctic states and polar community.

Briefing Notes

Briefing Note

The Need to Better Unpack the Transaction Costs Associated with Northern Research in Canada

Ashlee-Ann E. Pigford, Samantha Darling & Gordon M. Hickey

Introduction

Governments in Canada have been steadily increasing their investments in scientific research to help support evidence-based decision-making for sustainable northern development (Carr, Natcher et al., 2013; ITK, 2018). Prominent examples include financial support for: ArcticNet (2003-2018; 113.2 million CAD), the Canada program for the International Polar Year (2006-2011; 150 million CAD), the Polar Continental Shelf Program (2006-2011; 88.9 million CAD), the Arctic Research Infrastructure Fund (2009; 85 million CAD), Sentinelle Nord (2015-2023; 98 million CAD), Natural Sciences and Engineering Research Council of Canada's (NSERC) Northern Chairs Program (2000-2017; 11 million CAD), the Canadian High Arctic Research Station (250 million CAD for construction; 2018 onwards 26.5 million CAD /year) and the Institut nordique du Québec (2018; 83.5 million CAD for construction).[1] Along with these investments, various knowledge co-production frameworks have been proposed and some have been adopted to help foster the production of scientific knowledge that is considered relevant to academia, communities and governments (e.g. participatory, community-based and action research) (Gearhead and Shirley, 2007; Burn, 2008; Pearce, Ford et al., 2009). While collaborative approaches to scientific research have seen some success in informing public policy directions (Armitage, Berkes et al., 2011), northern advocates have continued to call attention to gaps between scientific pursuits, community needs and northern policy outcomes (Burn, 2008; Ogden, Schmidt et al., 2016; ITK, 2018). Reports such as *Research Excellence in the Northwest Territories: Holistic, Relevant and Ethical Research in the Social Sciences, Humanities and Health Sciences* (ACUNS, 2018), *Research Excellence in Yukon: Increasing Capacity and Benefits to Yukoners in the Social Sciences, Humanities and Health Sciences* (ACUNS, 2017), and *A new Shared Arctic Leadership Model* (Simon, 2017) also suggest that equitable collaboration and

Ashlee-Ann E. Pigford, Samantha Darling and Gordon M. Hickey are affiliated with the Department of Natural Resource Sciences, Faculty of Agricultural and Environmental Sciences, McGill University, Canada.

participation in northern research processes has yet to be fully realized (see also Korsmo & Graham, 2002; Caine, Salomons et al., 2007; Gearhead & Shirley, 2007; Brunet, Hickey et al., 2014; Brunet, Hickey et al., 2017). Interestingly, despite the identification of these gaps, there has been relatively little systematic analysis of the northern research governance system that guide collaborative engagement, consultation practices, and overall co-productive capacity in Canada. In this Briefing Note, we consider how such an analysis might be approached by drawing on a transaction costs approach to help inform more strategic and integrated research policy frameworks across scale.

Transaction Costs in Research

Through the lens of social network theory, a transaction costs approach has the potential to provide insight into how existing institutions[2] either support or impede effective collaborative research endeavors (Landry & Amara, 1998). According to Landry and Amara (1998), a transaction costs approach predicts that when the perceived monetary and non-monetary costs (e.g. time and opportunity) of participating in formal collaborative research arrangements are relatively high, actors will tend to seek alternatives. Robust public research governance is inherently relational and often accrues costs associated with engaging in processes to exchange information, coordinate diverse actors and enforce reporting and monitoring requirements (Landry & Amara, 1998; Ruiter, 2005). The types of transactions that are associated with relational activities tend to be continuous and occur over an extended period of time, moving away from market transactions that aim to be both costless and instantaneous (Nahapiet & Ghoshal, 1998). It is often assumed that governance structures that lower transaction costs and control for the dimensions of transactions (e.g. uncertainty, frequency, specificity) will perform better than those that do not (i.e. those with higher transaction costs) (Croisier, 1998; Jobin, 2008). Therefore, 'organizing transactions in order to economize on transaction costs' is often considered a core aspect of effective public governance (Ruiter, 2005).

Research governance is often approached with the intent to minimize administrative requirements (e.g. reporting, managing collaborative research relationships) and maximize available resources for research efforts (i.e. minimizing transaction costs) (Landry & Amara, 1998; Boardman and Bozeman, 2006). However, Clark (2010) has suggested that despite government polices that aim to foster academic collaboration, institutional requirements at other levels of governance (e.g. university contract requirements) may unintentionally increase transaction costs (see also Kim & Bak, 2017; Widmark & Sandstrom, 2012). Therefore, an improved understanding of governance attributes (i.e. the distribution of resources and responsibility) and capacity is often needed in order to support arrangements for sustainable long-term collaborative research relationships (Sinnewe, Charles et al., 2016). In the Canadian context, Landry and Amara (1998) have examined how university researchers initiate, negotiate and coordinate inter-organizational collaborative research arrangements with other research partners (e.g. industry, governments, and special interest groups) in response to transaction costs. Their results suggest the need for more systematic and holistic approaches to research policy. That study and others have also shown that high transaction costs associated with collaborative research may offset the benefits of collaboration and contribute to suboptimal collective research and policy outcomes (Croisier, 1998; Landry & Amara, 1998; Boardman & Bozeman, 2006; Jobin, 2008; Clark, 2010; Sinnewe, Charles et al., 2016; Kim & Bak, 2017).

Transaction Costs in Northern Collaborative Research

A range of direct and indirect transaction costs have already been reported in association with northern collaborative research processes (see Table 1). For example, the financial costs associated with collaborative Arctic science can be more than eight times higher than similar research conducted in southern Canada, prompting northern researchers to ask, *"Why conduct research in the Arctic, when you can do more work for less money in the South?"* (Mallory, Gilchrist et al., 2018), a question that has been echoed elsewhere (e.g. Brook, 2009). Northern researchers have also expressed concern over the need to negotiate conflicting demands between dominant academic reward systems (e.g. the 'publish or perish' phenomenon) and calls for more community-engaged research (e.g. participatory methods, outreach, training) (Korsmo & Graham, 2002; Gearhead & Shirley, 2007; Tondu, Balasubramaniam et al., 2014). While formal requirements for community engagement can require up to one quarter of a research budget (Mallory, Gilchrist et al., 2018) they also place significant demands on northern communities which often face challenges associated with limited research capacity. For example, local communities are often required to commit resources for participation in pre-project consultations, data collection, managing community-researcher interactions, and assessing scientific licenses, projects and reports (Gearhead & Shirley, 2007; Ogden, Schmidt et al., 2016; ITK, 2018). These challenges can be confounded by organizational and regional variation among formal approval processes (e.g. licencing and ethical approvals) (George, 2011), often leading to redundancies and barriers for implementation when projects span multiple regions, years or institutions.

To date, existing research into the transaction costs associated with northern science has largely focused on project-level outcomes, providing a 'snapshot' of the types of transaction costs that can be incurred by researchers and communities. However, this approach misses the inherent complexity of northern innovation systems and the related impacts of scale, feedback and memory. Recognizing that northern scientific research operates within dynamic and multi-layered governance contexts, there is a need for research-related policies, organizations and actors to pay closer attention to the broader research system in order to help co-deliver public value (Pigford, Hickey et al., 2017). This is particularly pressing for northern governance actors in the context of sustainable northern development, as existing institutional arrangements appear to produce a range of direct and indirect effects that cumulatively impact overall outcomes (Burn, 2008; Ogden, Schmidt et al., 2016; ITK, 2018).

Table 1. Project-level collaborative activities associated with transaction costs in the Canadian North

Activity	Associated Transactions	References
Relationship Building	**Time & Opportunity** - Extended physical presence and "idle time" in the community to identify appropriate authorities for community representation and facilitate the development of local networks and friendships (i.e. build trust) - Dedicated time for pre-project consultation with the community (or research team) - Communication in multiple formats (plain language, policy briefs) **Financial & Opportunity** - Travel for pre-project consultation - Provision of food & refreshments at meetings	(Korsmo & Graham, 2002; Carr, Natcher et al., 2013; Brunet, Hickey et al., 2014; Tondu, Balasubramaniam et al., 2014; Carr, 2017; Mallory, Gilchrist et al., 2018)

Location-specific Investments	**Time & Opportunity** - Involving communities in research design, including the time for necessary training - Involving community members in dissemination activities - Writing proposals to acquire extra resources for outreach **Financial & Opportunity** - Provide local training and employment - Provide honoraria for knowledge holders - The pursuit of collaborative funding	(Gearhead & Shirley, 2007; Pearce, Ford et al., 2009; Carr, Natcher et al., 2013; Tondu, Balasubramaniam et al., 2014; Carr, 2017; Mallory, Gilchrist et al., 2018)
Licencing & Ethics	**Time, Financial & Opportunity** - Community review of ethical and license documentation - Navigating the differences between formal informed consent and community practices - Obtaining consent at multiple levels (e.g. community, region, territory)	(Davison, Brown et al., 2006; Davidson-Hunt & Michael O'Flaherty, 2007; George, 2011)
Reporting, Outreach, and Knowledge Sharing	**Time & Opportunity** - Communication in multiple formats (plain language, policy briefs, academic outputs) - Disseminating research to the community first **Financial & Opportunity** - Outreach workshops (e.g. half of annual budget- see Mallory et al., 2018)	(Pearce, Ford et al., 2009; Tondu, Balasubramaniam et al., 2014; Mallory, Gilchrist et al., 2018)
Academic Expectations	**Time & Opportunity** - Navigating partner interests that may not align with academic science designed to serve a greater society - The need to publish findings for personal (tenure and promotion) and scientific reasons - Participating in interdisciplinary and international approaches to address complex issues	(Korsmo & Graham, 2002; Kraft Sloan & Hik, 2007; Gearhead & Shirley, 2007; Tondu, Balasubramaniam et al., 2014; Mallory, Gilchrist et al., 2018)

Future Directions

Ultimately, there is a need for the actors involved in Canada's northern research governance system (e.g. academics, northern communities, funding agencies, government departments, licencing bodies, universities and northern research institutes) to design 'path-breaking' policies that facilitate coordination and communication across the system to help minimize associated transaction costs. Attempts to better manage the impacts of research-related transaction costs in non-northern contexts have so far focused on the importance of knowledge brokers and boundary organizations, which could be further explored in northern contexts (Kowalski & Jenkins, 2015). A more systematic and coordinated approach to northern research governance could build on existing Canadian bridging efforts, such as the territorial "pan-northern" approach to science policy (Government of Yukon, 2016), the ArcticNet Network of Centres of Excellence (ArcticNet, 2017), Polar Knowledge Canada (Government of Canada, 2017), and Canada's participation in the Arctic Council. Future studies could, for example, examine how the policies that shape the science-policy-community interface in northern Canada might become more integrated, complementary and effective in achieving desired collective outcomes. An improved understanding of the nature of transactions (e.g. uncertainty, frequency, specificity) (Croisier, 1998) as well as the formal and informal dimensions of transaction costs (Landry & Amara, 1998) is also needed to more fully understand the diverse transaction costs associated with northern research. Building on previous

studies on research-related transaction costs conducted in non-northern collaborative environments, we can identify a number of themes and associated propositions that may act as useful starting points for further policy reflection, examination and experimentation in the northern research policy context, summarized below.

- Theme 1: Opportunism:
    - *Proposition:* In larger institutional arrangements, research actors will be more likely to engage in opportunistic behaviour (i.e. secure more resources for themselves) (Landry & Amara, 1998);
- Theme 2: Acquaintance:
    - *Proposition:* Transactions where actors are amicably acquainted (i.e. have higher levels of trust) will diminish the probability of opportunism and reduce the need for monitoring (Putnam, 1993; Nahapiet & Ghoshal, 1998; Boardman & Bozeman, 2006);
- Theme 3: Incentives:
    - *Proposition:* Extrinsic institutional reward structures designed to incentivize collaboration (e.g. resource sharing, co-learning) will be confounded by intrinsic individual reward incentives (e.g. personal motivations) (Boardman & Bozeman, 2006);
    - *Proposition:* In more formal institutional arrangements, research actors will be less likely to fully engage in collaboration due to the potential for reduced returns or 'shrinking costs' (Sinnewe, Charles et al., 2016);
- Theme 4: Research Stage:
    - *Proposition:* Collaborative transactions that occur earlier in the research process are more likely to foster equitable participation (versus sub-contacting) (Croisier, 1998);
    - *Proposition:* The adaptive capacity of an institutional arrangement will become more valuable, the longer the duration of the collaboration because of increasing probability that research actors will need to renegotiate their arrangements (Croisier, 1998);
- Theme 5: Collaborators:
    - *Proposition:* The greater the heterogeneity among research actors, the more likely that institutional arrangements will be formal and hierarchical (Boardman & Bozeman, 2006);
    - *Proposition:* The larger the number of partners, the more difficult it will be for research actors to distribute tasks and control efforts (Croisier, 1998; Boardman & Bozeman, 2006);
- Theme 6: Geography:
    - *Proposition:* The larger the geographical scope of transactions, the more difficult it will be for research actors to coordinate tasks and control efforts (Boardman & Bozeman, 2006);
- Theme 7: Governance & Change:

- *Proposition:* When the distribution of transaction costs become too expensive and/or unbearable research governance will make adjustments (Croisier, 1998; Landry & Amara, 1998; Widmark & Sandstrom, 2012); and
- *Proposition:* A better understanding of the different transaction costs incurred by research actors will improve the ability to predict and promote effective long-term research relationships (Sinnewe, Charles et al., 2016).

These themes and propositions provide a variety of potential research paths that may inform the development of revised institutional arrangements capable of more strategically managing transaction costs in the northern research system. A more deliberate, multi-dimensional and shared understanding of the various transaction costs associated with northern scientific research and the implications of these costs for collective research policy outcomes is needed. Such an understanding has the potential to usefully inform efforts of different actors to disrupt the *status quo* of northern research governance while also helping to realise more effective, systemic and reflexive northern research policy.

Acknowledgments

The authors would like to acknowledge funding support from: Natural Science and Engineering Research Council of Canada (NSERC) CREATE-Environmental Innovations; the Social Sciences and Humanities Research Council of Canada (SSHRC); and the Association of Canadian Universities for Northern Studies (ACUNS).

Notes

1. Sources for financial estimates:

   ArcticNet: http://www.nce-rce.gc.ca/_docs/reports/NCEReport-2015-RaportRCE_eng.pdf

   Arctic Research Infrastructure Fund: http://www.aadnc-aandc.gc.ca/eng/1100100037415/1100100037416

   Canadian High Arctic Research Station: https://www.canada.ca/content/canadasite/en/polar-knowledge/CHARScampus.html
   Institut nordique du Québec: https://www.newswire.ca/news-releases/the-governments-of-canada-and-quebec-support-the-sustainable-and-ethical-development-of-the-north-691110821.html

   International Polar Year: http://www.api-ipy.gc.ca/pg_IPYAPI_008-eng.html#q1.1http://www.api-ipy.gc.ca/pg_IPYAPI_008-eng.html#q1.1

   Natural Sciences and Engineering Research Council of Canada (NSERC) Awards Database: http://www.nserc-crsng.gc.ca/ase-oro/index_eng.asp

Polar Continental Shelf Program: http://www.nrcan.gc.ca/evaluation/reports/2012/796
Sentinelle Nord: https://www.ulaval.ca/fileadmin/ulaval_ca/Documents/sentinelle-nord/Sentinel_North_-_21_research_sub-projects.pdf

2. Institutions are the 'rules of game' and can include formal or informal customs, norms, standards, policies and laws.

References

ACUNS. (2017). *Research Excellence in Yukon: Increasing Capacity and Benefits to Yukoners in the Social Sciences, Humanities and Health Sciences*. Retrieved from

ACUNS. (2018). *Research Excellence in the Northwest Territories: Holistic, Relevant and Ethical Research in the Social Sciences, Humanities and Health Sciences* Retrieved from http://acuns.ca/wp-content/uploads/2018/07/2018-NWT_English-Web.pdf

ArcticNet. (2017). ArcitcNet About Us. Retrieved from http://www.arcticnet.ulaval.ca/aboutus/rationale.php

Armitage, D., Berkes, F., Dale, A., Kocho-Schellenberg, E., & Patton, E. (2011). Co-management and the co-production of knowledge: Learning to adapt in Canada's Arctic. *Global Environmental Change, 21*(3), 995-1004.

Boardman, C., & Bozeman, B. (2006). Implementing a 'bottom-up,' multi-sector research collaboration: The case of the Texas air quality study. *Economics of Innovation and New Technology, 15*(1), 51-69. doi:10.1080/1043859042000332196

Brook, R. K., Kutz, S.J., Veitch, A.M., Popko, R.A., Elkin, B.T. and Guthrie, G.,. (2009). Fostering community-based wildlife health monitoring and research in the Canadian North. *EcoHealth, 6*(2), 266-278.

Brunet, N., Hickey, G., & Humphries, M. (2014). The evolution of local participation and the mode of knowledge production in Arctic research. *Ecology and Society, 19*.

Brunet, N. D., Hickey, G. M., & Humphries, M. M. (2014). Understanding community-researcher partnerships in the natural sciences: A case study from the Arctic. *Journal of Rural Studies, 36*, 247-261.

Brunet, N. D., Hickey, G. M., & Humphries, M. M. (2017). How can research partnerships better support local development? Stakeholder perceptions on an approach to understanding research partnership outcomes in the Canadian Arctic. *Polar Record, 53*(5), 479-488.

Burn, C. (2008). Opinion: Science in the Changing North. *Northern Review*(29), 7-20.

Caine, K. J., Salomons, M. J., & Simmons, D. (2007). Partnerships for social change in the Canadian north: revisiting the insider–outsider dialectic. *Development and change, 38*(3), 447-471.

Carr, J. (2017). *Natural Resources Canada Departmental Plan*. Retrieved from

Carr, K., Natcher, D. C., & Olfert, R. (2013). Measuring the economic impact of publicly funded research in Northern Canada. *Polar Geography, 36*(4), 291-304.

Clark, B. Y. (2010). The effects of government, academic and industrial policy on cross-university collaboration. *Science and Public Policy, 37*(5), 314-330.

Croisier, B. (1998). The governance of external research: empirical test of some transaction-cost related factors. *R&D Management, 28*(4), 289-298.

Davidson-Hunt, I. J., & Michael O'Flaherty, R. (2007). Researchers, indigenous peoples, and place-based learning communities. *Society and Natural Resources, 20*(4), 291-305.

Davison, C. M., Brown, M., & Moffitt, P. (2006). Student researchers negotiating consent in northern Aboriginal communities. *International journal of qualitative methods, 5*(2), 28-39.

Gearhead, S., & Shirley, J. (2007). Challenges in Community-Research Relationships: Learning from Natural Science in Nunavut. *ARCTIC, 60*(1), 62-74.

George, M. A. (2011). Review of procedures for approval of health studies in northern Canada. *International journal of circumpolar health,, 70*(4), 354-362.

Government of Canada. (2017). P. K. *Polar Knowledge Canada, 2016-17 Report on Plans and Priorities*.

Government of Yukon, G. N. T., Government of Nunavut. (2016). *A pan-northern approach to science*. Retrieved from http://www.anorthernvision.ca/documents/A16_Brochure_PanNorthernApproachtoScience_71402_English_WEB-Final.pdf

ITK, I. T. K. (2018). National Inuit Strategy on Research.

Jobin, D. (2008). A transaction cost-based approach to partnership performance evaluation. *Evaluation, 14*(4), 437-465.

Kim, D. H., & Bak, H.-J. (2017). Incentivizing research collaboration using performance-based reward systems. *Science and Public Policy, 44*(2), 186-198. doi:10.1093/scipol/scw050

Korsmo, F. L., & Graham, A. (2002). Research in the North American North: action and reaction. *ARCTIC*, 319-328.

Kowalski, A. A., & Jenkins, L. D. (, 2015). The role of bridging organizations in environmental management: examining social networks in working groups. *Ecology and Society, 20*(2), 16.

Kraft Sloan, K., & Hik, D. (2007). International Polar Year as a catalyst for sustaining Arctic research. *Sustainable Development Law & Policy 8, 4*.

Landry, R., & Amara, N. (1998). The impact of transaction costs on the institutional structuration of collaborative academic research. *Research Policy, 27*(9), 901-913.

Mallory, M. L., Gilchrist, H. G., Janssen, M., Major, H. L., Merkel, F., Provencher, J. F., & Strøm, H. (2018). Financial costs of conducting science in the Arctic: examples from seabird research. *Arctic Science*.

Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management. The Academy of Management Review, 23*(2), 242.

Ogden, A. E., Schmidt, M., Van Dijken, B., & Kinnear, L. (2016). Science in the Yukon: Advancing a Vision for Evidence-based Decision Making. *ARCTIC, 69*(2), 210-221.

Pearce, T. D., Ford, J. D., Laidler, G. J., Smit, B., Duerden, F., Allarut, M., . . . Elee, P. (2009). Community collaboration and climate change research in the Canadian Arctic. *Polar Research, 28*(1), 10-27.

Pigford, A.-A., Hickey, G. M., & Klerkx, L. (2017). Towards Innovation (Eco) Systems: Enhancing the Public Value of Scientific Research in the Canadian Arctic. In: Heininen, L., H. Exner-Pirot and J. Plouffe (eds.) (2017). Arctic Yearbook 2017. Akureyri, Iceland: Northern Research Forum.

Putnam, R. D. (1993). The prosperous community: Social capital and public life. *The american prospect, 4*(13), 35-42.

Ruiter, D. W. (2005). Is transaction cost economics applicable to public governance? *European journal of law and economics, 20*(3), 287-303.

Simon, M. (2017). *A new Shared Arctic Leadership Model.* Retrieved from

Sinnewe, E., Charles, M. B., & Keast, R. (2016). Australia's Cooperative Research Centre Program: A transaction cost theory perspective. *Research Policy, 45*(1), 195-204.

Tondu, J., Balasubramaniam, A., Chavarie, L., Gantner, N., Knopp, J., Provencher, J., . . . Simmons, D. (2014). Working with northern communities to build collaborative research partnerships: perspectives from early career researchers. *ARCTIC, 67*(3), 419-429.

Widmark, C., & Sandstrom, C. (2012). Transaction costs of institutional change in multiple-use commons: the case of consultations between forestry and reindeer husbandry in Northern Sweden. *Journal of Environmental Policy & Planning, 14*(4), 428-449.

Briefing Note

On the Link between Climate Change and Forced Migration: The Impact of Climate Change in the Arctic and Global South

An Analysis in the Context of Bangladesh

Afroja Khanam

Introduction

Finland is now the Chair of the Arctic Council for the 2017–2019 period and aiming to highlight the Paris Agreement within Arctic cooperation on climate change and the UN Sustainable Development Goals (SDGs). During its chairmanship, Finland takes up a broad range of issue areas encompassing climate change mitigation and adaptation as well as sustainable development. There are certain priority areas of concentration: environmental protection, meteorological cooperation, connectivity and education (Finland MFA, 2017). In short, climate change stands out as the main focus – it is a global phenomenon and its impacts are visible everywhere, including the Arctic and also in the Global South. According to many researchers, climate change brings a lot of challenges in the Arctic, with various environmental impacts and implications to people's livelihoods and economic activities such as forestry, fishing and reindeer herding (AACA, 2017). At the same time, climate change also has its adverse effect on the Global South. Most of the low-lying countries are vulnerable due to the impacts of climate change. Bangladesh, as a country that is already vulnerable to and affected every year by many different types of environmental disasters, is particularly exposed to climate change and accompanying societal security threats. According to the Intergovernmental Panel on Climate Change (IPCC) 2012 report, Bangladesh is among the countries estimated to lose the largest amount of cultivated land due to environmental and climate changes (IPCC, 2012). Another data shows that 30 million people are expected to be displaced

Afroja Khanam is a PhD Researcher at the Faculty of Social Sciences, University of Lapland, Rovaniemi, Finland, and an Assistant Professor in the Department of Political Science, Jagannath University, Dhaka, Bangladesh.

due to Bangladesh losing 17% of its land if global sea levels rise by one metre. While the Arctic has some connections with South Asia and South-East Asia, as China, India and Singapore have become Observer states in the Arctic Council, Bangladesh is not among the Observer states although it is one of the most vulnerable countries with regards to global warming.

I have lived in Rovaniemi for a few years now, observing discussions on Arctic governance and in particular on climate change in the Arctic. What strikes me as an outside observer is that these debates are often disconnected from the broader global context. While there is increasingly more emphasis on the "global Arctic", the Arctic remains to a great extent discursively isolated in terms of governance, politics and pondering about its future. My aim in this commentary is to highlight the global context that, I believe, may prove crucial for the long term trajectories of human development in the Circumpolar North. I use Bangladesh as an example as this is the context that I am the most familiar with. Against this backdrop, this Briefing Note analyses, firstly, how climate change is affecting the Global South; here exemplified with the case of Bangladesh. Secondly, it analyses how climate change is contributing to increasing levels of forced migration. Discussing in greater detail the predicament of climate migrants in Bangladesh will also serve to highlight the critical human dimension to the discussion in this briefing note. Thirdly, it explains why and how more integrated and combined policy/action is required in order to combat these problems along with the existing policies.

The Context of Bangladesh

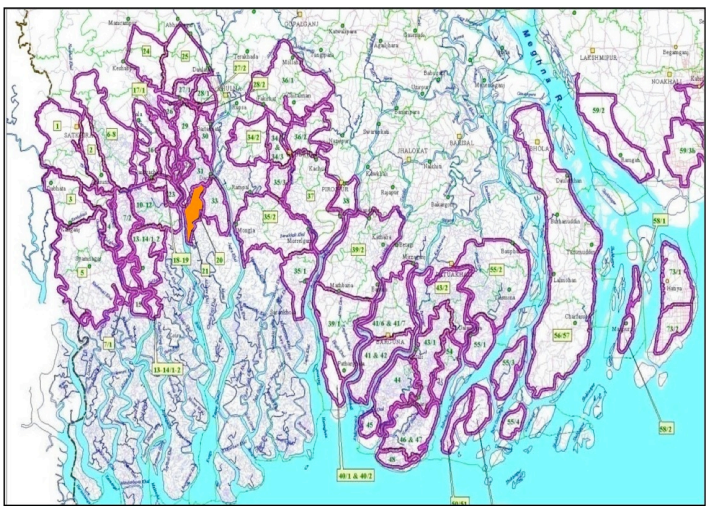
Figure 1: Map of Bangladesh (Rangpur and Sylhet divisions are not indicated in this map). Source: The United Nations, 2004

Geographically, Bangladesh is one of the environmental-disaster-prone countries in South Asia. Currently, its total population is almost 186 million (World Population Review, 2017). The coastal divisions, such as Barisal, Khulna and Chittagong, are the most vulnerable parts of the country with regard to cyclonic flood and storm surge due to its location (Karim & Mimura, 2008).

The coastal areas, which are less protected low-lying lands, are highly populated. Every year, Bangladesh experiences several tropical cyclones, storm surges, coastal erosion, floods and droughts which cause loss of thousands of lives and significant damage to property. Due to its geographical location, most of the climatic events that the country faces, such as cyclones and storms, originate from the South; from the Bay of Bengal and the adjacent North Indian Ocean (A. Ali, 2004). All environmental disasters in Bangladesh are complicated due to its large population and high density of people living in the affected areas. The country suffers from many serious problems, such as shortage of land to

accommodate its population, shortage of food, lack of clean drinking water, high level of illiteracy, and so on (A. Ali, 2004; Karim & Mimura, 2008). On top of that, Bangladesh is now predicted as one of the most vulnerable countries due to climate change and its impacts (Asaduzzaman, 2016; IPCC, 2012). As the country is facing more storm surges than ever before, the number of deaths resulting from natural disasters is continuously growing (A. Ali, 1999; A. Ali, 2004; Asaduzzaman, 2016). According to data which is modified from A. Ali (1999), approximately 31,279 people died in 1965 (11 May and 31 May); 500,000 people in 1970; 11,069 people in 1985; 5,708 people in 1988; and 138,000 people in 1991 due to natural disasters in Bangladesh. These high numbers of causalities, reaching hundreds of thousands during major cyclones and storms over the last 50 years, paint a clear picture of intensity and severity of these events. Therefore, these numbers provide a clear picture of the intensity and severity of cyclones and storms. They also result in enormous economic impacts through infrastructural damage that affects livelihoods (MoEF, 2008). Therefore, many places in Bangladesh face large scale population displacement, which can be defined as environmentally forced migration (Siddiqui, 2003; Siddiqui, 2012).

Figure 2: The Coastal Part of Bangladesh



Source: beahrselp.berkeley.edu

As already mentioned, due to the global warming the Arctic would be contributing significantly to sea-level rise. According to the AMAP assessment (2017), if the greenhouse gas emissions continue at current rates, the sea-level would rise by 25 centimetres between 2006 and 2100, which means that many low lying countries would become submerged. The increased emissions of greenhouse gases are extensively contributing to changes to the Arctic's sensitive climate. Moreover, the yearly updated data shows that it becomes evidently clear that the Arctic environment, familiar for previous generations, is being replaced by a warmer, wetter, and more inconstant environment. All these transformations have extremely serious impacts on people, resources and ecosystems globally (AMAP, 2017). It is adversely affecting also the Global South including Bangladesh as one of the low-lying countries.

As an impact of these catastrophes, the number of internally displaced persons (IDPs) has increased dramatically during the past two decades in many South Asian Countries. Consequently, these countries have witnessed a rapid growth in the number of slums and shanty towns. These

developments concern also Bangladesh, where a growing number of people are becoming displaced due to climate change related triggers and causes, such as floods, storm surges, riverbank erosion, sea level rise, high temperatures, lack of drinkable water, increasing salinity of land, and changes in cultivation patterns (Goodbred et al., 2012; International Organization for Migration (IOM), 2010). According to a study conducted by Refugee and Migratory Movements Research Unit (RMMRU) and the Sussex Centre for Migration Research, over 16 million people in Bangladesh will become internally displaced due to climate change induced natural catastrophes by the year 2050 (Siddiqui & Mahmood, 2015).

In Bangladesh, millions of people have moved to the capital city Dhaka from other parts of the country due to various reasons, such as displacement caused by river erosion, natural disasters and development projects, poverty and loss of livelihoods – or a combination of these and other factors. Dhaka, a megacity with over 16 million residents, continues to expand rapidly. According to the World Bank, already half of the population of Dhaka lives in slums. Between 1996 and 2005, the number of slum dwellers more than doubled from 1.5 to 3.4 million (Islam, 2006).

Many of these people can be considered either climate migrants or climate refugees (Goodbred et al., 2012; Walsham, 2010), and their situation remains dire and requiring urgent response at national and international levels. Currently, most climate refugees migrate internally within their home countries, but it has been estimated that in the future millions of Bangladeshi people affected by climate change will migrate also abroad (Siddiqui & Mahmood, 2015). As climate change induced displacement will also lead to international impacts beyond Bangladesh, including Europe and the Arctic region, it is necessary to address it as a phenomenon on a global level. To be able to address and tackle various social, political, economic and environmental problems from a broader and collective perspective, a holistic and nuanced understanding of climate change related displacement must be developed. Where the aim is to create common strategies, integrated policies and practical solutions for combatting climate change-related complex challenges, it is of utmost importance to combine knowledge and expertise from the countries of the Global South, such as Bangladesh, and the countries of the Arctic region. It is necessary to place our climate change actions at national and regional levels within a global and trans-regional context, rather than narrow down policy deliberations to one region and its specific challenges, excluding the grave developments taking place elsewhere.

At the same time, addressing serious social problems and injustices caused by climate change induced displacement locally in the Global South becomes also more important. Several studies have shown that despite the United Nation's Guiding Principles on internal displacement, when marginalized and poor people are displaced, they are not usually offered compensation or resettlement. In shanty towns, displaced people confront serious problems, such as lack of food, water, shelter, healthcare and education, as well as unemployment and police repression. Many studies have shown that women are more vulnerable to climate changes and its impact on their health, psychology and security (Bunce, Ford, Harper, Edge, & IHACC Research Team, 2016; Hossain & Punam, 2016; Sultana, 2014). In camps and resettlement colonies, women also often face gender-based violence and sexual abuse, and are in high risk of being trafficked (Basu, 2011; Ghimire, 2011). In this way, their human rights are being constantly violated (Hossain & Punam, 2016). Moreover, many IDPs living in slums are under the constant threat of being displaced again as slums are often evicted due to the continuously rising value of land in metropolitan cities (Jha,

2011). The effects are far greater than material impacts: displacement always represents "a wider loss of cultural autonomy, knowledge and power" (Baviskar, 2004; Chatterjee, 2004).

Besides the everyday struggles described above, internally displaced people and migrants are often exposed to political violence and dependence on a given political party (Suykens & Islam, 2013; Suykens, 2015; Suykens & Islam, 2015). A recent research shows that the level of political violence in Bangladesh has increased drastically from 2002 to 2013 in Bangladesh. In 2002, the total number of events including political violence was 668, whereas it was 14,187 in 2013 (Suykens & Islam, 2015).

The Global Arctic, the Global South and Climate Change

There is no immediate solution to climate change. As climate change and its impacts have taken a long time to become more visible, the processes of combatting them will also require time. For this to happen, a trans-regional approach is required to take action effectively. The time has now come to combine actions taken in the Arctic and in the Global South. In order to combat climate change and prevent forced migration at least the following steps can be taken:

- There should be a common working ground at the trans-regional or inter-regional level. Also, policies and approaches should be adapted trans-regionally or inter-regionally. The pattern should be multidisciplinary and multi-level. If the regions can take into account the situation in the other parts of the world then it would be more effective and timely.
- Traditional knowledge could be useful in this regard. It must include Indigenous knowledge including traditional knowledge from the Arctic region and Indigenous knowledge from the Global South.
- Access to updated knowledge is a must for this purpose. There is a huge gap of information between the Arctic and the South. Informing and updating the present state of climate change and its possible impacts would make others aware of the situation. When people from the Global South and Global North would have better understanding regarding the situation, they would realize the urgency of the issue. Thus, it will be helpful to generate new ideas for the purpose of mitigation.
- Adaptation would be helpful to reduce the impact. Adaptation strategies should be developed and implemented both individually and jointly. Vulnerability assessments should be conducted from different viewpoints and by building on knowledge and perspectives from multiple disciplines. This requires an integrated approach. From the perspective of climate justice it can be considered unfair while Bangladesh is a minimal contributor to the greenhouse gas emissions which result in global climate change, it is among the countries that suffer the most from the effects of climate change (see Ali, 2004). When compared to the Arctic Countries, the difference is that while they also suffer from effects of climate change, they are, at the same time, among the biggest emitters.

Finally, the Arctic Council or other Arctic regional forums should develop enhanced governance systems and mechanisms. They should be rather inclusive and comprehensive and bring also the concerns of non-Arctic regions to the discussions taking place in the Arctic forums. Currently, Arctic regions are closely connected between themselves through various platforms. From the perspective of the Global South the problem is that the existing platforms such as the Arctic Council are very focused on the region itself, and not enough attention is paid to policies that

would take into account other parts of the world. Broadening the scope is crucial but may prove to be challenging as it seems to be difficult to adopt even a coherent Arctic policy, as the ongoing debates demonstrate.

The same is true of the Arctic policies of such polities as the European Union. According to some research, there is no coherent policy for the Arctic region itself; including in the economic and political sectors (Stepien, 2014; Stepien & Raspotnik, 2015). This shows that it is very difficult to adopt and implement an integrated policy. Nevertheless, there should be some platforms or organizations that would address these issues also from the perspective of the Global South and link them with the Arctic region. The aim should be to develop an overarching policy that comprehensively addresses the whole spectrum of Sustainable Development Goals (SDGs) and links both regions together, which would help to combat and mitigate the adverse effects of climate change collectively. This is a complex question and it requires political will. However, without collaboration between the Arctic region and countries of the Global South, it will be impossible to address challenges related to climate change and its impacts more effectively, including the ongoing and rapidly increasing phenomenon of climate change-induced forced migration.

Conclusion

This Briefing Note addresses climate change in general with climate refugees from the Global South; more specifically from Bangladesh. Due to the ongoing 'refugee crisis'; forced migration has become an object of wide attention and public debate in Europe. At the same time, there seems to be a certain blindness to forced migration that takes place outside the borders of Europe. In Bangladesh, for example, millions of people are forced to migrate from rural areas to urban slums. While increasingly many of these 'climate refugees' migrate abroad, the country receives also a growing number of refugees itself. For example, during the last few years, over 300,000 Rohingyas have escaped ethnic cleansing in Myanmar and crossed the border to Bangladesh. It is high time for the Arctic region and Arctic governance related institutions, along with the EU, to develop a strong and common framework. If climate change is not tackled now comprehensively and collectively, the number of people migrating from Bangladesh and other countries will continue to grow substantially. Then, the question is, whether the Arctic countries are ready to accept more climate refugees in the future?

References

AACA. (2017). *Adaptation Actions for a Changing Arctic: Perspectives from the Barents Area. Arctic Monitoring and Assessment Programme (AMAP).* Retrived from https://www.amap.no/documents/doc/Adaptation-Actions-for-a-Changing-Arctic-Perspectives-from-the-Barents-Area/1604

Alamgir, M., Jabbar, M., & Islam, M. (2010). Assessing the livelihood of slum dwellers in Dhaka city. *Journal of the Bangladesh Agricultural University*, *7*(2), 373–380. https://doi.org/10.3329/jbau.v7i2.4749

Ali, A. (1999). Climate change impacts and adaptation assessment in Bangladesh. *Climate Research*, *12*(2–3 SPEC. ISS. 6), 109–116. https://doi.org/10.3354/cr012109

Ali, A. (2004). Climate change impacts and adaptation assessment in Bangladesh. *Climate Research*, *12*, 109–116. https://doi.org/10.3354/cr012109

Ali, a. (2004). Climate change impacts and adaptation assessment in Bangladesh. *Climate Research*, *12*, 109–116. https://doi.org/10.3354/cr012109

AMAP. (2017). *Snow, Water, Ice and Permafrost. Summary for Policy-makers. Arctic Monitoring and Assessment Programme (AMAP)*. Retrieved from http://hdl.handle.net/11374/1931

Asaduzzaman, M. (2016). Climate Change in Routledge Handbook of Contemporary Bangladesh. In A. Riaz & M. & Sajjadur Rahman (Eds.) (p. 1). Routledge. https://doi.org/doi:10.4324/9781315651019

Basu, S. (2011). Practising the " Guiding Principles " for Development ' s Displacees : Problems and Prospects. *Refugee Watch: A South Asian Journal on Forced Migration*, *37*(June), 16–29.

Baviskar, A. (2004). *In the belly of the river: tribal conflicts over development in the Narmada Valley* (2nd Editio). New Delhi: Oxford University Press.

Bunce, A., Ford, J., Harper, S., Edge, V., & IHACC Research Team. (2016). Vulnerability and adaptive capacity of Inuit women to climate change: a case study from Iqaluit, Nunavut. *Natural Hazards*, *83*(3), 1419–1441. https://doi.org/10.1007/s11069-016-2398-6

Chatterjee, P. (2004). *The Politics of the Governed: Reflections on Popular Politics in Most of the World. Contemporary Political Theory* (First, Vol. 7). New York, NY: Columbia University Press. https://doi.org/10.1057/palgrave.cpt.9300318

Ghimire, A. (2011). Rethinking "women" in Forced Displacement. *Refugee Watch: A South Asian Journal on Forced Migration*, (37), 30–43.

Goodbred, S., Gilligan, J., Ackerly, B., Ayers, J., Furbish, D., Hornberger, G., … Abkowitz, M. (2012). Environmental stress and human migration in a low-lying developing nation : A comparison of co-evolving natural and human landscapes in the physically and culturally diverse context of Bangladesh Funded by : Office of Naval Research – Columbia University, (1), 3–4.

Hossain, K., & Punam, N. J. (2016). Climate Change Impacts and Human Rights of Rural Women in Bangladesh (Vol. 325, pp. 493–514).

International Organization for Migration (IOM). (2010). *World Migration Report 2010 - The Future of Migration: Building Capacities for Change. Change*. https://doi.org/ISBN 978-92-9068-619-4

IPCC. (2012). IPCC 2012, Summary for policymakers. In *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* (pp. 1–19).

Islam, N. et al. (2006). *Slums of Urban Bangladesh: Mapping and Census, 2005*. Centre for Urban Studies (CUS), National Institute of Population Research and Training (NIPORT) and MEASURE Evaluation. https://doi.org/978-0-9842585-6-7

Jha, M. K. (2011). *Place of Poor in Urban Space. CRG Series on Policies and Practices* (Vol. 39). Kolkata.

Karim, M. F., & Mimura, N. (2008). Impacts of climate change and sea-level rise on cyclonic storm surge floods in Bangladesh. *Global Environmental Change*, *18*(3), 490–500. https://doi.org/10.1016/j.gloenvcha.2008.05.002

MoEF. (2008). *Bangladesh Climate Change Strategy and Action Plan. Strategy*. https://doi.org/10.1007/978-4-431-54249-0_7

Siddiqui, T., & Mahmood, A. (2015). *Impact of Migration on Poverty and Local Development in Bangladesh*.

Siddiqui, T. (2003). Migration as a livelihood strategy of the poor: The Bangladesh case. *Regional Conference on Migration, Development and Pro-Poor Policy Choices in Asia*. https://doi.org/10.1177/097152150501200207

Siddiqui, T. (2012). *Impact of migration on poverty and development* (No. 2). Sussex.

Stepien, A. (2014). Commentary "Strategic Assessment of Development of the Arctic : Assessment Conducted for the European Union " – The EU-Arctic Nexus and a More Balanced Picture of Arctic Developments for the European Audiences. *Arctic Yearbook*.

Stępień, A., & Raspotnik, A. (2015). Exploring Reasons & Remedies for the EU's Incapability to Devise an "Arctic policy": The Quest for Coherence. *Arctic Yearbook 2015*, 432–436.

Sultana, F. (2014). Gendering Climate Change: Geographical Insights. *The Professional Geographer*, *66*(3), 372–381. https://doi.org/10.1080/00330124.2013.821730

Suykens, B. (2015). The Land that Disappeared: Forceful Occupation, Disputes and the Negotiation of Landlord Power in a Bangladeshi *Bastee*. *Development and Change*, *46*(3), 486–507. https://doi.org/10.1111/dech.12165

Suykens, B., and Islam, A. (2015). *The Distribution of Political Violence in Bangladesh (2002-2013)*. Ghent.

Suykens, B. and Islam, A. (2013). Hartal as a complex political performance: General strikes and the organisation of (local) power in Bangladesh. *Contributions to Indian Sociology*, *47*(1), 61–83. https://doi.org/10.1177/006996671204700103

Walsham, M. (2010). *Assessing the Evidence: Environment, Climate Change and Migration in Bangladesh. International Organization for Migration (IOM)*.

World Population Review. (2017). Bangladesh Population. Retrieved from http://worldpopulationreview.com/countries/bangladesh-population/%0A

Briefing Note

Women of the Arctic:

Bridging Policy, Research and Lived Experience

Malgorzata (Gosia) Smieszek, Tahnee Prior & Olivia Matthews

The Idea

On September 6th and 7th, 2018 the University of Helsinki hosted *Women of the Arctic: Bridging Policy, Research and Lived Experience*, a side event of the UArctic Congress 2018. Building on ongoing efforts to better understand gender in the Arctic, *Women of the Arctic* sought to bring conversations about women's and gender issues outside of research circles and to carve out a non-academic space for women and girls who work on or live in the Arctic. More specifically, its aim was to explore the roles and contributions of women to northern policy-making, research, exploration, art, activism, and daily life in a form of dialogue between invited guests and with active involvement of the audience.

The idea behind *Women of the Arctic* grew out of a conversation between Tahnee Prior, a Pierre Elliott Trudeau Foundation Scholar and PhD candidate at the University of Waterloo and Malgorzata (Gosia) Smieszek, a researcher at the Arctic Centre, University of Lapland, and their realization that, amidst a steadily growing number of Arctic venues, initiatives focusing specifically on Arctic women – the successes they achieve and the challenges they face – remain few and far between. Moreover, the equal representation of women on Arctic conference panels is still far from standard with women's perspectives often missing from debates, despite women's critical role in their communities, their societal and political engagement, and their high levels of expertise and credentials. *Women of the Arctic* sought to address this issue, fill this critical gap and reach beyond the academic sphere to illuminate the stories and perspectives of a broad range of women from Arctic and non-Arctic countries, both of Indigenous and non-Indigenous origin. Ultimately, the

Malgorzata (Gosia) Smieszek is a researcher at the Arctic Centre, University of Lapland. Tahnee Prior is a Pierre Elliott Trudeau Foundation Scholar and PhD candidate at the University of Waterloo. Olivia Matthews is Research and Program Assistant at Plan A: Women of the Arctic.

objective was and is to create an awareness of, and promote a continued focus on, issues relating to northern women and non-Arctic women who engage with polar realities.

The Event

The event opened on September 6th at the evening reception of the UArctic Congress with the performance of a play, *Whale Song*. With a keen desire to bring together art and science as a part of a large-scale academic event, like the UArctic Congress, *Women of the Arctic* partnered with the Arctic Cycle, a New York-based arts organization that uses theatre to foster dialogue about global climate crisis, to create an empowering vision of the future, and to encourage people to take action. *Whale Song,* a one-woman 15-minute play written by Chantal Bilodeau, the Arctic Cycle's program director, tells the story of women's suffering and strength when faced with the adverse effects of climate change and gender-based violence; both issues are still rarely brought to the forefront of debates about the Arctic.

On September 7th, *Women of the Arctic* was opened with a speech by Finland's State Secretary and forthcoming Secretary General of the Nordic Council of Ministers, Paula Lehtomäki, followed by a series of panels focusing on three major topics: northern women in leadership roles; women in Arctic science and exploration; and the role of arts in healing from systemic and gender-based violence in northern communities.

The first panel, "Northern Women at the Table: From Community to Business Leaders" drew on the experiences of women politicians, entrepreneurs, and civil society leaders to better understand their roles and examine how to prepare the next generation of women leaders. Among the speakers were Finland's former Minister of Gender and Ombudsperson for Minorities, Eva Biaudet, the speaker of the Sami Parliament of the Kola Peninsula and director of the Kola Saami Radio, Valentina Sovkina, and Kjersti Busch, a co-founder and CEO of SALT, a knowledge-based company from Lofoten, joined by Secretary Lehtomäki. Together, they discussed issues pertaining to gender inequality where even the Nordic countries, which often rank among the top in the world in this regard, did not reach yet equal representation in public offices. The speakers also explored the reasons behind the significantly low number of women entrepreneurs and investors, as well as disparities when it comes to raising and conditioning boys and girls in a manner that ultimately influences the life trajectories they choose. In addition to focusing on education and the responsibility of raising the next generation to take on equal work and caregiving roles, panelists spoke about the challenges of advancing work-life balance when caregiving and domestic duties often default to women – a commonality spanning from the northernmost communities to the highest-level political offices in the capitals. All panelists agreed that women bring distinct qualities to leadership, which is oftentimes more focused on communal benefits and shared advantages, rather than personal career advancement and development. In words of Kjersti Busch, being a leader is a privilege and as Valentina Sovkina noted women's softness is their strength, which should be cherished and valued.

Building on this momentum, the second panel on "Women in Arctic Science and Exploration" focused on traditional and Indigenous knowledge, as well as Western science, to explore how policy, education, international collaboration and mentoring can support women's scientific careers and promote greater diversity in polar science. The speakers on the panel represented a great diversity of backgrounds and roles in Arctic science and education. Among them were Susan

R. Eaton, the founder of Sedna Epic Expeditions which brings all-female snorkeling crews to the Arctic to document the effects of climate change, empower local and Indigenous communities, young girls and women in particular, and engage youth in experiential learning; Renuka Badhe, the Executive Secretary of the European Polar Board; Karen Barnes; the President and Vice-Chancellor of Yukon College, Canada; Gunn-Britt Retter, the head of the Arctic & Environment Unit of the Sami Council and the long-term representative of the Sami Council at the Arctic Council; Marina Kalinina, the Rector's Advisor for International Collaboration at the Northern Arctic Federal University (NArFU) in Russia; and Ylva Sjöberg, a permafrost researcher at the University of Stockholm and member of the Association of Polar Early Career Scientists (APECS). Together they spoke of the role and position of women in Arctic science and research and how there has been a visible shift in the management structures of many polar organizations over the last 20 years, with more women hired in these positions. However, this change is not pervasive; in many Arctic countries, a low number of colleges and universities are run by women who have advanced little in their roles over the past decades. Panelists also gave significant attention to the broader role of diversity in science and exploration, beyond gender equality. They stressed that diversity should be taken on as a full package beyond the gender binary to include the race, age, and sexual orientation of Arctic researchers, educators, and managers. "Women explore the planet differently than men," said Susan R. Eaton, "…the sense of place, where they are. Women seek to understand the place they are exploring through the people that live in that place." Yet, in order to become scientists and explorers, women must often face the expectations placed on them by others, like traditional roles, and by themselves, such as high or unrealistic expectations which can impede their development and cast doubt over their own potential. "It's very important to create opportunity for youth so they can make a choice. It is the opportunities they have that give them better choice," noted Marina Kalinina. The speakers agreed that collaboration among women fosters a sense of solidarity and common purpose which often prevails over competition. What is more, women role models and mentors can be immensely powerful for future generations. "We need to keep up with the younger ones. Rather than be protective, [we need to] guide them, be role models and help them get further than we ever got", concluded Gunn-Britt Retter.

The third and final panel on "Grappling with 'Uncomfortable' Conversations: From Past Traumas to Future Generations" examined some of the causes of, and solutions to, systemic and gender-based violence in northern communities and industries which disproportionately impact the lives of northern women and children. A special focus was given to the role that art can play in unpacking and healing individual and collective trauma. The speakers included Michelle Demmert, the Law and Policy Consultant of the Alaska Native Women's Resource Center and Chief Justice of the Central Council Tlingit and Haida Indian Tribes of Alaska; Sighthrudur Gudmundsdottir, Director of Kvennaathvarf, Iceland's first and only women's shelter; Liisa Holmberg, the Rector of the Sami Education Institute and Director of the International Sami Film Institute; and Katarzyna Pastuszak, the Artistic Director of Amareya Theatre who collaborated with Louise Fontain on "Nomadic Woman", which tells the story of her deportation as a child from Greenland to Denmark. Instead of solely breaking down the statistics on violence in Arctic communities, panelists shared tangible stories, real challenges and successes from their experiences. Over the course of their panel, speakers were able to create a safe space for often-silenced conversations, sharing their experiences of intergenerational trauma in northern communities, at the hands of the state and local communities alike. Woven throughout their insights was a focus on art - film,

theatre, and other forms of storytelling – as it is used in their daily work. "I can do nothing with what they did with us as children [referencing deportation and abuse]," Louise Fontain reflected, "but I can tell my story – my whole story – not about the shame, or about the loss of language. I can tell the whole story of who I am." Katarzyna Pastuszak, Fontain's collaborator, added, "when we [performed our theatre piece, "Nomadic Woman", in] Greenland, the place where Louise was born...she spoke about her story…and most of the young generation knew nothing about this...that it took place for many years. [When we performed in Nuuk], we had a group of elderly women who sat with us after the performance and telling their stories of deportation. Which means that, depending on what audience or witness you get for this storytelling, (…) the tool brings different results." Both Sightrudur Gudmundsdottir and Michelle Demmert reflected on how their work in service provision and the law engages with the arts to teach children to identify violence and to inspire legal change, respectively. Despite a focus on pain and shame, the panelists ultimately drew attention to the strength that comes from understanding. As Michelle Demmert poignantly noted, "It is so powerful for people to realize they are not the only one and that there is hope."

The event came to an end with the closing session of the UArctic Congress, where former President of Finland, Tarja Halonen, an active spokesperson on issues of gender and girls' and women's rights, spoke about the essential role of gender equality in achieving the Sustainable Development Goals. "Women are critical agents of change in their communities. Without women and girls, we can't be successful."

Moving Forward

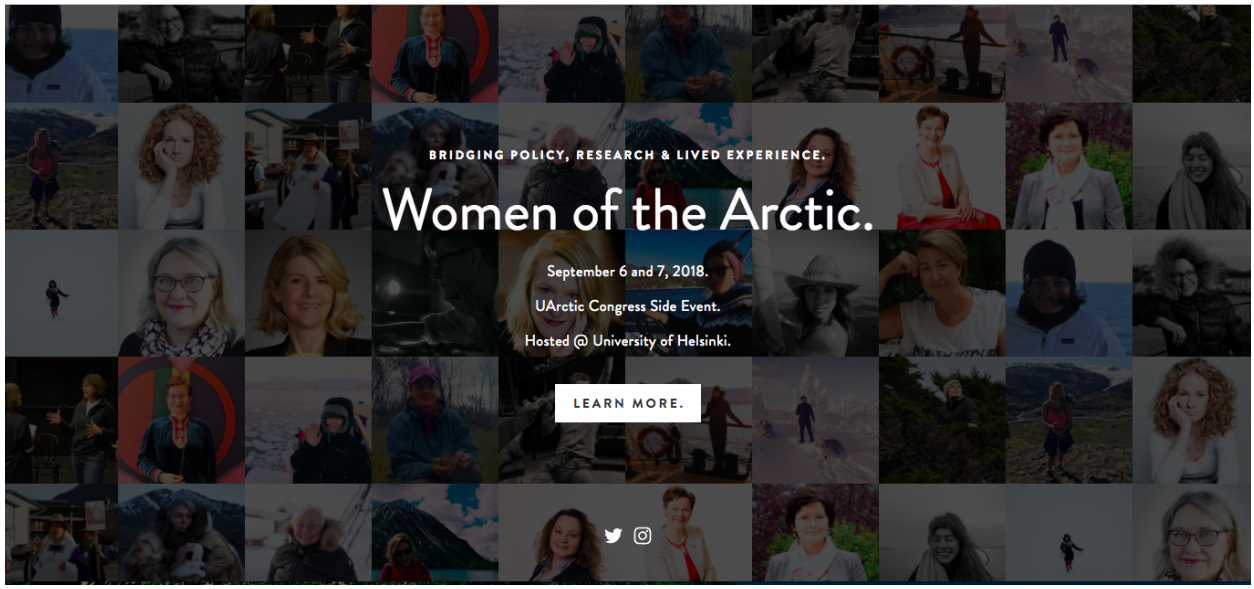
To maintain a long-term focus on women in the Arctic, organizers partnered with creative communications collective *What Took You So Long* to document the event, as well as to interview some speakers and participants about their professional and personal stories. Collected materials will be hosted on a digital storytelling platform, at www.genderisnotplanb.com. The organizers are now exploring the possibility of hosting future events in various Arctic and non-Arctic locations, in collaboration with existing groups and networks interested in issues relating to women and gender in the Arctic.

The event was funded by NordForsk and supported by the University of the Arctic and the University of Helsinki.

For more information about "Women of the Arctic" please visit www.genderisnotplanb.com and follow along on Twitter and Instagram at @PlanArctic.

Join Us

Do you live in, work on, or engage with the Arctic? Help us give a fuller picture of the #WomenoftheArctic! Send us your photo at info@genderisnotplanb.com and we will add it to the mosaic of *Women of the Arctic* on our website. Please feel free to share it with your Arctic colleagues and collaborators.


BRIDGING POLICY, RESEARCH & LIVED EXPERIENCE.
Women of the Arctic.
September 6 and 7, 2018.
UArctic Congress Side Event.
Hosted @ University of Helsinki.
LEARN MORE.

Briefing Note

Less EU in the Arctic Region After 2020

Stefan Brocza & Andreas Brocza

With three EU Member States (Denmark, Sweden, Finland) and an additional two European Economic Area members (Norway and Iceland) being Arctic states, the EU has a strategic interest in the Arctic remaining a low-tension area, with ongoing cooperation ensured by the Arctic Council, a well-functioning legal framework, and solid political and security cooperation. Therefore the EU tends to contribute to this through enhanced work on climate action and environmental research, sustainable development, telecommunications, and search and rescue, as well as concrete cooperation with Arctic states, institutions, Indigenous peoples and local communities.

For quite a long period, the EU provided a significant amount of funding through various initiatives to Indigenous peoples and local populations in the Arctic region. Funding programmes during the 2007-2013 co-financing period amounted to 1.14 billion EUR, or 1.98 billion EUR including the co-financing of EU Member States. Over 1 billion EUR from the European Structural and Investment Funds will be invested in the area over the current 2014-2020 financing period in strategic fields such as research and innovation, support to small businesses and clean energy.

Serious Change After 2020

However, this will change seriously with the next EU financial period starting in 2021. From 2021 on, the EU will have to reduce and focus its financial engagements in external relations for a variety of reasons:

Stefan Brocza studied law, political science, communication science and international studies in Vienna, St. Gallen and Harvard. He works currently as lecturer at several universities, political adviser and consultant. Andreas Brocza studied political science with a focus on regional integration at the University of Vienna. He works as a lecturer and political analyst.

Brexit

Following the decision of the United Kingdom to withdraw from the EU, its contribution to the EU budget – currently around 15 percent of the total budget – will end. Since there is no realistic scenario that the remaining Member States could take over this amount, the total available budget for the EU will be remarkably reduced from 2021 on. Even when the current proposal from the EU Commission increases the EU budget for the period 2021-2027, at the end the final amount has to be agreed between all (at this time) 27 Member States and the European Parliament. Already now several Member States indicated that they are not willing to pay more into the EU budget. With a view to the current Brexit negotiations, there could be another budget relevant irritation: If the British withdraw from the EU ends in a "hard Brexit" (e.g. without an agreement before 29 March 2019), the envisaged financial remunerations and paybacks from the United Kingdom in the EU budget – for the moment discussions over an amount of 60 billion EUR are ongoing – would not be done.

Greenland

For the moment Greenland is one of the EU Overseas Territories and Countries (OCT) and therefore eligible for funding from the EU's general budget through the EU-Greenland Partnership. For the current financial period 2014-2020 an overall amount of 217.8 million EUR is foreseen for the cooperation with Greenland. Education, vocational training and post-elementary school systems have been chosen as the concentration sectors for cooperation between the EU and Greenland for the period 2014-2020. In addition, in 2015 an 'umbrella' framework document for the post-2013 EU-Greenland relations, a Joint Declaration on relations between the European Union, on the one hand, and the Government of Greenland and the Government of Denmark, on the other, has been signed. By this legally and financially non-binding document the EU confirms its long lasting links between with Greenland and reiterates the geostrategic importance of Greenland for the EU.

The new proposal for an EU Council Decision on the Association of the Overseas Countries and Territories with the European Union including relations between the European Union on the one hand, and Greenland and the Kingdom of Denmark on the other (so called "Overseas Association Decision") comes in the context of the 2021-2027 Multiannual Financial Framework proposal from the EU Commission. It focuses on consistency with existing policy provisions in the policy area.

The mid-term review report (December 2017) on 10 EU external financing instruments, including the Greenland Decision and the 11th European Development Fund (EDF), which includes programming for the other OCTs, concluded that the external financing instruments were 'fit for purpose'. However, both the report and the consultations conducted highlighted the need for increased flexibility, simplification, coherence and performance. This has led to a proposal for a future Neighbourhood, Development and International Cooperation Instrument, which will draw on lessons learned to help streamline the Union's external action architecture.

The Overseas Association Decision and the Greenland Decision cannot be included in the new Neighbourhood, Development and International Cooperation Instrument or in any other legal act subject to ordinary legislative procedure. This is because they both have a specific adoption

procedure: an EU Council Decision by unanimity, following consultation of the European Parliament.

However, to streamline the number of programmes it is proposed that both Decisions be merged into a single Decision regrouping all OCTs, including Greenland.

When Greenland decides to become totally independent from Denmark, the current privileged status as an OCT ends automatically. An independent Greenland would mean that Denmark is no longer a member of the Arctic Council. The EU would lose one of its members in the Arctic Council and the only EU member in the group of the Arctic Five.

Iceland

Iceland applied for EU membership in July 2009. The EU Commission issued a favourable opinion in February 2010, and the EU Council decided in June 2010 that accession negotiations would be opened. After a new government took over in May 2013, Iceland put the accession negotiations on hold. At the time of this decision 27 of the negotiating chapters had been opened, of which 11 were provisionally closed. In March 2015 Iceland's government requested that "Iceland should not be regarded as a candidate country for EU membership".

However, Iceland is highly integrated with the EU through membership in the European Economic Area (EEA), the Schengen Area and the European Free Trade Association (EFTA). It is also a signatory of the Dublin regulation on asylum policy and a partner in the EU's Northern Dimension policy to promote cooperation in Northern Europe.

Through the EEA Iceland participates in the single market and contributes financially towards social and economic cohesion in Europe. A significant proportion of the EU's laws are applied in Iceland today. Iceland also participates, albeit with no voting rights, in a number of EU agencies and programmes, covering areas including enterprise, environment, education and research.

Iceland has a bilateral Free Trade Agreement with the EEC since 1972. Two thirds of Iceland's foreign trade is with EU Member States.

With a view to the Arctic engagement of the EU, the withdrawial of Iceland's request for EU accession weakens the EU position. Iceland becoming an EU Member would have increased the number of EU states in the Arctic Council.

New External Priorities

Finally, the EU is currently reorganizing its external priorities. A strong focus will be laid to the so called "close neighbourhood" in Eastern Europe and northern Africa. The growing security interest of the EU in these areas will call for additional funding.

The current proposal for the EU Multiannual Financial Framework 2021-2027 sets the main priorities and overall budgetary framework for EU external action programmes under the heading 'Neighbourhood and the World', including the establishment of the so-called Neighbourhood, Development and International Cooperation Instrument. The objective of the Neighbourhood, Development and International Cooperation Instrument is to uphold and promote the Union's values and interests worldwide in order to pursue the objectives and principles of its external action. The proposal provides for a date of application as of 1 January 2021 and is presented for a Union of 27 Member States, in line with the notification by the United Kingdom of its intention

to withdraw from the European Union and Euratom based on Article 50 of the Treaty on European Union received by the European Council on 29 March 2017.

Each regional envelope under the new instrument will be adapted to the needs and priorities of the regions in question, which reflect the EU's strategic priorities, notably in the EU's neighbourhood and Africa. Within the 75 page document the Arctic is only mentioned once: in footnote 17 as an *inter alia* example for "other policy documents". Already this indicates that the Arctic region will not be high ranked within the new external priorities of the EU in the period 2021-2027.

Conclusion

For the moment it is unclear how the envisaged new external priorities will be framed and to what extent they are going to change the EU financial framework of the post-2020 EU budgets. Already, the Arctic topic is unlikely to be anywhere close to the top of the agenda for the EU in the coming years. In summary, from 2021 onwards it is expected that the EU will have less financial funding available and will strengthen its external engagements in regions of the world other than the Arctic.

References

European Commission: External Evaluation of the Greenland Decision (2014 –mid 2017) Final Report, June 2017, https://ec.europa.eu/europeaid/sites/devco/files/gd-final-report-vol-i-main_en.pdf

European Commission: Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing the Neighbourhood, Development and International Cooperation Instrument {SEC(2018) 310 final}, {SWD(2018) 337 final}, Brussels, 14.6.2018, COM(2018) 460 final 2018/0243 (COD), https://ec.europa.eu/commission/sites/beta-political/files/budget-may2018-neighbourhood-development-international-regulation_en.pdf

European Commission: Proposal for a COUNCIL DECISION on the Association of the Overseas Countries and Territories with the European Union including relations between the European Union on the one hand, and Greenland and the Kingdom of Denmark on the other ('Overseas Association Decision'), {SWD(2018) 337 final}-{SEC(2018) 310 final}, Brussels, 14.6.2018, COM(2018) 461 final 2018/0244 (CNS), https://ec.europa.eu/commission/sites/beta-political/files/budget-may2018-other-territories-decision_en.pdf

European Parliament: EU Arctic Policy in regional context, paper requested by the European Parliament's Committee on Foreign Affairs. 6 July 2016. http://www.europarl.europa.eu/RegData/etudes/STUD/2016/578017/EXPO_STU(2016)578017_EN.pdf

Briefing Note

Travelling with the Calotte Academy, June 2018

Peter Kujawinski

In Summer, the Rovaniemi airport feels empty, as if off-season is in full effect. To me this seemed strange because after all, Summer is historically considered the best time to visit Lapland. The temperature is comfortable, it is light almost all the time, and the forests and fields are in bloom. But now that Rovaniemi is the "official hometown of Santa Claus," I guess it shouldn't be surprising that the area seems so empty during the most pleasant time of the year. It underscores how the Arctic works in rhythms that are often counterintuitive.

I was in Rovaniemi to join the Calotte Academy, a traveling symposium of academic researchers that takes a bus ride through northern Europe to discover the Arctic in all of its complexity. My own journey to Rovaniemi began in the Canadian Arctic, where I had worked both as an American diplomat and later as a freelance journalist. In North America, the Arctic is sparsely populated and remote. This makes it difficult to get to, and the challenges people face while living up there are similar to the challenges anyone would face in areas that are difficult to access. The cost of living is very high and getting anywhere is a challenge. Therefore the Canadian and US Arctic have a high profile mainly because of the myths of living in a place so far north – not because of any lived reality.

My time with the Calotte Academy demonstrated that the European experience of the Arctic is quite different. First, of course, is the fact that the European Arctic isn't as cold as the North American Arctic. As we drove through the beautiful forests of Lapland, I noticed a mix of hardwood, deciduous trees and pines. It could've been the forests of the north-central United States – of Minnesota, Wisconsin and Michigan. For example, here is a snapshot of late evening near Inari, where we stayed on the grounds of a wonderful conference center.

As we drove through northern Finland, the topography remained similar, though those of us from North America were constantly surprised at how developed the infrastructure was in these northern latitudes. Cell phones networks, roads, even bike lanes were ubiquitous.

Peter Kujawinski is a Strategic Communications Consultant and a former United States diplomat. He was a participant in this year's Calotte Academy, an annual traveling symposium organized by the UArctic –NRF Joint Thematic Network on Arctic Geopolitics and Security, which also publishes the Arctic Yearbook.

To me, the work done in the European Far North to build infrastructure and professional links crystallized in the Norwegian town of Kirkenes. The history of the town was fascinating in its own right – a common Norwegian/Russian district until 1826 (and Sami before colonization), occupied by Nazi Germany and then taken over by the Russian army towards the end of World War II. And then of course there's the geographical aspect – it's further east than even Istanbul or St. Petersburg. It occupies a unique place in the northern European context.

In the picture above, you can see the coastal waters leading to the Barents Sea, taken from the Kirkenes heights.

Today, Kirkenes styles itself as an epicenter of the Barents region, which encompasses the northernmost parts of Norway, Sweden, Finland and Russia. When these Russian parts are included, the Barents region could easily be considered the most populated part of the Arctic. Here it is possible to perceive the sometimes conflicting currents of European integration, EU-Russian military concerns, environmental issues, and through it all, the desire to continue cooperation and trade.

While in the town of Kirkenes, I was pulled between two contradictory thoughts. First, Kirkenes was indeed very far away, on the margins of Europe, at the every edge of Norway. The town itself, though tidy and well built, is small – with a population of 3500 people.

On the other hand, Kirkenes is the center of the Barents region, an area that always seems to be on the cusp of attracting the world's attention, whether for natural resource extraction, military maneuvres, or something else. The town is only 20 minutes from Russia and 40 minutes from Finland. I could well imagine that this town buzzed with expectation a few years ago, when European relations with Russia were at a higher level than currently. Now, the atmosphere seemed to be one of waiting. Or, to be more diplomatic, anticipation.

After our time in Finland and Norway, we visited Russia for several days. For an American like myself, the European Arctic is accessible, but the Russian Arctic feels different. Of course, a big reason is the recent downturn in relations between Russia and the West, as well as the palpable weight of the government. Checkpoints were many, and it was unclear what or why they were checking papers so often.

A picture of the factory city of Nikel, near the Norwegian/Russian border

We spent many hours in the bus, driving through areas that wouldn't seem out of place in Norway or Finland – swift-flowing rivers and thousands of square miles of forest. Other areas, like the massive factories and smelters on the road to Murmansk had clearly ruined the vegetation of the surrounding area.

After a few days in Russia, we returned to the nearly empty town of Rovaniemi. The only work going on was in the Christmas village, as workers prepared to expand even more. It seems the interest in the Arctic – especially in the Winter – never stops.

Sunset near the Arctic Russian town of Kirovsk

As a non-academic, I wasn't sure how much I could contribute to the Calotte Academy, but I'm so thrilled to have participated. Not only did I learn about a wide variety of issues I wouldn't ever have understood before, but there is a certain rhythm of traveling together on a bus that stands the test of time. It was the perfect introduction to the European and Russian Arctic. I was left with an impression of a region of great possibility – and great uncertainty. Because of the many changes going on in the Arctic, it's unclear whether the Barents region will become central in the way it had been in recent history, or whether it will recede and become even more of a backwater. Given the amount of attention, and the patient, deliberate building of relationships that I witnessed, my bet is this area will grow in importance in the decades to come.

Check out the Arctic Yearbook 2018 Special Section on *China & the Arctic* at:

https://arcticyearbook.com/arctic-yearbook/2018/china-the-arctic

2018 ARCTIC YEARBOOK

ISSN number: 2298-2418