

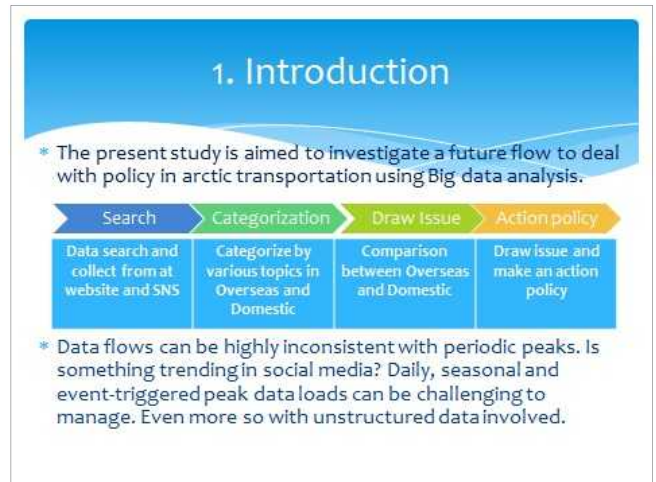
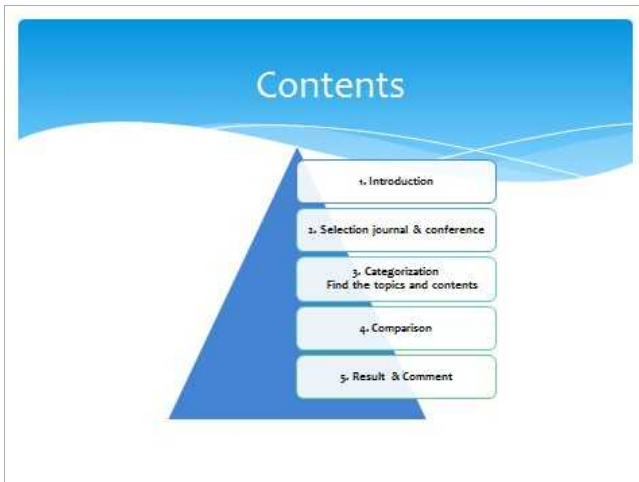
# Study of Future Flow in Arctic Transportation using Big Data

투메자르갈\* · 김원욱\*\* · † 윤대근

\* 목포해양대학교 대학원생, \*\* 한국해양수산연수원 교수, † 목포해양대학교 교수(북극해연구센터장)

**Abstract:** The Arctic transportation offers big opportunities as shorter transport distances, less fuel consumption, less carbon emissions, faster deliveries of goods, and more profits. The present study is aimed to investigate a future flow to deal with policy in arctic transportation using Big data analysis.

**Key words :** Arctic, Transportation, Big data, Future Flow, Policy



**Introduction**

\* Rapid changes are affecting the region's biodiversity and people in many ways, including by increasing access to the region for energy and mineral development, shipping, tourism, and military operations—human activities that may carry both risks and opportunities for the Arctic region.

**2. Journal and Conference in Overseas**

Journal Name	Research papers	Conference	2014/2015
1. Journal of Offshore Mechanics and Arctic Engineering <a href="http://offshoremechanics.asmedigitalcollection.asme.org/ASME">http://offshoremechanics.asmedigitalcollection.asme.org/ASME</a>	<ul style="list-style-type: none"> <li>CC and VIV</li> <li>Marine Technology</li> <li>Offshore Geotechnics</li> <li>Offshore Technology</li> <li>Structures and Safety</li> <li>Drilling</li> </ul>	Arctic Technology Conference	<ul style="list-style-type: none"> <li>Geology and Geophysics</li> <li>Codes and Standards</li> <li>Mesoscale Prediction</li> <li>Arctic Navigation</li> </ul>
2. The Arctic Journal		ACUNS Conference	
3. Polar Research		Polar Research	
4. Forum for Arctic Modeling & Observational Synthesis		Russian Arctic Oil & Gas	
5. Arctic Science		The Arctic Program's Strategic Analysis, called Arctic Commerce, Governance and Policy	<ul style="list-style-type: none"> <li>Arctic states, Arctic international governance, and Norwegian interests</li> <li>Security challenges</li> <li>New Arctic shipping lanes</li> <li>Energy and other natural resources</li> <li>Polar and climate research</li> </ul>
6. USARC, United States Arctic Research Commission		The Arctic Conference Geopolitics of the Arctic Commerce, Governance and Policy.	<a href="http://arctic.usa.gov/research-topical/58-arctic-states-international-governance-and-norwegian-interests">http://arctic.usa.gov/research-topical/58-arctic-states-international-governance-and-norwegian-interests</a>
7. Journal of the Arctic Institute of North America	International study of Arctic Change		

† 교신저자 : 종신회원, dyoon@mmu.ac.kr  
 \* 종신회원, tumee824@yahoo.com  
 \*\* 종신회원, kwo0228@seaman.or.kr

## Categorization in Overseas

	USA	Europe	Asia	Russia
Arctic Environmental Change Goal		Mostly interested in factors and shipping in the Arctic ocean. Emphasized the international cooperation for the Arctic matters.		Fundamentals of the State of the Russian Federation in the Arctic up to 2030 and Beyond
Arctic Human Health		International polar foundation	Japan: Cooperation with Norway and Russia	Development of Gas hydrate, definition of Continental shelf, Utilization of the Northeast Passage
Arctic Natural Resources			The Asia-Pacific Journal: Japan Focus Newsletter No. 26, 2014	
The Arctic "Built Environment"		<a href="http://www.worldpolicy.org/blog/2015/04/04/european-union-arctic">http://www.worldpolicy.org/blog/2015/04/04/european-union-arctic</a>	China: Observance of the UNCLOS. Opposes the excessive expansion of marine sovereignty of Arctic coastal nations.	
Arctic Cultures and Community Resilience				
International Scientific Cooperation				
Emerging Topics in the Arctic				

## The highest level Journal and Conference in Korea

Journal	Conference	Research papers
Ocean and Polar Research (SCOPUS, KCI)	KMI International Seminar  Climate Change: The implication and Strategic Overview for the Arctic Shipping	<ul style="list-style-type: none"> <li>- Environmental changes and perspective on the Arctic ocean</li> <li>- Research direction and future plan on Arctic passage of Japan</li> <li>- Related laws and policy</li> <li>- Condition in ship navigation and shipbuilding technology task</li> <li>- Task and counterstrategy according to arctic changes</li> </ul>

## Arctic Research Plan 2013-2017

- \* There is broad scientific consensus that rapid changes in global climate are altering ice and snow cover and affecting Arctic ecosystems, indigenous societies, and natural resources. Research is needed to increase fundamental understanding of these changes and inform development of sound, science-based solutions.
- \* The Interagency Arctic Research Policy Committee (IARPC) is charged with developing five-year plans for Federally sponsored research in the Arctic region. For 2013 to 2017, the IARPC, which consists of representatives from 14 Federal agencies, departments, and offices, has identified seven research areas that will inform national policy and benefit significantly from close interagency coordination. They are:

- \* Sea ice and marine ecosystems;
- \* Terrestrial ice and ecosystems;
- \* Atmospheric studies of surface heat, energy, and mass balances;
- \* Observing systems;
- \* Regional climate models;
- \* Adaptation tools for sustaining communities; and
- \* Human health.
- \* These research areas do not encompass all Federal Arctic research activities that will occur over the next five years. Many important investigations outside the scope of this plan will continue to be conducted within individual agencies or through other interagency collaborations.

The Arctic Ocean offers shorter transport distances, less fuel consumption, less carbon emissions, faster deliveries of goods, and more profits than what traditional trading routes can provide between ports in the North Pacific and North Atlantic.

- \* Three shipping passages are available to service trade in the Arctic Ocean: the Northeast Passage (NEP) running north of Eurasian continent and connecting the Atlantic to the Pacific Ocean, the Northwest Passage (NWP) passing through the Canadian archipelago between the Bering and Davis Straits, and the Transpolar Passage (TPP) going through the high seas of the Central Arctic Ocean.



## Korea in the Arctic Ocean

- \* Korea should be engaged in activities of the Arctic Council. It needs to strengthen its cooperation with Arctic coastal nations, such as Russia, the US, Canada, Denmark and Norway.

	Topics	Contents
1	Navigation	Developing the commercial routes
2	Education	Establishment of official organization
3	Transportation	Establishing the strategy for developing the Arctic shipping
4	Observance	Fortifying international coordination in the field of R&D
5	Energy Resource	Participation in the development of the Arctic energy resources and establishing the strategy for the management

Russian sources suggest that the rapid development of ice-classed vessels and icebreaking technology can make shipping in these waters feasible in winter from April to May and November to December. If so, the shipping season can be extended up to 9 or 10 months.

- \* Considering navigation conditions, the Norwegian Shipowners' Association ranked the NEP as their preferred passage in the short term, the TPP in the medium term, and the NWP in the long term.
- \* Both Arctic states and non-Arctic states like China, South Korea, Singapore, and India, favor greater economic resource extraction, trading, and shipping in the Arctic. According to experts, destination shipping connected to resource extraction is the type of trade likely to expand the most in the years to come, both for the NEP and NWP.
- \* Arctic Leadership Programme for Executives (ALPEX) to prepare executives for the challenges of the changing Arctic. The program will take place in 2015 and 2016 in Tromsø, Norway and Helsinki, Finland. The overall purpose of ALPEX is to prepare decision makers with "a good understanding of the Arctic System in total and how the different sub-systems, technical, environmental, political, social and legal interact."
- \* Given the tremendous changes impacting the region, the Arctic is entering a new age of human interaction and one with a principally industrial future, both in terms of economic and political priorities.

## Result and Comment

- \* The law has been arranged according to increasing demands and interests about the Arctic. It means that it is necessary to create detailed policy and action points.
- \* Collaboration on business model and strategy through various fields is needed.
- \* It also needs to make a strategy for the mid-long term in order to participate actively to develop energy resources.
- \* Keeping consistent policy and organized laws.