KMI International Journal of Maritime Affairs and Fisheries • Volume 7 Issue 2 December 2015 pp.031-041 •

Possible Business Models Using the NSR: South Korea's Perspective

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ABSTRACT

The new era of Northern Sea Route (NSR) is changing the global logistics environment. In response to this phenomenon, this study explores possible ways for South Korea to use the NSR commercialization. The study highlights trade of wood pellets and promotion of cruise industry as promising two business models which enable to accelerate the NSR commercialization. The findings in this study for removing risks and barriers related to the models can be summarized as follows. First, a closer examination of ports and their related infrastructure along the coasts of the Arctic Ocean is required. Second, target and demand for the logistics infrastructure required should be identified. Third, enormous investments into the construction of ports and related logistics infrastructures are required. Fourth, transport·logistics network should be connected as a whole. Fifth, in order to maximize benefits and profits, business models relevant to NSR require considerable effort for further development. The South Korean government and the local governments should establish strategies by which business models can be utilized more effectively.

Keywords: Northern Sea Route (NSR), Arctic shipping, Business model, Commercialization

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1. Introduction

After experiencing the Cold War between the US and USSR following World War II, the definition of globalization has become widespread throughout the world. The globalization has brought a huge change in the logistics field such as containerization and intermodalism which are the basis for the movements of goods. The globalization has rapidly spread through the transportation revolution and stimulating growth of global trade which has achieved a rapid growth from 1.5 times to global GDP to 3 times. Going through the process of adaptation and proliferation for many decades since the first emergence of containerization, the world maritime container transport network has become reality by spreading it from Europe and US to Asia and the third countries.[1] The remarkable aspect is that the field of maritime transport has grown very fast, handling more than 80% of international trade. Due to the sustainable growth of the international trade by utilizing maritime transport, the functions of ports and the back-up logistics facilities have developed with incredible speed and as the size expands, the spatial structure of port back-up areas of main countries are changing.[2] However, although the port back-up areas network connected to maritime transportation has changed dramatically, maritime transportation connected to ocean has remained the same in terms of its geographic spatial aspect since the 20th century. Since the Atlantic Ocean and the Pacific Ocean have connected by the commercial revolution by discovering the sea routes from Europe to Asia using the route for the Cape of Good Hope which was discovered in 16th century and, by opening of Suez Canal in 19th and Panama Canal in 20th century, no particular changes have been made in the shipping routes.

While not much change has been made in terms of transportation geography, the new commercial revolution has broken out recently in the field of sea transport. Thawing of the ice in the Arctic region due to the global warming has provided the shortcut between Europe and Asia. The emergence of the Northern Sea Route (here in after referred to NSR), bringing a new form of trade between Asia and Europe, makes it possible to bring the center of the world economy to Asia.[3] In this respect, East Asian countries such as South Korea, China and Japan are taking their profound interests in the NSR. Based on this environmental change, it is required to examine the necessary requisites in order to use NSR from the perspectives of East Asian countries.

Therefore, this study explores to find the elements required and actions which are to be taken in order for the East Asian countries to make economical use of the NSR. The research proposes the possibility of commercializing NSR from the perspectives of South Korea to expand the role in Northeast Asia in a new NSR era.

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1) Rodrigue, J.P., Notteboom, T., "Foreland-based regionalization: Integrating intermediate hubs with port hinterlands", Research in Transportation Economics, Volume 27(1), 2010, p. 20.

2) Lee, S.W., Ducruet, C., "A Tale of Asia's world ports: the spatial evolution in global hub port cities", Geoforum Volume 39(1), 2008, p. 163.

3) Lee, S.W., "The Change in the port logistics system in East Asia and the commercialization of the Northern Sea Route", KMI press: Seoul, 2014, p. 77.

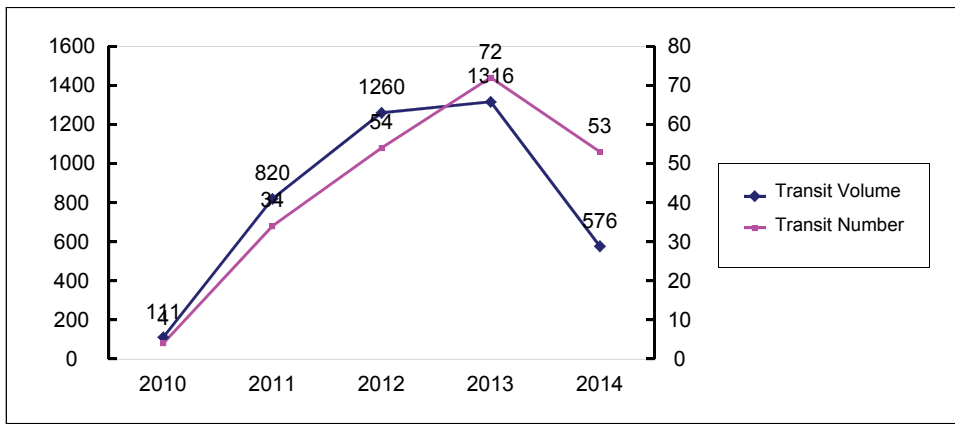
2. Possibility and Challenges of the NSR

The NSR has contributed in changing the map for international logistics of the 21st century and this particular issue is still rising. This is a revolutionary event in logistics since the NSR could reduce more than approximately 10 days or 7,000 km in distance compared to the previously existing route passing the Suez Canal when going to Europe from Asia. Although it varies from case to case, it is reported that approximately 25% of the ocean freight charge could be reduced in terms of expense.[4]

However, many negative opinions exist in using this NSR yet. Concerns on harsh climate condition, unconfirmed maritime information, and poor condition of logistics infrastructure, and environmental destruction in Arctic region are some of the elements that are perceived as obstacles in utilizing the NSR. Despite these concerns, the use of NSR is already in progress as seen in the <Figure 1>. The number of vessel passing through the NSR is increasing rapidly, for example there were 34 transits in 2011, 46 transits in 2012, 72 transits in 2013 in the NSR.[5] However, the fact that Russian government controls the examination of the management system of the NSR and that the country is currently undergoing political sanction due to the Ukraine crisis make it hard for the countries to pass through Russian part of the NSR. Therefore, the number of ships navigating in the NSR seems to reduce, yet, the use of NSR will consistently increase without doubt.

Figure 1. Increasing the number of shipping via the NSR

(Unit: USD thousand, ton)



Source: Arctic Logistics Information Office, "Northern Sea Route Information Office in Centre for High North Logistics", http://www.arctic-lio.com/NSR, each year (Access date: Nov. 10, 2015)

4) Lee, S.W. Song, J.M. & Oh, Y.S., "Shipping & Port Condition Changes and Throughput Prospects with Opening of the Northern Sea Route", KMI press: Seoul, 2011, p. 100.

5) Lee, S.W., "Essential Factors in Commercializing Arctic Shipping", presentation material, KMI press: Seoul, 2013, p. 3.

As shown in <Table 1>, the main objects of cargo using the NSR are mostly liquid cargo such as crude oil, refined oil, gas etc. Moreover, it contains 3 times more cargo from Europe to Asia than that from Asia to Europe. Most of the traffic is done within Russia. However, it is known that the frequency of utilization among East Asian countries figured out to be also very high, showing 9 times transits from both South Korea and China.[6)]

Table 1. Increasing the number of shipping via the NSR, 2012

Cargo Type	No. of Vessels	Cargo Volume(t)	Full displacement	Eastbound Cargo	Westbound Cargo
Liquid	26	894,079	-	661,326	232,753
Bulk	6	359,201	-	262,263	96,938
Frozen Fish	1	8,265	-	-	8,265
Ballast	6	-	472,075	-	-
Repositioning	7	-	78,351	-	-
Total	46	1,261,545	550,426	923,589	337,956

Source: Lee, S.W., "Shipping and Offshore Conference in Huston", Presentation Material, KMI press: Seoul, 2013, p. 7.

In this context, the Russian Government and a South Korean research institute have presented the estimation of the amount of cargo passing through the NSR located in Russia. The Russian Government estimated all the cargoes passing through the NSR until 2030 and forecasted the approximate volume of cargo transported to be 1.2 billion tons. The Korea Maritime Institute analyzed the expense condition of cargo limited to containers by comparing with that of Suez Canal route and predicted the approximate volume of cargo transported to be 12 million TEU by 2030 on the assumption that expense for using the NSR is same as previously existing route.

3. Commercializing Ways through the NSR

3.1 Efforts of the Republic of Korea

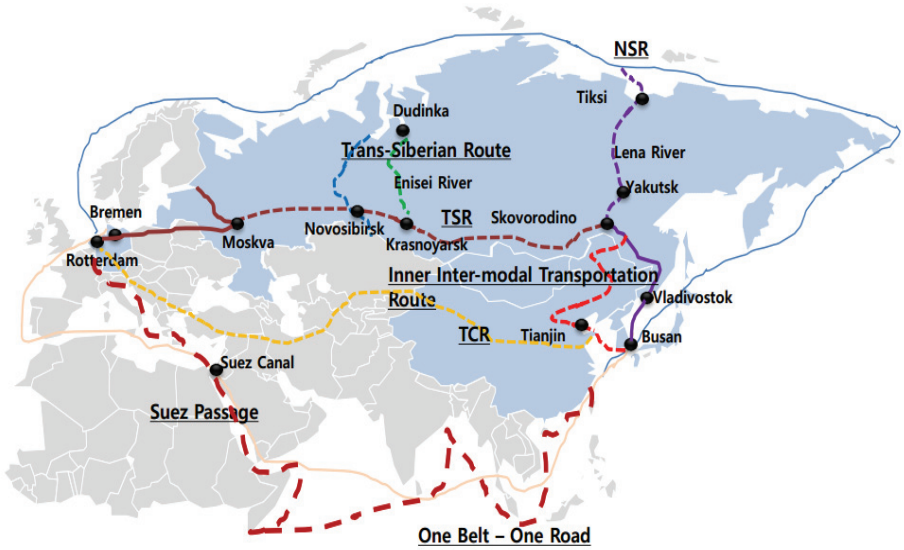
Despite these difficulties, three Northeast Asian countries including China, South Korea and Japan take continually considerable efforts to explore the NSR. In particular, South Korea makes a lot of effort regarding the NSR. Dasan Scientific Research station was established in the Arctic region in 2012 and the first icebreaker named "Araon" was built in 2009 directed by South Korea. Also, active participation of South Korea in the Arctic Council has led the status of South Korea as the permanent observer. Moreover, South Korea has concluded MOU for port development in Asia with Russia and MOU for Shipping and Arctic utilization with Norway. Already, it carried out pilot shipping[7)] of NSR twice by South Korean logistics companies.

6) Rosatomflot, http://www.rosatomflot.ru/index.php?menuid=16, 2014, (Date: 2015.11.11)

7) In October, 2013, a South Korean liner shipping company (H company) successfully operated a pilot service

Since then, various efforts have been made to accelerate the international cooperation for tackling the tasks and issues raised by the commercialization of the NSR. Such efforts have begun at bilateral and multilateral level in the Arctic region including East Eurasia. According to the figure 1 below, both sea and land routes will provide the countries inter-connected transportation. Therefore, development of ports in the Russian Far East and North Korea and the railway project between North and South Korea will be essential and should be preceded beforehand so as to achieve commercializing NSR successfully.

Figure 2. The East Eurasia logistics networks connecting the NSR



Source: Reorganized by KMI based on the Google Map data (Access date: Nov. 12, 2015)

3.2 Two possible business models through the NSR

For achieving the Eurasia logistics networks connecting to NSR as shown in Figure 1, have to develop utilizing business models between the regions and South Korea in terms of cargoes and passengers. In this context, this study proposes some business models based on trade between South Korea and Russia, and the economic potential of East Asia.

through the route for the first time. They transported approximately 40,000 tons of naphtha from Ust-Luga port located in Northern Russia to Gwangyang in South Korea. The shipping total distance transported was 15,970km which include 4,254km of the NSR, taken 35 days. Further, in July 2015, another domestic shipping company (D company) sailed the second trip through the NSR, featuring the first commercial service by way of the NSR. They transported loading/unloading equipment for maritime oil and gas specialized for the polar region from Mussafah in UAE to the coast of Noviy port in the Yamal Peninsula of Russia. Total shipping distance was around 16,700km including about 500km of the NSR.

3.2.1 Wood pellets

Firstly, wood pellets are one of the largest internationally traded solid energy commodities used specifically for energy purposes. The trading volume reaches about 4 million tons – they can be compared to bio-diesel or bio-ethanol. While the handling of wood pellets requires care, advantages over other types of solid biomass such as wood chips or agricultural residues are their storability and relatively easy handling. Wood pellets also have low moisture content and relatively high energy density. And it is economically more feasible to transport wood pellets instead of wood chips above 5,000 nautical miles (9,300 km).[8] It means that wood pellets are economical for long-distance transport. On the other hand, South Korea's imported wood pellets have been increased from 122,447 tons in 2012 to 1,849,641 tons in 2014.[9] Also the demand of wood pellets was expanding because of the execution of RPS system.[10] Finally, those kinds of compressed wood pellets can be used as a new renewable energy. In particular, according to <Table 2>, Russia's exports increased 12 times from 2011 to 2012. The volume of wood pellets, which are exported from Russia, is increasing every year.

Table 2. Import volume of wood pellets in South Korea

(Unit: ton)

Country	2009	2010	2011	2012	2013	2014	2015 (Until Sep.)
Vietnam	638	4,399	7,237	30,296	157,226	742,794	669,993
Canada	1,118	1,440	2,022	2,646	79,795	344,261	77,113
China	8,774	8,084	5,582	3,648	10,220	287,063	3,010
Malaysia	49	3,264	7,626	30,698	78,420	168,336	99,538
Thailand	-	-	23	314	9,315	100,752	21,159
USA	43	327	105	184	32,018	61,944	18,641
Indonesia	723	797	225	8,933	33,534	62,729	34,487
Russia	-	-	3,301	41,731	76,941	34,756	59,222
Australia	-	-	-	-	-	26,751	-
Japan	4	285	2,186	3,546	4,629	4,290	435
all	12,042	20,893	29,678	122,447	484,668	1,849,641	987,993

Source: Korea International Trade Association, http://stat.kita.net/stat/cstat/peri/item/ItemList.screen, 2015 (Access date: Nov. 12, 2015)

There are two business models. One of them is "To-Be Biz model" which is imported by South Korea after wood pellets made in Russia or made in South Korea after materials had imported from Russia. Like this, the domestic demand for wood pellets is growing exponentially and it is possible to import materials from Russia

8) Steiner M., Junginger M., Hiegl W., Sikkema R., Faaij A., Hansen M. T., The European wood pellets markets: current status and prospects for 2020, Society of Chemical Industry and John Wiley & Sons, 2011, p. 251.

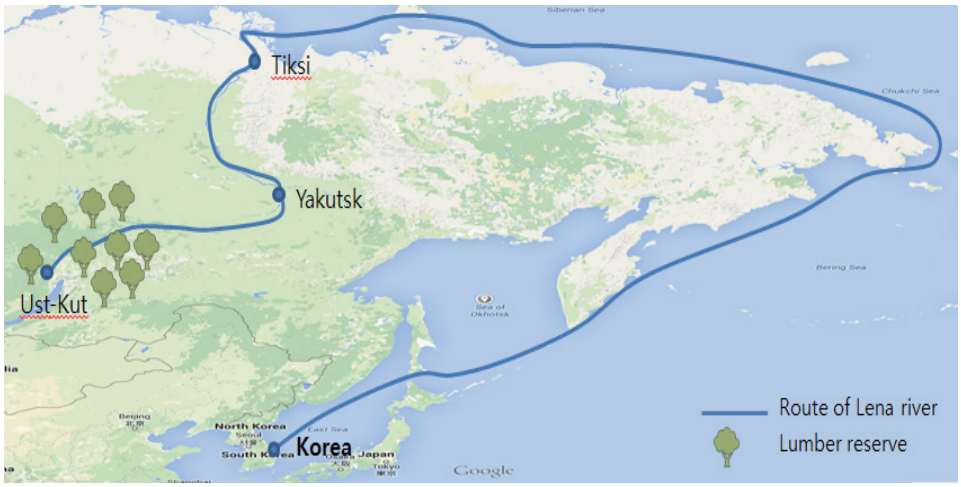
9) Korea International Trade Association, http://stat.kita.net/stat/cstat/peri/item/ItemList.screen, 2015, (Date: 2015.11.12)

10) National Renewable Energy Laboratory, "Renewal Portfolio Standard", http://www.nrel.gov/tech_deployment/state_local_governments/basics_portfolio_standards.html, (Date: 2015.11.10)

along with import from Southeast Asia and North America. As a result, domestically manufactured models can be considered not only complete products made by wood pellets but original materials.

Depicted in <Figure 3>, the wood pellets are passed through Ust-Kut, Yakutsk, Lena River, Bering Sea, Northeast Asia (South Korea, China, Japan), subsequently to the provinces of South Korea. Furthermore, following the improved economic conditions in Northeast Asia, demands to Russia's wood pellets that feature high quality and abundant natural resource are expected to increase gradually.

Figure 3. The transport route for Russia's wood pellets



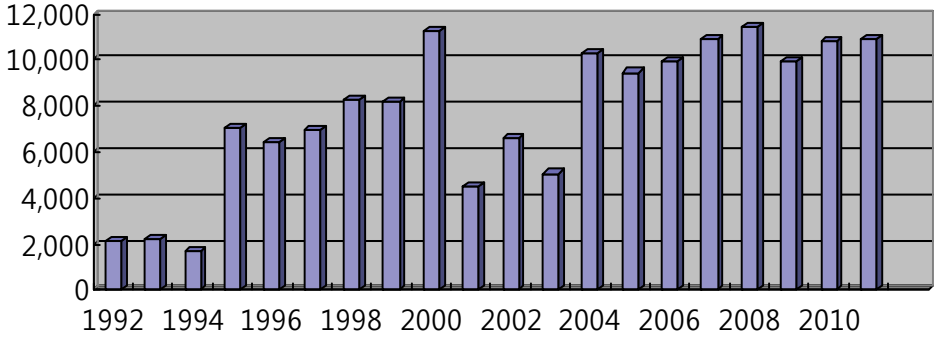
Source: Reorganized by KMI based on the Google Map data (Access date: Nov. 11, 2015)

3.2.2 Cruise

The second one is the business model of cruise route development. From <Figure 4> as below, tourist industry regarding the North Pole and the Arctic Oceans has been increasing constantly since 2000s because of the growth of income and environment-friendly experience tour. In the past 15 years, Arctic marine tourism has been increased approximately 8 times in the North European countries, Canada, and Alaska. The North Pole tourism consists of Alaska Glacier Bay national park, Nunavut territory of Canada, Greenland/Iceland cruise tour and Sweden/Norway/North area of Finland.[11]

11) Arctic Portal, "Sustainable Arctic Tourism", http://portlets.arcticportal.org/tourisminthearctic, 2012, (Date: 2015.11.11)

Figure 4. Arctic visitation, 1992-2010



Source: National Park Service, http://www.nps.gov/ (Access date: Nov. 11, 2015)

In this context, in the provinces which are located in the East Sea, cruise route development plan is pushing forward a business. Geographically, the ports of these provinces are located between northeastern cruise route and the arctic route. If the provinces take advantage of this geographical benefits and the growing arctic market which is developing 16% each year, there are high development possibilities of cruise industry. Therefore, it is necessary to carry forward to making tour programs connecting the arctic route, ports of the provinces, Japan and China and Southeast Asia cruise like a belt by using cruise, aircraft and railroad.

Figure 5. New-cruise route linked with South Korea

Source: Reorganized by KMI based on the Google Map data (Access date: Nov. 11, 2015)

4. Conclusion

In this aspect, a staged approach is urgently needed in order for the East Asian countries and the Arctic States to make the right use of NSR. This study highlights a few of the expected business models which is able to attract cargoes from the commercialization of NSR in terms of South Korea. Overcoming the above-mentioned obstacles has to be preceded before the commercialization of the NSR. Therefore, following measures are to be taken in order to reduce the obstacles.

First, a closer examination of ports and their infrastructure around the Arctic Ocean is required for the commercialization of the NSR. The support of various services and the secured passing of cargoes through the ports are required for the operation of the NSR regardless of liner or steamer. In this regard, the analysis should be made on various information regarding ports surrounding the NSR, and it is necessary to jointly develop main ports and select hub ports by cooperating with neighboring countries.

Second, target and demand for the infrastructure required for NSR should be identified. The ports surrounding NSR are functionally different from general ports. Many special facilities must be equipped in order for the ports to operate in extreme situation.[12)]

Third, a large amount of money will cost in constructing port and logistics infrastructure in the regions affected and seeking for the procurement of the financial aid is required. In order to smoothly promote the relevant businesses and to encourage active participation of the companies from coastal countries and user countries, the governments and the public institutions of the affected countries shall participate in the procurement of the relevant funds. The government-run bank of South Korea, China and Japan and the participation of recently mentioned AIIB[13)] or a new multi-lateral cooperative bank like, so called, Arctic Investment Bank, might be good alternatives.

Fourth, although there is an urgent requirement for securing the ports and logistics infrastructure in order to commercialize the NSR, logistics can be competitive only when it is connected as a whole. Therefore, only under the connection of ports around the Arctic Ocean and the logistics network coming from the Fast East Russia, Northern Mongolia, and Northern China make logistical functions possible to perform.

Last, considering the problems on the international governance amongst respective governments as discussed above, South Korea requires taking considerable pains to develop business models linked with NSR that can maximize benefits and profits of its economy. Particularly, as mentioned above, a business model to import Russia's wood pallets from East-Siberia regions via Far-East Russia, and a business model linking with the polar area-cruise will suggest useful insights for activating

12) Ibid. pp. 137-138.

13) The Asian Infrastructure Investment Bank (AIIB) is an international financial institution proposed by the government of China. The purpose of the multilateral development bank is to provide finance to infrastructure projects in the Asia region; http://en.wikipedia.org/wiki/Asian_Infrastructure_Investment_Bank (Date: 2015.04.24)

ports in South Korea's eastern provinces, in that the models provide the way to attract both cargoes and passengers. Taking these opportunities into account, each province in South Korea needs to take their own efforts to secure a regional logistics hub and invite the relevant industries to port back-up areas and/or free trade zones.

The Korean Peninsula is located at both the starting and the ending point of the Eurasian logistics network connecting NSR, accordingly taking an important role and the possible method at present will be an integration of logistics network in the area. In doing so, both maritime and land logistics networks should be established connecting each other and various enterprises need to extend their businesses in Eurasia and NSR where required.

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