

**Rajin (DPRK) – Khasan (Russia) Railway and Port Study Project:
Preliminary Forecast on Transport Volumes and Shipping Costs at
Pacific End of Tumen Transport Corridor**

Study Report

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Study Report “Rajin (DPRK) – Khasan (Russia) Railway and Port Study Project: Preliminary Forecast on Transport Volumes and Shipping Costs at Pacific End of Tumen Transport Corridor” is prepared by Dr. Hee-Seung NA in accordance with decisions of 13th GTI Consultative Commission and 3rd GTI Transport Board meetings with the financial support from ROK-UNDP Trust Fund.

The Study has been carried out to analyze current situation surrounding the Rajin port development and relating facilities based on 3 individual country reports from China, Mongolia and ROK. The Study results and conclusions provide potential investors with persuasive and comprehensive information and serve as reference and guidelines for members of GTI Transport Board in implementation of the relevant part of the GTI Regional Transport Strategy, in particular finding optimal ways for the development of Pacific ports at the Tumen Transport Corridor.

List of Abbreviations

ADB	– Asian Development Bank
AIIB	– Asian Infrastructure Investment Bank
CCTT	– Coordinating Council on Trans-Siberian Transportation
CFS	– Container Freight Station
DPRK	– Democratic People’s Republic of Korea
EU	– European Union
GDP	– Gross Domestic Product
KRW	– Korean Wong
MOU	– Memorandum of Understanding
NAFTA	– North American Free Trade Area
NEA	– Northeast Asia
PRC	– People’s Republic of China
RMB	– Renminbi
ROK	– Republic of Korea
TEU	– Twenty-foot Equivalent Unit
TKR	– Trans-Korean Railway
TSR	– Trans-Siberian Railway
UN	– United Nations
UNDP	– United Nations Development Programme
UNESCAP	– United Nations Economic and Social Commission for Asia and the Pacific
USD	– US Dollar
WB	– World Bank

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1 INTRODUCTION

1.1 Background of the Study

Rajin (DPRK) and Khasan (Russia) Railway and Ports (Rajin, Zarubino and adjacent ports) are key segment and nodes of the transportation corridor in Northeast Asia and will generate greater trade volume, reduce cargo delivery time and transport costs in regional trade. The reconstruction of the Rajin-Khasan railroad section and renovation of the Rajin Port are the initial parts of a larger project to connect the Trans-Siberian Railway (TSR) and Trans-Korean Railway (TKR). The Rajin - Khasan project promoted by ROK, DPRK and Russia is a pilot project for the TKR - TSR project. As part of this project, a pilot project to transport bituminous coal from the Western Siberia through Rajin Port of DPRK to Pohang in ROK was started on November 23, 2014. 40,500 tons of Russian coal was sent out on the 23rd through Vladivostok and arrived at Rajin Port on the 24th. The coal, which is worth \$4 million, went to through transshipment and customs clearance and then loaded into a 56,000 ton Chinese bulk carrier. It departed from Rajin Port on the 28th and arrived in Pohang on the 29th. Although not a complete railway transportation using TKR - TSR, this is a sea & rail type composite Eurasian logistic transportation. This project holds particular significance as it is promoted jointly by ROK, DPRK and Russia. The logistics and energy network in Eurasian region, as such, will contribute to logistic cost reduction and trade expansion between countries within the region and perform an important role in activating GTR economic zones. Through this investment, extension of Pier 3 and dredging operation were conducted. In addition, modernization of Pier 3 enabled the berthing of 50,000 ton bulk carriers. This project was proposed by a Russian coal company Mechel to POSCO in 2012 and two status surveys were carried out in 2014.

On March 24, 2009, in Ulaanbaatar (Mongolia) at the 10th Consultative Commission Meeting of the Greater Tumen Initiative (GTI), the Rajin-Tumangang Project was approved to be included in the list of GTI priority projects. In August 2013, at the 3rd Transport Board Meeting in Vladivostok, ROK side proposed Study Project titled “Rajin-Khasan Railway and Port Project: Preliminary Economic Analysis of Rajin Port Development Component” to be carried out with the financial support from ROK-UNDP Trust Fund, and Board members approved the proposal. Bearing in mind the key position of the Rajin Port and link to GTI corridor and reflecting opinions and concerns from the GTI Transport Board members, GTI Secretariat has prepared the TOR on Rajin (DPRK) – Khasan (Russia) Railway and Port Study Project: Preliminary Forecast on Transport Volumes and Shipping Costs at Pacific End of Tumen Transport Corridor (hereafter the Study Project). Member countries have provided their approval at the 14th CC Meeting in October 2013.

On 13 June 2014, the GTI Secretariat hosted the Rajin-Khasan Railway & Port Study Project Interim Seminar, with support from the Hunchun City local government in Jilin Province, China. Preliminary research results were presented by national consultants from China, ROK, and Mongolia at the seminar, and based on feedback from the stakeholders, the Study Project will be

extended for an additional four months (November 2014-February) in order to incorporate the most recent forecasts and data into the Final Report.

1.2 Objectives and Scope of the Study

Development objective of the Study Project is to foster economic development of the region by establishing an operational connection between TSR and TKR.

The Study Project aims at:

- contributing to the improvement of overall logistics environment in NEA by modernizing and upgrading railway connections and port facilities in the region;
- strengthening international cooperation and partnership in development of transport infrastructure in the region;
- expecting necessary capacity of the ports in Tumen Delta sub-region;
- development of the ports in commercially viable way among several options (ex: container port or bulk cargo port).

The Study Project will analyze current situation surrounding the Rajin port development and relating facilities, and provide potential investors with persuasive and comprehensive information and data. More specifically, it will:

- collect the necessary data for the traffic forecast in the narrow sub-region with two Pacific branches of Tumen Corridor: Tumen, Hunchun to Rajin, Hunchun to Zarubino;
- forecast the traffic volumes in ports (Rajin, Sonbong, Zarubino);
- estimate the needed capacity in the ports to handle the forecasted freight volumes;
- analyse current railway, road and sea traffic and respective mode capacity usage ratio;
- find most effective financial channels.



(Source: GTI)

Figure 1.1 Geographical position of Rajin Port

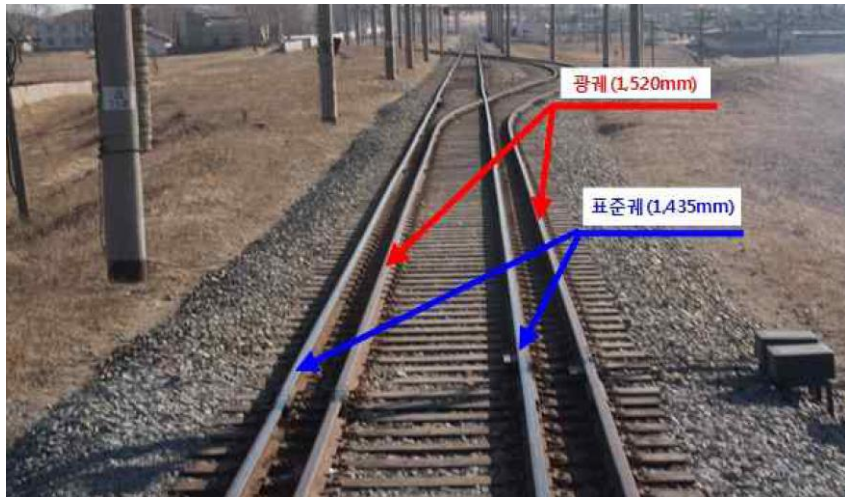


Figure 1.2 Reconstruction of the Rajin-Khasan railroad

2 CURRENT SITUATION SURROUNDING THE RAJIN PORT

Rajin port is a gateway for entry not only to DPRK, but also to the Northeastern part of China and the Pacific region of Russia. Therefore, it is evaluated that Rajin Port has a geopolitical advantage to grow into a hub for Northeast Asia's export/ import cargo handling and for transit trade in the Northeast Asian regions. The project promotion background of Rajin Port is as follows.

2.1 Northeast Asia cooperation

As it is well known, Northeast Asia is a home to the 3 of the world's major powers, 2 of the 5 permanent members of the UN Security Council and 2 of the largest economies of the world. This area of the world includes countries with very diverse political and economic conditions. Thus, the basis of an international economic cooperation framework could be a combination of rich mineral resources of Mongolia and investment capital and advanced technologies from Japan and ROK, as well as a considerable pool of workforce from China (PRC) and DPRK.

A survey (Evaluation Study on the Sea-Land Routes in the Greater Tumen Region, February 2014) shows that between 2000 and 2012, the compound annual GDP growth rate of five Northeast Asian nations (China, Russia, ROK, Japan, and Mongolia) was 4.1%, 1.5 times higher than that of the world (2.6%). There has been steady increase in the share of the five nations in terms of GDP; they took up 17.5% of the global GDP in 2000, 18.2% in 2004, 19.4% in 2008, and 21% in 2012.

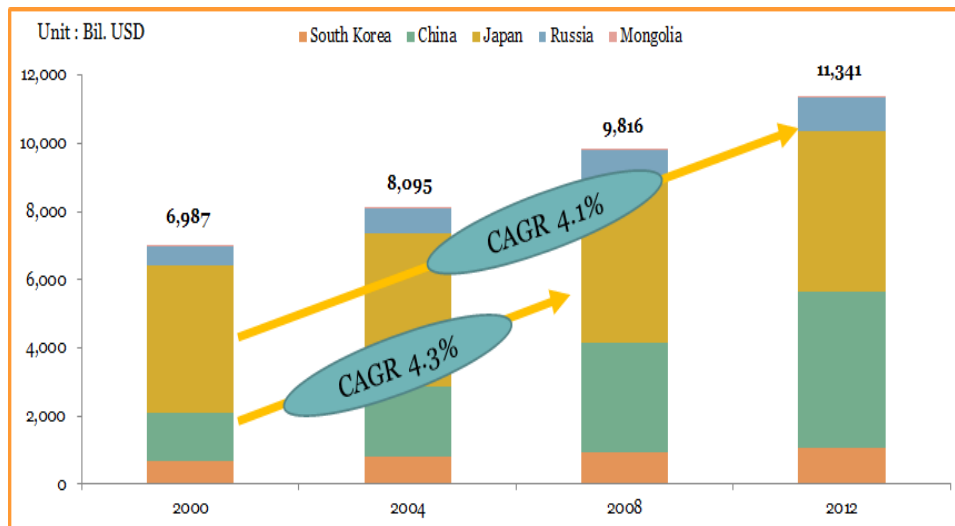


Figure 2.1: Real GDP Levels of NEA

(Source: Global Insight, 2013.7.15)

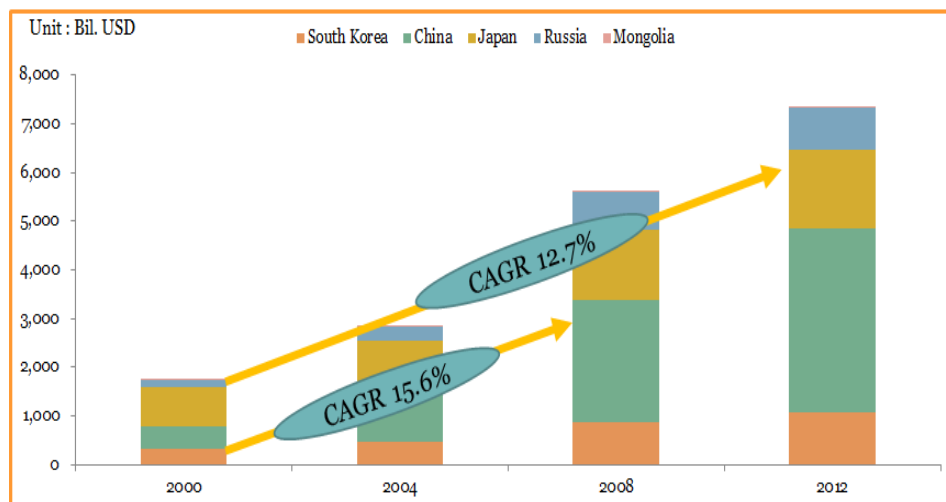


Figure 2.2: Trade Volume of NEA

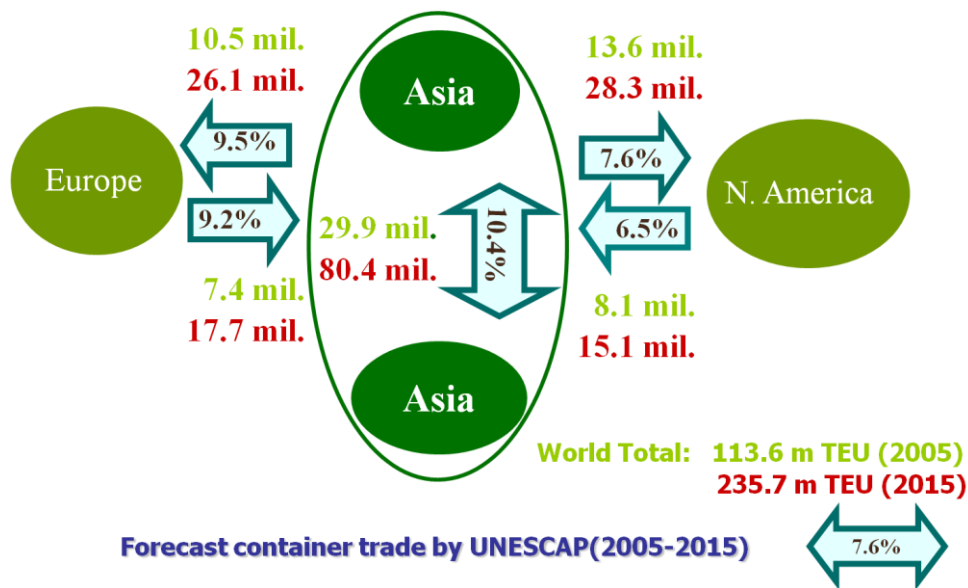
(Source: Global Insight, 2013.7.15)

Between 2000 and 2012, the trade volume of the five Northeast Asian nations showed exponential growth rate of 12.7% on average. There also has been firmly increase in the share of the five nations in terms of the global trade volume; they took up 13.8% of the global trade volume in 2000, 15.8% in 2004, 17.8% in 2008, and 20.5% in 2012.

Northeast Asia is expected to show continuously growth in interregional trade, interdependence, and the volume of the logistics market and is showing great potential for developing into a booming market when the logistics networks are established. And Northeast Asia has huge potential for the sea-land multimodal transport given its complementary economic structure and geopolitical factors.

Northeast Asia is one of the world's three trade zones (EU, NAFTA and Northeast Asia). Recently, freight volume in Northeast Asia has increased rapidly to around 30% the world's total

freight volume. The increase rate of freight volume in Asia is exceeding that of the EU and NAFTA. A report from the UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific) predicts that the world's high value-added container freight volume will more than double in around ten years. In particular, it forecasts that the percentage of freight volume in Asia will be more than 10% of the global volume annually. However, the increased exchange of material and human resources among Asian countries is resulting in the distribution facilities to be continuously in a saturated state. Therefore, it is very important to build transportation and logistics infrastructures of Northeast Asia for the east gate of the Asia as well as integration of the Northeast Asia.



(Source: UNESCAP)

Figure 2.3: Forecast container trade of the world's three trade zones

Rajin (DPRK) and Khasan (Russia) Railway and Port study project is to build a distribution base and a business hub targeting the three Northeastern Provinces in China (Jilin Province, Liaoning Province and Heilongjiang Province) and the Maritime Province in the Far East. It also aims at securing a logistics route connecting ports of the Far East areas and three Northeastern Provinces with Rajin Port and establishing a foundation for entry to the Far East, Northeastern Province and Mongolia.

Business environment in the three Northeastern Provinces is very attractive. From the perspectives of market/ investment conditions as well as policy and geographical aspects, the three Northeastern Provinces have the highest growth potential in China. The economic growth rate of Jilin Province in 2011 is 13.7%. For reference, China's economic growth rate for the same year was 9.2%. In 2010, the three Northeastern Provinces recorded \$579.5 billion in GDP, which is within the world's top 20. Rajin Port is a strategic point located at the border with three countries, China, Russia and DPRK. This is linked with China's Changchun - Jilin - Tumen development plan. When Rajin Port is developed, Rason City is expected to emerge as one of the logistics

hubs for Northeast Asia. Cities along Tumen River and in the border areas have considerably high potential for development into a logistics channel extending to the East Sea and the Pacific via Rajin Port in DPRK.

Consequently, logistics environment around Rajin Port is changing rapidly and the added value of Rajin Port is increasing.

2.2 Standpoint of Northeast Asian Countries for Rajin Port Development

Transport network development issues in Northeast Asia are crucial to establishing integrated relations in the region. Rajin Port is located close to the border of DPRK, China and Russia, and thus forms the apex of a small delta in the Basin of Tumen River together with Hunchun and Zarubino.

China's basic standpoint is that it is active about the Northeastern Provinces - Rajin route establishment for economic development promotion in the three Northeastern Provinces, transport route modernization according to Northeast China promotion strategy. Its importance is growing as a gateway to the Northeastern part of China where there is no port to the East Sea. For trade with the three Northeastern Provinces of China, distribution cost can be reduced when Rajin Port is used.

Russia is most active in TKR - TSR connection and modernization of Rajin port. Russia is developing the various Eurasian transportation routes and improving traffic system using Russian transportation system modernization programs. It is to activate economy in Siberia and the Far East areas and to expand political and economic influence to Northeast Asia

ROK, too, is facing the necessity to actively devise plans for participation in order to strengthen economic cooperation with DPRK and also with Northeast Asian countries and to achieve logistics efficiency within the region. This is a core project for South - North economic cooperation. It is connecting Eurasian railway to the existing terminal in Korean peninsula, saving distribution cost, increasing direct trade, improving international competitiveness, promoting stability in Korean peninsula, recovering national homogeneity

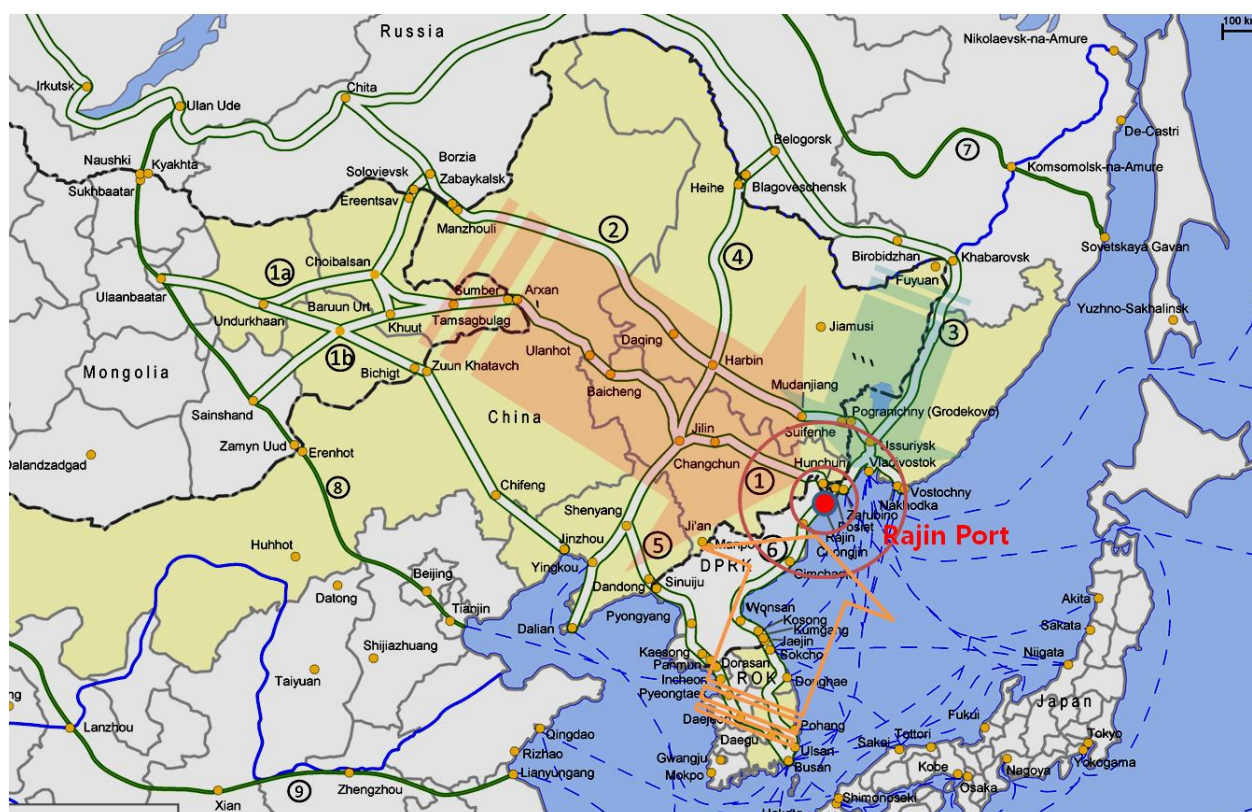
DPRK is anticipating benefits of DPRK Port, Road, railway modernization, increasing transportation earnings, activating DPRK economy. It is to promote economic cooperation with areas in the three Northeastern Provinces and Far East. In view of strategic value at Rason district resulting from the Rajin Port Development project, it would bring about a huge political and economic benefit. Improving existing infrastructure by restoring the transport system and forming the logistics base by constructing the logistics facilities would be able to provide the new driving force to Rason special district as well as create the synergy needed for Rajin development. 'Rajin' is the strategic area in the Northeast Asia which is expected to attract the logistics cooperation among the two Koreas and China and/or Russia. Rajin-Khasan project, among others, has a specific meaning as pilot project before TKR-TSR project, and should the project of Busan-Rajin marine transport with container transport linked to TSR be commercially successful, it would work as positive effect in obtaining positive understanding for TKR-TSR project and modernization of

DPRK's railway network in international community.

Japan is also showing interest in Rajin Port development and operation for expansion of its trade with China and DPRK. This is because Rajin Port can be used as a gateway for trade with the three Northeastern Provinces of China. It is to build an advance base targeting China, Russia, Mongolia and Europe. It is anticipating economic activation in areas adjacent to the East Sea, the backward areas (Niigata, Tottori and Kanajiwa).

Mongolia is to overcome limitations as a land-locked country, to promote economic development. It is to accept advanced technologies and culture. As for Mongolia, which is rich in mineral resources, transportation network has special significance for reducing its isolation in the world and within the own borders. The seventh largest country in Asia, Mongolia is one of the largest landlocked countries in the world. It has a total borderline of 8,162 km, of which 3,485 km is shared with the Russian Federation to the north and the remaining border with China to the east, south and west. Improving transport access to seaports or gateway is one of the key factors to enhancing Mongolia's foreign trade competitiveness.

Therefore, for Rajin Port development and activation, cooperation with not only Northeast Asia, but also other neighboring countries, is considered necessary.



(Source: GTI)

Figure 2.4: Geographical Advantage of Rajin Port

2.3 Analysis and assessment on the status of economic trade amount countries surrounding Rajin and Khasan

2.3.1 Economic conditions in the three Northeastern Provinces of China

The eastern part of Jilin Province shares borders with Russia and the DPRK, with a total length of 1,452 km. Jilin has a total area of 190,000 square kilometers and a total population of 27.49 million. In 2013, the GDP of Jilin Province was 1.29 trillion RMB, and its industrial structure ratio was 11.6 : 52.8 : 35.6. Between 2009 and 2013, the average annual GDP growth rate in Jilin was 12.3%, higher than the national average level, resulting in relatively fast economic growth.

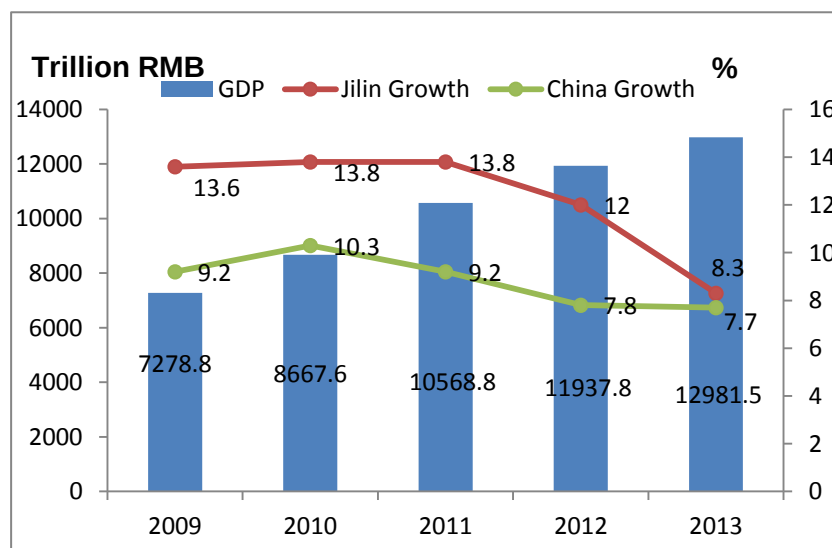


Figure 2.5: Growth of GDP in Jilin Province

In 2013, the GDP of Yanbian Prefecture was 85.030 billion RMB. Between 2009 and 2013, the average annual GDP growth rate in Yanbian Prefecture was 15.2%, higher than the average level of Jilin Province, resulting in relatively fast economic growth.

In 2012, the GDP of Hunchun City was 12.51 billion RMB. Between 2005 and 2012, the average annual GDP growth rate in Hunchun City was 24.6%, much higher than the average level of Yanbian Prefecture, resulting in relatively fast economic growth in Yanbian Prefecture. Being located in the junction of China, Russia, and Korea, it enjoys a strategic location. The growth of Hunchun economy will increase rapidly in the next decade.

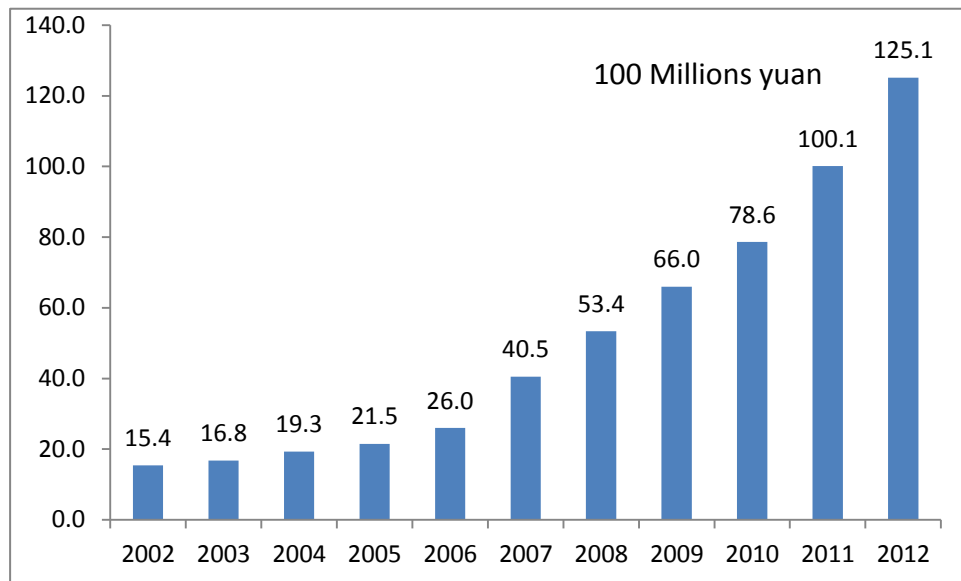


Figure 2.6: Gross Domestic Product in Hunchun from 2002 to 2012

In 2012, the GDP of Tumen City was 3.26 billion RMB. Between 2004 and 2011, the average annual GDP growth rate in Tumen City was 15.1%, slightly lower than the average level of Yanbian Prefecture, resulting in flat economic growth in Yanbian Prefecture. Due to the proximity with DPRK, Tumen City will be an essential strategic supporting to DPRK in international trade in the next decades.

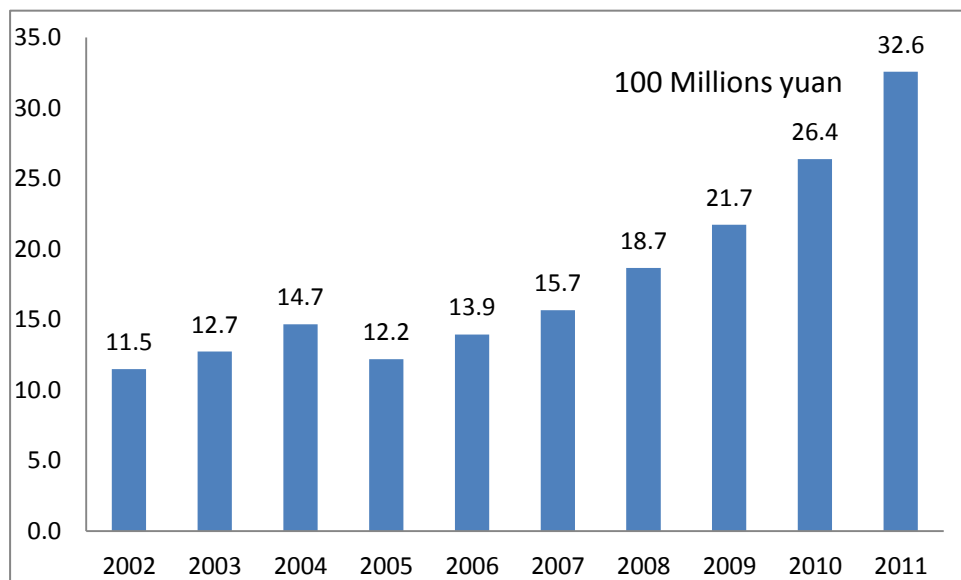


Figure 2.7: Gross Domestic Product in Tumen from 2002 to 2011

(Source: Jilin Statistical Yearbook 2003 ~2012)

In 2013, the GDP of Yanji City was 30.58 billion RMB. Between 2007 and 2013, the average annual GDP growth rate in Yanji City was 15.0%, slightly lower than the average level of Yanbian Prefecture, resulting in flat economic growth in Yanbian Prefecture. Despite that, capital

stock of Yanji economy is the largest in Yanbian Prefecture. Yanji City, as a capital city, will play a key role in the development of Yanbian Prefecture.

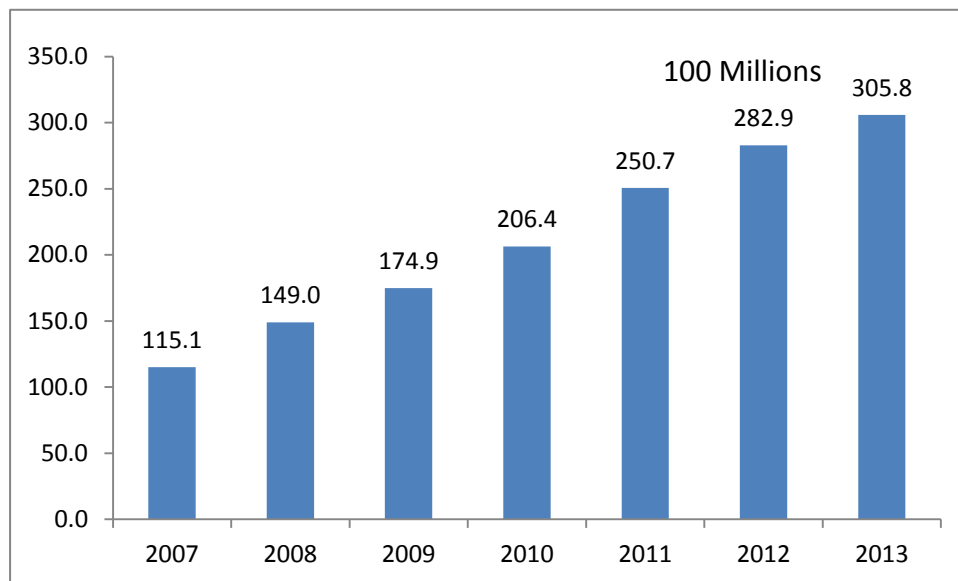


Figure 2.8: Gross Domestic Product in Yanji from 2007 to 2013

(Source: Yanji Economic and Social Development Statistics Bulletin 2007-2013)

2.3.2 The trade potential for resource development in Russia's Siberia and Far East

Abundant resources exist in Russia's eastern Siberia and Far East such as oil, natural gas, metal ore, coal and wood, while Japan, ROK, China mainland and Taiwan, Hong Kong, and Southeast Asia lack of these resources. In recent years, major northeast Asian countries such as Russia, China, Japan and ROK are exploring the possibility of laying pipes in Russia's eastern Siberia and Far East to develop these resources.

Suifenhe port in Heilongjiang province will receive the imported crude oil 1.5 ~ 2 million tons/year from the Northeast China around 2005, and Hunchun railway port can receive 0.5 ~ 1 million tons. Large-scale development of eastern Siberia oil is expected to achieve in 20 to 30 years. It is estimated that in 2020, the volume of oil pipeline from Russian through the Tumen river area will reach 15 million tons, and in addition, 1 million tons of oil will enter into China through the Hunchun port.

Al Dan coal mine is a large iron mine of the Sakha Republic which is located in the eastern part of Russia. The iron ore reserves of Al Dan coal mine are among the biggest in Russia, an estimation of 2 billion tons high grade ore reserves (iron metal reserves about 47%). In the early 1970 s, Russia intended to export 15 million tons of iron ore to Japan, although it didn't come true. If the iron and steel industries in the northeast of China use Russian iron ore, the iron ore logistics between China and Russia will increase sharply in Tumen river area. It is estimated that in 2020, the iron ore logistics between China and Russia in China's northeast area will amount to 10

million tons, and it will reach 2.5 million tons in Tumen river area.

The total forest stock volume of Russia's eastern Siberia and Far East is 51 billion cubic meters, 22.3 billion cubic meters in Far East, among which the mature and over mature forest volume amounts for 13.5 billion cubic meters. In Far East, the yield of wood harvesting is one-third of the wood natural growth. The year growth in Far East can reach 200 million meters, and its potential cutting volume is 60 million cubic meters. The imported logs from Russia by far are less than 10 million cubic meters per year in our country. It is estimated that in 2020, the imported logs from Russia will reach 3 million tons in Tumen river area.

In short, if Russia-China investment and international relations maintain a good situation, Russia will expand the resources output of eastern Siberia and Far East, and the trade flows from Russia are expected to reach 10 ~ 11 million tons in 2020 in Tumen river area.

Table 2.1: The Russian resource Trade goods in Tumen river Areas

Trade Goods	Logistics starting point	Logistics terminal	Trade Port	Current Cargo	Cargo Potential
Oil	Far East Sakhalin region	Northeast China	Hunchun, Suifenhe Port	2~3 million tons per year	15 million tons / year through tube 1 million tons / year Through Hunchun Port
Iron mine	South of the Autonomous Republic of Sakha	Northeast China	Hunchun and Tumen railway Port	—	2.5 million tons /year
Timber	Eastern Siberia and the Far East	Northeast China	Hunchun, Manzhouli and Suifenhe Port	National annual import volume is less than 10 million m3	3 million m3/year through Hunchun Port
Total	Russia	Asia-Pacific	Tumen River Area		10 to 11 million tons / year

2.3.3 The trade potential for resource development in Mongolia

There are abundant mineral resources and oil in eastern Mongolia, 6.4 billion tons of coal reserves in Gobi area alone. The coal reserves of AdunchuLun coal mine in Choibalsan are 400 million tons, but at present, its actual production is only 250,000 tons. Therefore, the scale of mineral trade between Mongolia and China is very small in fact.

If there is a better traffic condition, it is expected to be a large scale development and transportation of all resources from eastern Mongolia in 2020. As the main trade partner of Mongolia is the Asia-Pacific area, 70% of its trade will be through the northeast area of China. As a result, the total China-Mongolia trade volume in Tumen river area is expected to reach 13.5 million tons in 2020.

2.3.4 The trade potential of DPRK

Yanbian prefecture is an important constituent part of the Tumen river area. So generally speaking, there is a highly positive correlation between Yanbian-the northeast Asian countries trade volume and Tumen river area-the northeast Asian countries trade volume. Therefore, this report makes a comparison between Yanbian's total trade with DPRK and with Russia in order to predict its trade status with DPRK.

As shown in figure 2-4, the total volume of Yanbian trade with DPRK and Russia are close to each other in a long period comparison. So the situation will remain the same in 2020 as a prediction. Moreover, Yanbian's trade with Russia accounts for about 50% of the trade between Tumen river area and Russia, while Yanbian's trade with DPRK makes up about 90% of the trade between DPRK and Tumen river area. The calculated result predicts that in 2020, the total volume of Tumen river area's trade with DPRK can reach about half of the trade volume with Russia (5 ~ 6 million tons).

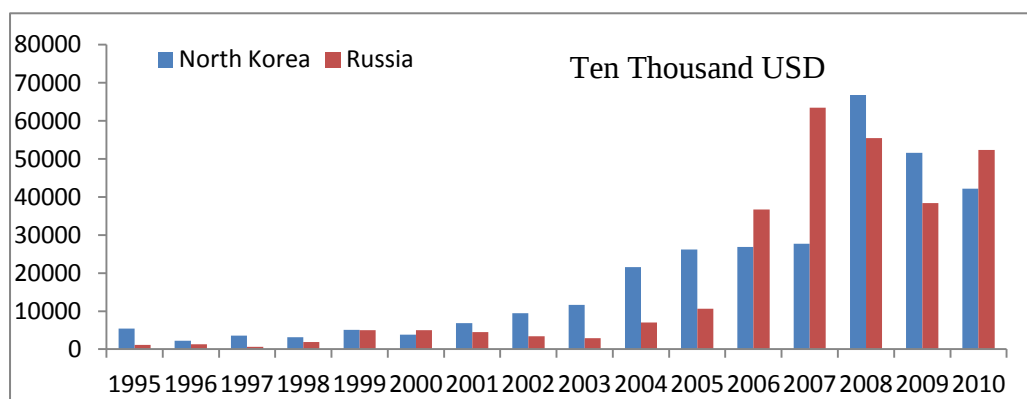


Figure 2.9: Comparison of DPRK and Russian Trade with Yanbian

In 2010, Yanbian's mainly imported products from DPRK are anthracite, minerals, textile fiber, iron ore, seafood and wood. Tumen river area is expected to share a similar imported

commodity structure with that of Yanbian in 2020, because the supplies from DPRK change little in the next 10 years.

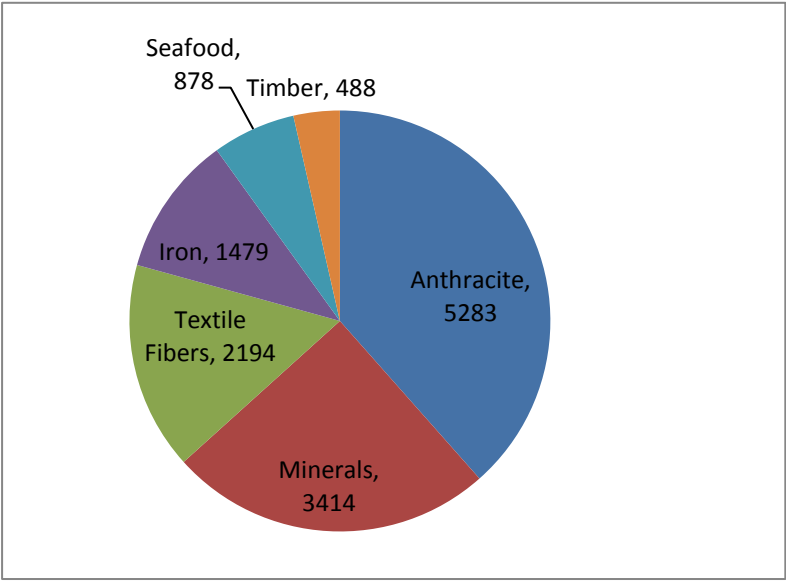


Figure 2.10: Yanbian’s major import commodities from DPRK in 2010
(Source: Yanbian Business Bureau, Chinese Customs statistics)

In 2010, mainly exported products from Yanbian to DPRK are oil, coke, machines, plastic products of electrical equipments, steel and grain. Tumen river area is expected to share a similar exported commodity structure with that of Yanbian in 2020, because of few changes in the trade supply and demand between Tumen river area and DPRK.

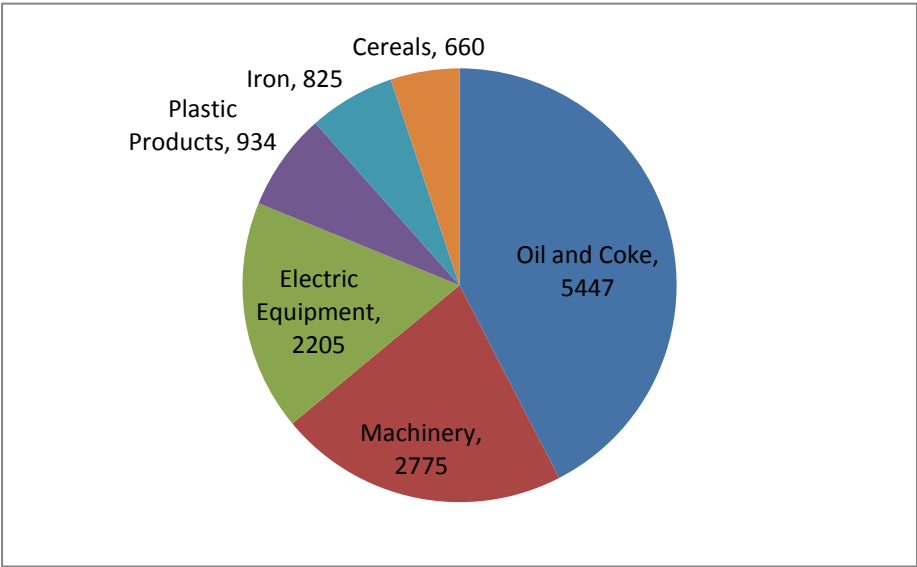


Figure 2.11: Yanbian’s major export commodities to DPRK in 2010
(Source: Yanbian Business Bureau, Chinese Customs statistics)

2.3.5 The trade potential of ROK

In this section, a comparison has been made between Yanbian's trade with ROK and with Russia in order to estimate the total trade volume of Yanbian's trade with ROK. In a long trading period, the total ROK-Yanbian trade volume accounts for a quarter of the total Russia-Yanbian trade volume. Moreover, Yanbian's trade with Russia accounted for about 50% of the trade between Tumen river area and Russia, while Yanbian's trade with ROK makes up about 60% of the trade between ROK and Tumen river area. The calculated result predicts that in 2020, the total volume of Tumen river area's trade with ROK can reach about a quarter of the trade volume with Russia (2~3 million tons).

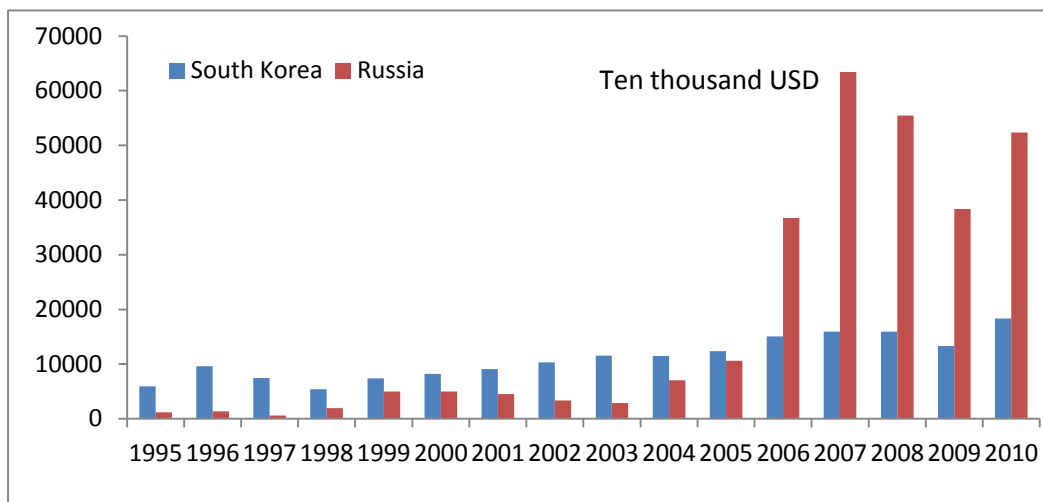


Figure 2.12: Comparison of ROK and Russian Trade with Yanbian

In 2010, mainly exported products from Yanbian to South Korea are iron, steel, chemicals, timber and seafood, while the imported products from ROK are mainly textiles, seafood, equipment, food and chemicals. Tumen river area is expected to share a similar foreign trade commodity structure with that of Yanbian in 2020, because of few changes in the trade supply and demand between Tumen river area and ROK.

Table 2.2: The trade structure between Yanbian Prefecture and Republic of Korea

Trade	Trade Goods	Accounting in 2010	Expected Accounting in 2020
Export	Iron	—	—
	Chemical Products	—	—
	Timber	—	—
	Seafood	28.7%	20%

Import	Textiles	30.3%	30%
	Seafood	23.5%	25%
	Equipment	22.3%	20%
	Food	15.9%	15%
	Chemical Products	8.0%	5%

(Source: Yanbian Business Bureau, Chinese Customs statistics, Jilin Daily)

2.3.6 The trade potential of Japan

In the long trading period, the total Japan-Yanbian trade volume accounts for about a quarter of Russia-Yanbian trade volume. Yanbian-Russia trade volume accounted for about 50% of Tumen river area-Russia trade volume; meanwhile, Yanbian-Japan trade volume is about 65% of that between Tumen river area and Japan. The calculated result shows that the Tumen river area- Japan trade volume is expected to reach about a quarter of the total trade volume with Russia (2 ~ 3 million tons) in 2020.

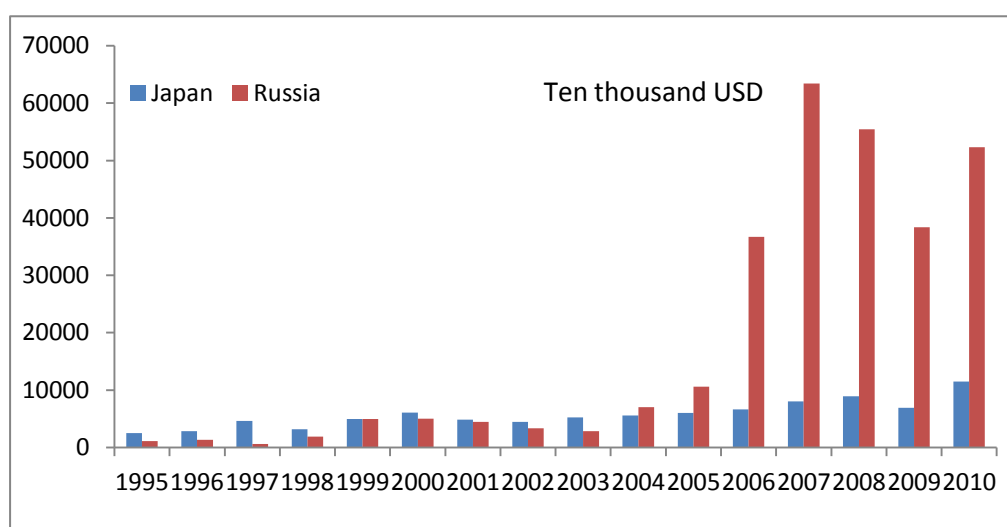


Figure 2.13: Comparison of Japanese and Russian Trade with Yanbian

In 2010, the Yanbian exports to Japan are mostly mechanical and electronic products, textiles and raw materials, furniture and toys, while the imports from Japan are mostly mechanical and electronic products, base metals and their products, and transportation equipments. It is estimated to share the similar import and export commodity structure in 2020.

Table 2.3: The trade structure between Yanbian Prefecture and Japan

Trade	Trade Goods	Accounting in 2010	Expected Accounting in 2020
Import	Mechanics and Electrics	36.8%	35%
	Base metals and Products	2.9%	4%
	Transportation Equipment	38.2%	40%
Export	Mechanics and Electrics	46.6%	50%
	Textiles and Raw Materials	22.4%	25%
	Furnishing	6.2%	4%
	Toy	6.2%	4%

(Source: Yanbian Business Bureau, 2010 Trade Report of China Commerce Ministry)

2.4 Overview of Port

2.4.1 Overview of Rajin Port

The area of Rajin port is approx. 5km², coastline is 44.5km, width of the entrance to bay is 5.6km and maximum water depth is 36.5m. It is opened to the south from Rason. Small streams, such as Songnim Stream, flows to the bay. Daecho Island and Socho Island located across the entrance to the bay function as a natural breakwater. Within the bay, there are other smaller bays, such as Yujin Bay and Bangjin Bay. The coastline is relatively simpler. Rajin Port is a nonfreezing port located at the northernmost end of Korea peninsula. It started growing rapidly as harbor work began in 1932.

Rajin Port is a the Northeastern terminal of a railway route between DPRK and China. It functions as one of the key ports connecting cargoes transported from Harbin towards Tumen to international trade. In particular, Rajin Port is mainly used for the handling of marine cargoes between Korea and the three Northeastern Provinces of China.

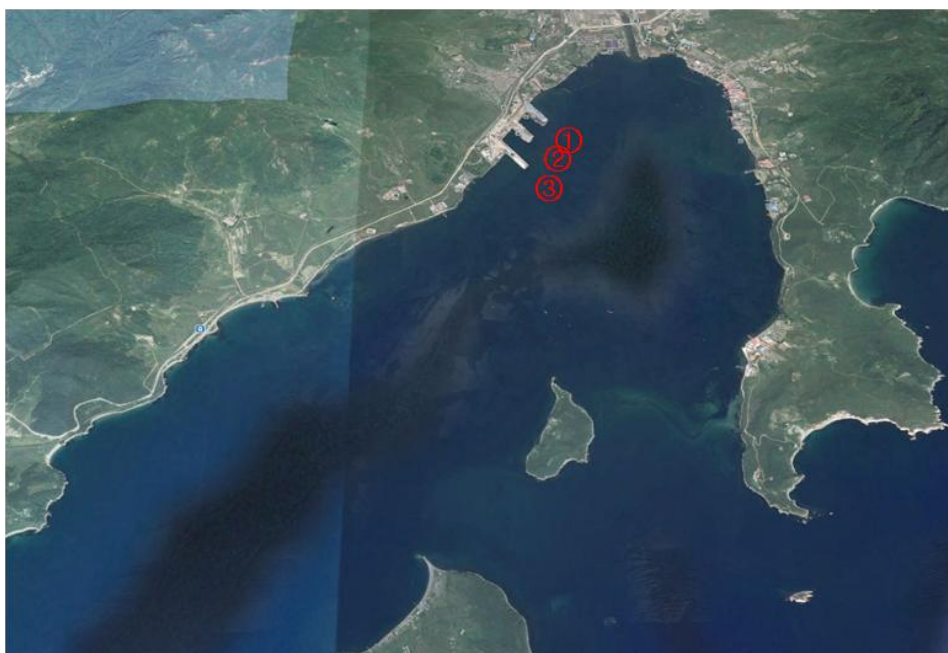
At present, Rajin Port has 15 berths with 5,000 - 10,000 ton capacities in three Piers. The total quay extension measures as long as 2,448m. The maximum water depth in front of the Piers is 11m, which is enough for the berthing of 10,000 ton level ships. The annual cargo handling capacity of Rajin Port is estimated to be around 3Mil tons.

(Source: Internal data of Korea Maritime Institute).

Pier 1 is a bulk terminal. With a standard gauge railway extending to the Pier, this Pier is suitable for handling grains, chemical fertilizers and coal. There are three storages in this Pier. The storage areas are 8,100m², 5,400m² and 3,100m² respectively. In addition, an open-air storage measuring approximately 165,000m² is available.

Pier 2 is a container terminal. A 30 ton crane is installed for container cargo handling and an open-air container storage measuring approx. 33,000m² is secured. The annual container handling capacity as of present is around 7,000TEU.

Pier 3 is a multi-purpose terminal. A plan for remodeling into a coal terminal is being promoted. A storage measuring 3,100m³ in volume and an open-air storage of approx. 99,000m² are located.



(Source: Google)

Figure 2.14: Pier 1, 2, 3 of Rajin Port

Classification	Details
Wharf extension	2,448(m)
Simultaneous berthing capacity (berths count)	15 ships
Key equipments	5 - 15 ton crane
Berthing capacity	20,000 GT
Max. water depth	11m
Annual handling capacity	3 million tons
Main cargoes handled	Coal, fertilizers, hardwood and miscellaneous goods

Table 2.4: Current Status of Rajin Port

2.4.2 Overview of Marine Transportation in the Far East Russia

Ports in the Far East Russia include Vladivostok Port, Nakhodka Port, Vostochny Port, Slavyanka Port, Posyet Port and Zarubino Port. These ports are connected with TSR and have linked networks with DPRK or China. Vostochny Port handles the largest freight volume. Its annual freight handling volume is as large as 38 million tons. Nakhodka Port and Vladivostok Port also handle approximately 15 million tons and 12 million tons of freight a year respectively.

2.4.3 Overview of Zarubino Port

Located near the border between China and DPRK, Zarubino Port is an ice-free port. It is approximately 104km (around four hours) away from Vladivostok via sea route and 60km from Hunchun via overland route.

Russia's largest port operating company Summa Group and Chinese companies agreed to build Zarubino Port with an annual freight handling volume of 60 million tons.

Currently, Zarubino Port is handling approximately 750,000 tons of freight a year and is mainly processing timber, metal, food, frozen fishery products and Mazda cars. The cargoes can be transported to the nearby Sukhanovka Station by train. In case of Mazda cars, they are imported from Japan and transported to Moscow by train.

Zarubino Port has a total of four berths and the extension is 650m. The maximum vessel size for berthing is 15,000 tons, and thus large-scale ships cannot be berthed at the port. This port also has a storage terminal for small-sized trucks and heavy machinery, an automobile storage center and a food storage measuring 5,000m². In 2012, General Grains Corporation and Dalport jointly planned a large-scale grain terminal in Zarubino Port and invested approximately KRW 280 billion. Once the grain terminal is completed, 10 million tons of grains and other agricultural products will be handled in this port.

The freight volume in Zarubino Port is the smallest of all ports in the Far East Russia and has been decreasing continuously since 2006. In 2012, Zarubino Port recorded only 120,000 tons of freight handling.

2.4.4 Overview of Hunchun Port (BCPs in Tumen Transport Corridor)

Hunchun Road Port is 14 km away from the urban area of Hunchun and 8 km away from the Hunchun Border Economic Cooperation Zone. With an area of 48000 square meters, it is the only land port open to Russia in Jilin. The annual cargo capacity of the inspection building at the port is designed to be 600,000 tons.

Hunchun railway port is 28.3 km (8 km inside the border and 20.3 kilometers outside the border) away from Russian Kamyshevaya railway port, Kamyshevaya railway port is 12 km away from Mahalino railway port, and its cargo reloading and inspecting capacity is 800,000 tons in the

initial stage, and 2.5 million tons in the middle stage. But presently, the railway line runs intermittently, and its cargo capacity only reaches 52,000 tons.



Figure 2.15: Photograph of Hunchun Port

2.4.5 Overview of Tumen Port (BCPs in Tumen Transport Corridor)

Tumen Port, consisting of road port and railway port, is an international passenger and cargo transportation port, and the second largest land port in China to DPRK. Opposite the port is Nanyang Port of DPRK, 177 km away from Chongjin of DPRK, with an annual cargo capacity of 5.6 million tons. The cargo capacity of the port has reached 200,000 tons now. In 2012, import and export cargo volume of Tumen railway port was 84,800 tons.



Figure 2.16: Photograph of Tumen Port

2.5 Overview of Corridors surrounding the Rajin Port

There are four key logistic transportation routes surrounding the Rajin Port.

First is Rajin-Khasan route. The Rajin - Khasan project, when it was started in 2006, was aimed at a container port development. The project model has since been changed to a coal bulk carrier port. In the initial phase of the project, Korea was asked to take over 40% of Russia's equity. However, Russia is requesting acquisition by up to 49% of shares at the moment. For reference, the overview of Rajin - Khasan railway repair work announced by Russian in the initial phase is as follows: The objective of this project is to build a new railway with an extension of 54km and to repair ten railway stations, three tunnels, more than 40 bridges and other facilities. A joint venture established by Korean State Railway of DPRK and Russian Railways supervises the implementation of this project. As for train passage in the Tumen River and Rajin section and freight volume, it is aimed at the round trip by 12 trains a day and processing of 4 million tons of freights per year respectively. In the future, Russian Railways will induce container transit cargoes from the Asia - Pacific region to TSR through Rajin Port.

In particular, the biggest goal is to induce 100,000 TEU of freight from Korea annually to TSR. The new container terminal is designed to accommodate 400,000 TEU of freight per year. However, it is forecast of expansion up to 700,000 TEU in the future. The Rajin - Khasan section, especially, is a composite track section where both the standard and broad gauge tracks are installed. Therefore, transportation with broad gauge train is possible immediately from Rajin Port without transshipment or transfer at the DPRK and Russian borders. Accordingly, the time of passing through the borders and the related procedures are reduced drastically. This year, for the port opening, DPRK and Russia discussed simplification of the procedures of passing through borders and also the port globalization. In addition, Russia exported Russian coal to the southeastern part of China through Rajin Port. This pilot transportation project holds significance in establishing the environment for advanced logistic service as such. For the full-on operation of Rajin Port, final inspection will be carried out in each stage, such as from Rajin - Khasan train operation to customs clearance and cargo handling.

Second is Hunchun – Rajin – Shanghai route. Opened in January 2011, this route was used to transport coal from the northeastern district of China to Shanghai. Since 2014, it has been used to transport foods, timber and cooper other than coal through product diversification. In the past, transport only from Yanbian to southern areas was allowed. However, in 2014, transporting goods back from southern areas to Yanbian was permitted, and thus transportation in both directions is possible. As a result, efficient transportation of freight in the northeastern district and the southern parts of China is now possible. Accordingly, freight volume to be handled by Rajin Port is forecast to increase drastically.

Third is Hunchun – Zarubino – Sokcho route. Opened in April 2004, this route was suspended of usage in October 2010. It was then reopened on March 19, 2013. However, as Korea's vessel inspection and customs clearance became stricter, it was agreed to temporarily close the route on June 27, 2014. This route is used to transport approximately 1,530 tons of

freight and is playing a key role in trade and tourism business between Yanbian and Korea. Yanbian government is striving to resume the route operation again.

Fourth is Hunchun – Russia – Niigata of Japan route. Opened in August 2012, this route is currently being used by only six marine transportation companies as the freight volume is small.

3 FUTURE DEVELOPMENT POTENTIAL

3.1 Review of On-going Project

The major development plans of the connecting areas expected to affect the use demand of Rajin Port are the development plan of the Chang-Ji-Tu development pilot zone of China, development plan of Rason Economic and Trade Zone of DPRK, Rajin-Khasan Project, Trans Korean Railway Project and Railway and Road development in Eastern Mongolia to the Tumen Delta Region.

3.1.1 Development of Rason Economic Trade Zone and Rajin Port in DPRK

The Rason area development has been continuously mentioned from 1990, but has not produced a particular result yet. However, the development project has been emphasized once again from 2010. DPRK has promoted active foreign capital attraction and open door policy to develop Rason city from early 1990, however, the attempt is evaluated as having limit without producing a noticeable result. The main factors for limit were pointed out as restriction on entry by foreigners, insufficient infrastructure, excessive development plans, closed measures based on concern of opening markets and limitation of entry of ROK companies.

Table 3.1: Rason Free Economic and Trade Zone Development Process

Period	Contents
1991	Designated as 'Rajin-Seonbong Free Economic Trade Zone'
1993	Established 'Rajin-Seonbong area total territory construction plan'(3 phases) - Phase1 (1993~1995): Attract foreign capital for industrial complex construction and infrastructure expansion, such as roads, railways, and ports - Phase 2 (1995~2000): Strengthen role as an international freight base and attract investments in export-oriented manufacturing business - Phase 3 (2001-2010): Make a base city for international exchange (transit trade, export processing, tourism and financial function)

1993.9	Reorganized into 'Rajin-Seonbong directly controlled city'
1995	Modified general national territory construction plan in 1995 - Present Phase (1993~2000): Construct a transit base for international freight and export processing base - Future Phase (2001~2010): Construct a base city for international exchange Drastically alleviated foreign investment restrictions and constructed infrastructure - Improved legal and systematic investment environment (customs regulations, building transfer regulations, and security regulations etc.) - Opened passage between Wonjeong-Hunchun(China) and sea container route between Rajin and Busan - Newly constructed roads between Wonjeong and Seonbong, and paved road between Wonjeong and Rajin
1996.9	Held investment forum for Rajin and Seonbong (540 people from 110 companies from 26 nations participated) - Formed investment contracts in the amount of USD 350billion for 49 cases
1997.6	Strengthened system improvement to form investment environment - Took measures to actualize exchange rate, abolished foreign currency use restrictions, and implemented floating exchange rates - Opened an international free market at Weonjeong-ri, and allowed private businesses to operate within the free economic trade zone - Implemented an independent property system for state-owned companies
2001.5	Integrated administrative area as Rajin-Seonbong directly controlled city
2005.7	Agreed development of Rajin port between DPRK and China (MOU formed for road construction between Rajin and Weonjeong) Established Rason International Logistics Joint Corporation between DPRK and China
2008.3~4	Consulted repair of Rajin port and modernization of Rajin-Khasan (Russia) railway
2009.11	Acquisition by China of development right for 1 Pier of Rajin port
2010.1.4.	Elevated city status as Rason special city
2010.1.27.	Revised Rajin-Seonbong labor zone laws

(Source: Internal data of Korea Research Institute for Human Settlements)

Preferential Treatment for Foreign Investment Induction for Rajin Development is as following. DPRK, like other developing countries, is introducing incentive system to attract direct foreign capital investments.

One of the key contents of this system is preferential corporate income tax reduction. In

other words, according to tax laws concerning foreign invested companies and foreigners in the Democratic People's Republic of Korea, "income tax rate for companies in resource development for advanced technological fields and scientific research and technology development in substructure construction fields encouraged by the country is prescribed as 10%."

Moreover, DPRK is implementing a tariff exception system. Tariffs are exempted on items necessary for corporate activities, such as facilities, materials and parts for road construction as well as office and home supplies for engineers dispatched by foreign invested companies.

DPRK announced the ordinance of the DPRK Supreme People's Assembly of "having Rason City as a special city" on January 4th, 2010, and at the same time, revised the 'Rason Economic Trade District Act,' which is the law relating to the opening and development of Rajin-Seonbong area on the 27th. After being designated as Rajin-Seonbong Free Economic Trade Zone in 1991, the place was elevated into Rason directly controlled city by combining Rajin and Seonbong in 2001, the place was renamed to Rason special city in 2004, and was announced as a special city in 2010. The main contents of the Rason Economic Trade District Act is stated as emphasis on investment and tourism sector and allowance of economic trade activities within the site by compatriots (ROK) residing overseas.

The core of DPRK's Rason area development strategy mentioned in 2010 is in the connection with the three northeast provinces of China. In particular, an industrial logistics site plan in connection with China's strategy to utilize Rajin port is being promoted. DPRK is promoting a policy of developing Rason city as an advanced base of foreign trade by actively attracting capital and infrastructure investment.

3.1.2 Chang-Ji-Tu Pilot Zone Development Plan in China

The objective is to construct a logistics base in the northeast and a new industrial and agricultural base of northeast China through the special areas of Changchun-Jilin-Tumen.

The northeast area, which was excluded from development after the reformation and open-door policy of China in 1978, has started its development as one of the four major economic zones, along with the pre-existing three major economic zones, which are Chu Chiang Delta, Changjiang Delta, and Beijing-Tianjin. The Central Committee of the Communist Party of China submitted an "Opinion on Implementing Promotional Strategies on the Old Industrial Bases of the Northeast etc." in 2003.

The northeast promotion plan promotes the four development plans, which are "Liaoning coastal waters economic belt," 'Shenyang economic zone,' Hadachi industrial corridors,' and 'Chang-Ji-Tu economic zone,' as the core development strategies. The Chang-Ji-Tu development plan, which started in full-scale in 2007, is a wide-area based plan seeking to develop Hunchun as a core open base and to enable Changchun and Jilin to support the base.

The Chang-Ji-Tu Development Plan started to be implemented since Prime Minister Hu Jintao visited Jilin Province in January 2007 and stated that, "We must lead the development of Jilin Province by strengthening and leading science technology and reformation and having an

open-door policy by selecting an area equipped with the conditions for promotion of an old industrial base.” The State Council of China ratified “Joint Development Plan Outline for China’s Tumen River Area for Chang-Ji-Tu Development Pilot Zone” as a national strategy in August 2009.

【Plan Outline】

The plan scope covers a total area width of 73,200km², which is 39.1% of the entire area width of Jilin Province and 40.7% of the population, and China is planning to invest up to 2020.

① Changchun~Hunchun Expressway (480km)

② Chang-Ji-Tu Development Pilot Zone(Changchun-Jilin-Tumen etc.)

- Development area width: 30,000m²
- Passed ratification by the State Council in August 2009
- Cultivation of northeast logistics base by using the Hunchun-Rajin passage

③ Hunchun~Rajin Road (planned to be constructed in a length of 93km.)

【Developmental Direction】

The objective is to expand investment attraction and open doors internationally by combining factors, such as the geographical position of Hunchun, border area advantageous, and the business and technical superiority possessed by Changchun and Jilin as metropolitan cities.

【Development Contents】

The contents of the pilot zone development can be summarized as the following four.

First, as a core matter, the internal construction of the Chang-Ji-Tu pilot zone development includes environmental reservoir, base facilities, industrial development, and space arrangement.

Second, interlocked development plans with other areas of China (other areas of Jilin Province, Heilongjiang, Liaoning, Inner Mongolia etc.) are being considered.

Third, a clear context has been proposed, along with participation in the Tumen River Area Development Programme (TRADP) including the ‘International Golden Route Construction’ plan.

Fourth, establishment of collaborative policies between each Province and specialized divisions in charge and relevant financial support for acceleration of the construction of the Chang-Ji-Tu pilot zone has been set forth.

【Detailed Plan】

The objective is to construct the four major base areas (Jilin Province open door policy pilot zone, Tumen river area cooperative development pilot zone, Jilin Province development locomotive, and Northeast area cooperative core zone) and eight industrial bases (construction of eight new major industrial bases, such as for vehicles, petro-chemistry, agricultural processing, electronic information, alloy construction materials, equipment manufacturing, bio, and new materials).

The core base of Chang-Ji-Tu development pilot zone is Hunchun. Development will be planned centering on Hunchun, so that Changchun and Jilin city may support Hunchun, and Hunchun will likely perform an important role as a logistics base of northeast China. Hunchun city with a population of 250,000, is located in a 15km distance from the East Sea, and has a geographical position in which ten ports of Russia and DPRK are concentrated within a 200km radius. Hunchun will receive subsidy of approximately RMB 10billion (approximately KRW180billion) from the central government until 2016, the northeast border trade center started construction in August 2009, and a foreigner-exclusive industrial complex will be formed.

Various infrastructures are being constructed in connection to utilize Rajin port of DPRK as a new outbound route, as an extension of the plan of integrating the ground, sea, and zones of China. Chang-Ji-Tu development plan has its core in procuring an exit from the East Sea side, thus, is located on an extension of the 'Ground, Sea, and Zone Integration' plan of China. It is a development plan conducted to integrate the roads, port, export processing, and bonded logistics area included in the Rajin-Seonbong of DPRK and Hunchun of China, along with the 'Ground, Port, and Zone Integration' project.

- Road: The old road in the length of 48km from Weonjeong to Rajin of DPRK is completed to be repaired and constructed to qualify as China's standard.
- Port: The 4 pier of Rajin port will be newly constructed.
- Zone: A logistics circle integrated with the functions of business service, bonded warehousing, and export processing will be constructed near Rajin port.

A result of analyzing the overall Chang-Ji-Tu development and opening plan shows that China will be constructing an economic cooperation system with Russia and DPRK, and that efforts will be needed to expand the traffic infrastructure to develop the Tumen river area. Additionally procuring a nearby 'sea trade route with DPRK and Russia' from the previously used 'ground-focused logistics transportation system' implicates the intent to construct an ultra-border special cooperative zone. The plans to expand transportation infrastructure, such as 'Ground, Sea, and Zone Integration' or the Hunchun Development Plan and 'International Golden Route Construction' of Chang-Ji-Tu development plan reflects such intent.

A change in the freight route of the three northeast provinces of China is expected to occur when connecting the Chang-Ji-Tu Development Area to Rajin port, and a new connection to Busan Port seems available.

The key contents of China's Rajin Port development project implementation, which was officially mentioned in November 2003, are to expand Pier 3 in Rajin Port by connecting Hunchun of China with Rajin through a road and to transport export/ import cargoes between DPRK and China through Rajin Port by developing Pier 4. The scope of this project also includes the development of a general distribution complex, which functions as an export processing yard, a bonded warehouse and a business facility, in the hinterland area of Rajin Port. The official title of the project is 'Hunchun - Rajin road, port and distribution complex integration project.' China's Rajin Port development project is being promoted in two stages. The first stage is to expand and maintain a 48km road from Wonjeong and Rajin Port, to develop auxiliary facilities along the road, to expand Pier 3 in Rajin Port and to develop a 1.3 million m² port hinterland complex. The second stage is to operate a ferry ship, to build an inland transportation facility for containers from Rajin Port and to promote Pier 4 development. For this, the so-called 'Green Path' for prompt customs clearance service 24 hours a day between China and DPRK was opened in February 2006, and thus the efficiency of customer formalities has been improved.

3.1.3 On-going pilot project of Rajin Port ; Rajin-Khasan Project

The recently promoted Rajin-Khasan project between ROK, DPRK, and Russia is highly likely to achieve commercial success, and has significant meaning as a demonstration business of the TKR-TSR project, modernization of Rajin Port, Development of Rason Economic Trade Zone. The Rajin-Khasan project is a logistics business connecting the Rajin port and Trans-Siberian railway (TSR) through procuring freight trains, constructing freight terminals, and renovating railways (54km) from the third dock of Rajin port to Khasan. This business is a Eurasian international complex logistics transportation business in both the sea and rail type, being a 'logistic transportation via TSR after sea transportation between Busan/East Sea port-Rajin,' and shows extremely high likelihood of commercial success.

By procuring strategic value of the Rason area pursuant to performing the Rajin-Khasan project, this business will have huge political and economic effect.

The Rajin-Khasan project was initially designed to transport container, however, the plan has been modified to handle coals and bulk freights. In particular this sector uses a complex gauge, where a standard gauge and broad gauge has been simultaneously built in, thus, directly transporting to a broad gauge train at the DPRK and Russian border is available without transshipping or transfer, after departing from Rajin port. This complex gauge shows the advantage of drastically reducing the border pass through time and procedures. DPRK and Russia are currently undergoing discussions to simplify border pass through procedures and port internationalization to open a port. Russia recently exported Russian-produced coal into the southeast area of China through Rajin port. It seems as though each stage of train operation,

customs, and cargo handling between Rajin and Khasan was ultimately examined for the full-scale operation of the Rajin port. The Rajin-Khasan project between ROK, DPRK, and Russia started from 2006, however, participation by ROK was uncertain for five years or more due to the infracted relationship between ROK and DPRK. The construction began by the collaborative business between DPRK and Russia, and the Rajin-Khasan railway opened after going through trial tests. However, Mechel, a coal company in Russia, proposed this project to POSCO, reigniting the project as a three party collaborative business between ROK, DPRK, and Russia. The status investigation and negotiations are currently being conducted. Development is being undertaken to construct a coal bulk port, instead of a container port as initially planned, and Korea is being requested to take over 49% of the Russian share. The freight volume that can be processed annually is four million tons, and when processing containers, the initial 100,000TEU freights can be held by TSR.



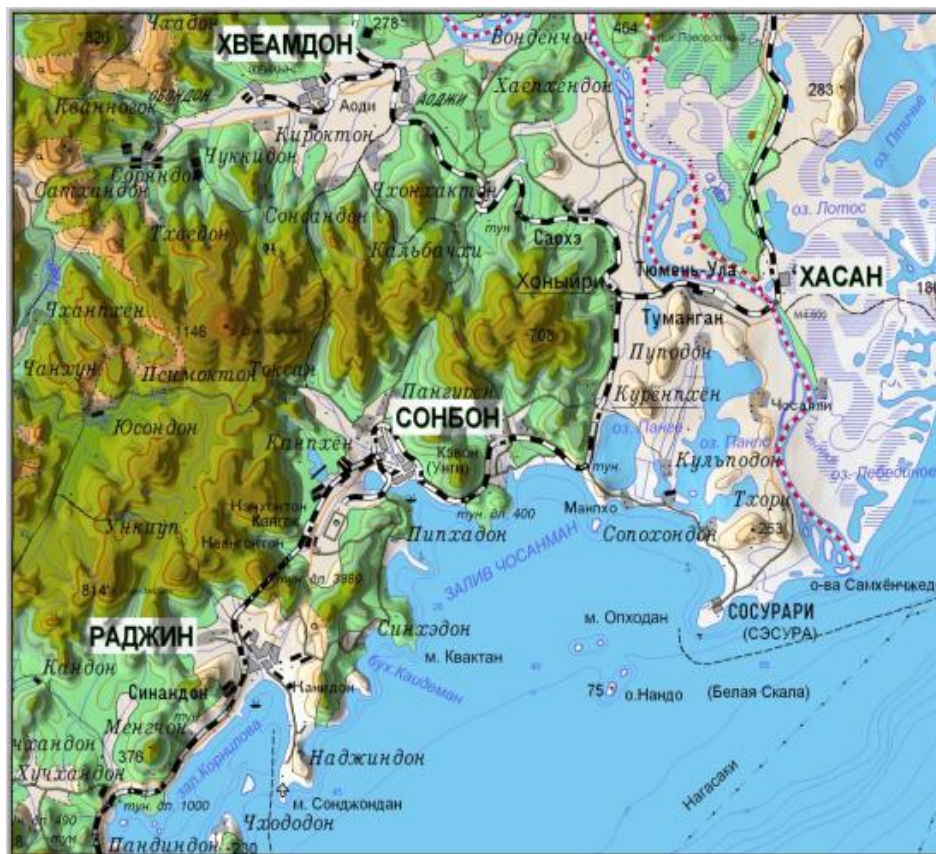
(Source: RZD)

Figure 3.1: Modernization of Rajin Port Pier 3

For the success of the Rajin-Khasan project, the following should be equipped through negotiations and cooperation between ROK, DPRK, and Russia: (1) competitive freight charge structure; (2) speedy transportation time; (3) prompt and transparent customs procedure; and (4) plentiful port infrastructure. In particular, ROK and Russia should provide competitive logistic service in terms of cost and time through reducing port use costs, reducing train rental costs, applying discounted freight charges, providing fast transportation time, and simplifying customs procedure regarding the Rajin-Khasan project.

【Overview of Rajin - Khasan Project 】

Logistics project to repair and improve railway from Rajin Port Pier 3 to Khasan (54km) and to connect Rajin Port with Trans-Siberian Railroad (TSR) by building a freight terminal and securing freight trains.



(Source: RZD)

Figure 3.2: Rajin - Khasan Railway Project

【Status】

DPRK and Russia completed Rajin - Khasan railway repair and improvement in October 2011 and conducted a pilot container operation once. Rajin - Khasan railway was opened in September 2013.

【Korea's Participation】

The Korea - Russia Summit Talk adopted a joint final declaration on November 13, 2013. In Paragraph 11 of the Declaration, the summits welcomed Rajin - Khasan railway restoration and Rajin Port modernization. In addition, the countries agreed to encourage successful completion of the project promoted by their local companies. At the summit talk, Korea and Russia signed an MoU for Rajin - Khasan railway operation by Russia's railway corporation and to establish a consortium of POSCO, Hyundai Merchant Marine and Korail, etc. for equity investment in the project of a port development in Rajin, and thus to have the consortium participate in the port operation.

This project is based on the demand of domestic power generators as well as of POSCO. With demand from the southeastern part of China added on in the future, a considerable freight volume will be secured. In addition, using Elga and Neryungri coalmines that are close by almost 3,000km than Kuzbas (6,500km), time and cost-wise benefits will also be achieved. The average transportation distances between key coal producing sites in Russia and major ports in the Far East are as follows:

Key Coal Producing Sites	Port for Export	Distance (km)
Kuzbass	Vostochny	6,023
	Posyet	5,863
	Vanino	5,304
Neryungri	Vostochny	2,585
	Posyet	2,111
Elga	Vostochny	2,445
	Vanino	1,900

Rajin Port development must be carried out in order to solve the issue of ports in the Far East reaching a state of saturation as a result of increased resource export in the Far East – Siberia and Arctic Ocean areas.

In the past, Korea imported large amounts of coal from China. However, recently, import from Russia is increasing. As of 2012, the amount of coal processing in these ports is 49.2 million tons. This exceeds the standard processing capacity of 38.2 million tons, which means that the capacity has been saturated by 128.8%. Even when the currently implemented project of coal processing capacity expansion in the Far East ports is completed, the situation where the standard processing capacity is exceeded (105.5%) is forecast to continue until 2020.

Item	2012	2020
Coal Export through Ports in the Far East	49.2	96.0
Processing Capacity of Ports in the Far East	38.2	91.0
Utilize ratio	128.8%	105.5%

(Source: Russian coal export potentials, Argus Media)

Until 2030, Korea's import of Russian coal with price competitiveness is expected to increase. It is forecast that coal export processing capacity of ports in the Far East will continue to be in a saturated state. In addition, it is necessary to utilize Rajin Port as a port for Russian coal export.

3.1.4 Development of Zarubino Port

There are many issues and uncertainties with the future development of Zarubino Port. The port could play a determinant role in making the Tumen Corridor a dynamic and vibrant corridor but pressing issues and challenges would have to be met and resolved first.

Zarubino started as a local and fishing port. In 1995 it went to some port expansion focusing on international trade. It has since concentrated in importing Japanese used cars, machinery and equipment while exporting metals, scrap products. Since the beginning of years 2000, traffic has not picked up and is in fact in declining trend especially for containers. Traffic was reported to be 128,000 tons in 2010 with only 2,180 TEUs. The maximum TEU volume was reached in 2005 (11,000) with maximum overall throughput being reached in 2008 (252,000 tons).

Inadequate handling equipment at the port and the closure of the railway line to Hunchun can explain the present low container traffic. The non-operation of the railway line also forbids any large volume of bulk freight coming from or going to Northeast China through Hunchun and Jilin Province and constitutes a major impediment for the development of Zarubino Port.

Road infrastructures connecting China to Primorsky District through Kraskino are now quite adequate but crossing the border for freight takes time. Goods need to be transhipped and Customs formalities on both sides are a complex matter.

It is not clear what are the intentions of the current owners of the port and if they are prepared to provide financing if large expansions could become economically justifiable. Also it should be noted that the port is located in a sensitive environmental zone and any major expansion would need to be carefully planned.

All the above are serious challenges that would need to be overcome to consider a serious program of expansion for the port. There are on the other hand quite a few positive factors which justifies considering such a large sustainable port development.

The Makhhalino railway that extends from Russia to China has been opened and is being operated successfully. It transported 500,000 tons of coal in the first half of 2014.

On May 20, 2013, China and Russia's Suma Group agreed on modernization of Zarubino Port in Russia. China intends to use Zarubino Port as a trade corridor connecting between Japan and Korea.

(Source: Integrated Transport Infrastructure and Cross-Border Facilitation Study for the Trans-GTR Transport Corridors).

3.1.5 Phased modernization of Trans Korean Railway for integration of the Northeast Asia

The biggest change that will be brought by ROK– DPRK railway network connection is that the transportation distance, which is limited to 400km, will increase to 1,000km. As a result, an environment will be established where long-distance transport, the biggest merit of railway transport, can be implemented to the full. As for ROK– DPRK railway system implementation, repair and improvement must be promoted in a short term in order to secure the basic accessibility between ROK and DPRK and to effectively support economic development of DPRK. In other words, improvement of industrial railway, a key element in long-distance mass transportation, is essential in implementing an integrated arterial network in the Korean peninsula and establishing the ROK– DPRK Economic Community.

To that end, the measures to modernize the DPRK railway and create the virtuous circle of logistics industry, thereby strengthening the international logistics competition. The measures to improve in stage the international competitiveness of the Trans-Korean railway, which is represented as “Minimal repair & maintenance of Inter-Korean railway network → Profit-making by logistics industry / Reinvestment → Modernization of DPRK's railway system for restoration → Expansion of logistics industry / International consortium → Modernization of DPRK's railway system for building a new line → Completion of Eurasian land bridge”.

Therefore it's necessary to work out the phasing strategy to develop the DPRK's railway network and suggest the medium and long-term road map for inter-Korean railway. Inter-Korean special economic zone and virtuous circle structure of inter-Korean railway network are expected to create the inter-Korean economic community.

Stage 1 (inter-Korean railway connection stage) is the phase for construction of regional infrastructure at the borderland such as Gaesung and Mt Geumgang. It's the stage completed. Gyeongui and Donghae line and overland route have been completed, but the operation of Gyeongui cargo line has been currently suspended.

Stage 2 (DPRK railway restoration stage) is the phase for implementation of infrastructure development stage in preparation for the demand from North Korea-Russia, North Korea-China and the trans-North Korea. It's the stage currently required. As the demand in North Korea at early stage is insignificant, it shall focus on potential demand passing through the North Korea. That is, international cargo from/to China and Russia. To accomplish the goal, the project among the two Koreas and Russia or the two Koreas and China need to be developed.

Rajin-Khasan project is the project for which the consultation between the two Koreas and Russia has been in process. Rajin-Khasan project refers to the trial effort for TKR-TSR project, and it would positively influence on obtaining public understanding on modernization of North Korea's railway network and TKR - TSR project.

Stage 3 (modernization of DPRK's railroad) is the stage to improve the infrastructure (double-tracking, high-speed and Automatic Variable Gauge System) in preparation for transit and potential DPRK demand. It's the stage to modernize DPRK's railway system based on

construction of the new line we understand and the international consortium is realizable. On a long-run, it's the stage requiring internal improvement for construction of infrastructure network in Northeast Asia and constant infrastructure in Korean Peninsula.

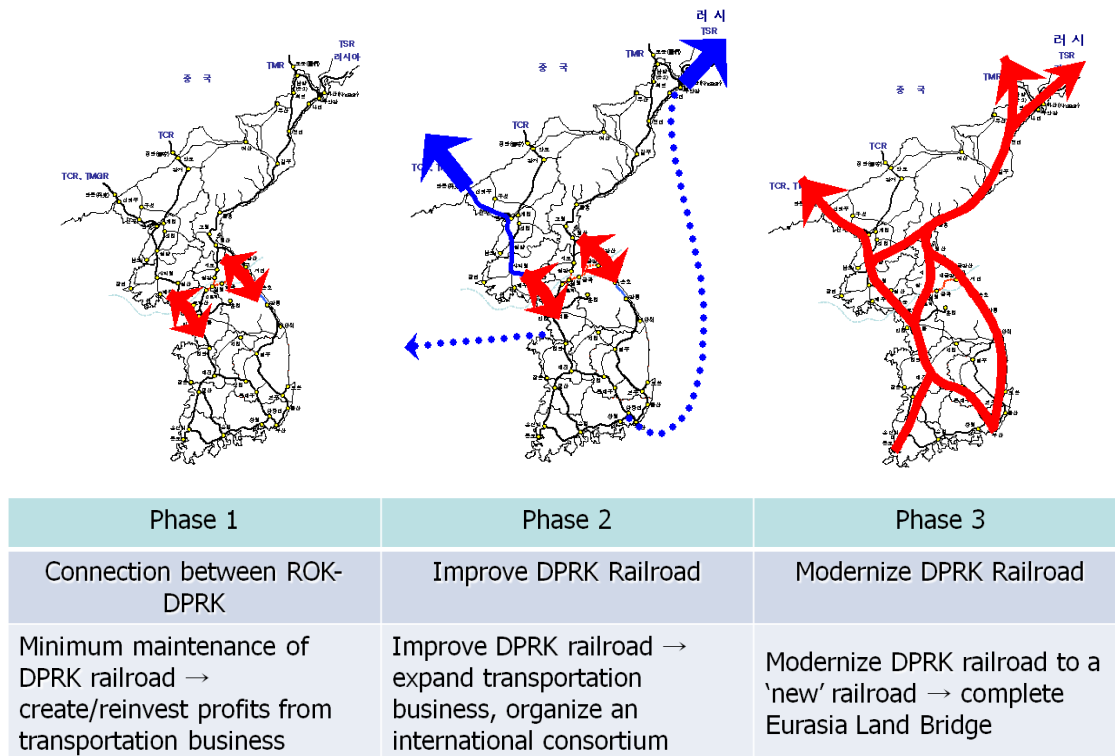


Figure 3.3: Roadmap of Inter-Korean Transportation for ROK-DPRK Railway

3.1.6 Railway and Road development in Eastern Mongolia to the Tumen Delta Region

In 2010 The State Great Khural (Parliament) of Mongolia has endorsed the State policy on Railway Transportation. According to the Policy approximately 5683.5 km of main railway composition shall be newly built in Mongolia in 3 stages. The first stage (approximately 1100 km in total) is:

- Dalanzadgad –Tavantolgoi-Tsagaan suvarga-Zuunbayan - 400 km;
- Sainshand-Baruun Urt -350 km;
- Baruun Urt-Khuut – 140 km;
- Khuut-Choibalsan – 150 km.

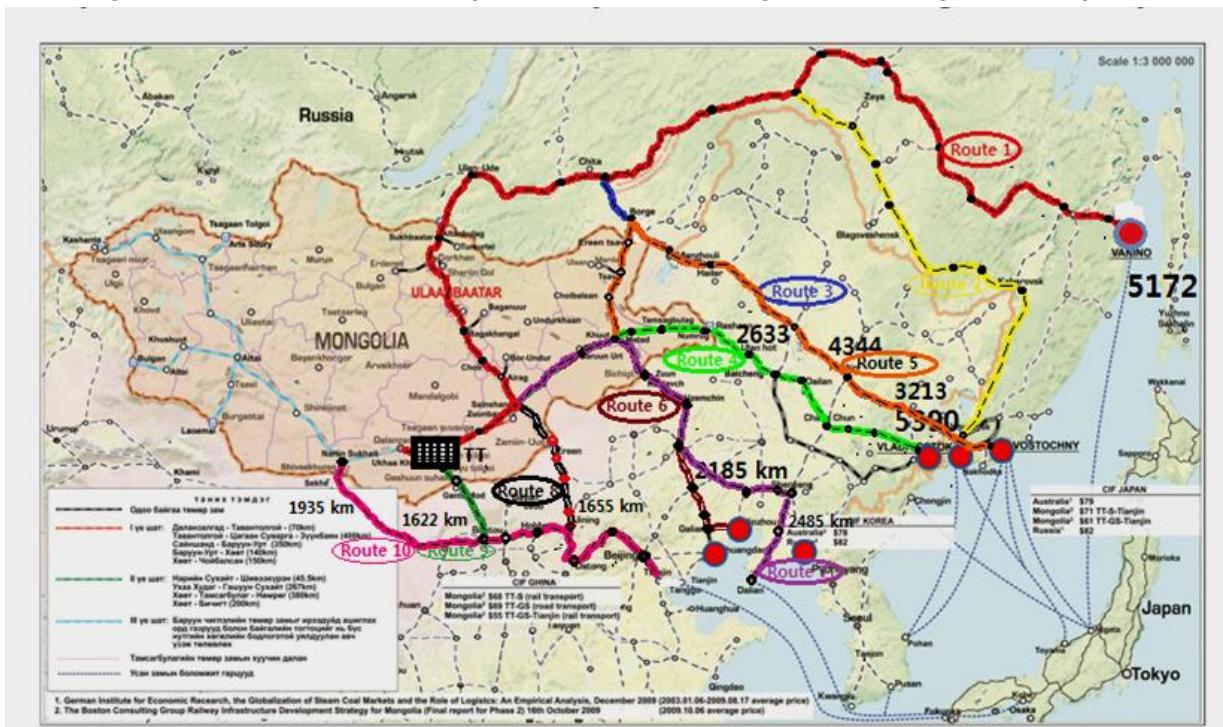
In May 2012, the Government of Mongolia made a decision to build 3 sections of the new railway within 2.5 years and allowed some private contractors to start construction activities on the basis of Concession order (build, operate and transfer). These railway lines will be owned by the contractors for 24 years of operation. Afterwards the railway lines will be transferred to the Government ownership. The rail lines will have axle load of 25 tons per axle.

There are 10 possible routes for transportation of coal from the bigger mining sites to the seaports in the NEA.

Figure 3.4: Railway network development plan of Mongolia



Figure 3.5: Potential coal transport routes from mining sites in Mongolia to seaports



In order to reach potential markets in the NEA countries, route 4 which is named as “Trans GTI corridor” can be used for transportation of coal from the bigger mining sites to the seaports in the NEA region.

State Policy on Railway Transportation endorsed by the State Great Hural (Parliament) of

Mongolia says that the issues of broadening the main railway composition, direction to build new railway and processing and exporting of mining products shall be resolved in close relation.

Nowadays, there are 3 on-going mega-projects that have great impact on future traffic:

1. Tavan Tolgoi (TT) coal mine project. In 2020, volume of the unprocessed products of the mine would be 67.7 million tons. This mine has 6 operational sites:

- West Tsanhi (owned by Erdenes Tavantolgoi): 15.0 million tons per year;
- East Tsankhi (Erdenes Tavantolgoi): 15.0 million tons per year;
- Ukhaa khudag (Energy resources): 15.2 million tons per year;
- “Small” Tavantolgoi (Tavantolgoi LC): 8.0 million tons per year;
- West Naran (Energy Resources): 10.0 million tons per year;
- Tsant Uul (Hunnu): 4.5 million tons per year.

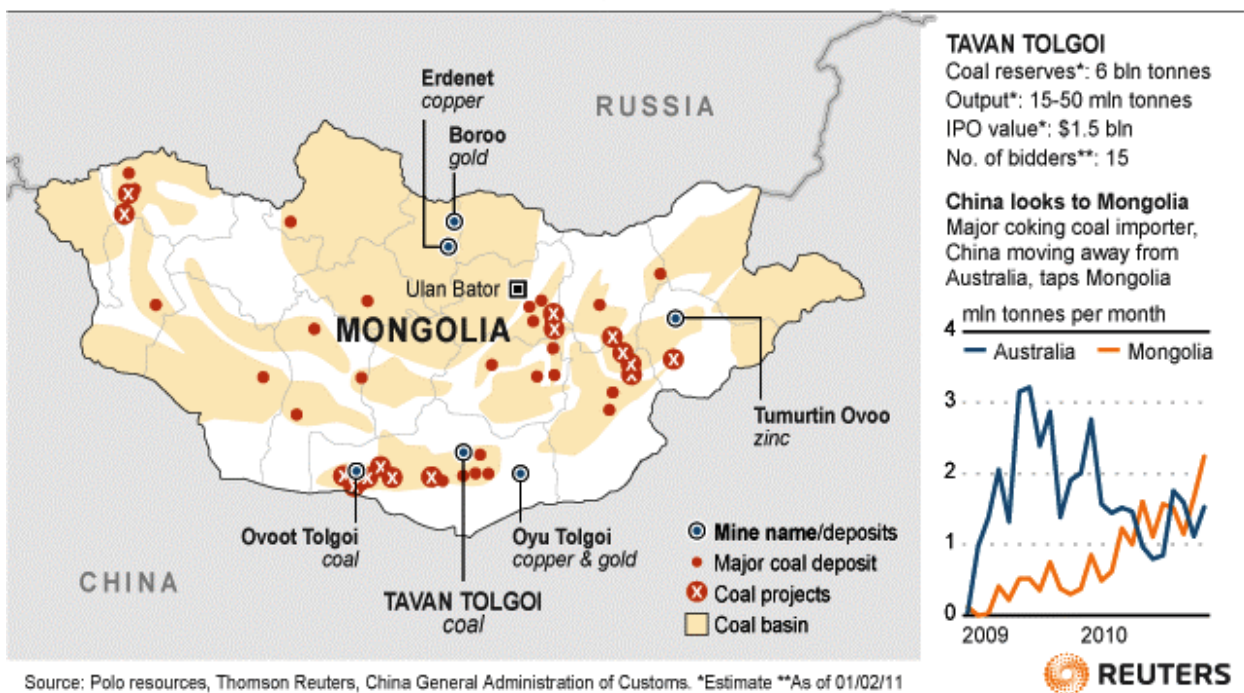


Figure 3.6: Tavantolgoi coal deposit overview

TAVAN TOLGOI DEPOSIT OVERVIEW

Reserves*	• 6.4 billion tons of coal, out of which: • 1.8 billion tons of coking coal • 4.6 billion tons of thermal coal
Location	• Gobi Region in southern part of Mongolia • 540 km south of Ulaanbaatar, capital city • 270 km from the Chinese border
Infrastructure	• All infrastructures (electricity supply, railroads, roads, water, supply etc.) need to be developed

*- Conversion of coal resource into JORC standard increases coal reserve, in particular, coking coal

2. Nariin Sukhait (NS) coal mine project. In 2020, volume of the unprocessed products of the mine would be 30.5 million tons. This mine has 3 operational sites:

- Ovoot tolgoi, Sumber (South Gobi): 14.0 million tons per year;
- Nariin Sukhait (MAK): 15.0 million tons per year;
- Nariin Sukhait (MAK joint venture): 1.5 million tons per year;

On the basis of the washing and crashing outcomes of each mine, it is expected that in 2020 total coal exploration of the above 2 coal Mines would reach up to 98.2 million tons 66.8 million tons of which will be transported by rail.

Exploration of Tavantolgoi mine will reach 46.5 million tons per year, of which:

- 29.7 million tons – coking coal;
- 16.8 million tons – steam coal.

Exploration of Nariin Sukhait would be 20.3 million tons per year, of which:

- 14.1 million tons –coking coal;
- 6.2 million tons – steam coal.

3. Oyu Tolgoi (OT) copper mine project. Prior to 2013, copper production in Mongolia has been solely attributable to the Erdenet Mine operated by Erdenet Mining Cooperation, fourth largest copper mine in the world. In 2013, the Oyu Tolgoi (OT) copper and gold mine operated by Rio Tinto, and considered the largest foreign investment project in Mongolia commenced production. OT Mine is predicted to contribute to one-third of the country's GDP once it reaches full operational capacity in 2019. Expected production volume is 2.1 million tons of copper

concentrate per year.



Figure 3.7: Important Mines in Mongolia

3.1.7 Hunchun POSCO Hyundai International Logistics Complex

The Hunchun POSCO Hyundai International Logistics Complex is invested and jointly developed by POSCO affiliates and Hyundai Group.

An international logistics complex site in Hunchun (approx. 1.5km²) has been leased for a long term (50 years). On the site, an international logistics warehouse, an open-air storage yard and cargo collection and delivery facilities are being installed.

The complex will be developed in three stages from 2013 to 2020 and operation will commence in 2015.

Stage 1 construction (general warehouse, low temperature warehouse and CFS) was completed in October 2014.

Upon completion of stage 3 construction, 16 general warehouses, 4 low-temperature warehouses and 3 CFS buildings will be established together with administrative facilities including an administration building, a lodging complex and a gas station.

Key items handled in the complex are consumer goods (73%), feeds (13%), automobiles/automotive parts (6%), grains (5%), timber and fishery products. The scope of trade extends from the two Northeastern Provinces of China (Jilin, Heilongjiang) to Shanghai and Guangzhou of

China as well as Russia, DPRK, ROK and Japan. The complex's key customers are global shippers and logistic service providers.

As a bi-directional freight transportation route of the southern parts of Shanghai - Rajin - Hunchun was ratified, an increase in domestic freight transportation volume in China is forecast. In addition, as the demand for Rajin Port opening by surrounding nations increases and according to the strategy of China's entry to the East Sea, logistics for export and import freight is forecast to activate in the mid to long term.

Companies wishing to enter the complex are mostly those providing transporting service within China, such as between the eastern and the southern parts of the country. Companies providing service targeting the eastern parts are those that have previously passed through Russia's Vladivostok. These companies have an intention to use Hunchun as an intermediate transportation site. As for those targeting the southern parts, they have the will to develop new markets up north as logistics market along the southern coast of China has reached a saturated state.

In relation to the handled items and transportation routes by stage, in stage 1, timber and petroleum resources are imported and clothing items are exported through the existing overland route between Hunchun and Russia. In addition, clothing, mineral resources and fishery products are transported through the Hunchun – DPRK route. Moreover, through bidirectional marine transportation, strategic materials, such as coal and grains, as well as fishery products and processed timber products, are transported from Rajin to areas south of Shanghai and consumer goods, clothing, vegetables and fruits and medicine and medical supplies are transported from areas south of Shanghai to Hunchun and Rajin.

In stages 2 and 3, in case international export and import processing is possible in Rajin Port, the export and import freight of Dalian Port (consumer goods, automobiles, clothing and feeds), which has reached a state of saturation, will be absorbed using geographical advantages and the shortest routes to and from Hunchun, Rajin – areas south of Shanghai, Russia, DPRK/ROK, Japan, the U.S. and Europe.

Companies located in Hunchun POSCO Hyundai International Logistics Complex will be provided with administrative support in relation to investment procedures. In addition, competitiveness of the companies will be enhanced through strategic and multilateral cooperation between the related governments and the companies.

3.1.8 Investment of China to DPRK in Tumen Area

69% of investment in Jilin Province is targeting Hunchun, Yanji, Changchun and Tumen. As investment in Jilin for Rason area has been increasing since 2010, 50% of investment is focused on Rason area. This is because, with the launch of economic cooperation belts extending from Changchun of Jilin to Yanbian and Hunchun to DPRK's Rason on the basis of close cooperation between DPRK and China, investment conditions in DPRK have improved and, at the same time, DPRK's position in export to Jilin has been elevated.

The percentage of investment in DPRK by Jilin Province is lower than that by Liaoning and Heilongjiang. In addition, although investment in resource development including iron, copper ore and gold ore represents 25% of total investment, the core of investment in DPRK is to support ‘road and port integration’ , which is to compositely develop roads, railways, ports and development zones. Moreover, in trading between DPRK and Jilin Province, clothing displayed a remarkable performance and, accordingly, investment in DPRK and tall processing increased.

The CYN 3.6 million for repair of a bridge over the Tumen River between China’ s Quanhe and DPRK’ s Wonjeong was paid in full by Hunchun City. Together with the approval on an offshore coal transportation route extending from China’ s Hunchun to DPRK’ s Rajin and China’ s Shanghai and the commencement of road repair work by Jilin Province between Wonjeong-ri of DPRK and Rajin Port, China and DPRK ratified a number of investments including ratification of Rason Economic and Trade Zone Development and Investment Corporation by Jilin Joint Development and Investment Corporation to support joint development and management of the two economic zones. In March 2012, the right to use Rajin Port Pier 1 was secured.

3.2 Traffic Infrastructure Review and Transport Demand

3.2.1 Traffic Infrastructure Review for Rajin Port

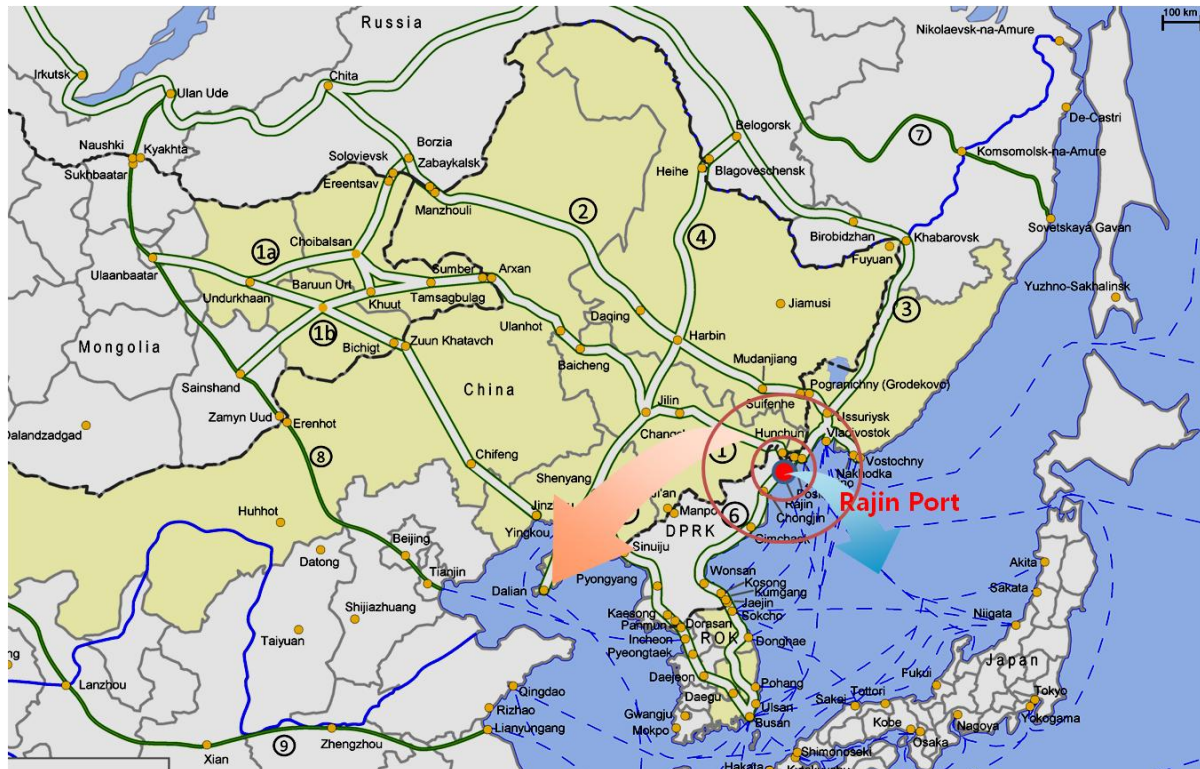
Transportation infrastructures around Rajin Port are changing rapidly as of late. China opened 'Harbin - Changchun - Shenyang Expressway' passing through provincial capitals of the three Northeastern Provinces a year ago. The entire China is already connected with high-speed railway network. It is highly likely for the existing railway to be used as a distribution network.

China continuously expressed its interest in developing Rajin port, as a geographical limitation is already appearing at Dalian and Dandong ports, which are the main ports of the three northeast provinces of China. China is continuously interested in Rajin port as a foreign trade window to handle freight volumes in connection with the three northeast provinces development plan, including the Rajin port development and Chang-Ji-Tu development plan.

Rajin port is geographically closer to Jilin and Heilongjiang Province of China compared to Dalian port as following. Thus, it is evaluated that a considerable amount of freight that will occur as a result of developing the northeast area in the future will enter to Rajin port.

Table 3.2: Comparison of ground distance between Rajin port and Dalian from the three northeast provinces

Classification	Dalian (China)	Rajin (DPRK)
Liaoning Province (Shenyang)	355km	525km
Jilin Province (Changchun)	1,033km	735km
Heilongjiang Province (Harbin)	1,659km	506km



(Source: GTI)

Figure 3.8: Advantage of Rajin Port in the three northeast provinces

In addition, construction of northeastern expressways that may directly be connected to the Rajin port is expanding, and in particular, improvements are being made concentrating on the development in connection with Rajin port and Chang-Ji-Tu development pilot zone. The entire sectors of Changchun-Yanji-Hunchun expressway (480km), the core road infrastructure within Jilin Province under the Chang-Ji-Tu development plan, was completed on September 2010, thus, the Changchun-Hunchun route, which took eight hours previously, now only takes five hours.

【Logistic Corridors to Rajin Port in Yanbian Area】

1) Logistic Network in Yanbian Area

- Road: A 460km expressway from Changchun to Dunhua, Antu, Yanji, Tumen and Hunchun has been completely opened and the traveling time is approximately five hours. In addition, construction of a 43km expressway from Hunchun to Quanhe Trade Zone is being promoted. Yanji – Wangcheng expressway opened and it is connected with Changchun – Hunchun expressway. Moreover, Yanji – Longjing expressway extension project was completed. Yanji – Helong expressway construction began and it is scheduled for completion in 2016. In the future, an expressway network connecting eight prefectures and all cities in Yanbian will be established.

- Railway: Jilin – Hunchun expressway is under construction. In addition, construction of Hunchun – Dongning railway, a part of Eastern Border Railway connecting China with DPRK and Russia, is being promoted actively.

- Logistics Complex: There are currently no large-scale logistics complexes in operation

within Yanbian. However, a logistics complex for agricultural products has been built and is under pilot operation at the moment. In addition, construction of Yanji General Logistics Complex is being promoted. In 2012, Hunchun POSCO Hyundai International Logistics Complex was opened.

- Currently, there are seven trade zones targeting DPRK in Yanbian (Quenhe, Tumen, Sanhe, Kaishantun, Goseong-ri and Nampyeong).

2) Logistic Corridors to DPRK in Yanbian Area

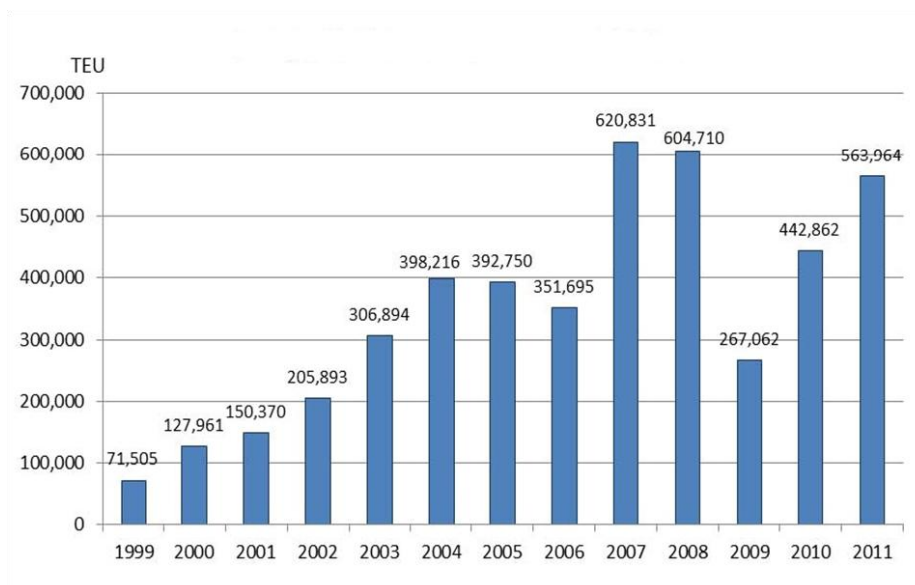
- There are three routes that run from China through the Tumen River trade zone down to DPRK's Rajin Port and Cheongjin Port. One is an overland route and the other two are railways. The overland route extends from Quenhe Trade Zone to Rajin Port through Wonjeong-ri Trade Zone. The railway routes are Tumen Trade Zone – Nanyang Trade Zone – Rajin and Tumen Trade Zone – Hoeryeong – Cheongjin.

3) Prospect of Logistic Corridors in Yanbian Area

- The existing international logistic route in Yanbian runs from Yanji to Changchun (or Jilin), Dalian Port (or Yingkou Port, Dandong Port), southern parts of China and Korea or Japan.

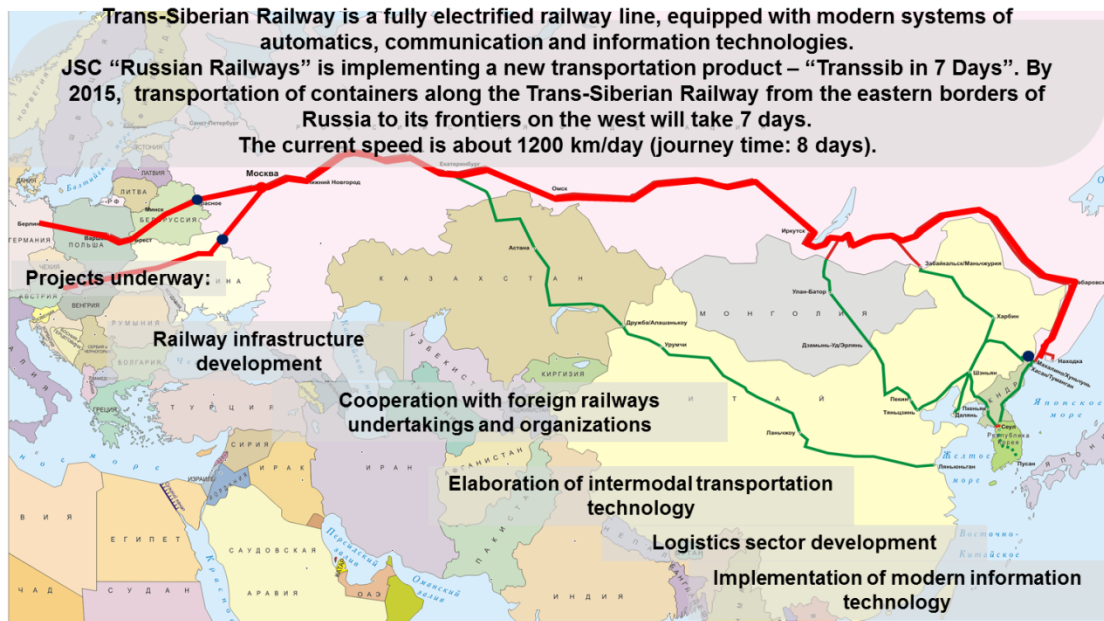
- The new logistic routes built in Yanbian through China – DPRK cooperation are Yanji – Hunchun – Wonjeong-ri – Rajin Port – southern parts of China (or Korea/ Japan), Yanji – Tumen – Nanyang – Rajin Port – southern parts of China (or Korea/Japan) and Yanji – Tumen (or Longjing) – Hoeryeong – Cheongjin Port – southern parts of China (or Korea/ Japan). The new logistics network is expected to reduce transportation time and cost.

The international container freight volume of TSR have increased by nine times during the last nine years. Currently Russia is promoting the groundbreaking 'TSR seven-day project' to reduce TSR transportation time from two weeks to one. The environment of Rajin Port development will be improved and the added value of Rajin Port as a distribution network for Northeast Asia and Eurasian regions will be increased. This is the reason why Rajin Port development is extremely important.



(Source: CCTT)

Figure 3.9: Transportation volume of TSR



(Source: RZD)

Figure 3.10: TSR seven-day project

【 Infrastructure Development in Neighboring Countries of Rajin Port】

- Railway between Rajin and Khasan
- Road between China and Russia
- Expressway for Harbin - Changchun – Yanji / Hunchun
- Eastern border railway in China
- High speed railway for Harbin - Changchun - Yanji / Hunchun
- Maintenance and extension work for bridge between Hunchun (China) - Wonjeong-ri (DPRK)
- Maintenance and extension work for road 49km between Wonjeong-ri and Rajin
- Rajin Port maintenance and extension work
- TSR seven-day project

3.2.2 Transport Demand for Rajin Port

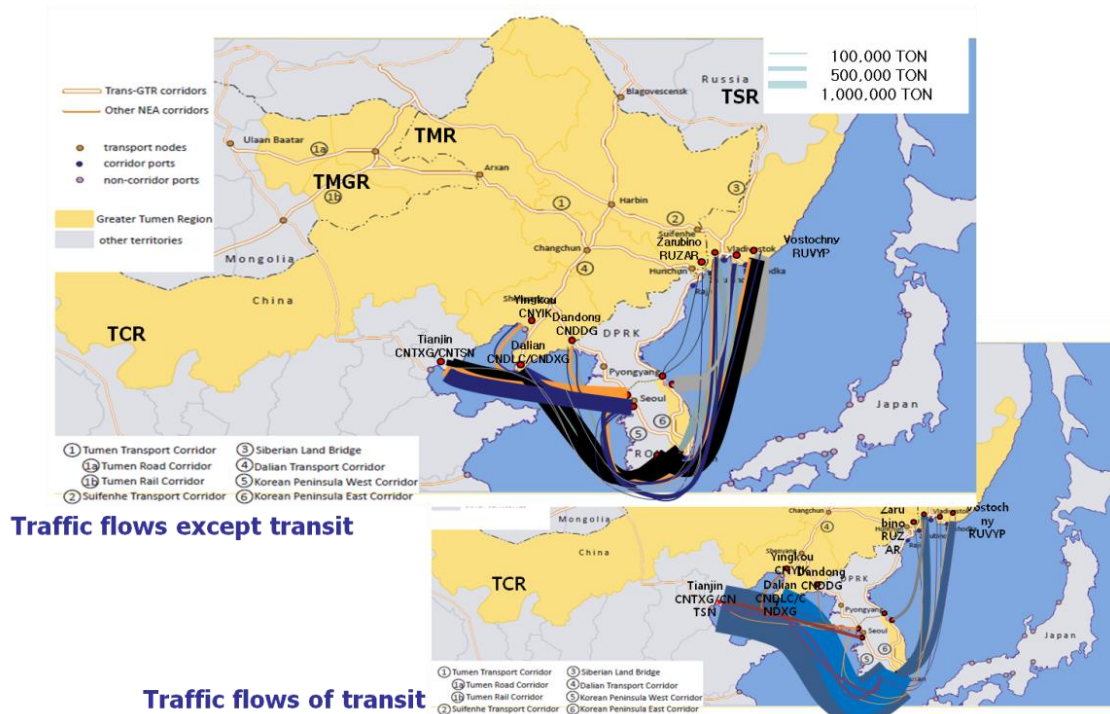
The feasible freight volume for Rajin port can be largely divided into three types, which are 1) freight volume from ROK and Russia, 2) transferred freight volume for the three Northeastern Provinces and 3) freight volume generated by hinterland industrial complex.

1) Freight Volume from ROK and Russia

1-1) Freight Volume from ROK

In 2011, current state of freight traffic flows through ports is shown in figure and tables. On the sea freights O/D by zone (ROK - the Three Northeastern Provinces, Hebei, Beijing/ Tianjin,

far-east Russia, etc.) is used. The Port of Busan, Incheon, Guangyang and Pyeongtaek in ROK are taken into consideration for Korean Peninsula West Corridor 5. The Port of Busan, Sokcho, Donghae and Mukho in ROK are taken into consideration for Korean Peninsula East Corridor 6. The Port of Dandong, Dalian, Dalianxingang, Tianjin, Tianjinxingang and Yingkou in China are taken into consideration for Korean Peninsula West Corridor 5. The Port of Vladivostok, Vostochniy, Nakhodka and Zarubino in Russia are taken into consideration for Korean Peninsula East Corridor 6. For transport demand, freight is targeted not only the import-export freight but also the transit. The freight traffic data of 9 years old is investigated to be contemplating Korea Customs Service data base. The freight traffic volume increased steadily for 9 years despite world economic crisis in 2008. Especially, freight traffic volume of Pusan Port for import-export and transit is massive. The freight traffic volume of Incheon, Guangyang, Pyeongtaek and Mukho Port for import-export is crucial factor. Recently freight traffic volume for transit increased rapidly between ROK and Russia. The current data on freight traffic flows through ports to be considered are shown below.



(Source: GTI)

Figure 3.11: Current state of freight traffic flows through ports of ROK (Import-Export and Transit)

Of the demand for freight traffic in the GTI-linked zones, the traffic demand to Korean Peninsula West and East Corridor of GTI is estimated according to 2015, 2020, 2025 as follows. The freight traffic demand in the GTI-linked zones is divided into ROK - China/ Russia, ROK - transit shipment to Russia/China.

ROK - China/ Russia Freight Traffic Demand On-the-sea freights O/D by zone (Korea - the Three Northeastern Provinces, Hebei, Beijing/ Tianjin, far-east Russia, etc.) is used. For transport demand, estimation targeted only the import - export freight excluding transit shipment. As shown in figure, freight traffic volume of ROK-China increased steadily for 10 years despite world economic crisis in 2008. In the GTI-linked zones, the freight traffic demand to West and

East Corridor is estimated according to the freight traffic data of 10 years old as follow. The freight demand between ROK and China will increase about two times for 15 years. The freight demand of transportation between ROK and China in 2025 is estimated to be 20.05 million tons.

Similar with China, freight traffic of ROK-Russia volume increased steadily for 10 years despite world economic crisis in 2008. The freight demand will increase about two times for 15 years. The freight demand of transportation between ROK and Russia in 2025 is estimated to be 10.22 million tons. (Source:GTI)

ROK-Transit to China/ Russia Freight Traffic Demand Estimation targeted transit shipment between Korea ports and the China/ Russia.

As shown in figure, freight traffic volume of ROK-China increased steadily for 10 years despite world economic crisis in 2008. In the GTI-linked zones, the freight traffic demand to West and East Corridor is estimated according to the freight traffic data of 10 years old as follow. The freight demand between ROK and China will increase about two times for 15 years. The freight demand of transportation between ROK and China in 2025 is estimated to be 18.85 million tons. Similar with China, freight traffic of ROK-Russia volume increased steadily for 10 years despite world economic crisis in 2008. Especially, freight traffic volume for transit increased rapidly between ROK and Russia. The freight traffic demand will increase about two times for 15 years. The freight demand of transportation between ROK and Russia in 2025 is estimated to be 4.98 million tons.

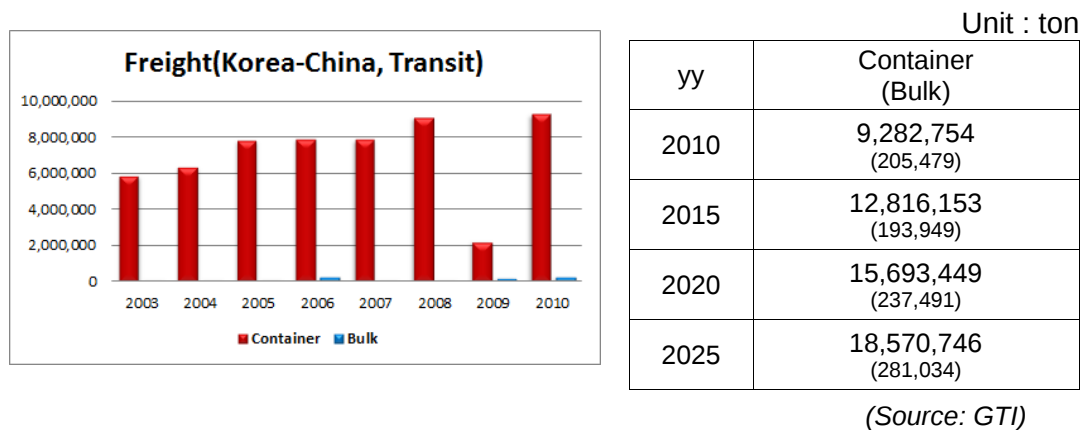


Figure 3.12: Results of freight traffic estimation between ROK and China (Note: Korea is ROK)

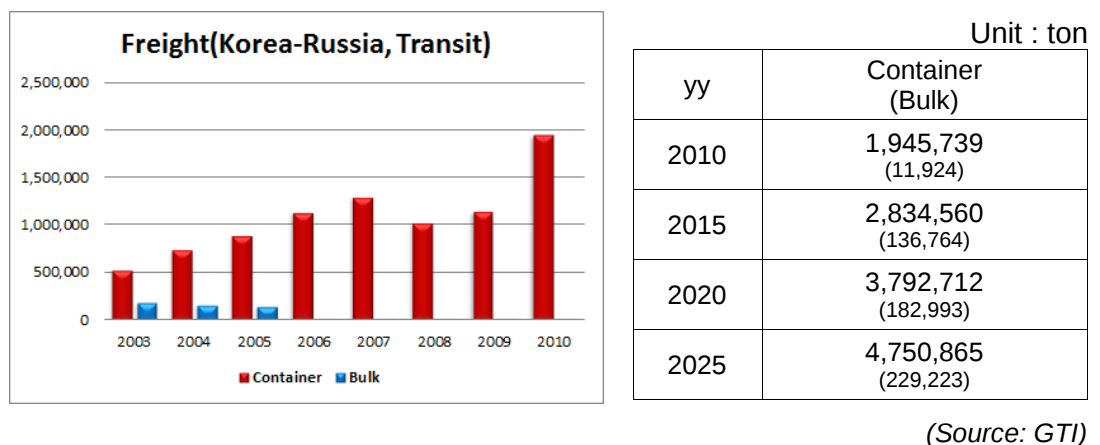


Figure 3.13: Results of freight traffic estimation between ROK and Russia (Note: Korea is ROK)

Demand of Container Volume from ROK

In 2010, the volume of containers transported between Korea and Far East region of Russia is approx. 2.9 million tons (It is equivalent to 250,000 TEU). It is forecast that the volume of containers between Korea and Russia will increase up to approx. 6.8 million tons in 2025 (It is equivalent to 570,000 TEU).

1-2) Freight Volume from Russia

Russian government's freight volume forecast is as of the following. Total Freight Volume in Russia is 955 Million tons in 2025. Approx. 20% of the freight volume in Russia is from the Far East areas. In this study, approx. 10% of container from the Far East areas is assumed for Rajin port. It is 167,000 TEU.

Table 3.3: Freight Volume from the Far East

Unit: Mil. ton

	2015	2020	2025
Total Freight Volume in Russia	774	885	955
Total Freight Volume in the Far East	150	181	216
Percentage of the Far East	19.4%	20.5%	22.6%
Container in the Far East (10,000 TEU)	116	140	167
Container for Rajin port (10%)	11.6	14	16.7
Coal for Rajin port	2	4	10
Grain for Rajin port	-	0.2	0.3
Non Containerized goods for Rajin port	-	1	2

(Source: RZD)

It is also necessary to investigate the demand for Rajin Port from China and Mongolia. For this, assistance from Chinese and Mongolian experts is necessary.

2) Transferred Freight Volume in the Three Northeastern Provinces

Demand from ChangJiTu An increase in the gross economy of Jilin Province according to the Changchun - Jilin - Tumen development plan (gross economy of Jilin Province to double in 2012, to quadruple in 2020) is taken into consideration. Of the freight volume to be generated by the Changchun - Jilin - Tumen development, approx. 11.46% is to Korea. It is 120,000 TEU in the study of GTI. (Source: GTI)

In the study of Korea Maritime Institute, if the 20% and 10% shares of Hunchun and Suifenhe respectively of the freight volume in the three Northeastern Provinces are transferred, the transferred freight volume is estimated to be 620,000 TEU by 2025. (*Source: Internal data of Korea Maritime Institute*).

Prediction of freight volume in Hunchun and Tumen Ports conducted by china consultant is as following

Since the railway between Hunchun and Russia runs intermittently in recent years, the annual freight volume of all the ports in Hunchun totaled only 133,000 tons in 2013. Due to the reorganization and expansion of Hunchun port, only the first half annual freight volume in 2014 has exceeded 500,000 tons. With the large-scale output of the natural resources by Russia's East Siberia, Far East area and Mongolia, and the growing demand of natural resources in ROK and Japan, freight volume of Hunchun port is predicted to reach 1,500,000 tons in 2015 and 4,500,000 tons in 2020.

In 2012, the import and export cargo of Tumen road port totaled 131,600 tons, and the import and export cargo of railway port totaled 8.48 tons. With the advancement of businesses and development in Tumen River Region by China, Russia, DPRK, Japan and ROK, etc., the import and export cargo and passenger volume of the Tumen road and railway ports will exceed the design standards in construction. The elastic coefficient of freight volume growth and GDP growth is calculated as 1.33. According to the 12th Five-year Plan for national economic and social development in Tumen, the city's annual GDP growth rate is 20% during 2011-2015. According to the national economic and social development planning of Jilin province, the GDP growth rate of Jilin province, by conservative estimate, will remain above 12% during 2016-2020. Tumen port freight volume is predicted to reach 450,000 tons in 2015, and 700,000 tons in 2020.

3) Freight Volume Generated by Hinterland Industrial Complex

Demand by Rason Economic and Trade Zone Development Plan There is no visible result yet from the Rason Economic and Trade Zone, however, if formed as planned in the future, approximately 30Mil. ton of volume is expected to occur. DPRK attracted the light industry, textile industry, and electric electronic industry at a 12.9 km² site until 2000 as Phase 1, and is planning to promote plans to attract the machine industry and vehicle assembly and components industry at a site of 3.8 km² until 2010. But this project does not seem to be gaining a noticeable outcome as of 2010.

If the foreign economic condition of DPRK is improved and the Rason industrial complex is formed as planned in the future, the freight volume in this area is expected to be 34 Mil. ton, and the sea freight volume is estimated to be roughly 20 Mil. ton (approximately 1.37 Mil. TEU). In this case, total freight volume is 34.4 Mil. tons, estimated sea freight volume is 20 Mil. ton.

(*Source: Internal data of Korea Research Institute for Human Settlements*)

4) Feasible Freight Volume for Rajin Port

In conclusion, the feasible freight volume for Rajin Port can be largely divided into three types above mentioned. The feasible freight volume can be estimated as the following three. Total container volume of Rajin port is estimated as min. 2.23 ~ max. 2.73 Mil. TEU.

Table 3.4: Feasible Container Freight Volume of Rajin Port (2025)

Table 6-4. Possible Container Freight Volume of Rajin Port (2020)		
Freight Volume from ROK & Russia	Transferred Freight Volume in the Three Northeastern Provinces	Freight Volume Generated by Hinterland Industrial Complex
Demand of Container Volume from ROK 570,000 TEU	min. 120,000 ~ max. 620,000 TEU	1,370,000 TEU
Demand of Container Volume from Russia 170,000 TEU		
min. 2.23 ~ max. 2.73 Mil. TEU		
Col 10 Mil ton/ Grain 0.3 Mil ton/ Non Containerized goods 2 Mil ton		

Table 3.5: Required Berths by Wharf in Rajin Port

Classification	2025
Container Terminal (400,000 TEU processed per berth/ 4,000 TEU level berthing)	7
Coal Terminal (6.65 million tons processed per berth/ 200,000 DWT level berthing)	2
General Terminal (850,000 tons processed per berth/ 50,000 DWT level berthing)	3

5) Feasible Freight Volume for Zarubino Port

According to forecasts from the Chinese Ministry of Transport, the total volume of container from Northeast China to Japan and Korea in 2015 will reach 2.5 million TEUs and likely 3 million TEUs in 2020. Container volume through Zarubino in 2020 is however forecasted to be about 300,000 TEUs. Only goods originating or destined to Jilin Province would have advantage passing through Zarubino and they would have to compete with Rajin Port in DPRK. The 300,000 TEUs assume that if not all at least the vast majority of the impediments listed have been eliminated.

The Chinese Ministry of Railway estimated for year 2020 1.8 million tons of imports for Northeast China and 0.5 million tons of exports passing through Zarubino Port(34) for Northeast China. Most of the goods would normally be containerized. Busan Port estimated an overall potential of 160,000 containers between ROK and Zarubino Port for the year 2020.

There is a consensus that Zarubino Port should not handle “dirty bulk commodities” like coal specializing more in transit containerized goods between Japan, ROK and China. The port however would continue to receive break bulk commodities like Japanese used cars for the Russian markets, machinery and equipment and scrapped products. This non containerized cargo could reach 1 million tons. There is more uncertainty in the potential for grain export, though it is estimated to reach 1 million tons under an optimistic scenario. If Mongolia coal would travel on the Tumen Corridor, then the export port should be Posiet and not Zarubino.

The location of Zarubino provides an opportunity to handle significant volumes of transit goods for the Jilin Province. However one should adopt a realistic approach for the future of the port and avoid falling in the trap of over designing expensive infrastructures. Benefits of any port expansion programme would come after 2015, at the earliest. Putting in place infrastructures and getting the market to handle 300,000 TEUs or more when the current traffic is only a few thousands is a huge challenge which is going to require quite a few years to achieve.

In the table below two scenarios are proposed for Zarubino Port development, a conservative and an optimistic.

Table 3.6: Zarubino Port scenarios

Commodity	2010		2020 Conservative		2020 Optimistic	
	TEU	Tonnes	TEU	Tonnes	TEU	Tonnes
Containerized goods	2, 180	17, 330	300, 000	2, 385, 000	450,000	3, 575, 000
Grain						1, 000, 000
Non Containerized goods		300, 000		780, 000		1, 000, 000
Total	2, 180	217, 330	300, 000	3, 165, 000	450,000	5, 575, 000

Therefore it is foreseen that, assuming that most if not all the challenges are met, port throughput potential in Zarubino could vary between 3 and 5.5 million tons in the year 2020 with containers being in a range of 300,000 to 450,000. It is then recommended to design long term facilities for a maximum of half a million TEUs but building such capacity in stages.

(Source: Integrated Transport Infrastructure and Cross-Border Facilitation Study for the Trans-GTR Transport Corridors)

4 RECOMMENDATIONS FOR GTI STRATEGY: CURRENT LIMITATIONS AND FOLLOW-UP WORKS FOR RAJIN-KHASAN DEVELOPMENT

4.1 Limitations

This study is a basic research for successful completion of the currently promoted Rajin – Khasan project. However, traffic plans, infrastructure status and information data of countries applied with GTI are different. As a result, the study outcomes can be limited. It is anticipated that additional studies will be conducted and produce general and comprehensive results. For reference, Russian consultants did not participate in this study. To supplement this, Russian statistical data were utilized as much as possible. It is necessary for Russian consultants to participate in additional studies to be conducted in the future.

Freight Volume from ROK is based on container demand prediction using data from Korea. As Russian consultants did not participate in this study, Freight Volume from Russia was established by using data from Russia as much as possible. Russian government announced Russia Transport Strategy 2030 and, based on this, freight volume for the Far East ports was estimated. In addition, using the data, freight volume of Rajin Port was assumed. The freight volume of China to be processed in Rajin Port is relatively smaller than those of Korea and Russia. As for Mongolia's freight volume, there are limitations in reflecting it as the necessary infrastructure has not been established sufficiently. These limitations must be overcome through the associated studies in the future. It is anticipated that additional studies will produce more complete outcomes.

Most of the demand for bulk freight is of cargoes carried out from Rajin Port. Therefore, the bulk freight demand estimation was carried out based on statistical data from Russia. On the other hand, the demand for container freight was mostly of cargoes carried into the port. Accordingly, the container freight demand estimation was carried out based on Korea's container export demand by referring to container freight volumes in the Far East ports of Russia. Overestimation of container freight volume and additional demand from China and Russia are possible, and thus additional studies are necessary to address these issues.

As mentioned previously, for the development of Rajin Port, ① abundant freight volume, ② competitive freight charge structure, ③ rapid transportation, ④ prompt and transparent customs procedure and ⑤ extensive transport infrastructure need to be secured.

For this, comprehensive data on the status of freight volume processed through the logistical transportation networks in GTI countries in relation to Rajin Port and a mid to long-term freight volume plan are necessary. Additional studies need to be conducted on the subject of time and cost-related benefits through analysis of transportation time and rates applied to the logistical transportation networks linked with Rajin Port. Through this, more accurate estimation of infrastructure development demand will be possible.

4.2 Rajin-Khasan Railway and Ports Development in the future

Considering the status and the demand prediction of Ch 2, 3, it is necessary to further expand the scope of Rajin – Khasan development. The new piers 4, 5, 6 need to be developed additionally considering the increasing freight volume demand in the future when the currently promoted Rajin – Khasan project is finished successfully. For this, phased development strategies are necessary and additional studies need to be conducted to develop and establish the strategies. It is necessary to establish a comprehensive development plan through a link with Rajin – Seonbong special zone development and Rajin Port expansion through studies to be pursued in the future.

4.2.1 Action Plan of Rajin Ports Development

Through Pier 1, 2 and 3 and hinterland development, Rajin Port must be developed into a sea & rail type composite logistic complex for Russian and Chinese freight processing and entry to the emerging markets in Eurasia. It is necessary to develop Rajin Port as an international logistics and transit port with economic feasibility. For processing of container freight from the three Northeastern Provinces, which is increasing in line with economic growth, China is focusing on transport and logistics infrastructure improvement in the border between DPRK and China, such as participation in Russia's Zarubino Port development, development of Cheongjin Port Piers 3 and 4 and securing of Rajin Port Pier 1. As for Rason Complex, Piers 4, 5 and 6 of Rajin Port must be developed as container terminals in the mid to long-term in order to ensure efficient processing of freight from the three Northeastern Provinces of China and TSR container freight from Russia. In addition, swift processing of freight from the three Northeastern Provinces must be ensured using Hunchun – Wonjeong – Rajin Port road (48km, 2 hours). Moreover, Domun – Cheongjin – Rajin railway modernization and road improvement project as well as railway – road transport and logistics infrastructure environment improvement through Rajin – Khasan road improvement must be promoted. At the same time, for Rason Complex, Rajin Port must be developed as a composite international logistic port and the related infrastructure development, such as for customs clearance, railway control, power supply and communication, must also be promoted.

The SWOT Analysis to Rason Industrial Complex is as follows:

Table 4.1: The SWOT Analysis to Rason Industrial Complex

Strengths	Weaknesses
-Topographical strength (wide area, center of Northeast Asia) -Resources in surrounding areas	-Insufficient SOC -Lack of related industries other than fisheries

(natural resources) -Labor power (no language barrier, high-quality labor at low cost) -Special benefits as special economic zone (competitive edge over China in terms of tax reduction)	-Geographical condition (distant from ROK and Pyeongyang) -Issues concerning passage, communication and customs clearance -Economic sanctions by international society (issues concerning place of origin and strategic materials)
Opportunities	Threats
-China's support (Rason special zone development promotion) -Support from international community possible - Feasibility to function as an economic cooperation hub in the northern region (Rajin – Khasan railway connection, logistics hub in Northeast Asia) - Opportunity of market dominance as a pre-emerging market	-Instability of DPRK regime -Military tension between ROK and DPRK -DPRK's nuclear test and missile launching

(Source: Korea Federation of SMEs, 'Rason Special Economic Zone development status and plans for entry by Korean small and medium businesses' (2013))

Rajin Port's annual freight handling capacity is 3 million tons (as of 2011). On July 18, 2014, port extension was completed with Pier 3 modernized. Currently, approximately 5 million tons of coal can be handled a year in Rajin Port.

Rajin Port development plan in DPRK- China joint development plan is as outlined below. In the short term (5 years), Pier 4 will be built and Rajin Port's annual freight handling capacity will increase to 9.5 million tons. In the mid to long term (15 years), Piers 5, 6 and 7 will be built and the annual freight handling capacity will increase to 45 million tons.

Rajin Port long-term development plan is as outlined in the table below.

Table 4.2: Rajin Port long-term development plan

Pier	Berthing Capacity (10,000 tons)	No. of Quays	Quay Length (m)	Max. Freight Handling Capacity (10,000 tons)
Pier 1	0.7~1	4	975	120
Pier 2	0.7~1	4	957	100
Pier 3	0.7~4	2	583	500

Pier 4	2~5	4	1,017	560
Pier 5	5~10	5	1,500	680
Pier 6	2~10	5	1,640	1,680
Pier 7	2~5	6	1,500	1,200

Through Pier 1, 2 and 3 and hinterland development, Rajin Port must be developed into a sea & rail type composite logistic complex for Russian and Chinese freight processing and entry to the emerging markets in Eurasia. It is necessary to develop Rajin Port as an international logistics and transit port with economic feasibility.

Rajin – Seonbong Industrial Complex must be developed into Rason Composite International Industrial Complex and it is necessary to build Rajin Port as a hinterland industrial and logistics complex. This, in turn, needs to be developed into a central hinterland industrial complex for an international logistics hub port in the Pan East Sea area. With the implementation of composite logistic network projects, such as Rajin – Khasan railway connection and a link between Hunchun and Rajin Port, an increase in the demand of companies wishing to be located in logistics complex is expected. In addition to Rajin Port development Rason Complex must be developed into a composite international industrial complex to cover logistics and various industrial sectors (raw material processing, light industry (textile, food) and assembly and manufacturing) as well as tourism development and infrastructure construction. It is necessary to promote composite and linked development of infrastructure and industrial complex through multilateral cooperation among Korea (logistic industrial complex development), DPRK (land and labor supply), China (Rajin Port development) and Russia (gas pipelines and railway connection). For the composition of a multinational industrial complex, active investment induction from foreign companies is required together with the bolstering of characteristic as a multinational logistic industrial complex from the beginning. In particular, when the North Pole route opens, Northeast Asia is expected to enjoy the largest benefits. Northeast Asia will become the center of global logistics in the future. For freight transportation between Northeast Asia and Europe, utilization of the North Pole route in addition to the Suez route is forecast. Moreover, key ports in Northeast Asia (including Rajin Port) will emerge rapidly as major international ports.

As for the recently discussed Rajin - Khasan project, transportation time to and from Rajin Port will be halved in comparison to marine transportation when TSR is used. So this project will lead to inducing 100,000 TEU of cargoes through TSR from Asia - Pacific regions, especially Korea. However, the increased freight volume among Northeast Asian countries is resulting in the distribution facilities to be continuously in a saturated state. Therefore, it is very important to build transportation and logistics infrastructures in Rajin port

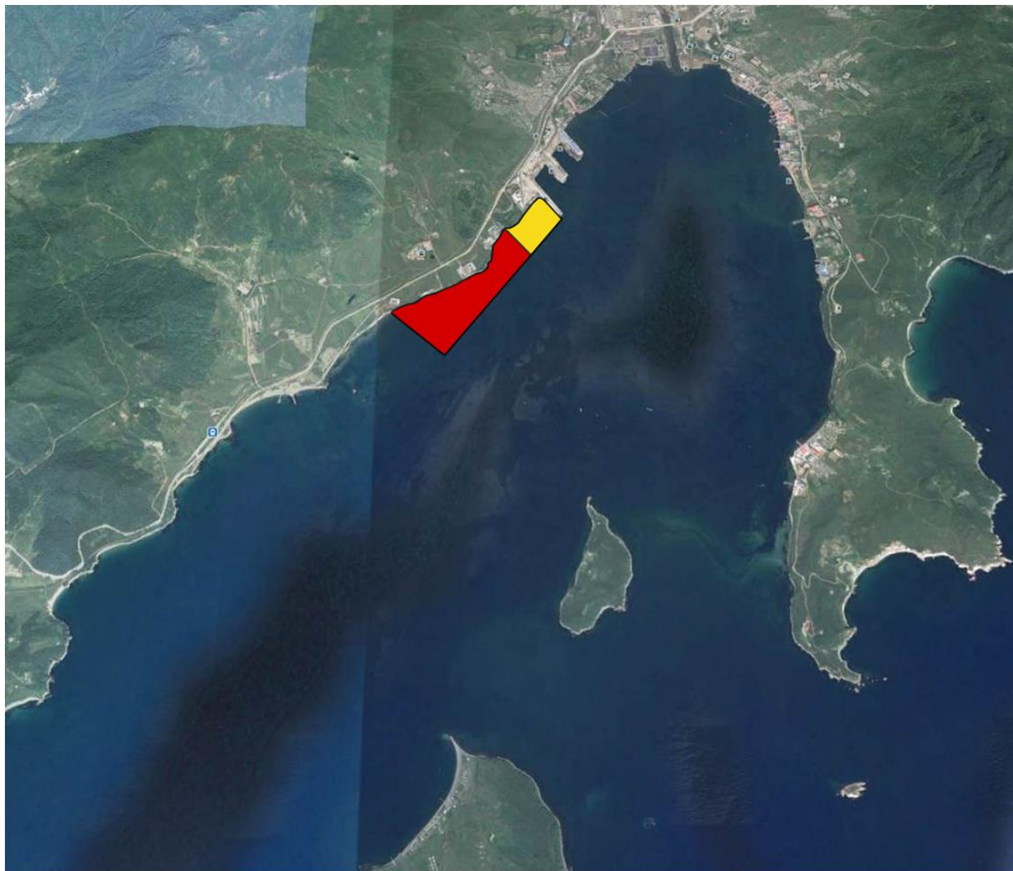
In the mid and short term, the new container terminal will be designed to accommodate 500,000 TEU of cargoes a year. However, it is forecast that the capacity will increase up to 2.7Mil. TEU in long term according to feasibility study above mentioned.

The main contents of this project are to expand Pier 3 as well as developing Pier 4, 5, 6 in

Rajin Port. The scope of this project also includes the development of a general logistic complex in the hinterland area of Rajin Port, which functions as an export processing yard, a bonded warehouse and a business facility.

The ground play for Piers 4,5,6 of Rajin Port development project is as of the following.

- Piers 4 : 500,000 TEU
- Piers 5 : 1,000,000 TEU
- Piers 6 : 1,200,000 TEU



(Source: Google)

Figure 4.1: Development of Rajin Port Pier 4, 5, 6

At present, Rajin Port faces an extreme shortage of hinterland logistic complex and the length of the berths. There is also an insufficiency of sheds. As the berths are short in length, the crane cannot be increased. As a result, the quay length must be increased. Mid to long-term development plan must be also established for Development of Rason Economic Trade Zone and Rajin Port.

In case of Pier 4, the ground play of phase 1 and 2 for Rajin Port development is as of the following. For the ground plan, the required scale of berths in the project site is decided based on the freight volume estimation. Here, the ground plan has been set based on not only the freight volume prediction until 500,000 TEU, but also a layout plan considering expansion in the future.



(Source: Google)

Figure 4.2: Phased Development of Rajin Port Pier 4

The ground play for phase 1 of Rajin Port development project is as of the following. The berth length for the phase 1 of project is 210m. The estimated freight volume for processing is 200,000TEU.

【1st Phase for Pier 4 】

Freight Volume Handled 200,000 TEU

Quay Length 420m

Next is the ground play for phase 2 of Rajin Port development project. In the 2nd stage, the quay length is 840m. The estimated freight volume is 500,000TEU.

【2nd Phase for Pier 4 】

Freight Volume Handled 500,000 TEU

Quay Length 840m

To modernize cargo handling facilities and to improve terminal facilities in Rajin Port, container cargo handling yard, open-air container storage and terminal gate container terminal facilities will be installed and repaired. In addition, a modern port logistics system will be established. The estimated cost of Rajin Port modernization is \$ 150 million.

【Transportation routes 】

Transportation routes for the use of distribution complex can be divided into three types as follows.

The first is the Rajin-Khasan route. The Rajin-Khasan project is a logistics business connecting the Rajin port and Trans-Siberian railway (TSR). This business is a Eurasian international complex logistics transportation business in both the sea and rail type, being a 'logistic transportation via TSR after sea transportation between Busan/East Sea port-Rajin'.

The second is the bidirectional marine transportation route between Rajin and areas south of Shanghai. The areas south of Shanghai refer to areas along the eastern coast, such as Shanghai and Ningbo, and areas on the northern and southern coasts, such as Guangzhou and Shenzhen. This transportation route is aimed for handling the domestic demand in China. Marine products and processed timber products as well as strategic items, such as coal and cereal, will be transported from Hunchun/ Rajin to areas south of Shanghai. In addition, daily consumables, clothing, fruits and vegetables and medicine and medical supplies will be transported from areas south of Shanghai to Hunchun/ Rajin.

The last is the international export and import route via Rajin Port. Hunchun/ Rajin will be connected not only with the areas south of Shanghai, Russia and DPRK, but also Korea, Japan, the U.S. and Europe. Based on the geographical advantages, it is anticipated to hold a superior competitive edge for inland regional freight transportation within Northeast Asian regions. The key items are daily consumables, automobiles, clothing and feeds.

【 Prospect of international logistics by Changchun - Jilin - Tumen development project 】

The prospect of international logistics environment development is as follows.

- As a bi-directional freight transport route covering areas south of Shanghai -> Rajin -> Hunchun was ratified (Feb. 18, 2014), a considerable increase in the domestic demand for transport volume in China is forecast.
- Chinese government is in need of a sustainable port along the East Sea as it is promoting Changchun - Jilin - Tumen development project.
- China is promoting a plan to build infrastructures in relation to Rajin Port (to build expressway/ railway between Hunchun and Rajin and to extend the wharves in Rajin Port).
- The demand from neighboring countries to open Rajin Port for export and import is increasing. In addition, activation of the route not only for domestic demand, but also for export and import within a mid to long-term scope is anticipated.

The following are target tenant selection details according to phased development.

Table 4.3: Phased Development of Rajin Port

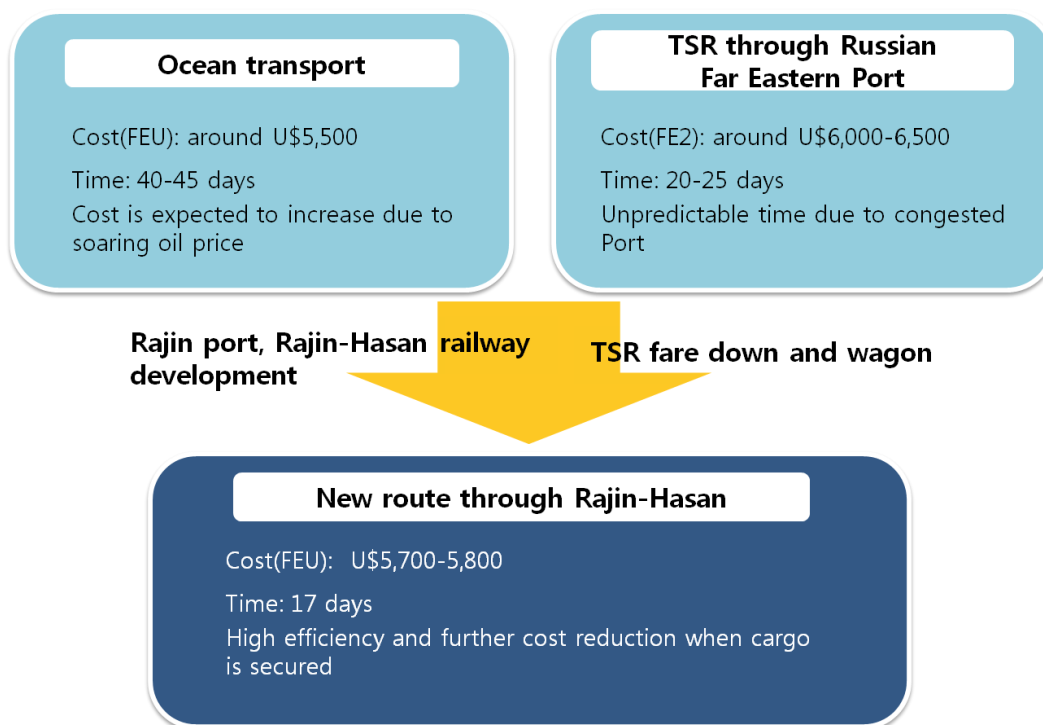
Classification	Period	Transport Route	Target Tenant Items
Rajin Port Improvement	Phase 1 (by 2016)	Hunchun - China/ Russia/ DPRK (domestic demand in China)	Daily consumables, fruits and vegetables, cereal, marine and processed marine products and timber and processed timber products
Rajin Port Development	Phase 2 (after 2017)	(+) Korea, Japan, U.S., Europe (export/import)	(+) Automobiles, clothing, feeds, automotive parts and additional services, such as clothes packing and labeling

4.2.2 Expected Benefits of Rajin - Khasan Railway and Ports Development

Rajin Port is a strategic point located along the border of countries, China, Russia and DPRK including ROK, Mongolia, Japan. This project will contribute considerably to strengthening the competitiveness of logistics infrastructures of Northeast Asia for the east gate of the Asia as a trade port as well as to build integration of the Northeast Asia. It will also contribute to inter-Korean economic cooperation by linking key ports in ROK and DPRK. In addition, it will increase the feasibility of port appliance with port cities in neighboring countries (Russia, China and Japan). Rajin Port, as a relay base for export and import freights to China and Russia, will handle cargoes passing through Korean peninsula to the continent. At the same time, it will significantly contribute to supporting Rajin - Seonbong Special Economic Zone.

The one of expected benefits of this project are factors reducing transportation time and cost. This project will lead to reducing the transportation time from Busan to Moscow by approximately 20 days. In particular, it has an effect to reduce the inventory period of high value-added freight by more than 20 days, and thus is expected to create large demand in link with automotive industry.

From the perspective of logistics cost, this project will enable transportation with a higher price competitiveness than marine transportation considering that it will replace the high cost incurring Far East port and reduce the cost of freight car purchase. In addition, this project will drastically improve the competitiveness of freight transportation in Central Asia and Mongolia.



(Source: GTI)

Figure 4.3: Economic feasibility of Rajin-Khasan project

Connection with Northeastern part of China is possible through a road extending from Rajin and Wonjeong of DPRK to China's Hunchun. For freight transportation from Hunchun of China through Rajin - Seonbong to Japan, the inland and marine transportation distances are reduced by 1/10 and 1/2 respectively than the transportation route through Dalian. Based on Yanji, the Yanji - Rajin - Busan transportation route measures 1,154km, which is around 50% shorter than Yanji - Dalian - Busan (2,300km) route. In addition, the 3,450km route of Yanji - Dalian - Niigata is reduced by approximately 2/3 to 1,120km if Yanji - Rajin- Niigata route is used. The cities along Tuman River and in the border areas have considerably high potential for development into a logistics channel extending to the East Sea and the Pacific via Rajin Port. In reference, freight transport time between Heilongjiang Province (Harbin) and Zhejiang Province (south of Shanghai) is as following.

- Using Inland Railway: Approx. 15 days
- Using Dalian Port: Approx. 7 days
- Using Rajin Port: Approx. 4 days

In addition, this project holds a great strategic value for link with the Arctic Ocean. By improving infrastructures through a railway network installation in the hinterland of Rason Special Zone and establishing an Eurasian logistics base through distribution complex construction, this project will provide a new growth engine to Rason Special Zone and secure synergy of development. This is to promote substantial multilateral cooperation projects of GTI member countries through sea & rail type logistics business in Eurasia.

The details of bi-directional domestic logistics in China are as follows: China plans to transport grains, timber, metal and other goods from the northern to the southern part of the country. In the opposite direction, various industrial products will be transported. For reference, using Rajin Port, the time and cost of coal, timber and cooper transportation from Hunchun to Shanghai can be reduced drastically. Transportation cost and time through the existing route are CYN 235/ ton and 10 days respectively. However, using Rajin Port, the cost and time are reduced to CYN 207/ ton and 7 days. As such, transportation cost and time can be decreased by more than 10%.

North -> South	South -> North	Transportation Price Comparison (2014)
1. Grain transportation Initial grain transportation volume 500,000 – 1 million tons (Container unit 20,000 – 40,000 TEU) (Beitahuang Group) 2. Timber transportation Annual timber transportation amount 500,000m² (Container unit 20,000 TEU) (Suifenhe Jinxin Forestry Corp.) 3. Metal transportation A number of metal companies in Hunchun will transport 100,000 tons of copper annually. (Container unit 6,000 TEU) Other transportation items include frozen fishery products (30,000 tons a year estimated), timber products and natural spring water.	1. 500,000 tons of building materials, light industry products, foods and furniture to be transported a year (20,000 TEU) 2. Container freight centering on clothing, shoes, building materials and electronic appliances Annual transportation volume 1 million tons (50,000 TEU) (Freight previously exported along the existing route of Changjiang Triangle, Shanghai, Fujian, Guangdong -> Yinkou -> Dongning, Suifenhe -> Russia will be transported through a shorter distance in a shorter period of time.) Other transportation items include ceramics and beverages.	Transporting coal, timber and cooper from Hunchun to Shanghai: Cost of transportation through Hunchun – Yingkou – Shanghai route: CYN 235/ ton Cost of transportation through Hunchun – Jinzhou – Shanghai route: CYN 245/ ton Cost of transportation through Hunchun – Rajin – Shanghai route: CYN 207/ ton

(Source: Extracted from interviews with Jilin Provincial Government)

Rajin Port is expected to perform a role as an intermediary site for the North Pole route opening and Arctic Circle development.

For logistic transportation between Northeast Asia and Europe, utilization of the North Pole route is expected in addition to the Suez route. In addition, key ports in Northeast Asia (including Rajin Port) are forecast to emerge rapidly as key international ports.

The distance of logistic transportation between Northeast Asia and Europe is 12,700km through the North Pole route and 20,100km through the Suez route. North Pole route can reduce the transportation distance by 7,400km..

In 2013, a total of three ships sailed from Russia's Ust – Luga Port to the Korean Peninsula through the Arctic Ocean. Two of the ships sailed to Gwangyang in ROK. This pilot operation was carried out by leasing a Stena ship in October 2013 and took approximately 35 days. One of the ships arrived at Rajin Port of DPRK. The figure shows the operational route of HHL Hong Kong.

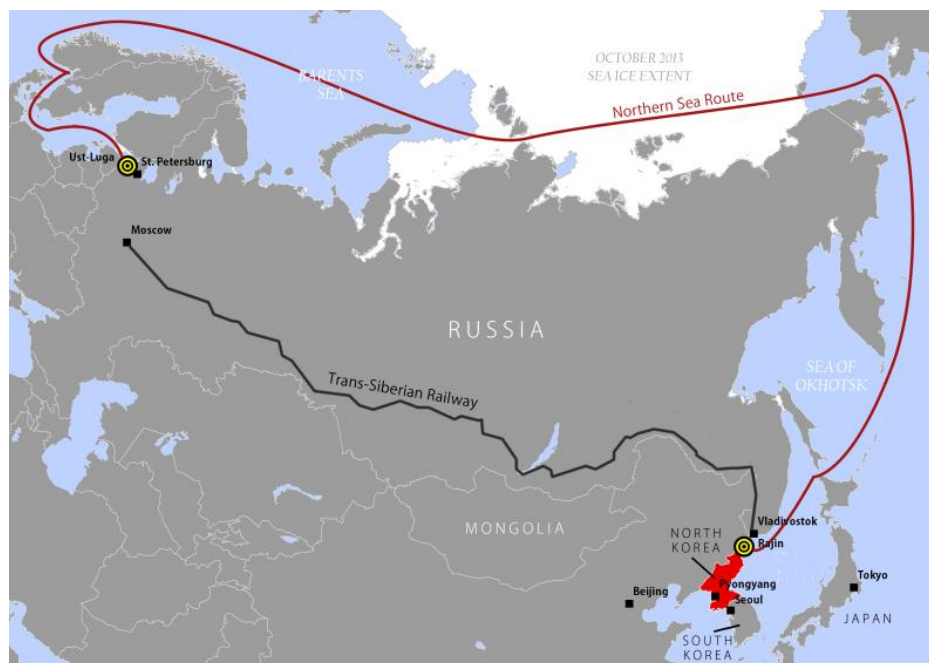


Figure 4.4: Map 1- The voyage taken by HHL Hong Kong from Ust-Luga, Russia to Rajin, DPRK in 2013.

4.3 Review on Financing issue

The feasibility of project increases when cooperation among countries in the area and active participation by companies interested in the countries are achieved. In addition, it is difficult to execute such a mega-scale project without cooperation with international financial organizations. However, considering the conditions and circumstances in North Korea, supply of the required fund within a short period of time will be difficult. So, it is most important to successfully establish development plans by stage. In the short term, the necessity of this project

must be emphasized and a consensus on this must be achieved among the related countries by making effective use of the GTI. At the same time, it is necessary to actively examine applicability of the recently founded export and import (EXIM) bank.

In the mid to long term, the feasibility of cooperation with international ODAs and financial organizations (ADB and WB) must be increased based on more active efforts from North Korea. Especially, the possibility of cooperation through the newly established AIIB needs to be examined actively. Countries under the GTI join AIIB and develop their respective areas by obtaining support from AIIB. With AIIB's investment fund as a guarantee, a greater amount of international private investment can be induced.

4.4 Recommendations

The directions for Rason area development as a trans-frontier cooperation zone are as follows:

First, it is necessary to bolster not only bilateral cooperation, but also multilateral cooperation in order to enhance awareness and expand the sharing of vision for Rason area development. Second, in order to increase effectiveness of the project, trans-frontier cooperation to actively respond to changes through phased approach must be promoted. Third, cooperation must be promoted in a direction to increase feasibility of trans-frontier cooperation by reflecting regional development strategies of the related countries and relevant organizations as much as possible. Fourth, it is necessary to promote composite development with consideration given to the order of priority for individual projects in a direction to increase geo-economic integration and efficiency for the entire areas of the Tumen River basin. Lastly, efficiency of trans-frontier cooperation in the Tumen River basin must be maximized by making an active use of the existing international cooperation tools available within the region.

1. Basic Direction

- Project development through joint investigation and consultation led by GTI governments
- Gradual and phased development considering increase in freight volume and move-in demand
- Inter-government consultation to improve conditions for investment
- Actively reflecting demand for participation by GTI companies
- Collecting opinions through questionnaire survey and TF activities

2. Consultation with GTI government

3. Establishing detailed plans for Rajin Port and hinterland complex development

- Participation by research centers, engineering companies and construction companies from GTI countries

4. Project promotion

- A plan to promote this project by establishing an SPC (special purpose company) with GTI countries is discussed with the government.
- Considering GTI companies' investment demand, a plan to expand hinterland distribution

complex by phase will be devised.

- To generate freight volume for Rajin ports, it is necessary to develop a hinterland industrial complex using natural resources of the three Northeastern Provinces of China, the Far East Russia, Mongolia and technological power of Korean and Japanese companies.
- As a promotion strategy, it is necessary to increase the flexibility of project by dividing the roles between central and local governments and also with the private sector (1.5-track).
- In particular, for successful implementation of this project, it is necessary to achieve ① competitive freight rate structure establishment, ② fast transportation time, ③ transparent and prompt customs clearance procedures and ④ extensive port infrastructures. Therefore, ROK and Russia should provide competitive logistic service in terms of cost and time through reducing port use costs, reducing train rental costs, applying discounted freight charges, providing fast transportation time, and simplifying customs procedure regarding the Rajin-Khasan project.
- For this, it is necessary to discover cooperative projects and to build a strategic cooperation system between central and local governments in relation to the applicable areas.

In conclusion, Rajin Port development is one of the pilot projects aimed at achieving 'integration' and 'community' formation between the Korean peninsula and other Northeast Asian countries. To effectively fulfill this mission, upgraded relationship setting and economic cooperation are necessary.

First, for the Korean peninsula and Northeast Asia to grow cooperatively, it is necessary to build a trans-border cooperation mechanism to share investments and profits as well as industries and infrastructures centering on Rajin Port.

Second, Rajin Port development project must be promoted under the principle of separation between economy and politics. Convergence type efforts for peace and prosperity are necessary with which to secure a structure of virtuous circle for economy, military and security.

Third, a 'globalization' strategy to divide the roles between the government and the private sector and also between the central and the local governments is necessary. Through Rajin Port development, a new success model for inter-Korean and Northeast Asian economic cooperation must be achieved.

One of the goals of this project is to build and activate a logistic network based on Rajin Port. For this, a multilateral GTI cooperation plan is required. GTI members need to build a Pan – East Sea marine transportation network that connects Korea's East Coast region, the area in Japan off the East Coast, China's southern coastal area on the basis of Rajin Port.

Considering the necessity of Rajin Port development, Zarubino Port development plans and the demand for freight handling in these two regions, the relationship between these two ports need to be recognized as supplementary rather than competitive.

Rajin Port repair and extension work are necessary together with the basic infrastructure construction. For this, active cooperation with surrounding countries, such as China, Russia, Mongolia, Japan, DPRK and ROK, is required. In addition, overland routes connected to the ports must be established. A road connecting between Changchun and Rajin Port and a railway covering Changchun – Tumen – Rajin Port/ Cheongjin Port need to be repaired and extended.

To activate this project, it is necessary to build an industrial complex for export/ import and a logistics complex inside Rajin Economic and Trade Zone.

Governments of the neighboring countries, such as China, Russia, Mongolia, Japan, DPRK and ROK, need to foster international logistics companies specializing in Northeast Asian region. At the same time, for development of the logistics companies, these governments must actively deploy various supporting projects, such as for tax benefits and funding support.