

An International Logistical Network in Northeast Asia¹

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1. Introduction

The aim of this paper is to outline the current status of existing and planned transportation corridors in Northeast Asia, as well as their characteristics and problems relating to them. Firstly, we select 10 transportation corridors in the region and provide an overview of them, before stating our thoughts on the potential held by the Trans-Siberian Railway (TSR) transportation corridor, the Trans-China Railway (TCR) transportation corridor, a route that competes with the TSR corridor, Mongolian transportation corridor, and the Korean Peninsula transportation corridors, which it is hoped will be connected to the TSR corridor in the future.

2. Northeast Asia's International Transportation Corridors: Existing and Planned Routes

We would now like to describe the 10 Northeast Asian transportation corridors in more detail. Fundamentally, a transportation corridor is intermodal, making use of all means of transport, including rail, road and marine transport. In this paper, we focus on the overland part of each corridor, but we will also add some information about the marine sections linking up with them.

(i) Vanino – Taishet (BAM) Transportation Corridor: Railway Between Vanino and Taishet

This corridor consists of the BAM (Baikal-Amur) Railway line, which branches off from the TSR to the northeast at Taishet and runs more-or-less parallel to the TSR between 200 and 500km north of that line, terminating at Vanino Port, on the Tatar Strait. The gauge of the rails is 1,520mm (broad gauge). It is mainly used for the development of resources in northern Siberia, but it also serves as an alternative route to the TSR. There are abundant forestry resources and coal reserves along the railway, some of which are exported to countries such as Japan via Vanino Port. In addition, there is a rail ferry between Vanino Port and Kholmsk, which provides an important link to Sakhalin.

Issues that must be tackled in this corridor include the construction of double tracks on single-track sections and the electrification of longer stretches of the railway; however, it has not shown itself to be inadequate thus far.

¹ This paper is based on my presentation made at a symposium “Eurasian Landbridge Railway; Approaches to efficient utilization”, organized by the Korea Railroad Research Institute on November 17 2003 at COEX Conference Center of Seoul.

(ii) Trans-Siberian Railway (TSR) Transportation Corridor: Ports in Primorsky Territory – Russian Domestic Destinations / Europe / Central Asia / Afghanistan

The TSR is Russia's main East-West artery, running 9,297km from Vladivostok to Moscow. The line is also linked with lines running further west to such European countries as Finland and Poland. In addition, it is connected through numerous branch lines to Northeastern China, the DPRK, Mongolia, Kazakhstan and Uzbekistan. Furthermore, via marine routes starting from ports such as Vladivostok and Vostochny, it is linked to such places as Japan, the ROK, the coastal areas of China and Vietnam. The line uses rails with a gauge of 1,520mm (broad gauge) and is double-track along its entire length, apart from a 2,658m stretch on the Amur River Railway Bridge, on the outskirts of Khabarovsk. Work to electrify the whole of the railway was completed at the end of 2002.

The TSR is used for the domestic and international transport of a variety of commodities, including coal, timber, petrochemical products and container cargo. International containers are loaded onto block trains, which travel at an average speed of 50km/h. Block trains can cover the distance between Vostochny and the Finnish border in 12 days and between Busan and the Finnish border in 16 to 22 days. The volume of cargo transported has continued to grow over the last few years.

There is no trans-Siberian road running in parallel with the railway. At present, road construction is taking place in Amur region. When this road is completed, it should become possible to drive from Vladivostok to Moscow.

(iii) Manzhouli Transportation Corridor: Heilongjiang Province – Manzhouli – Zabaikalsk – Chita – TSR

This is a trade corridor that links Northeastern China and Russia via overland (road and rail) routes. Of the numerous border-crossing points between China and Russia, Manzhouli – Zabaikalsk is the most heavily used for the transport of cargo. Cargo exported from Russia to China includes timber, scrap metal and wood pulp, while that exported from China to Russia includes household electrical goods, fruit and vegetables, and consumables such as clothing. In the case of the railway, China and Russia use different rail gauges, so transshipment of cargo takes place at stations on the border. There are facilities for transshipping container cargo and about 30,000TEU of containers are transshipped annually. However, they tend to become crowded, so it takes about two days to cross the border.

(iv) Suifenhe Transportation Corridor: Heilongjiang Province – Suifenhe – Vladivostok / Nakhodka

This is a corridor that runs to the sea from China's Heilongjiang Province, via Russia's Primorsky Territory; it is actually used for trade, tourism and other travel

between China and Russia. In the case of the railway, China and Russia use different rail gauges, so transshipment of cargo takes place at stations on the border. In the case of road transport, Chinese trucks are permitted to operate in Russia as far as Ussuriysk, while Russian trucks are permitted to operate in China as far as Mudanjiang, but it would be preferable for this area to be extended further.

Traffic through this corridor is on the increase, with 4.2 million tons of cargo and 800,000 people passing through it in 2001. With regard to trade freight between China and Russia, the overwhelming majority is accounted for by exports from Russia to China, most of which take the form of logs. Containers are mainly transported by road, with little use of the railways.

The biggest problem in this corridor is the time that it takes to cross the Chinese-Russian border. It takes time to clear customs on the Russian side of the border, due both to limited facilities and inefficient procedures.

Experts in Seattle have proposed linking Heilongjiang Province and the US West Coast via ports in Primorsky Territory (the East-West corridor). However, this idea has remained on the drawing board, as there is insufficient cargo between Heilongjiang Province and the US.

If routes (iii) and (iv) were linked, then Chita would, in theory, be linked with ports in Primorsky Territory in a more-or-less straight line passing through Chinese territory and they could be viewed as a single transportation corridor, but if we take into consideration the two border crossings that would be required and the fuss involved in transshipping rail cargo, we can see that it is not a practical transportation route. Even though the total distance is greater, the TSR is a more practical route for transport from Chita to Primorsky Territory.

(v) Tumen River Transportation Corridor: Jilin Province – Ports in the Tumen River Area (Rajin / Zarubino / Posiet)

This is a transit route to the sea from China's Jilin Province, which does not have a seaport, using ports in Russia and the DPRK that lie at the mouth of the Tumen River. The ports used include Rajin and Chongjin ports in the DPRK and Zarubino and Posiet ports in Russia. There are many issues that must be tackled, such as transport infrastructure (road and rail) problems on DPRK territory, Russia's border-crossing procedures, and problems relating to the port facilities. Therefore, the corridor has not been used as much as was initially anticipated.

The two regular shipping routes established in 1999 to link ports in Japan with those on the Tumen River (Niigata – Rajin, Akita – Posiet) are dormant or have only irregular services, mainly due to a lack of cargo.

However, shipping routes linking ports in the ROK with those on the Tumen River are doing well. Three sailings per month have continued to operate on the Busan – Rajin route established in 1995, with 4,000-5,000TEU of cargo being carried annually.

Furthermore, the Sokcho – Zarubino ferry established in 2000 operates three times a week and is crammed with tourists and peddlers traveling back and forth between the ROK and Yanbian. This ferry also carries container freight and competes with the previously established Busan – Rajin route.

In the long term, the Tumen River transportation corridor is anticipated to function as an alternative route to the crowded Dalian transportation corridor. Moreover, there have been suggestions that the corridor might be extended west from Changchun, in Jilin Province, to link up with eastern Mongolia, thereby providing Mongolia with a new outlet onto the sea.

(vi) Dalian Transportation Corridor: Harbin – Changchun – Shenyang – Dalian

This corridor is a major artery passing from north to south through the three Northeastern Chinese provinces (Liaoning, Jilin and Heilongjiang), running as far as Dalian Port; the majority of domestic and trade cargo and passenger transport for the three provinces passes through this corridor. Electrification work on the railway between Harbin and Dalian (944km) was completed in November 2001 and the entire line is double-track. Furthermore, in September 2002, an expressway between Harbin and Dalian was opened, and this has helped to ease some of the congestion on the Harbin – Dalian railway. The volume of southbound cargo far outstrips that of northbound cargo.

Dalian Port is the biggest international port in Northeastern China, handling more than 100 million tons of cargo in 2001, with the volume of container cargo handled reaching 1.2 million TEU. Dalian New Port is being constructed in order to respond to the year-by-year increase in cargo. With regard to the main commodities handled, the main container import is car components destined for China FAW Group Corporation in Changchun, while the main container exports include finished cars, rice and tobacco. Moreover, there are vast silos for cereals in Dalian, which are used in the import of wheat and the export of corn and soybeans. Oil is brought to Dalian from the Daqing oilfield via a pipeline and is taken overseas by ship after being refined. Iron ore is imported from overseas and transported to domestic ironworks. In addition, Yingkou and Jinzhou ports are located near Dalian.

(vii) Mongolia Transportation Corridor: Tianjin – Erenhot – Zamyn-Uud – Ulaanbaatar – Ulan-Ude – TSR

The corridor between Mongolia and Tianjin is the shortest route from the landlocked country of Mongolia to a seaport. This railway line has the potential to become the shortest route from China (Beijing, Tianjin) to Russia and Europe, stretching north to connect with the TSR. As Mongolia's railway uses the same broad gauge as Russia, transshipment is necessary at the Chinese border. Extensive infrastructure construction has been conducted with Japanese assistance, such as the construction of

a transshipment terminal at the Chinese-Mongolian border, and the laying of fiber-optic cables on Mongolian territory between its borders with China and Russia. However, Mongolia's entire domestic railway network is single track.

The volume cargo transported along Mongolia's railways is growing dramatically, reaching 3 million tons in 2002.

Container transportation is also increasing significantly. With regard to domestic routes, a container block train named 'Eastern Wind' began operating between Ulaanbaatar and Zhamyn-Uud in April 2000. As far as international routes are concerned, a container block train named 'Friendship' began operating twice a week in May 2002, running between Tianjin and Ulaanbaatar; another, named 'Mongolian Vector', began operating every other week in March 2002, running between Brest and Ulaanbaatar via the TSR.

In the future, there is a possibility that a container block train will run between Tianjin, Ulaanbaatar, and Europe (Finland) via the TSR. At present, Chinese export cargo bound for Finland and Moscow is shipped long distance using multimodal transport on the Tianjin ~ Busan ~ Vostochny ~ TSR ~ Finland route. This Mongolian route has the potential to reduce the shipping time.

It would be preferable for a road running in parallel with this railway to be built.

(viii) Trans-China Railway (TCR) Transportation Corridor: Lianyungang Port – Alashankou – Druzhba – Kazakhstan – Uzbekistan

This is one of the routes linking Japan and the ROK with Central Asia (the other being Corridor (ii) via the TSR), consisting of a railway running across China, stretching from Lianyungang Port as far as Kazakhstan and further to Uzbekistan.

Railways in Central Asia use broad gauge, like Russia, so it is necessary to transship cargo at the Chinese border.

Container block trains run between Lianyungang Port and Alashankou three times a week. It was previously impossible to keep track of the progress of containers sent on this route, but a tracing service is now available.

The main problems on this route are the time-consuming border-crossing procedures on the Kazakh side and the fact that containers are opened at random for inspection. Another issue is that fairly large portion of the Chinese railroad is still single track and non-electrified. China is planning to improve these portions gradually.

UIC is heavily involved in endeavors to extend this route further west to Northern Europe via Russia (the N.E.W. Corridor).

(ix) Korean Peninsula West Transportation Corridor (Gyungui Line): Busan – Seoul – Pyongyang – Sinuiju – Dandong – Shenyang

This is a route that runs to the DPRK from Busan in the ROK via Seoul, traveling north along the west coast to Sinuiju and then on to China. Before the Second World

War, this corridor was an important transport route linking Japan and Northeastern China, but it had to be severed when the Korean Peninsula was divided in two. However, since the North-South Summit in June 2000, momentum for reconstructing the Gyungui Line between north and south has increased and railway construction work has taken place on the ROK side. In September 2002, work to clear mines began on the DPRK side. Work on connecting the north-south railway has continued in 2003, and the only outstanding issue is the rehabilitation of the railway on the DPRK side. After the railway is opened, it will be necessary to conclude a transport treaty and secure safety guarantees in order to run services on this line.

There are plans to construct a road running in parallel with the Gyungui Line.

(x) Korean Peninsula East Transportation Corridor (Donghae Line, Gyungwon Line, etc.): Busan/Seoul – Wonsan – Rajin – Khasan – Ussuriysk – TSR

There are a number of candidates for a route running up the east coast of the Korean Peninsula to Rajin in the DPRK and Khasan in Russia. Initially, several routes linking Seoul and Wonsan were proposed. These included the reconstruction of the Gyungwon Line, the use of the Gyungui and the Pyongra (Pyongyang – Rajin) lines, and a line branching off from the Gyungui Line. Russian experts carried out field studies into some of these options.

However, it was agreed in April 2002 that the Donghae Line between north and south should be connected. In September 2002, a ceremony was held simultaneously on both sides of the border to commemorate the commencement of work on the Gyungui and Donghae lines. The Donghae Line takes the shortest possible route between Busan and Russia, without passing through the ROK capital. When it is completed, it will be possible to use the railway to export to Russia goods produced in factories near Busan, such as household electrical items. As there is no link to any domestic railways in the ROK, however, the burden of construction costs borne by the ROK will be considerable.²

The problem that all these transport corridors hold in common is that national borders form very tall barriers in Northeast Asia.

Firstly, two different types of gauge are used for railways in the region, making transshipment necessary wherever these two types meet. Formerly Soviet countries (Russia, Central Asian states, etc.), Mongolia and Finland use broad gauge (1,520mm) rails, while China, the Korean Peninsula and Europe (other than Finland) use standard gauge (1,435mm). In addition, in Japan, the bullet train uses standard gauge, while conventional railway lines, including cargo lines, use narrow gauge (1,067mm).

² New track is required on 298km of the Donghae Line: on the northern part (127km on the Gangnung – DMZ Line) and the eastern part (171km between Samcheok and Pohang). However, only 18km of new railway track is required on the DPRK side.

Japan is an island nation, so this is not a problem at present, but if, at some stage in the future, the railways of Japan and the ROK were linked, then this would become a major obstacle.

With regard to the soft aspects of border crossing as well, there are many borders that are inefficient in terms of procedures and the time required to complete them, and these are a hindrance to economic activity. In particular, in Russia and Kazakhstan, there are problems with the efficiency of border crossing and customs inspection procedures. It would be preferable if international institutions were to take the initiative and solve such problems at the governmental level.

3. The Current Status of the Trans-Siberian Railway Transportation Corridor and Competing Routes

The four types of route that use the TSR that are currently being used as international transportation routes are as follows:

- i) European Transit: Cargo can be transported from East Asia to Europe (Finland) via ports in the Russian Far East and the TSR in 16 to 22 days. Cargo is stored temporarily in Finnish bonded warehouses and is ultimately exported to Russia. Currently, this route is hardly ever used to reach any other European countries, adopting standard gauge, as it is not competitive in terms of cost or time.
- ii) Central Asian: Cargo can be transported from East Asia to Kazakhstan/Uzbekistan via ports in the Russian Far East and the TSR in about 20 days. In addition, a block train began operating between Vostochny and Almaty in February 2003, reducing the journey time by about one week.
- iii) Afghan Transit: Cargo can be transported from East Asia to Central Asia/Afghanistan via ports in the Russian Far East and the TSR in about 30 days.
- iv) Russian Domestic: Cargo can be transported from East Asia via ports in the Russian Far East and the TSR in about 17 days, in the case of Moscow.

Each of these routes has competitor routes; consignors make decisions about which routes to use depending on their relative competitiveness in terms of cost, journey time, frequency of service and trustworthiness.

European Transit's biggest competitor is the All Water route. The latter takes about a month to transport cargo from ports in Japan and the ROK to Finland, which is considerably longer than the 16 days that the TSR takes, but its low-cost service, made possible by its investment in vast ships that can carry more than 6,000TEU, is its major weapon. The marine freight rate between Japan and Europe is particularly low, so the TSR route is consequently unable to compete with the All Water route. However, as the marine freight rate between the ROK / China and Europe is much higher than this, the TSR route is competitive compared to the All Water route.

Corridor (viii) via the TCR is a competitor to the Central Asian route. Both routes can apparently match each other in terms of cost and journey time, but block trains have recently begun to run between Vostochny and Almaty, reducing the journey time between these points by a week, so we can infer from this that the TSR has the edge at present. However, for cargo originating in Japan, there are about three shipping services per week to Chinese ports, which is more convenient than the two services per month to the TSR, so many consignors apparently use the TCR. On the other hand, for cargo originating in the ROK, there is a higher frequency of sailings to ports in the Russian Far East, making the route more convenient, so use of the TSR is higher. As mentioned before, the downside of the TCR is the fact that border-crossing procedures on the Kazakhstan side take several days.

A route via Iran is the main competitor of the Afghan Transit route. The Iran route uses marine transport as far as Bandar Abbas and then runs overland to western Afghanistan, and is cheaper than the TSR. However, transit via the Iran route has stopped at times in the past due to the political situation, so it lacks trustworthiness.

Cargo on the Russian Domestic route is often sent via Finland. From East Asia it is transported as transit cargo to Finland via All Water or the TSR, and cargo being exported to Russia, such as household electrical goods, is held temporarily in bonded warehouses near the Finnish border. After it has been confirmed that the purchaser has paid, a truck is sent from Russia and the cargo is handed over. The main reason for choosing this route is that a lower customs duty is charged on goods entering Russia this way than those entering the country via ports in the Russian Far East, so it is competitive in terms of cost.³ Other advantages of this route include the existence of easy-to-use Finnish bonded warehouses and transit railway charges that have been set far lower than those for bilateral cargo.

The total volume of cargo on the TSR using the aforementioned routes has continued to grow steadily over the last few years, increasing from about 70,000TEU in 2000, to 90,000TEU in 2001 and about 130,000TEU in 2002, according to statistics released by VICS (Vostochny International Container Services). In 2003, cargo volumes have been rising by as much as 50% on last year and the total volume for the year is anticipated to reach 180,000TEU. Factors behind this increase include 1) the cut in journey times and the increase in the TSR's trustworthiness among ROK and Chinese consignors; 2) the spring 2003 price rise on the All Water route, the TSR's competitor in transit transport to Finland⁴; and 3) the boom in the Russian economy and active demand for ROK-produced household electrical goods and Chinese-produced miscellaneous

³ Piecing together remarks made by those involved in the business, it seems that, in the case of goods carried from Finland to Russia by Russian transportation companies, the invoices are fiddled and discounts on customs duty are granted.

⁴ The TSR went ahead with a 30% rise in rail transit charges to Finland from 1st January 2003, but the All Water route also increased its prices, so there was hardly any effect on the TSR.

everyday goods. There are concerns that, if this rise continues, transport capacity will be exceeded and delays will result.⁵

(Table 1) Changes in the Volume of Containers Handled at Vostochny Port
(2000 – 2002)

	2000	2001	2002	2002/2001
Transit: Westbound	25,219	27,731	31,148	1.12
Eastbound	17,512	20,996	20,940	1.00
Bilateral: Westbound	19,748	24,854	46,626	1.88
Eastbound	5,684	6,146	10,406	1.69
Empty containers	4,514	10,044	24,654	2.45
Other	24	146	30	0.21
Total	72,701	89,917	133,804	1.49

Source: VICS (Vostochny International Container Services)

Several trends have been visible in TSR container transportation in recent years.

1) A rapid increase in Chinese cargo and a decline in Japanese cargo

It was Japan that blazed a trail in TSR transit transport in the latter half of the 1970s. TSR transit transport from Japan to Europe reached its peak in the 1980s. However, cargo declined in the 1990s, due to lowered prices on the competing All Water route, a deterioration in the route's image due to the chaos arising from the collapse of the Soviet Union, and the tendency of Japanese companies to transfer their manufacturing hubs overseas, and the fall in cargo volumes could not be checked.

Meanwhile, the ROK made a great leap forward to become a major exporter in the 1990s, surging ahead as the main player in exports of household electrical equipment to Russia, in particular. According to shipping companies in the ROK, TSR cargo increased 3.3 times on 1991 levels in the 10 years to 2001.

Furthermore, China has emerged as a major exporter in recent years. Due to the momentum created by the establishment in the autumn of 2000 of a container route linking Shanghai and Ningbo in China with Vostochny, exports to Russia using the TSR have continued to climb sharply. At present, services are operating on the Hong Kong – Vostochny shipping route as well, and cargo is also taken from a number of Chinese ports to Busan, where it is transhipped and sent to Russia. Cargo from China includes clothing, everyday items and household electrical items produced in Korean factories in China; these are exported to Russia, either directly or via Finland. Looking

⁵ There is no accepted figure for the transport capacity of the TSR, as it is partly related to domestic transportation, but according to experts from the Russian Ministry of Railways, it is around 200,000TEU.

at cargo by countries of origin and destination, in 2001, 77% originated in or was destined for the ROK, while the figures for China and Japan were 12% and 11%, respectively; however, the figures for ROK cargo include Chinese cargo transshipped at Busan. Currently, it seems that China's share is growing significantly while the shares of Japan and the ROK are declining.

As mentioned previously, fares on the All Water route between East Asia and Europe vary greatly depending on the country. The rate between the ROK and Europe is much higher than that between Japan and Europe, while the rate between China and Europe is even higher again. The key reason for the low usage of the TSR by Japanese cargo lies in this cost difference.

2) An imbalance between westbound and eastbound cargo and an increase in empty containers

The ratio of westbound to eastbound cargo is imbalanced, having grown to 71 : 29 from 66 : 34 in 2001. In connection with this, the volume of empty containers is on the increase. Empty containers accounted for 18.4% of all cargo in 2002. The increase in empty containers does not only have repercussions for the cost of using containers, but also has an effect on the efficiency of work at Vostochny Port. This phenomenon is believed to be caused by the increase in Chinese cargo, which tends to be bound in one direction only.

3) A rapid rise in bilateral cargo

Looking at Table 1, although we can see a slight increase in transit cargo, we can also see that bilateral cargo is growing rapidly. The ratio of transit to bilateral cargo has become almost evenly divided, shifting from 61 : 39 in 2001 to 48 : 52 in 2002. In particular, the increase in westbound bilateral cargo signifies an increase in ROK cargo destined for Central Asia, and Chinese cargo destined for the domestic market in Russia.

4) An active approach on the part of the ROK forwarders

The active approach on the part of forwarders in the ROK has played a significant part in the increase in TSR container cargo. ROK forwarders have been creating a business environment for strengthening the competitiveness of the TSR route. For example, the attempt by multiple shipping companies to become involved in the Busan – Vostochny shipping route succeeded in reducing⁶ marine transport fares by

⁶ Originally, Transorient Shipping Co., Ltd. (a joint venture between FESCO and Hyundai Merchant Marine) had a monopoly on the Busan – Vostochny route, but in 2001, other shipping companies were given permission to run services on the route and around five companies decided to take advantage of this. As a result, the marine transport fares for transit cargo fell by 30-35%. In contrast, the joint service run by FESCO and Mitsui O.S.K. Lines still has a monopoly on the Japan – Vostochny route.

encouraging competition. In addition, the forwarders themselves own containers and reduce the burden on consignors by allowing them to use them. In contrast, Japanese forwarders do not have their own containers, so consignors have to lease containers, which in turn pushes costs up. Furthermore, major forwarders receive bulk discounts on rail transport fees. The ROK's forwarders have been picking up Chinese cargo at such places as Dalian, Tianjin and Hong Kong, transshipping it at Busan and then sending it via the TSR route.

There are several issues that must be dealt with in the future with regard to the ROK's and China's use of the TSR, which at present appears to be going smoothly.

- 1) Most of the ROK's exporting companies have domestic production bases, but it is likely that in future there will be an increasing trend towards shifting production bases overseas to countries where labor costs are low, as has been the case in Japan. In this case, the volume of export cargo originating in the ROK will decrease and the country may well go down the same path as Japan.
- 2) The All Water route, which is the main competitor of the European Transit route, is moving towards the introduction of gargantuan ships, so it is possible that they will go on a further low price offensive.
- 3) Russian Railways has increased its rates occasionally in the past. For example, it increased transit fares by about 30% in January 2003. Additionally, it announced an increase in charges in October 2003, citing security reasons, but ended up having to back out of this move due to strong objections among users. Such fare increases may reduce cost competitiveness.
- 4) The TCR route, which is the main competitor of the Central Asian route, could well embark upon efforts to speed up its transport times and improve its level of service. For instance, some cargo is now transported from Tianjin to Alashankou directly, without passing Lianyungang Port. If a container block train were run along this route, the new TCR could have an advantage in terms of speed.
- 5) The Mongolian route could become a competitor to the TSR. Chinese exports to Russia and Finland will increase further and, if a new route from Tianjin ~ Ulaanbaatar ~ TSR ~ Europe were developed, this route might have an advantage in terms of time, compared with the existing option of transit to the TSR via Busan.

4. Linking the Korean Peninsula Railways (Corridors ix. & x.) and the Trans-Siberian Railway (Corridor ii.)

Now let us consider the potential for and profitability of linking the Korean Peninsula railways, upon which work has already started, and the TSR.

1) Korean Peninsula West Transportation Corridor (Gyungui Line)

Once the Gyungui Line has been completed, North-South commerce will be able to

take place overland, rather than having to use marine transport, as is the case at present; the line is likely to have an advantage both in terms of time and cost. North-South trade was worth \$402.957 million in 2001, rising to \$641.730 million in 2002. Trade between the two countries takes place on four regular and irregular shipping routes, including Incheon – Nampo and Busan – Rajin. The cost of marine transport between Incheon and Nampo is about \$720/TEU, but this is expected to fall to \$200/TEU if the Gyungui Line were used, and the number of days required to complete the journey is also anticipated to decrease considerably.

Furthermore, there is potential for the Gyungui Line to be used for trade between the ROK and Northeastern China, for which the ROK is currently dependent on marine transport. Which route is used will ultimately be decided by each route's competitiveness in terms of time, costs and procedures, but given that the Korean Peninsula and China use the same rail gauge, the potential for this route to be realized is great.

However, several barriers have to be overcome in order to use the Gyungui Line to transport cargo to Western Russia or Europe. In order to go from China to Russia, transshipment at Manzhouli or Erenhot is required due to the gauge difference. In addition, the Chinese railway line that the route would use does not have sufficient transport capacity to allow block trains for foreign cargo to run on it as well.

The example of the shipping route used by a car factory in Jilin Province, China, serves as a reference in considering the economics of linking the ROK with Europe by means of a railway. In a joint venture with Germany's Volkswagen (VW), Changchun's China FAW Group Corporation is setting up a production line for such VW cars as the Audi brand. It is what is called knockdown production, with the main parts being imported from Germany. The import route from Germany uses marine transport on the All Water route from Hamburg to Dalian, with trucks or trains used to transport the parts between Dalian and Changchun. As can be seen by looking at a map, transport takes the long way around, going via the Suez Canal, but according to a German contact in the transport business, the All Water route is cheaper than using a unified rail route, taking the TSR through Corridor ii), traveling via Manzhouli in Corridor iii) and then joining up with Corridor vi). Eastbound All Water cargo is apparently considerably cheaper than westbound cargo on this route. In addition, although the TSR route is described as a unified rail route, transshipment must be carried out twice and the journey time varies according to how long the cargo is kept waiting at the border. Given that All Water route is more competitive even in the case of a landlocked city like Changchun, it is unlikely that the unified rail route is going to be more competitive in the transport of cargo to Western Europe from places much closer to the sea, such as the ROK, Japan and the coastal region of China.

2) Korean Peninsula East Transportation Corridor

Even if the east coast route is completed, it is thought that it will not carry many passengers or much cargo between North and South, due to its geographical conditions. It could however be used for international transportation.

Firstly, a route linking the ROK with China's Jilin Province, via Chongjin and Rajin in the DPRK section of the Tumen River area, is conceivable. Yanbian Prefecture, in the east of Jilin Province, is home to many ethnic Koreans and many ROK companies have established bases there. At present, a marine route is used for transporting cargo between the ROK and Yanbian, but it would be possible to transport it overland if this corridor were completed.

The second possibility is the concept of connecting the ROK with Russia's Primorsky Territory. The Russian Ministry of Railways has great expectations with regard to the concept of connecting the Donhae and Gyungwon lines with the TSR. The ministry's take on the concept is that, if cargo could be sent from the ROK, which is now taken by boat to ports in Primorsky Territory, by rail via the DPRK, without once loading it onto a ship, marine transport fees would not be required and it would be possible to make the route more price competitive than the current combined marine and TSR transport system, so might it not be possible to extend the European transit route from Finland, where it terminates at present, to Central and Western Europe? However, as might be expected, shipping companies and those working at ports in the Russian Far East are opposed to this concept.

Furthermore, there are several problems regarding the economic efficiency of joining the TKR with the TSR and using this route. First of all, the DPRK and Russia use different gauges, so transshipment at the Korean-Russian border would be necessary and the construction of a new facility for this would be required. Secondly, the DPRK's domestic railways are extremely dilapidated single-track lines, so a vast amount of investment would be required before block trains could run on them. Thirdly, the DPRK would demand transit fees for ROK cargo and the trains would have to travel some 500km within the ROK from Busan, so rail transport costs would rise. Fourthly, it would be necessary to construct new railway facilities on the ROK side. If we put together all these factors, it is unclear whether the fares on the TKR+TSR route would be economically competitive with those on the marine route between Busan and Vostochny, which have apparently fallen significantly in recent years.

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