

**Integrated Transport and Logistics Infrastructure
Development for Northeast Asia: With Special Emphasis on
Korean Peninsula**

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Abstract

Northeast Asia is one of the most dynamic regions in the world. Economic development has been rapid in this region and transport and logistics infrastructure development at national level has also been very active in recent years. However, the transport and logistics network is neither sufficient nor well integrated at the international level. The existence of missing links in Korea Peninsula and other parts of the region are the major cause of this lack of transport and logistics integration in the region. But increased economic exchange between South and North Korea could provide a momentum for expediting transport and logistics integration not only in Korean Peninsula but also in the entire the region.

In the current international environment characterized by globalization and regionalization, transport and logistics system integration is a prerequisite for countries to maintain competitiveness and has become a key factor for sustained employment creation and economic growth. The case of the European Union (EU) provides an excellent example of transport integration that supports economic integration. The EU has been seeking to provide an integrated transport and logistics network throughout Europe by eliminating missing links, alleviating bottlenecks and securing interoperability of the network. A well-integrated transport network in Northeast Asia could also facilitate regional integration and increase economic and cultural exchanges.

This paper provides basic facts and statistics regarding transport and logistics developments in Northeast Asia. However, it is extremely difficult to obtain reliable information or data on North Korea. Transport and logistics related data on North Korea are also offered based on information compiled by estimation. This paper also describes recent political and economic developments in Korean Peninsula to the extent that they have relevance in integrated transport development in Northeast Asia. Especially, the significances of major transport corridors that link the Korean Peninsula and Northeast Asia are investigated. Various efforts for developing an integrated transport and logistics in Northeast Asia are discussed and financing options for the required investments are also discussed.

1. Introduction and Rationale for Infrastructure Development in Northeast Asia

Transportation provides vital services for our socio-economic activities. A well developed, efficient transport and logistics network and the facilitated flow of goods are important prerequisites of sustained economic growth. Such conditions enable world market access by providing transportation and logistics services to cities and industrialized areas and connecting untapped, resource and consumer rich hinterlands to logistics hubs. Good transport systems decrease transportation time and costs, benefiting local industries and encouraging foreign investment.

Northeast Asia is one of the most economically vibrant regions in the world. It has recently seen rapid economic growth that has been over three times the world average. This rapid growth in economic activity has fueled the demand for increased transportation, both for freight transportation and demands due to increased socio-economic activities. In particular, South Korea and Taiwan are both successful cases of economic growth through infrastructure development. Though individual nations in Northeast Asia have prospered through infrastructure development, Northeast Asia as a

whole has yet to realize its full strength and potential as an economically efficient, unified region, with many areas lagging woefully behind and the richest areas failing to reach their true economic potential. Shortage of regional transportation infrastructure hinders the ability of nations to develop economies of scale with each other and take advantage of each nation's lower costs of labor or other resources.

In addition to the quantifiable economic benefits of infrastructure development, there are numerous more qualitative non-economic benefits that stem from the development of infrastructure within and between countries. By improving the economy within a country, infrastructure can improve a country's stability and the conditions of its citizens. Transportation infrastructure increases their freedom and mobility. Infrastructure between countries does the same, and also fosters peace. Through facilitation of the exchange of goods, services, people, and ideas, international infrastructure increases beneficial interdependence; makes nations better understand each other, causing them to be less suspicious, frightened, or biased against each other; and helps to heal old wounds. Since the days of the Silk Road, transportation infrastructure, though created with economic goals in mind, has increased the interaction between cultures, spreading ideas and technologies to everyone's benefit. Foreign investment in infrastructure in less prosperous countries is also a sign of goodwill and shows a certain level of trust.

Particularly on the Korean Peninsula, regional and international infrastructure development can—and has already proven to—help ease the tensions between North and South Korea and prepare for a peaceful and easier reunification in the future. Mutually beneficial agreements that led to the reconnection of road and rail infrastructure between South Korea and Gaeseong in North Korea are the result of eased tensions, and in a circular manner help to further ease tensions, resulting in further inter-Korean transportation projects and economic exchanges in the future. Projects that seek to connect South Korea with North Korea also provide the opportunity for North Korea to upgrade corresponding infrastructure domestically. Improvements to North Korea's ports and connections with China also can help to peacefully usher North Korea to the world stage.

While this paper focuses on traditional transportation infrastructure, the concept is similar for infrastructure that “transports” other essential commodities, such as water, electricity, and communications. Currently many parts of Northeast Asia lack basic and necessary infrastructure, hindering the prosperity and development (and sometimes even the basic survival) of those regions and their peoples. Infrastructure between nations is even less prevalent, impeding peace and prosperity for all Northeast Asian nations. Ultimately parochial interests must be set aside, as regional cooperation is required for building an integrated transport network. Infrastructure development is a prerequisite for regional peace and mutual prosperity in Northeast Asia.

2. Northeast Asia and the Korean Peninsula: Trends and Current Conditions

Northeast Asia is one of the most economically vibrant regions in the world. It has recently seen rapid economic growth that has been almost three times the world average: An annual GDP growth rate of 6.4 percent compared to 2.3 percent growth worldwide. This rapid growth in economic activity has fueled the demand for increased transportation, both for freight transportation and demands due to increased socio-economic activities.

<Table 1> Geographic and Economic Statistics of North-East Asia

Country/Region	Area (km ²)	Population (thousands)	GDP (billion US\$)*	Per Capita GDP (PPP US \$)	Export (billion US\$)	Import (billion US\$)
As of	April, 2010	July 2009	July 2009	July 2009	July 2009	July 2009
World	510,072,000	6,790,062	70,290	10,500	12,090	12,030
North-East Asia (% Share to the World)	28,857,492 5.7	1,679,948 24.7	16,448 23.4	87,400 n/a	2,365 19.6	1,929 16.0
China	9,596,961	1,338,613	8,789	6,600	1,194	922
Japan	377,915	127,079	4,137	32,600	516	491
South Korea	99,720	48,509	1,356	28,000	355	313
North Korea	120,538	22,665	40	1,900	2.1**	3.6**
Mongolia	1,564,116	3,041	9.5	3,200	1.9	2.1
Russian Federation	17,098,242	140,041	2,116	15,100	296	197

Note : *GDP (purchasing power parity), ** 2008 Estimated

Source: Central Intelligence Agency, USA. 2009. The World Fact Book

Northeast Asia has the resources to back up such growth. With more than 28

million square kilometers of land and more than 1.6 billion people, Northeast Asia comprises 5.7 percent of the world's surface and 25.8 percent of its population (Table 1). China alone has 20 percent of the world's population. Currently Northeast Asia accounts for about 23 percent of the world's GDP in terms of purchasing power parity and 20 percent of the world's export, by value.

While high growth is a factor of life for Northeast Asia for the foreseeable future, each nation is vastly different in its stage of transport infrastructure development. The level of infrastructure development in each country can either promote or impede a healthy economy, but from a regional perspective the differences serve only to impede economic vitality. With the rapid increase in road transport demand, however, countries have been providing an increased supply. In China, for example, the percentage of paved road miles has increased dramatically in the last ten years. North Korea has about 30,000 km of roadway, about one third of South Korea's total roadway network. It has eight expressways, with the most important trunk routes being between Pyeongyang and Gaeseong and Pyeongyang and Shinuiju along the western side of the country. However, less than seven percent of the roads are paved, compared to 75 percent in South Korea.

China, Russia, and Mongolia have a much higher mode share for rail than for road (Table 3). Rail demand has experienced relatively small overall increases for both passengers and freight. Some stagnation and decreases in rail passenger demands have occurred in South Korea and Russia. Rail freight demand for Japan has also leveled, and has only increased slightly in South Korea. In several locations in East Asia active railway development is proceeding. Express rail is being planned between Dalian and Harbin (Dongbiao Rail) in northeast China, and high-speed rail service between Seoul and Busan has recently begun. North Korea has a high reliance on rail, and has four times as many kilometers of rail per capita as South Korea. More than 4,200 kilometers, or 81 percent, of the system is electrified (compared to South Korea's 40 percent electrification rate), which is advantageous for passenger travel and reducing environmental impacts (Table 2). Main lines include the Kyungeui line and the

Pyeongyang-Rajin line.

<Table 2> North Korean Railway System

(Unit: km)

Total Length	Track Type			Single Track	Double Track	Electrification
	Standard	Broad	Narrow			
5,224	4,567	134	523	106	5,118	4,243

However, despite this dependence on rail and the total length of track, 98 percent of the system is single track, meaning train or track problems and repairs can cause lengthy delays and coordinating passing trains without causing delays becomes extremely difficult. Combined with outdated technology and poorly maintained infrastructure and rolling stock, the level of service and comfort is low and trains are slow. The average train speed in North Korea is between 30 and 50 km per hour.

<Table 3> Transport Demand Comparisons in Northeast Asia

Country	Passenger (million passenger kilometers)		Freight (ton-kilometers)	
	Rail	Road	Rail	Road
South Korea(2008)	32,027	104,152	11,566	(not available)
China(2008)	777,860	1,247,610	2,510,630	328,682
Japan(2007)	255,000	919,000	23,000	355,000
Mongolia(2001)	1,062	371	5,288	130
Russia(2008)	175,900	115,400	2,116,000	216,000

Sources: National Bureau of Statistics of China, www.stats.gov.cn
 Statistics Bureau & Statistics Center of Japan, www.stat.go.jp
 Ministry of Land, Transportation and Maritime Affairs, Statistics – An Annual Report, www.mltm.go.kr
 National Bureau of Statistics of Russia, www.gks.ru
 South Korea's figures includes only travels by commercial carriers

Exact rail demand numbers for North Korea were not available. However, it is estimated that in North Korea 60 percent of passenger trips are taken by rail, compared to 24 percent in South Korea. Even freight transport in North Korea is

highly dependent on rail, with a 90 percent freight transport share.

In Japan and South Korea, the mode share for travel by road is much higher than by rail as shown in Table 3. Road development in these nations has also outpaced rail development, particularly in South Korea. Road person-kilometers traveled (PKT) has generally been increasing over the past decade, though the growth has slowed in recent years in Northeast Asia. Freight movement by road has seen similar trends, with only Japan experiencing a general stagnation or decrease in road freight transport.

Statistics about roadway demand in North Korea were not available. However, most North Korean roads are known to be relatively empty, and due to the poor economic situation car ownership is very low. As movement within the country is also restricted by the government, travel by car is not generally practical. Finally, even in the former eastern block nations of Europe, socialist nations generally prefer to invest most transportation resources into rail systems. The high rail mode share when compared to other modes may be explained in part, therefore, by lack of modal choice.

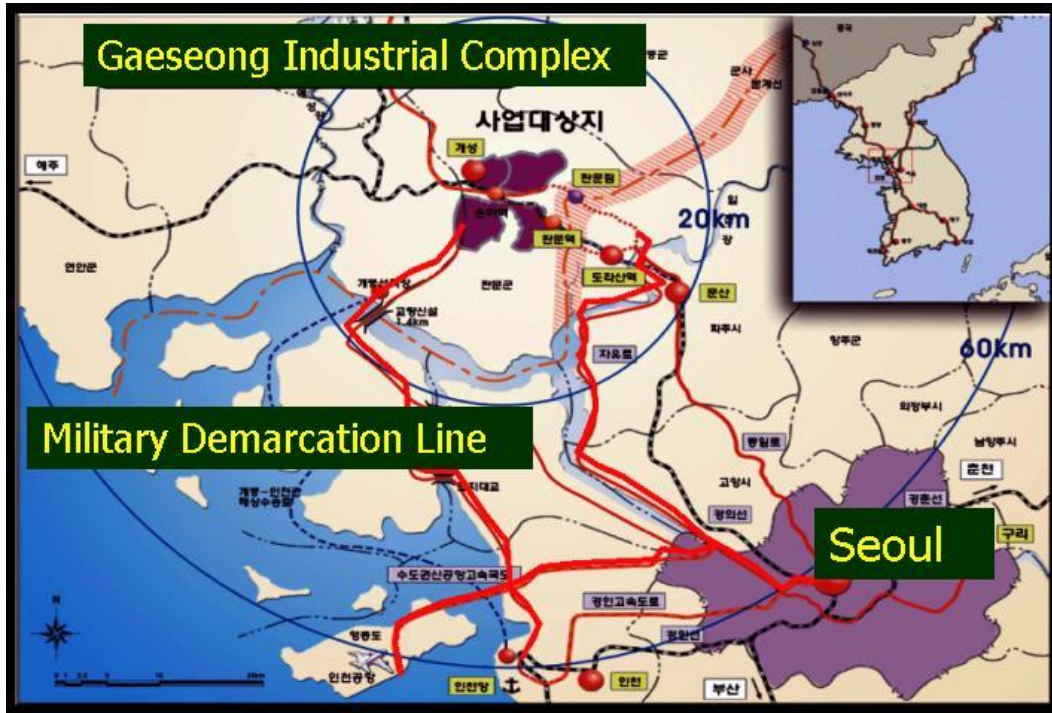
The diplomatic situation on the Korean Peninsula is fluid and unpredictable. However, resumption of six-nation talks with prospects of solving the North Korean nuclear issue bode well for improvements in relations between North Korea and South Korea and between North Korea and the rest of the world. Solving the nuclear issue may lead to better diplomatic relations, which will result in better economic and social relations. It can lay the groundwork for regional transport infrastructure development for mutual prosperity in Northeast Asia. The talks themselves provide a format for North Korea to interact with the outside world and economic and transport related issues may be part of the discussion.

Reconnection of missing transport links between North and South Korea was a major priority after the 2000 summit meeting between the two Koreas. The Kyungeui railway along Korea's west coast has been reconnected, though full service has not yet begun. Work is currently being done to reconnect the Donghae line on the east coast of Korea. Roadway connections have also been re-established parallel to the Kyungeui

line and the Donghae line and are currently in operation. In 2003, trade between North and South Korea reached US\$724 million. Main imports from North Korea include agricultural products and garments, and main exports to North Korea include agricultural products, garments, and chemical products.

Gaeseong is a city of major historical and cultural importance in Korea, having been the capital during the Goryeo Dynasty. Located in the southwest corner of North Korea, it is only 20 kilometers from the DMZ and Panmunjeom. Between the city of Gaeseong and the DMZ, and only 70 kilometers from Seoul, is the site of the Gaeseong Industrial Complex (GIC), a major breakthrough in inter-Korean relations (Figure 1). The GIC project involves cooperation between the North Korean government and South Korean private industry and government. The agreement calls for re-established road and rail links between South Korea and the GIC in North Korea; private industrial development by South Korean industry; permission for South Korean workers to be employed at the GIC; permission for North Korean workers to be employed at the GIC and to be paid directly; and the provision of electricity and phone service from South Korea to North Korea. The entire site is 65.7 square kilometers. The plan calls for three phases of development, with Phase I including 3.3 square kilometers development. Parts of Phase I are complete, with road and rail links (the Kyungeui line) physically re-established, several companies currently operating, and phone and electricity service established. Phase I plans ultimately envisage participation by 250 South Korean companies from 2006, employing 100,000 people by 2007, which has been partially achieved as of 2010..

<Figure 1> Map of Gaeseong Area



The city of Rajin and its neighboring city of Seonbong are located in northeast North Korea on the East Sea. These industrial cities are close to both the Russian Federation and the northeast provinces of China. Though they have extensive port facilities, these facilities are highly underutilized. Due to the existing port infrastructure underutilization, and strategic location, there is interest by South Korea, North Korea, and even China in further developing the use of the ports and realizing their full potential. Besides being a convenient and potentially cheaper alternative for shipping international goods to and from China's northeast provinces, it can even be effective for shipping items from those provinces to other parts of China. Transport infrastructure to the port facilities from other parts of Korea and the rest of Northeast Asia is a major impediment, however. Chinese authorities have expressed interest in leasing the port facilities and constructing a paved highway between the Chinese border and Rajin. In 2008 a permit to use the port facilities for the duration of 10 years was granted to a Chinese firm.

3. International Cooperation for Infrastructure Development in Northeast Asia

Numerous domestic and international plans are underway for specific infrastructure projects in Northeast Asia. These projects span a variety of modes and are of importance to all of Northeast Asia. China is planning the Dongbiandao rail line, going between Suifenha in northeast China near North Korea to the major port city of Dalian, via Tumen, Yanji, Tonghua, Dandong, and Zhuanghe (Figure 2). The rail line has a total distance of 1,380 kilometers. The demand is high for transport between the northeast provinces of China and the port of Dalian, and it is increasing every day. Such as rail line has benefits for Korea as well when its rail system is unified and connected with China, and with improvements to the road linking the port of Rajin in North Korea with China as described in Section 2. China's Dalian-Harbin Express Rail Plan calls for exclusive high-speed passenger rail in the same corridor, with 900 kilometers of double tracking and electrification.

<Figure 2> Planned Dongbiandao Rail Line



The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) has been working with countries across all of Asia to plan and promote the integration of rail networks across international borders. The Trans-Asian Railway (TAR) project consists of identifying key routes in an integrated Asian rail network, identifying physical and institutional issues, formulating plans to integrate the network, and working with governments to try to implement those plans. Routes to be included in the TAR network include:

- Capital to capital links;
- Links to industrial and agricultural centers;
- Links to seaports, river ports, and airports;
- Links to container terminals and depots; and
- Links to tourist attractions.

The identified TAR network consists of about 81,000 kilometers of rail across 26 countries. However, the network has numerous missing links, bottlenecks, and sections in poor condition.

The TAR originally consisted of a southern corridor going through South-East Asia, Bangladesh, India, the Islamic Republic of Iran, Pakistan and Turkey, but was later expanded under the Asian land transport infrastructure development (ALTID) project to cover the whole of Asia. It was made possible by lessening of political tensions between the countries involved, the rapid economic development of China, the possibility of greater economic exchanges with North Korea and the prospects of accelerated economic development in Mongolia and the Russian Federation. Accordingly, UNESCAP concluded a feasibility study on connecting the railways of China, Mongolia, the Russian Federation and the Korean Peninsula with thoughts given to identifying the TAR routes in the countries concerned. The study also considered route requirements and the border-crossing facilitation measures required to assist in organizing efficient container land-bridges between Asia and Europe that could compete with the shipping services.

The Trans-Korean Railway (TKR) refers to the future interconnected railway system of the Korean Peninsula (Figure 3). Through bilateral agreements over the past years between the two Koreas missing railway links have been in planning and construction. The completed connection of the Kyungeui line was a major breakthrough in the realization of the TKR. The major proposed lines of the TKR connect Busan with Seoul, and Seoul to Shineuiju via Pyeongyang and Seoul to Rajin via Wonsan. The system has numerous opportunities for connections to the Trans-China Railway (TCR), the Trans-Mongolian Railway (TMGR) via China, the Trans-Manchurian Railway (TMR), and the Trans-Siberian Railway (TSR) through the Russian Federation.

<Figure 3> TKR Network and Continental Rail Connections



The creation of the TKR and its connection to other Asian railway networks can have

numerous positive impacts on the Korean Peninsula and all of Northeast Asia. A cohesive and modern rail system can reduce transportation and logistics costs, not only for Korean companies and individuals but for companies and individual from other nations as well. To ship resources or goods between Japan and China's northeast provinces, for example, currently the resources or goods must travel by ship between Japan and Dalian, and then across congested roads for as much as 1,000 kilometers. Korea will be able to take better advantage of its geopolitical location, to the benefit of Korea and all of Northeast Asia, and develop into a transportation hub of Northeast Asia.

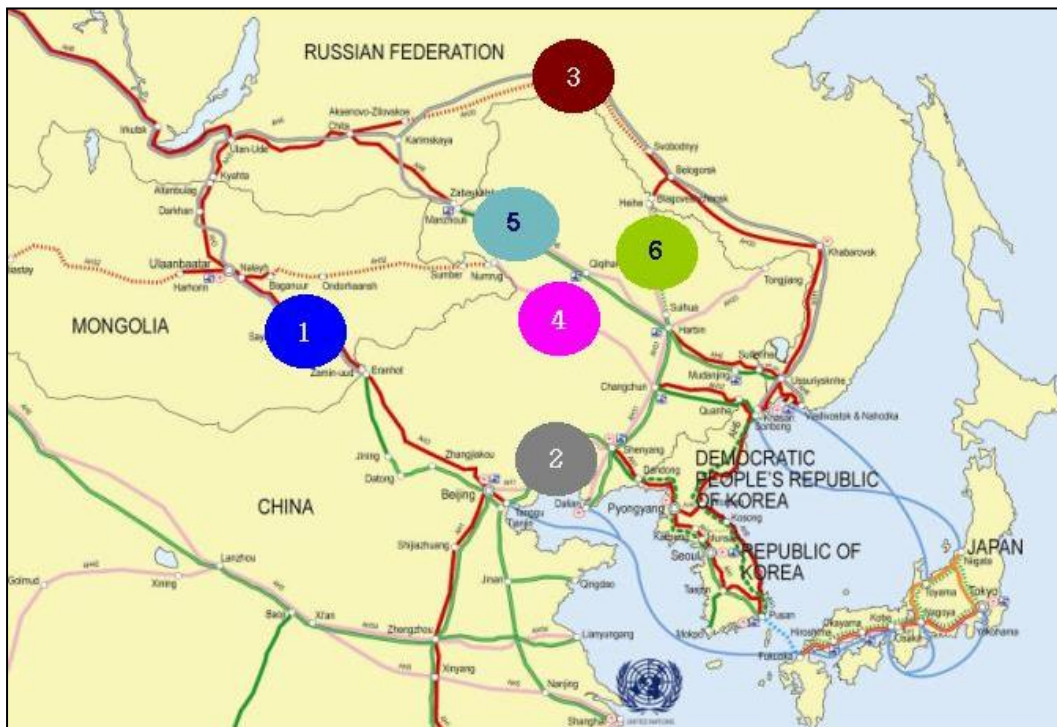
The TKR will expand economic cooperation between South and North Korea with the help of direct trade. As a result it will also expedite constructive progress in inter-Korean reconciliation and unification, and through connections with the rest of the TAR will help to reduce political and military tension in Northeast Asia on the basis of mutual trust and cooperation. The TCR, TMGR, TMR, and TSR are all currently in operation without missing links. However, bottlenecks at borders due to customs or technology issues, as well as needs for renovations, upgrades, or increased capacity along the individual lines do exist.

UNESCAP has also promoted the creation of the Asian Highway network, with similar goals as the TAR. While first suggested decades ago, the idea was revitalized in 1992. As with the TAR, the Asian Highway network promotes regional cooperation, trade, and good will. Links were selected using the same criteria as the TAR. Asian Highway member countries have adopted the Asian Highway network of 140,000 kilometers with coordinated alignment, unified standards and signage. At the 60th Commission session held at Shanghai, China in April 2004, 26 member countries signed the important International Agreement on the Asian Highway network. The project aims to reduce costs by maximizing the use of existing infrastructure. By connecting to major ports and container terminals, it also will increase intermodal connections to leverage multimodal capabilities in each country.

As part of joint research between UNESCAP and KOTI, six priority corridors

were identified in Northeast Asia (Figure 4). These selected corridors include roads and railway lines linking neighboring countries and providing connections to major port clusters in the North-East Asia. Maritime container or ferry service routes were also selected to provide sea links to Japan from the six corridors. Each corridor was evaluated to determine its existing road and rail conditions, including missing links, bottlenecks, major intermodal connections, and estimated travel time and cost. This analysis can serve as an aid to policy makers.

<Figure 4> Priority Corridors



4. Issues on the Infrastructure Development in Northeast Asia

An evaluation of existing transportation infrastructure in Northeast Asia reveals numerous deficiencies and needs. The most common issues are:

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- Existing but deficient transport infrastructure;
 - Missing links
 - Lack of intermodal transport facilities;
 - Lack of technical compatibility and interoperability at border crossing points;
 - Delays in customs; and
 - Safety and reliability problems.

Currently deficient transportation infrastructure exists in all Northeast Asian countries, excluding Japan. As described previous section, North Korea has deficiencies in most of its rail system and the majority of its roadway network is not paved. Other nations face similar issues. Common in all Northeast Asian countries and countries around the world is a lack of sufficient intermodal transport facilities. Intermodal facilities allow countries and private industry to leverage multimodal transport infrastructure by being able to easily change between modes. A facility that allows easy transfer of trailers between truck and train or rail and highway access to a port for quick transfer of cargo are examples of freight intermodal facilities. An airport with passenger rail access or an intercity rail station with cross-platform boarding for urban heavy rail are examples of a passenger intermodal facilities. As with other major bottlenecks in the transport system, the less prosperous countries have the greatest shortage of such facilities and the greatest need to leverage their existing transport infrastructure.

Missing links in the system continue to cause impediments to mobility and economic growth within countries, especially the vast hinterlands of large countries such as China, and particularly between nations. The most extreme examples of missing links are those between North and South Korea as a result of the Korean War. These missing links are detrimental to the economies of neighboring countries and peace.

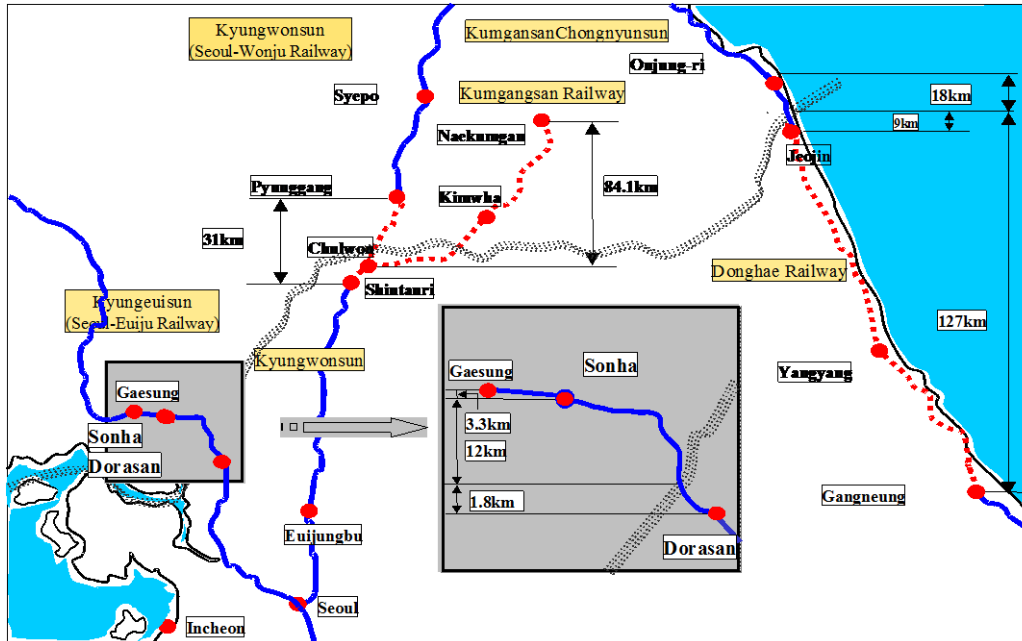
There are other international transport bottlenecks beyond lack of transport infrastructure. The lack of technical compatibility and interoperability at border crossing points, including gauge changes and railway electrification, can be a major impediment to cross border trade or cause major delays. Customs procedures cause

delays, at times may seem arbitrary, and are different between countries. Nations who have not become party to international conventions on customs protocols impede trade across their borders. In addition, safety and system reliability are often a deficiency on transport systems in Northeast Asian countries. Safety is an issue of significant social concern, and frequent accidents can also lead to increased reliability issues. Poor system reliability is economically detrimental to persons and businesses. A long but consistent delay for which people and shippers can plan is often preferred over unpredictable delays.

The Korean Peninsula has three major missing links across the DMZ: along the Kyungeui line, along the Donghae line, and at Cheolwon (Figure 5). Along the Kyungeui rail line, 27.3 kilometers of rail was rebuilt to reconnect the line for service to the GIC. However, service has not begun yet. The neighboring road was also connected by building a bypass from South Korea's National Highway 1, around Panmunjeom, to Dorasan in South Korea, and to the GIC. These 12.1 kilometers of new roadway have been built and are in operation. The Donghae line travels along Korea's east coast. For the railway 25.5 kilometers of track laying has been completed, though the missing link has not been completely re-established yet. The corresponding roadway has been reconnected with the construction of 24.2 kilometers of roadway and is in operation.

The bottlenecks; missing links; plans for regional, inter-regional, and inter-continental rail and road links; poor condition of existing transport infrastructure in many countries; lack of adequate transport supply, including transport for even basic commodities; and the past and projected expectations for tremendous economic and population growth and the resulting increase in transport demand outlined in the previous sections all justify numerous infrastructure investment needs in Northeast Asia and North Korea. This section presents an estimate of those "social overhead capital" (SOC) needs for Northeast Asia and North Korea specifically. The required costs of infrastructure development represent, as defined, are "needs", and are not simply representative of a "wish list" of projects.

<Figure 5> Missing Railway Links on the Korean Peninsula



Estimating costs required for infrastructure development across an enormous region such as Northeast Asia, involving numerous countries some of which have limited or unavailable data, is a formidable task. Across all of Northeast Asia, it is estimated that between US\$16 and US\$160 billion of investment is required for roads, airports, ports, railways, pipelines, power plants and transmission, and other infrastructure development per year¹. Of that amount, it is expected that at least US\$5 to US\$15 billion of external financing is required. As the most populated country and second largest country in Northeast Asia, with the fastest growing economy, China has the biggest share of those investment needs.

From an economic perspective, North Korea alone has infrastructure development needs estimated between US\$ 1.2 to US\$ 5 billion per year, substantial for a nation of that size. However, that estimate does not consider the outdated nature of

¹ Based on estimates by the Korea Institute for International Economic Policy (KIEP)

most of North Korea's infrastructure, particularly rail, which could push North Korea's annual needs even higher. Table 4 shows total current infrastructure needs in North Korea as a function of the level of desired development. Simply to achieve South Korea's level of economic and infrastructure development in 1980—a time at which South Korea was just coming out of the extreme poverty of previous decades and at which South Korea was not nearly as developed and prosperous as it is now—would require US\$197 billion of investment. US\$118 billion of that cost is for transportation infrastructure. South Korea made significant economic progress in the 1980s with corresponding improvements in SOC. In order for the North Korean SOC to match South Korea's level in 1990, US\$726 billion of investment is required—more than 18 times North Korea's entire GDP.

<Table 4> Estimation of North Korea's Total SOC Investment Needs

Unit: 10 Million US Dollars

	Target I (South Korea's 1980 Level)	Target II (South Korea's 1985 Level)	Target III (South Korea's 1990 Level)
Electricity	2,994	7,313	10,430
Road	5,265	16,853	27,387
Railway	3,249	5,571	6,960
Port	3,485	5,999	13,344
Industrial Complex	4,752	8,624	14,454
Total	19,745	44,360	72,575

Source: Lee Jang-Yung, 2003. 5.

5. Financing the Infrastructure Needs

The enormous needs identified in Section 4 present a major hurdle to improving economic and political conditions in Northeast Asia and on the Korean Peninsula. These needs cannot be financed purely from the coffers of each individual

country. However, a variety of innovative financing techniques are available. This section outlines suggested components of financing strategies for the needs—particularly in North Korea—and suggests the applicable available techniques. In general, financing economic development aid to developing countries should be based on progressive development and be both progressive and flexible. It can come through:

- Official development assistance (ODA) as a result of bilateral cooperation;
- ODA as a result of multilateral cooperation;
- Foreign direct investment (FDI);
- Commercial loans; and
- Private funding by securities and bonds.

Financing and development can come through consortiums of domestic and foreign companies under build-operate-transfer (BOT) agreements, build-transfer-lease (BTL) agreements, or a multinational consortium.

In the case of North Korea, in the current environment many of these sources are unlikely. North Korean's foreign debt to the West is estimated at between US\$4 and US\$5 billion, with total foreign debt at US\$12 billion. Economic reform and opening are required to build trust and attract additional investment. As investment starts and successful projects are built, the trust will continue to grow, leading to even further foreign investment.

The following describes possible sources of funding for investment in infrastructure development in Northeast Asia, particularly North Korea. The most straightforward method of infrastructure funding is through domestic private or government funding. However, in developing nations with limited resources internal funds fall far short of estimated needs. In North Korea in particular, funds are scarce, the government currently spends most funds on the military due to the current diplomatic climate, and the private sector functionally does not exist in the political environment.

Funding from international financial institutions requires joining or active participation; economic reforms for successful transition to a market economy; active participation in economic monitoring, including “Policy Dialogue”; and at least five to six years of membership. There are three major institutions that could be engaged for funding. The establishment and funding of a special trust fund for a country is possible even before that country has joined an international financial institution. A North Korean economic aid fund or technical assistance trust fund could be established. However, this requires a successful and peaceful resolution within the Korean Peninsula before nations would be willing to invest in such a fund.

Recently there have been proposals for establishing a Northeast Asia Infrastructure Development Bank to meet infrastructure development needs in the region. Such an institution, targeted specifically to Northeast Asia, is necessary for the region’s infrastructure development. There are several difficulties, however, in establishing the NIDB. US\$20 billion of paid-in capital must be raised, and how to distribute it among member states must be determined. It will require at least five years to establish such an institution, and it is likely that there would be opposition from the U.S. and Japan—nations that currently have high levels of authority and stake in other existing financial institutions.

Currently North Korea’s foreign debt is estimated at US\$12 billion, and North Korea is practically in default status on commercial external debt. Diplomatic conditions are unstable, internal government investment and practices are not always viewed as rational or transparent, and outside oversight is generally not allowed. Considering the high risk associated with North Korea related development, raising foreign investment is not very likely. Project financing (P/F) based on an international consortium is a feasible way to minimize risk and the financial burden for any single government, particularly the South Korean government.

6. Conclusions and Prospects for Infrastructure Development

An efficient, modern, interconnected transportation system is critically important for economic development, social development, and peace in Northeast Asia. Yet the current state of the system falls far short of such standards. Development and integration of Northeast Asian transport infrastructure, particularly on the Korean Peninsula, then should be of the utmost priority. That development, however, is impeded by lack of funding, political and diplomatic issues, and parochial interests.

The situation in Northeast Asia is perhaps more dynamic than anywhere else in the world. Through successes in the six-nation talks and inter-Korean cooperative projects, such as the GIC, tensions on the Korean Peninsula may ease, North Korea may open itself somewhat, and FDI and other financing schemes may become feasible.

Piece by piece, key sections of the TAR and Asian Highway are being constructed or upgraded. Road and rail connections are being re-established on the Korean Peninsula, and high-speed rail projects are being planned or constructed. Most economies are improving, meaning more revenues in the future to be spent domestically on infrastructure. The faster funding schemes and plans are developed for the most critical transportation infrastructure, the faster Northeast Asia can reach all her nations' goals of peace and prosperity.

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