PART IV: SECTORAL CONDITIONS IN NORTH KOREA

STRATEGIES FOR DEVELOPMENT OF TRANSPORT INFRASTRUCTURE IN NORTH KOREA FOR UNIFICATION AND BEYOND

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Abstract

It has been reported that passenger transport and logistics between regions in North Korea are very difficult due to deterioration and imperfect maintenance of transport infrastructure and limited investment in the facilities for several decades. If South Korea and North Korea are unified, massive investment in the development of transport infrastructure is inevitable. This investment would mainly be supported by South Korea as well as through cooperation with Multilateral Development Banks such as the World Bank Group (WBG), Asian Development Bank (ADB), and Asian Infrastructure Investment Bank (AIIB). In addition, special and efficient plans for transporting people and goods need to be established in case of reunification considering the current transport environment in North Korea. Thus, well-prepared strategies should be in place for short, mid, and long-term perspectives.

Introduction

Before discussion of strategies for the development of transport infrastructure in North Korea, it is necessary to describe the current economic situation. Table 1 presents a comparison of key economic factors between South and North Korea. The total population and land area of North Korea is 0.5 times smaller and 1.2 times wider than those of South Korea's, respectively. The urbanization rate (total population residing in urban areas) is 82.4 percent for South Korea and 60.7 percent for North Korea. Total manufacturing of motor vehicles and the total amount of foreign trade in 2014 for North Korea are only 0.09 percent and 0.69 percent of South Korea's, respectively. The Gross National Income (GNI) per capita of North Korea is $1,320, which is only 4.7 percent of South Korean GNI.

These differences in economic indicators are crucial for service level inequality of transport infrastructure for both countries. Due to insufficient transport infrastructure provisioning in North Korea, passenger transport and logistics movement are very difficult. This can easily be seen from the border area with China and Russia. The differences in quality of infrastructure between connected countries are getting more pronounced. North Korea recently announced a national development plan to overcome the current situation, however the government is experiencing a shortage of investment. In addition, international cooperation to improve transport infrastructure has stopped due to sanctions caused by nuclear weapon experiments.

Cooperation between the two Koreas for transport infrastructure improvement was initiated by an open-door policy for South Koreans at North Korea's Mt. Keumgang tourist region and followed by the North-South Korean Summit Meeting in held in 2000 and 2007 in Pyongyang. In this atmosphere, South Korea's Kaeseong Industrial Region (KIR) started to operate in North Korean territory in 2005. A road linkage project, completed in February 2003, established a direct connection between Mt. Keumgang and South Korea for tours.

The Mt. Keumkang tour program and KIR project triggered road connection projects between countries. National highway No. 1, No. 7, and Gyeongeui line railway—which were disconnected due to the division of the peninsula—were re-connected in 2004. However, two incidents caused this honeymoon period to cease: the July 2008 shooting of a South Korean tourist by a North Korean soldier at Mt. Keumgang; and North Korea's March 2010 attack of the on the South Korean naval vessel, the *Cheonan*.

In 2013, newly-elected President Park Geun-hye proposed the Eurasia Initiative, a transport corridor connecting South Korea, North Korea, China, Russia and Central Asian countries to Europe to formulate a massive single market through energy and logistics infrastructure. The Eurasia Initiative proposed interconnection with China's 'One Belt, One Road' and Russia's 'New East Policy' for cooperation with North Korean transport infrastructure development, but could not proceed because of international sanctions imposed on North Korea in reaction to its nuclear experiments.

There are few financial resources available for North Korea's transport infrastructure, and cooperation among South Korea, China, and Russia is both inevitable and difficult. This paper reviews the current situation of transport infrastructure in North Korea and proposes strategies for the preparation of reunification.

Current Status and Problems of Transport Infrastructure in North Korea

North Korea's transport network has been shaped by its topography and geography. Railways and roads have been developed alongside western coastal plains and the eastern coastline whereas the density of transport network facility in northern mountainous region is quite lower than that of the coastal area. The railway system is the main transport mode and road transport plays a secondary role to link the railway. Ports and airports take on a limited role.

Table 1 Comparison Economic Indicators between South and North Korea

Item	South Korea (A)				North Korea (B)				B/A x100
	2000	2005	2010	2014	2000	2005	2010	2014	2014
Population (1,000 persons)	47,008	48,138	49,410	50,424	22,702	23,561	24,187	24,662	48.9%
Area (km)	99,461	99,646	100,033	100,284	122,762	123,138	123,138	123,138	122.8%
Urbanization Rates (%)	79.6	81.3	81.9	82.4	59.4	59.8	60.2	60.7	73.7%
Production of Motor Vehicles (1,000)	3,115.0	3,699.4	4,271.7	4,524.9	6.6	4.5	4.4	4.0	0.09%
Foreign Trade (100 million USD)	3,327.5	5,456.6	8,916.0	10,981.8	19.7	30.0	41.7	76.1	0.69%
"Per capita GNI (USD)"	11,870	18,511	22,166	28,180	743	1,025	1,072	1,320	4.7%

Table 2 Comparison Transportation Infrastructure Indicators between South and North Korea

Item	South Korea (A)				North Korea (B)				B/A x100 2014
	2000	2005	2010	2014	2000	2005	2010	2014	
Length of Railway (km)	3,123	3,392	3,557	3,590	5,124	5,235	5,265	5,302	147.7%
Length of Electric Railway (km)	667.5	1,670	2,147	2,457	4,189	4,211	4,229	4,232	172.3%
Length of Subway (km)	433.1	503.1	550.6	615	34	34	34	34	5.5%
The Number of Rolling Stock (each)	17,541	18,118	17,149	15,709	20,092	21,881	26,312	28,084	178.8%
Length of Roads (km)	88,955	102,293	105,565	105,673	23,633	25,495	25,950	26,164	24.8%
Length of Expressway (km)	2,131	2,968	3,859	4,139	724	724	727	729	17.6%
Cargo Handling Capacity at Ports (1,000 ton)	430,437	650,281	915,430	1,039,378	35,500	37,000	37,000	41,560	4.0%
The Number of Motor Vehicles Registered (1,000)	12,059.30	15,396.70	17,941.40	20,118.00	261.90	249.70	257.00	275.80	1.4%
The Number of Airplanes (each)	268	297	514	656	20	20	22	23	3.5%
Tonnage of Vessels (In 10,000 G/T)	615	1,007	1,427	1,392	85	90	80	71	5.1%

Table 2 shows a comparison of the transport infrastructure indicators between countries, mainly for 2014. Total length of rail and electronic railway and the number of rolling stock for North Korea are greater than for South Korea. While the urban subway system implemented in South Korea is 615 km for six cities, North Korea has only 34 km for two routes in Pyongyang. The characteristics of the North Korean railway system can be summarized as a high percentage of a single line system, low speed, and deterioration, which leads to inconvenience. A comparison of length of road and expressway shows that North Korean statistics are 26 km and 729 km which are only 18-25 percent of South Korea's. The number of motor vehicles registered in North Korea is 1.4 percent of South Korea's. Overall the gap in the level of transport infrastructure between the countries is too big. There is only one private airline company in North Korea with 23 aircrafts, which is 3.5 percent of South Korea's. The total tonnage of North Korean vessels is much smaller than South Korea's.

Railway

North Korea's railway network comprises about 60 main and local railway lines. The total length of the railway network is approximately 5,302 km. Of this, about 1,100 km was built after 1960. North Korea has also electrified the railway network to improve its operations; more than 4,000 km has been electrified since 1958. However, despite a high level of electrification, about 98 percent of the railway network is single-track and is assessed to be very inefficient in terms of operating speed (average train speed: 30 to 40 km/hr). Overall, railway transport in North Korea has failed to make use of the advantages of rail transport; that is, it is more competitive for long-distances and for carrying large and heavy cargo.

Road

The development of roads in North Korea started after the Korean War. However, the closed economy, a lack of financial resources, and mountainous terrain in most of the country constrained the road network. The ratio of paved roads is only 6.7 percent, which in turns lowers the efficiency of roads. As part of the June 2000 Summit, the rehabilitation of roads was one of the suggestions to improve inter-Korean exchanges. North Korea needs to take steps to reconstruct the disconnected route to improve the efficiency of roads. As North Korea's trade with China increases, the Dandong-Shineuiju and Wonjeong-Rajin routes will play an important role. In the future, Shineuiju will be an important location for the creation of a special economic zone, similar to Kaeseong. Therefore, it is important that the government provides adequate road access around the surrounding areas.

Airport

North Korea is known to have about 10 airports which civilian airplanes can use. The major international airport is Soonan International Airport, which has two runways (3,500m x 70m, 4,000m x 50m) and opened a new international passenger terminal in April 2015. Soonan International Airport is located in the outskirts of Pyongyang, and is linked to Pyongyang by a four-lane semi-expressway. The annual passenger handling

capacity of the airport is estimated to be about 20 million passengers. But, because of low travel demand, existing airport facilities are underutilized. In July 2015, Kalma international airport opened in Weonsan near Mt. Keumkang.

Port

As North Korea trades primarily with China, there has been little need for investment in seaports. And given the availability of rail and land transportation with China and Russia, this has further reduced the need for seaports. Due to a lack of investment in ports, regular power failures result in slow unloading of ships. Only few ports can handle 40-ft containers as there are no cranes available. The main problems of North Korea's maritime trade include the country's collection of exorbitant port-entry fees and poor quality of inland transportation within North Korea.

Strategies for the Transport Infrastructure Development of North Korea

National Land Development and Transport Infrastructure in North Korea

North Korea established the 'National Economic Development and Strategic Plan for Decade' in 2010 and $100 billion investment and development plan was also announced for four industrial districts including Naseon petro-chemical industrial district, electricity and agricultural development, and transport network expansion as shown in Table 3. This investment plan includes $25.8 billion for railway, highway, and airport. In addition, North Korea is in the process of developing Weonsan-Mt.Geumgang as an international tourist zone including development of Weonsan/Kalma International Airport opened in 2015, and construction of railway, road and port are being planned.

South Korea's Ministry of Land, Infrastructure and Transport is in the process of establishing a 'Master Plan for National Land Development' to minimize the costs of unification and to fulfill the conditions of systematic and efficient unification in preparation. The South Korean government released the 'Revision of the 4th National Territorial Plan' in 2011. This revision includes a master plan for border area to expand inter-Korean cooperation and to reinforce the basis for Eurasia-Pacific cooperation.

Inter-Korean Cooperation of Transport

The transport plan established in 1999 by South Korea's Ministry of Construction and Transport and revised in 2011 has suggested the 'Comprehensive Transport Network Plan for the Korean Peninsula' as a long-term plan. The objective of the plan is to connect the Eurasian Continent by constructing two express railways which cross the Korean Peninsula with the profile line, in connection with a branch railway. For the road network, the plan aims to reconstruct the six national highways in the North-South borderline and to connect Asian road networks with China and Russia in the long-term.

In order to reconstruct the road network, the South and North Korean governments agreed on a road reconstruction project in ministerial talks between the two Koreas in July 2000 and August 2002. Consequently, the transportation of goods has been available since November 2004. Both sides consented to an investigation of current conditions of networks and reconstruction of roads and railways in the South-North Korean Summit on 4 October 2007.

Despite efforts and outcomes, the South Korean government placed sanctions against North Korea due to the killing of a female South Korean tourist by a North Korean guard near a restricted area on 11 July 2008, and the sinking of the *Cheonan-ham* vessel on 26 March 2010. The sanctions lead to

Table 3 Special Economic Zones of North Korea

Type	Economic Trade Zone	Economic Development Zone	Industrial Complex	Tourist Zone	Economic Trade Zone
Location	Naseon, Hamgyeongbuk-do	Sinuiju, Pyeonganbuk-do	Gaeseong, Hwanghaenam-do	Mt. Geumgang, Gangwon-do	Hwanggumpyong Island and Wihwado, Pyeonganbuk-do
Area	about 470km^2	132km^2	66km^2	about 100km^2	28.2km^2
Specify Time	Dec-91	Sep-02	Nov-02	Nov-02	2010
Laws	Act on Naseon Economic Trade zone	Framework Act on Sinuiju Special Administrative Region	Act on Gaeseong Industrial District	Act on Mt. Geumgang Tourism District	Act on Hwanggumpyong Island and Wihwado Economic Trade Zone

the suspension of all inter-Korean dialogue and contact. Despite this, there was a recent agreement in 2015 on the reconstruction of the Gyeongwon Railway and a ground-breaking ceremony was held in South Korea.

Eurasia Initiative and Cooperation Strategy with China and Russia

President Park Geun-hye of South Korea introduced the Eurasia Initiative in international conferences, named "Global Cooperation in the Era of Eurasia." Comprehensive transport and logistics networks in Eurasia, called the Silk Road Express (SRX), were proposed as a strategic way to achieve the goal.

The Silk Road Express forms a transportation and logistics networks based on transcontinental railways connecting South Korea, North Korea, Russia, China, Central Asia and Europe, creating a massive united market. This plays a crucial role in North Korea's economic recovery and the mutual growth of Eurasian countries. With the Eurasia Initiative, China and Russia have been proceeding to develop the transportation network with the policies of 'One Belt, One Road' and 'New East Asia Policy' respectively.

China's 'One Belt, One Road' is the representative international strategy combined with the Silk Road economic belt and the plan of the Ocean Silk Road of the 21st century by Chinese president Xi Jinping. This plan was proposed for Eurasian comprehensive cooperation in economy, politics, finance, and the military. The plan includes the construction of an international transport corridor, international long-haul railways, and main road network. As key projects, the plan precedes the construction of the six economic corridors to establish land transportation and logistics network with railway, road and energy network for fostering the development of urban and rural districts. Due to no consideration for South Korea and North Korea in the plan, cooperation with Korea and the Six Economic Corridor plan is needed.

Russia's New East Asia Policy materialized with the inauguration of the Putin administration. As part of the plan, Russia cooperates with Korea and China on the East Asian market. The continental railway, Najin and Tumen river development, and Tumen riverside attractions are key projects. However, establishing an execution plan is essential to specify funding for the project: $1.7 trillion rubles, which is 86 percent of total business costs and suggested to be funded from the private sector.

Construction of a Transportation System by International Organizations

Creating the transport infrastructure in a developing country is generally conducted by Official Development Assistance (ODA), with funding by an international organization or Multilateral Development Bank (MDB). It is not easy to carry out a project for North Korea, with its uncertain political risks. However, the possibility of carrying out a project can be raised through dispersed risks and international cooperation.

The first international cooperation project was undertaken by the UNDP, the representative development program of the UN. This organization called representatives from South Korea, China, Russia, Mongolia, North Korea, and Japan together in Pyongyang to develop the Tumen River Area Development Program (TRADP), designated as a top priority for the northeast region in October 1991. TRADP lost momentum due to the East Asian economic crisis in 1997, and changed its title to the Greater Tumen Initiative.

Meanwhile, the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) pushes forward with two road and railway improvement projects: the Asian Highway and Trans Asian Railway. The Asian Highway is the main road connecting 140,000 km in 32 countries, with the AH1, AH6, and AH32 lines passing through North Korea. ESCAP visited the North Korean portions of the highway to improve operating efficiency and invited North Korean public officials to Bangkok for technical training. The Trans-Asian Railway held its fourth professional conference in Bangkok in November 2015 to discuss railway network setup between Europe and Asia, which is a project of improving 117,500 km of railway in 28 countries, and it frequently holds international seminars such as ESCAP-UICs.

Funding Strategy for Development of Transport Infrastructure in North Korea

Development of transport infrastructure requires large expenses and a long time for implementation. If North Korea is able to secure economic growth engines through expanding investment on transport infrastructure in the period of South and North cooperation until unification, unification expense would be reduced and more benefits produced from the unification in the early stage. For that reason, it is necessary to study efficient funding strategy.

The Strategic Study on the Transport Infrastructure of the Korean Peninsula in Preparation for Unification of The Korea Transport Institute estimates the costs are 20-100 trillion *won*, and divides the financing measure into two categories; domestic and overseas. On the one hand, domestic financing contains inter-Korean cooperation funds, preparation of development fund for transport and logistics infrastructure of North Korea and the establishment of an infrastructure development bank of the Korean Peninsula with issuing national-and public-bond and financing of private corporation. On the other hand, overseas financing includes ODA, issuing foreign currency bonds, establishing an economic support fund for North Korea, a special trust fund, a development bank of Northeast Asia, and the Asia Infrastructure Investment Bank (AIIB), or participating

in the Global Infrastructure Hub (GIH) of the G20. Financing for expanding the transport infrastructure of North Korea, however, should be established under cooperation between South and North Korea and international organizations – with North Korea taking an active part in the project.

The most practical measure is to use existing financing rather than to establish new ones. If North Korea solves the nuclear weapon issue, joining international financial institutions will be accomplished without difficulties. Because North Korea may have a problem securing transport infrastructure financing on its own, a strategy of cooperation, governmental support for a licensing system, supplying of land, and providing construction workforce and materials will be required.

As a financing strategy for a development project of transport infrastructure, South Korea's "Act on Public-Private Partnerships in Infrastructure" should be revised to cover North Korea. In addition, establishing a private investment service center for North Korea to manage and support private investment business on infrastructure in North Korea—similar to South Korea's PIMAC (Private Infrastructure Investment Management Center)—would be valuable.

Conclusion and Future Tasks

This paper reviews the current status of transport infrastructure in North Korea and proposes strategies for development of their facilities. Overall, transport facilities in North Korea are seen as underdeveloped, with the railway system as its main transport mode and road transport as a secondary link to the railway.

To efficiently develop and integrate North Korea's transport infrastructure, inter-Korean cooperation plus engagement from neighboring countries such as China and Russia is essential. International organizations such as UNDP and UNESCAP can play an important role as well. Most importantly, to reduce unification expense and produce more benefit from unification in an early stage, it is necessary to study efficient funding strategies.

If South and North Korea are unified, a massive budget investment in the development of transport infrastructure is inevitable. This investment would mainly be supported by South Korea, with cooperation from multilateral development banks such as the WBG, ADB, and AIIB. In addition, specific plans for transporting people and goods in the event of unification need to be established now considering the current transport environment in North Korea. These strategic plans must include short, mid and long-term perspectives.

Finally it is necessary that academic and policy research toward transport infrastructure of North Korea should be continuously undertaken regardless of the political confrontation between South Korea and North Korea. This research effort is expected to play an important role in providing a sound foundation to promote cooperation to establish a transportation infrastructure network in a very short period of time for the restoration of mutual exchange between the two Koreas.

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