

Research Notes: Toward an Integrated Logistics System in Northeast Asia

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INTRODUCTION

Hans Linnemann categorized three types of costs that arise in international trade: physical shipping costs, time-related costs, and costs of unfamiliarity stemming from cultural differences.¹⁾ Based on Linnemann's approach, Jeffrey Frankel examined trade flows and the influence of geographical proximity using the gravity model of trade. He found that geographical proximity empirically produce the possible creation of an economic bloc through elimination of trade barriers, and leads to intra-regional Pareto optimality.²⁾

Due to political and ideological differences, the Northeast Asian

1) Hans Linnemann, *An Econometric Study of International Trade Flows* (Amsterdam: North-Holland, 1966); Requoted in Jeffrey A. Frankel, *Regional Trading Blocs in the World Economic System* (Washington, D.C.: Institute for International Economics, 1997).

2) Jeffrey A. Frankel, "Trading Blocs and the Americas: The Natural, the Unnatural, and the Super-Natural," *Journal of Development Economics*, Vol. 47, No. 1 (June 1995); J. A. Frankel and S. J. Wei, "Regional Trading Arrangements: Natural or Super-Natural?" *American Economic Review*, Vol. 86, No. 2 (May 1996).

Table 1. Overview of Transport Infrastructure in East Asia and Other Major Countries

	South Korea	North Korea	China	Japan	Mongolia	Russia	U.S.	Germany	Great Britain	The Netherlands
Population (million)*	48.3	22.5	1,287.0	127.2	2.7	2.7	290.3	82.3	60.0	16.2
Area (thousand km ²)	98.5	120.5	9,597.0	377.8	1,565.0	17,075.2	9,629.1	357.0	244.8	41.5
Land	98.2	120.4	9,326.4	374.7	1,554.0	16,995.8	9,159.0	349.2	241.6	33.9
Water	0.3	0.1	270.6	3.1	9.6	79.4	470.1	7.8	3.2	7.6
Road Length (thousand km)	87.5	31.2	1,400.0	1,152.2	34.0	952.0	6,334.9	230.7	371.9	7.6
Road Density (km/thousand km ²)	888.3	258.9	145.9	3,049.8	2.2	55.8	657.9	230.7	371.9	7.6
Population Density (person/km)	552.0	721.2	919.3	110.4	800.8	151.8	45.8	230.7	371.9	7.6
Railway Length (km)	3,125.0	5,214.0	71,600.0	23,168.0	1,815.0	87,157	45.8	230.7	371.9	7.6
Railway*** Density (km/thousand km ²)	31.7	43.3	7.5	61.3	1.2	5.1	45.8	230.7	371.9	7.6
Population Density (person/km)	15,456.0	4,315.3	17,974.9	5,490.3	1,487.6	1,657.9	45.8	230.7	371.9	7.6
Airport	102	72	500	175	50	2,743	14,801	551	470	28
Airport with Paved Runways	69	34	351	141	10	471	5,131	328	334	21

* Population statistics are as of July 2003.

** Reference points of road statistics are: North Korea (1996), Japan (1997), Russia (1998), South Korea (1999), China (1999), Mongolia(2000), the United States (2000), Germany (1999), Great Britain (1999), and the Netherlands (1999).

*** Railway and airport statistics are as of 2002.

Source: IMF, International Financial Statistics (2002); ESCAP, Statistical Abstract of Transport in Asia and The Pacific 2002, Preparatory Draft (2002); Korea National Statistical Office, Database [http://kosis.nso.go.kr].

region could not establish a formal economic cooperation body that corresponds to the European Union or the North America Free Trade Agreement (NAFTA). Based on the geographical proximity noted by Frankel, however, the region has been able to deepen its functional interdependence.³⁾

Although there have been massive increases in trade between Northeast Asian countries, discussions on establishing an efficient logistics systems to support burgeoning trade flows have not made much progress. Recently, some scholars have also pointed out underdeveloped logistics and transportation systems as a major barrier to trade expansion and foreign direct investment (FDI) within the region.⁴⁾ In this vein, the paper briefly reviews current logistics infrastructure in the Northeast Asian region, and takes lessons from EU's integrated transportation system.

CURRENT STATUS OF NORTHEAST ASIAN LOGISTICS SYSTEMS

First of all, transport infrastructure such as roads, railways, and airports of Northeast Asian countries are summarized in Table 1. Major developed countries' infrastructures are also listed as a point of comparison.

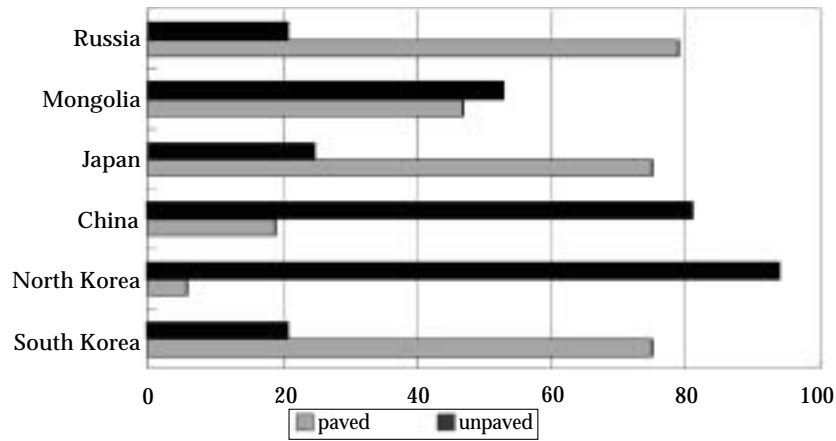
In terms of road density, represented by length of roadway per

3) Lee Chang-jae and Bang Ho-kyoung, "Trends and Characteristics of Trade in Northeast Asia" (in Korean), in Ahn Choong-yong and Lee Chang-jae, ed., *Northeast Asian Economic Cooperation: A First Step Toward Consolidation* (Seoul: Parkyoung-sa, 2003).

4) Tae Hoon Oum, "Creating Regional Air Transport System in Northeast Asia: Focus on Regulatory and Institutional Barriers," paper presented at the EWC/KOTI Conference on Creating a Regional Transportation System in Northeast Asia, organized by the East West Center, Honolulu, Hawaii, August 3-4, 2000; Peter J. Rimmer and Jun Il-soo, "A Vision for an Integrated Transportation System in Northeast Asia," a paper presented at the same conference.

Figure 1. Pavement Ratios of Selected Countries

(Unit: Percent)

Source: ESCAP, *op. cit.*

1,000 km² of land: 3,049 km in Japan, 888 km in South Korea, 258 km in North Korea and 145 km in China. Russia and Mongolia⁵⁾ account for the lowest density. Northeast Asian countries, excluding Japan, show relatively very low road density compared to Germany and the UK. Population density/road represents the number of people per 1 km of road. Population density of China, Mongolia and the two Koreas also show higher ratios than developed countries. Yet, according to ESCAP,⁶⁾ China and North Korea are severely lacking in highways and the quality of local roads, in terms of width, curves, and pavement, are underdeveloped. The pavement rates for China and North Korea are only 19 percent and 6 percent, respectively, as shown in figure 1.

5) The development of land transportation in Mongolia has been restricted by the former Soviet Union until 1990s. But recently, the government in Mongolia is attracting foreign investment. It is also receiving help from World Bank and ADB, and Kuwaiti Fund.

6) Economic and Social Commission for Asia and the Pacific, *Statistical Abstract of Transport in Asia and the Pacific 2002*, Preparatory Draft (2002).

Northeast Asian countries, excluding Japan, lag behind the world average in rail transportation considering their population and size. Rail density of China, Russia, and Mongolia is 7.5, 5.1, and 1.2 km per 1,000 km², respectively. South Korea's rail density is 31.7 km per 1,000 km², only half that of Japan's 7.5 km per 1,000 km².

The population density of rail is 15,456 and 17,974 persons/km in South Korea and China, respectively, far higher than Mongolia, Russia and Japan. North Korea's population density marking 4,315 person/km indicates its heavy reliance on rail transportation.

Maritime Logistics System within the Region

Military confrontation between South and North Korea obstructed the ground transportation network, which in turn, led to development of maritime transportation. Japan opened direct sea links with China and Russia in the 1950s. In 1958, regular ferry service linking Hokkaido (Japan) and Sakhalin (Russia) was launched. As the 1972 China-Japan diplomatic normalization increased their bilateral trade, they established a regular sea route. In order to manage the route, they founded the Maritime and Transportation Committee after signing the 1974 Maritime Agreement. Japan also allowed informal maritime transportation with North Korea in 1962 despite the absence of official ties.

South Korea opened sea links with Japan before normalization. By 1996, all South Korea-Japan sea routes were opened. South Korea also opened sea lanes with China in 1998, four years before establishing diplomatic ties. They established Korea-China Maritime Cooperation Committee in 1992, and signed the Maritime Agreement in 1993. Currently, South Korea's Busan and Incheon are linked with Shanghai, Qingdao, Dalian and other ports along China's East Coast. South Korea opened direct maritime links with Russia in 1991.

North Korea's maritime transportation is relatively poor mainly due to its heavy dependence on railway transportation. Recently, however, Pyongyang announced its plan to develop Rajin-Sunbong and Chongjin as hub ports in the East Sea to support the development

of the Tumen River area and Free Trade Zone. At the moment, North Korea and Russia are joined by maritime lanes linking Chonjin-Najin-Vladivostok-Nakhodka and Wonsan-Nakhodka. There is irregular service linking Chongjin and Heungnam of North Korea with Niigata, Kobe-Osaka and Tokyo-Yokohama.

Northeast Asian countries developed inter-regional maritime networks rather than intra-regional ones due to brisk trade with other regions. Among the world's three largest maritime sea lanes—Asia-North America, Asia-Europe and Europe-North America, the Asia-North America lane has the largest trade volume.

Owing to robust maritime transportation, Northeast Asia has relatively well-developed port facilities. Except for Japan, however, the harbor capacity still cannot handle the increasing volume of cargo. Currently, massive construction is underway to meet those needs in South Korea and China.

Lately, a port system that combines the hub-and-spoke system (ultra ships with 6,000 TEU or more call only at hub ports) and alternative maritime lanes (smaller ships call at medium-sized hub ports) is developed, rather than following the logic of the past “hub port economics.”⁷⁾ Considering the economic, political and geographical situation of Northeast Asia, maritime transportation will play an important role in and outside the region for a considerable period of time. Hence, the expansion of interconnectivity is required, which can be accomplished by establishing a logistics cooperation system in maritime transportation of the countries in the region.

Land Logistics System within the Region

Since the division of the Korean peninsula, land routes have been limited.

Mongolia has an actinoid road system centering on its capital city

7) Chun Il-su, “Transport and Logistics System” (in Korean), in Ahn Choong-yong and Lee Chang-jae, ed., *op. cit.*

of Ulaan Baatar. In particular, it has eight road junctions leading to China and Russia.⁸⁾

China has long used railways for trade in human and physical resources with 16 bordering countries. The Trans-China railway (TCR) linking the Lianyungang and Urumuchi has been connected with Central Asia since 1992, serving as a major logistics system in Eurasia. International railways linked to China are Shinuiju of North Korea, Brest of Belarus, and Ashkhabad of Iran—as well as Mongolia, Kazakhstan, and Russia.

North Korea and China share the same standard gauge rail (1,435mm). There are three links: The Seoul-Shinuiju Railway in the western area (Kaesong-Sariwon-Pyongyang-Shinuiju) is linked to Dandong of China; the Manpo Railway is linked to Jilin; and the Pyongyang-Rajin Railway is linked to Tumen. Furthermore, railways running through the northeastern part of North Korea are expected to play a significant role in developing the delta area of the Tumen River linking Rajin of North Korea, Hunchun of China, and Khasan of Russia.

EUROPEAN LESSONS FROM THE INTEGRATED TRANSPORT SYSTEM

According to William Anderson,⁹⁾ a prerequisite for the bona fide unity of the EU is consolidation of the transportation market and infrastructure and cooperation in transportation policy. Since the mid-1990s, Europe recognized the need for transportation system

8) Economic and Social Commission for Asia and the Pacific, *Asian Highway: The Road Networks Connecting China, Kazakhstan, Mongolia, The Russian Federation and The Korea Peninsula* (New York: United Nations Press, 1995), p. 10.

9) William P. Anderson, "Transport Integration in the European Union," in *Integration of Transport and Trade Facilitation* (Washington, D.C.: World Bank, 2001).

cooperation, and consolidation of the transportation sector has been the main focus of the policies directed toward unification of the region. It will support trade increase while reducing related costs and increasing productivity in the region.

In 2001, the EU published a white paper called "European Transport Policy 2010: Time to Decide," dealing with future transport policies to improve the quality of life and develop the economy. The paper addresses ways to transform transport facilities into more efficient and stable ones, stressing interconnectivity and interoperability.

The first step to establishing a united transport system was with the signing of the 1957 Treaty of Rome among the six member-countries of the European Economic Community (EEC) of the time. This treaty defined a common transport policy and a ban on discrimination, but no significant actions were taken until the early 1980s.

Finally, the EU Parliament asked the EU Court in 1983 to decide whether to call for the implementation of the Rome Treaty, and in 1985, the EU Court accepted the request. In 1985 in an EU Ministerial meeting, agreement was reached on (1) establishment of a free transportation market, (2) expansion of joint international transportation quotas and gradual adjustment of bilateral transport quotas to minimize discrimination against certain countries, and (3) easing of competition restriction in the Europe-wide transportation market. The Maastricht Treaty of 1992 defined policy items to set up a Trans-European Network (TEN) to create a borderless market in the region.¹⁰⁾

In 1994, fourteen transport specific projects were agreed upon at the European Council as shown in Table 2. The Council also signed a treaty on Common Transport Policy in railways, air, and sea transportation, whose purpose was to improve intermodal transportation by linking efficiently different transportation means for international and regional transport as well as to make common rules

10) Chun Il-su, *op. cit.*

**Table 2. Trans-European Networks:
Fourteen Priority Transportation Projects**

- 1 - High speed train / combined transport North-South (Berlin-Verona)
- 2 - High speed train (Paris-Brussels-Cologne-Amsterdam-London)
- 3 - High speed train South (Madrid-Barcelona-Montpellier/Madrid-Vitoria-Dax)
- 4 - High speed train (Paris-eastern France-southern Germany; includes Metz-Luxembourg branch)
- 5 - Conventional rail / Betuwe Line combined transport (Rotterdam-German border)
- 6 - High speed train / combined transport France-Italy(Lyon-Turin-Milan-Venice-Trieste)
- 7 - Greek motorways: PATHE (North-South axis: Rio-Antirio to Bulgarian border) and via Egnatia (East-West axis, Igoumenitsa to Turkish border)
- 8 - Multimodal link (integrated road, rail, maritime, and air facilities) between Iberian Peninsula and Central Europe
- 9 - Conventional rail link (Cork-Dublin-Belfast-Larne-Stanraer)
- 10 - Air hub for northern Italy (Malpensa Airport) with intermodal facilities for road and rail
- 11 - Fixed rail / road link between Copenhagen, Denmark, and Malmo, Sweden-Oresund fixed link (bridge-tunnel)
- 12 - Nordic Triangle: integrated road and rail systems connection major cities in Denmark, Sweden, and Finland, with sea link between Sweden and Finland
- 13 - Ireland-United Kingdom-Benelu road and ferry service link
- 14 - High speed train / combined transport West Coast Main Line (United Kingdom)

and consolidate policies in the EU. This rule also applied to foreign companies operating in the EU.

Specific policymaking is now done through a common process with the advice of the Economic and Social committee and Committee of the Regions in accordance with the Article 251 of the 1999 Amsterdam Treaty. Yet, as for employment and major transport-related policies, decisions are made considering recommendations and advice of the EU Parliament and Economic and Social Committee requiring unanimity in the Council. As for the areas concerned with

maritime and air transport, a weighted majority vote in the Council is taken to implement policies.

IMPLICATIONS FOR A NORTHEAST ASIAN LOGISTICS SYSTEM

Establishment of a Logistics Cooperation System

The global environment for logistics is changing rapidly due to globalization and informatization. Most of all, the establishment of international logistics networks and related cooperation is being promoted to set up efficient logistics systems to reduce trade-related costs and to increase global competitiveness.¹¹⁾

Northeast Asian countries accounted for 21.1 percent of the world's GDP as of 2001. The region's trade volume, 37.6 percent, is relatively lower than NAFTA and EU, but it is nevertheless continuously increasing. However, full-fledged intra-regional trade in Northeast Asia is hindered by legal, institutional and technological barriers. Thus, establishment of logistics system will deepen intra-regional economic cooperation and increase trade. An integrated system will also stimulate the efficiency of future free trade agreements among South Korea, Japan and China.¹²⁾

For an efficient logistics system, first, a linkage of free trade zones and export promotion zones within the region should be established which will lead to logistics cooperation encompassing the region's

11) Hummels, and Limao and Venables stressed that the reduction of transportation cost leads enlarged market share and trade volume. David Hummels, "Towards a Geography of Trade Costs." *Mimeo*, (University of Chicago, 1999); Nuno Limao and Anthony J. Venables, "Infrastructure, Geographical Disadvantage, and Transport Costs, and Trade" *The World Bank Economic Review*, Vol. 15, No. 3 (2001), pp. 451-479.

12) T. R. Lakshmanan, Uma Subramanina, William P. Anderson, and Frannie A. Leautier, in T. R. Lakshmanan, *et al.*, ed., *Integration of Transport and Trade Facilitation* (Washington, D.C.: The World Bank, 2001).

airport and port network. Second, standardization, digitalization of logistics systems and mutual certification systems need to be promoted. For this, common transport policy, regional transport committee and a regional infra-development organization would also be needed.

Establishment of Northeast Asian Development Bank

Limao and Venables¹³⁾ points that counterpart country's logistics infrastructure also affects one country's trade volume. As Table 1 shows, logistics infrastructure of the Northeast Asian countries lags far behind that of developed countries. More investment is thus needed for better infrastructure in order to raise the efficiency of regional transport, ease bottlenecks, and increase interconnectivity and access.

In the EU case, they raised money needed to build the Trans-European Network from the European Investment Bank, European Investment Fund, and Cohesion and Structural funds. Northeast Asia could use the Asian Development Bank but the resources of the ADB are limited, and available funds need to be shared with Southwest Asian countries. Therefore, it is necessary to establish a Northeast Asian Development Bank, a multilateral development fund organization to raise financial resources needed to improve railways, roads and other logistics systems in the region.

13) Limao and Venables, *op. cit.*