TWO: OVERVIEW OF TRANSPORT AND LOGISTICS IN NORTH-EAST ASIA

2.1 ECONOMIC AND TRANSPORTATION TRENDS IN NORTH-EAST ASIA

North-East Asia is an area with potential for future growth and economic cooperation among neighbouring economies. Since the end of the Cold War, economic cooperation between North-East Asian economies has increased very rapidly. The emergence of China and the Russian Federation in the free world market has substantially changed the size and structure of intraregional transactions of commodities and capital in North-East Asia. With Japan on one side as one of the most advanced industrial countries and China on the other side as the largest developing economy, North-East Asia has become an economic region composed of diverse and dynamic economies.

Furthermore, there are many other important factors that can increase economic ties among these countries. Continuing reduction of government controls and regulations on domestic production and foreign trade has forced the globalization of markets and encouraged the growth of trade and capital flows in North-East Asia. With increasing openness toward the import of goods and capital from each other, the economic interdependence of North-East Asian countries will increase in the future. The complementary production structures and factor endowments of North-East Asian countries, in addition to geographical and cultural proximity, will promote closer economic ties in the region.

Table 2-1 illustrates the current economic positions of North-East Asian countries. As of 2004, North-East Asia covers 5.7 per cent of the total world area, and has 25.8 per cent of the total world population. This high population forms an abundant labor pool and a huge intraregional market. Meantime, the combined output of North-East Asia accounts 18.4 per cent of the world GDP and its share of the world's freight transport is over 28 per cent. The trade volume in this region consists of 17.3 per cent (19.0 per cent for export and 15.7 per cent for import) of the world, compared to 39 per cent of the European Union (EU) and 21 per cent of the NAFTA respectively (see Table 2-2). Traditionally, international trade has provided North-East Asian countries with the driving forces of their economic growth.

Japan is the largest economy in the region with $4.3 trillion GDP in 2003, and China is the fastest growing economy with an economic growth rate of 10.2 per cent on average per annum throughout the 1990s (Table 2-3). North-East Asia's share of the world economy will further increase through the economic growth of China and other North-East Asian countries, despite the relative contradiction of the Japanese economy. The existence of all essential factors for economic growth – i.e. abundant labor force and capital, a huge intraregional market and a high level of technology – has resulted in directing international attention to North-East Asia.

Table 2-1 Major indicators of North-East Asia

Country/Region	Area (km^2)	Population (thousands)	GDP (billion US$)	Export (billion US$)	Import (billion US$)
As of	*2004*	*July 2004*	*2003*	*2004*	*2004*
World	510,072,000	6,379,157	36,400	8,880	9,215
North-East Asia* (% share to the world)	28,834,251 (5.7%)	1,644,010 (25.8%)	6,705 (18.4%)	1,597 (18.0%)	1,338 (14.5%)
China	9,596,960	1,298,848	1409	593	561
Democratic People's Republic of Korea	120,540	22,698	18**	1.04*	2.04*
Japan	377,835	127,333	4317	565	455
Mongolia	1,564,116	2,751	1	0.85	1.01
Republic of Korea	99,600.00	48,598	527	254	224
Russian Federation	17,075,200	143,782	433.49	183	95

Sources: Central Intelligence Agency, USA, The World Fact Book 2004 (As of December 7th, 2004); National Statistics Organization, Republic of Korea, www.nso.go.kr (as of December 7th, 2004); United Nations Statistics Division www.unstats/un.org; World Bank www.worldbank.org; WTO, World Trade Report 2005.

Notes: * 2002 Estimated
** GNP is used

Table 2-2 Comparison of North-East Asia with selected major regional areas

Areas	% Share of population to the world	% Share of GDP to the world	% Share of trade to the world	Intra-regional trade dependency* (%)
NAFTA	6.7[a]	33.9[a]	21[b]	22.9[c]
EU	7.1[b]	30.6[b]	39[b]	60.2[c]
North-East Asia	25.8[a]	18.4[b]	17.3[b]	19.4[c]

Sources: Central Intelligence Agency, USA, The World Fact Book 2004 (As of December 7th, 2004); WTO, World Trade Report 2004 (based on 2003 data); IMF, Direction of Trade 2003 (based on 2002 data)

Notes: * Amount of intraregional trade divided by the total amount of trade.
a: as of 2004; b: as of 2003; c: as of 2002.

Table 2-3 Economic growth rates in North-East Asia (unit: %)

Classification	1970 – 1979	1980 – 1989	1990 – 1999	2000-2003
China	5.6	10.0	10.2	8.2
Japan	4.6	3.9	1.0	1.1
Republic of Korea	8.8	9.0	5.4	4.2
The world on average	3.9	3.0	2.3	2.1

Source: Adapted from Chang-Jae Lee, et al., A new strategy for North-East Asian economic cooperation, KIEP, 1999

Interdependence of trade between the countries in North-East Asia has been increasing rapidly. The regionalization is expected to deepen with the increasing intraregional movement of goods and capital (see Table 2-4). The main reason for this expectation is the high level of economic complementariness existing among countries in North-East Asia. While China, for example, has abundant labor forces and a huge market, Japan has a high level of capital and technology. From a perspective of production, if these specialized factors can be combined in an efficient way, this will bring these countries greater economic achievement. In addition, from a perspective of consumption, these three countries can form a complementary market. That is, China can purchase high-tech products from Japan and the latter can be major consumers of labor-intensive Chinese products. In this sense, deepening regionalization can give North-East Asian countries mutual benefits.

The total trade of North-East Asian countries with the world increased from $238.6 billion in 1980 to $1,327.6 billion in 2000 at an average annual growth rate of 8.1 per cent. However, its intraregional trade amount increased from $46.6 billion to $442.9 billion during the same period at an average annual growth rate of 12.1 per cent. The intraregional trade amount of the North-East Asian countries in 1980 was only 19.5 per cent of their trade amount with world, but, in 2000, it increased to 33.4 per cent. Between 1980 and 2000 the Republic of Korea showed an increase in its share of intraregional exports, increasing from 23.3 per cent to 34.6 per cent. Japan also showed an increase from 19.1 per cent to 26.2 per cent. The Chinese share had increased from 49.6 per cent in 1980 to 65.1 per cent in 1990 through its foreign open-door policy but decreased to 42.6 per cent in 2000.

To capture the opportunities of liberalization of trade in the traditional and emerging markets there has to be sustained cooperation among the economies in the region. To a greater degree than Europe and North America, North-East Asia is beset with difficulties arising from political, economic and historical origins.

There have been a series of discussions and suggestions on regional development and infrastructure in North-East Asia. The close link between economic development and infrastructure building has been emphasized in some literature on regional development. Specifically, industrial development and its geographical distribution have direct ties with the availability of transport infrastructure. In North-East Asia, however, regional transport systems are not set up. Regional routes are being operated in most cases through the mutual agreement of related countries, which entail subdivided and thus inefficient small markets. Connection through inland transport systems is very limited except for some railway lines.

Before China and the Russian Federation entered the free market, there was little opportunity for cooperation among the North-East Asian countries on regional development and on transport networks. While policymakers are aware of the benefits of a free market economy and the need for changes in policy, these policy directions have yet to filter down to the provincial and ground level. Regulations at border crossings are still strict and complex. Policy makers still tend to favor domestic industries, and flow channels are limited to designated ports. With the emergence of the regional market, a transportation network for the region as a whole should be formulated and operationalized in order to enhance the cooperation in regional economic development. This would have a substantial impact on market expansion and growth.

Table 2-4 Trade mix of North-East Asian economies (unit: million dollars)

Export	Import	China	Democratic People's Republic of Korea	Japan	Mongolia	Republic of Korea	Russian Federation	North-East Asia	World
China	1980		374	4,032	4	3	228	4,641	18,319
	1990		362	9,210	28	2,268	2,048	13,916	64,500
	2000		451	41,654	111	11.293	2,233	55,742	249,195
Democratic People's Republic of Korea	1980	276		165		1	334	776	1,093
	1990	285		281		0	676	1242	1,818
	2000	37		257		273	3	570	1,413
Japan	1980	5,109	376		4	5,393	2,796	13,678	130.435
	1990	6,145	176		14	17,499	2,563	26,397	287,678
	2000	30,356	207		29	30,703	570	61,865	478,156
Mongolia	1980							0	
	1990							0	
	2000	193		9		2	37	241	410
Republic of Korea	1980	3		3,039			2	3044	17,505
	1990	1,533	1	13,638			519	15691	65,016
	2000	18,455	152	20,466	55		788	39916	171,826
Russian Federation	1980	240	449	1,703		9		2401	31,936
	1990	2,012	1,478	3,064		333		6887	50,284
	2000	5,233	43	2,766	182	972		9196	102,998
North-East Asia	1980	5,628	1199	8,939	8	5,406	3,360	24,540	199,288
	1990	9,975	2017	26,193	42	20,100	5,806	64,133	469,296
	2000	54,274	853	65,152	377	43,243	3,631	167,530	1,003,998

Source: http://www.kotis.net/main/tradedb.html

2.2 TRANSPORT AND LOGISTICS IN NORTH-EAST ASIA

Unlike the EU where member countries are more or less homogeneous in terms of the level of economic development and transport-related infrastructure, North-East Asia consists of countries whose socioeconomic characteristics differ vastly. Japan has the world's second largest economy with a per capita GDP of over $37,400 while China's per capita GDP is still less than $1,000.

As a result of these economic differences, as well as historical differences that have resulted in some modes being more prominent and accessible than others in some areas, transport demand also varies by country. Table 2-5 shows the intercity rail passenger transport trends in North-East Asian countries from 2000 through 2003. Demand in million person-kilometres traveled has remained fairly stagnant in recent years for all North-East Asian countries except China. China also has the highest rail demand among North-East Asian countries.

However, China has the world's largest population and the world's third largest land area. Although China experienced 25 percent more person-kilometres traveled than Japan, for example, it has more than 10 times the population (Table 2-6).

Table 2-5 Rail passenger transport trends (unit: million person-km)

Country	2000	2001	2002	2003
China	453,260	476,680	496,940	478,860
Japan	384,441	385,421	382,236	384,958
Mongolia	1,067	1,062	1,067	–
Republic of Korea	27,788	29,172	28,743	28,379

Sources: National Bureau of Statistics, China, www.stats.gov.cn; Statistics Bureau & Statistics Center, Japan, www.stat.go.jp; National Statistical Office, Mongolia, Mongolian Statistical Yearbook 2003; Ministry of Construction and Transportation, Republic of Korea, Statistics – An Annual Report, www.moct.go.kr

Table 2-6 Rail passenger transport trends, normalized by population (unit: km/person)

Country	2000	2001	2002	2003
China	349	367	383	369
Japan	3,019	3,027	3,002	3,023
Mongolia	443	435	431	–
Republic of Korea	572	600	591	584

Sources: National Bureau of Statistics, China, www.stats.gov.cn; Statistics Bureau & Statistics Center, Japan, www.stat.go.jp; National Statistical Office, Mongolia, Mongolian Statistical Yearbook 2003; Ministry of Construction and Transportation, Republic of Korea, Statistics – An Annual Report, www.moct.go.kr

Table 2-7 shows the rail freight transport trends in North-East Asian countries from 2000 through 2003. Demand in million ton-kilometres traveled has remained relatively constant for Japan and the Republic of Korea. Like passenger rail, China experiences the highest amount of freight ton-kilometres traveled by rail among the North-East Asian countries. The Russian Federation has a similarly high amount of ton-kilometres traveled by rail. The Russian Federation and China, however, have the first and third highest land areas in the world, respectively, and long distances are often required for freight transport.

Table 2-7 Rail freight transport trends (unit: million ton-km)

Country	2000	2001	2002	2003
China	1,366,300	1,457,500	1,565,800	1,724,700
Japan	22,136	22,193	22,131	22,794
Mongolia	4,283	5,288	6,461	–
Republic of Korea	10,803	10,492	10,784	11,057

Sources: National Bureau of Statistics, China, www.stats.gov.cn; Statistics Bureau & Statistics Center, Japan, www.stat.go.jp; National Statistical Office, Mongolia, Mongolian Statistical Yearbook 2003; Ministry of Construction and Transportation, the Republic of Korea, Statistics – An Annual Report, www.moct.go.kr

Transport demand by road also varies widely by country (Table 2-8). Despite having a large land area and over one billion people, China has fewer person-kilometres traveled by road than the Republic of Korea, whereas Japan – with the strongest economy in North-East Asia but a significantly smaller land area and population – has the highest amount of person-kilometres traveled by road. The average Japanese citizen travels significantly more by rail and road than citizens of any other North-East Asian country.

Table 2-8 Road passenger transport trends (Unit: million person-km)

Country	2000	2001	2002	2003
China	66,574	72,071	78,058	76,956
Japan	951,000	954,000	955,000	954,000
Mongolia	364	371	381	–
Republic of Korea	74,572	84,255	77,925	77,349

Sources: National Bureau of Statistics, China, www.stats.gov.cn; Statistics Bureau & Statistics Center, Japan, www.stat.go.jp; National Statistical Office, Mongolia, Mongolian Statistical Yearbook 2003; Ministry of Construction and Transportation, the Republic of Korea, Statistics – An Annual Report, www.moct.go.kr

Notes: Complete data on road person-kilometres traveled were not available for the Russian Federation.

Japan also experiences a high level of ton-kilometres traveled by road-twice as many as the Russian Federation (Table 2-9). Relative to rail, Japan relies heavily on trucks for freight transportation. In China, however, rail dominates freight transportation by land.

Table 2-9 Road freight transport trends (Unit: Million ton-km)

Country	2000	2001	2002	2003
China	61,294	63,304	67,825	70,995
Japan	313,000	313,000	312,000	322,000
Mongolia	126	130	134	-
Republic of Korea	11,412	12,322	13,275	13,006

Sources: National Bureau of Statistics, China, www.stats.gov.cn; Statistics Bureau & Statistics Center, Japan, www.stat.go.jp; National Statistical Office, Mongolia, Mongolian Statistical Yearbook 2003; Ministry of Construction and Transportation, the Republic of Korea, Statistics – An Annual Report, www.moct.go.kr

As the economy in this region has grown rapidly, container traffic and air transport demands also have increased very quickly. Container movements in major North-East Asian ports have shown spectacular growth in most cases, except in ports in Japan. Chinese ports in particular have shown more than a tenfold increase during the 1990-2000 periods (Tables 2-10 and 2-11).

Air transport in North-East Asia has increased in most countries. Both passenger and freight traffic have increased due to rises in income, overseas travel liberalization and the increases in intraregional trade. Although air transport occupies less than 2 per cent in volume, the value of goods transported by air is close to 30 per cent of the total traffic (see Table 2-12). In order to meet the ever-increasing air transport demand, major Asian countries are planning on expanding air transport related facilities.

Table 2-10 Container throughput trends in major North-East Asian ports (unit: 1,000 TEU)

Port	1990	1995	2000	2001	2002	2003	2004
Dalian	131	370	1,011	1,209	1,352	1,670	2,211
Tianjin	286	702	1,708	2,010	2,410	3,015	3,814
Qingdao	135	600	2,120	2,640	3,410	4,239	5,140
Kobe	2,596	1,464	2,266	2,010	1,993	2,046	2,177
Osaka	483	1,159	1,474	1,509	1,515	1,664	2,009
Tokyo	1,555	2,177	2,899	2,536	2,712	3,314	3,358
Yokohama	1,648	2,757	2,317	2,304	2,365	2,505	2,718
Busan	2,348	4,503	7,540	8,073	9,453	10,408	11,430
Gwangyang	-	12	678	887	1,126	1,185	1,320

Source: Containerisation International Yearbook

Table 2-11 Container throughput trends in North-East Asia (unit: 1,000 TEU)

Country	1990	1995	2000	2001	2002	2003	2004
China	1,204	17,232	35,483	44,726	55,717	61,898	74,540
Japan	7,956	10,604	13,621	13,127	13,501	15,055	15,987
Republic of Korea	2,348	4,503	8,530	9,287	11,543	13,050	14,299

Source: Containerization International Yearbook

Table 2-12 Air transport trends in North-East Asia (unit: million person-km, million ton-km)

Country	Passenger				Freight			
	2000	2001	2002	2003	2000	2001	2002	2003
China	90,960	109,140	126,870	126,320	3,900	4,372	5,155	5,790
Japan	176,629	165,621	168,763	157,178	8,312	7,204	7,833	7,958
Mongolia	515	539	661	–	9	10	9	–
Republic of Korea	62,837	84,544	92,175	82,231	7,774	11,327	12,606	11,696

Sources: National Bureau of Statistics, China, www.stats.gov.cn; Statistics Bureau & Statistics Center, Japan, www.stat.go.jp; National Statistical Office, Mongolia, Mongolian Statistical Yearbook 2003; Ministry of Construction and Transportation, the Republic of Korea, Statistics – An Annual Report, www.moct.go.kr

2.3 TRANSPORT AND LOGISTICS INFRASTRUCTURE IN NORTH-EAST ASIA

2.3.1 Existing conditions of transport infrastruture in North-East Asian countries

Transport related infrastructure development and transport and logistics demands differ greatly among the nations in North-East Asia. First of all, the level of motorization is quite different among the North-East Asian countries. The road network is continuously increasing in most North-East Asian countries along with the development of railway in some countries (see Table 2-13). The Russian Far East has the largest railway network of any of the North-East Asian countries with more than 87,000 km. China has more than 71,000 km. Mongolia, with 1,810 km of rail lines, has the smallest network.

China has more than 1.4 million miles of roads, making it the North-East Asian country with the largest road network. It also has the greatest number of express roads. Japan, despite being the fourth largest country in North-East Asia and being considerably smaller than the top three, has nearly 1.2 million miles of road network and the largest number of paved roads. The Democratic People's Republic of Korea has the smallest road network.

China's large expanses of inland territory are accessed by 121,557 km of navigable waterways. The Russian Far East has 96,000 of waterway. Mongolia, despite being a large, landlocked country has relatively few navigable waterways. Japan, the Republic of Korea, and the Democratic People's Republic of Korea all have few navigable waterways. However, these countries are relatively small in land area and either completely or almost completely surround by ocean.

The countries of North-East Asia vary considerably by population and land area. When compared to total population, the Russian Far East still has the most substantial rail network (Table 2-14). The Russian Far East has a relatively small number of people (7.2 million) spread over a considerable land area (6.6 million km^2). A large railway network is required to connect such large expanses, though there are fewer people there. Mongolia has the second highest rail kilometres per capita: despite having the smallest

rail network in North-East Asia, it also has the smallest population. China, with the largest population in the world, has only 55 km of rail per million persons.

Table 2-13 Comparison of transport infrastructure in North-East Asian countries

Country	Rail (broad gauge)	Rail (standard gauge)	Rail (narrow gauge)	Express road	Paved road	Non-paved road	Waterways
	km	km	km	km	km	km	km
China	0	68,000	3,600	16,314	297,890	1,088,494	121,557
Democratic People's Republic of Korea	0	5214*	N.A.	0	1,997	29,203***	2,250
Japan	0	3,204	77	6,455	528,016	627,423**	1,770
Mongolia	1,810	0	0	0	1,724	47,526*	580
Republic of Korea	0	3,125*	0	1,996	62,812	22,182	1,608
Russian Federation (Far East)	86,200	0	957#	0	358,833	173,560****	96,000

Notes: * Estimated in 2003 **1998 ***1999 ****2000
Narrow gauge is on Sakhalin Island

The Russian Far East has the most centerline kilometres of roadway per capita, more than four times higher than Mongolia and eight times higher than Japan. It also has nearly 50,000 km of paved road per million persons. Japan has the most centerline kilometres of express road per capita. Despite having the most absolute number of centerline kilometres of roadway of the North-East Asian countries, China has the lowest centerline kilometres of roadway per capita. When compared to population, the Russian Far East has the highest amount of waterways per capita, followed by Mongolia, in part due to their relatively small populations.

Table 2-14 Transport infrastructure per capita in North-East Asian countries

Country	Rail (total)	Express road	Paved road	Non-Paved road	Waterways
	km/million persons	*km/million persons*	*km/million persons*	*km/million persons*	*km/million persons*
China	55	13	229	838	94
Democratic People's Republic of Korea	230	–	88	1,287	99
Japan	26	51	4,147	4,927	14
Mongolia	658	–	627	17,276	211
Republic of Korea	64	41	1,292	456	33
Russian Federation (Far East)	12,105	–	49,838	24,106	13,333

Table 2-15 compares transport infrastructure per land area for each North-East Asian country. Centerline kilometres of infrastructure per land area give an indication of the level of accessibility in a country. The Democratic People's Republic of Korea and the Republic of Korea, with their relatively small land areas, have the highest centerline kilometres of rail per thousand square kilometres of land area. Japan has over 3,000 km of roadway per thousand km^2, making it the most accessible North-East Asian country by car or truck. All the North-East Asian countries except Japan and Mongolia have similar rates of waterway kilometres per land area.

Table 2-15 Transport infrastructure per land area in North-East Asian countries

Country	Rail (total)	Express road	Paved road	Non-paved road	Waterways
	km/thousand km²	*km/thousand km²*	*km/thousand km²*	*km/thousand km²*	*km/thousand km²*
China	7	2	31	113	13
Democratic People's Republic of Korea	43	–	17	242	19
Japan	9	17	1,397	1,661	5
Mongolia	1	–	1	30	0
Republic of Korea	31	20	631	223	16
Russian Federation (Far East)	13	–	54	26	14

2.3.2 Asian Highway and the priority road network

In order to meet the increasing demand for reliable and efficient land transport linkages and services in the Asian Pacific region, the Asian Highway project was initiated to promote the development of international road transport. Under the auspices of UNESCAP, the member countries have adopted the Asian Highway Network of 140,000 km in 32 countries with coordinated alignment, unified standards and signage (see Figure 2-1). The Asian Highway network was formalized through the Intergovernmental Agreement on the Asian Highway Network, which entered into force on 4 July 2005. As of September 2006, the agreement has been signed by 28 countries, of which 20 are Parties to the agreement.

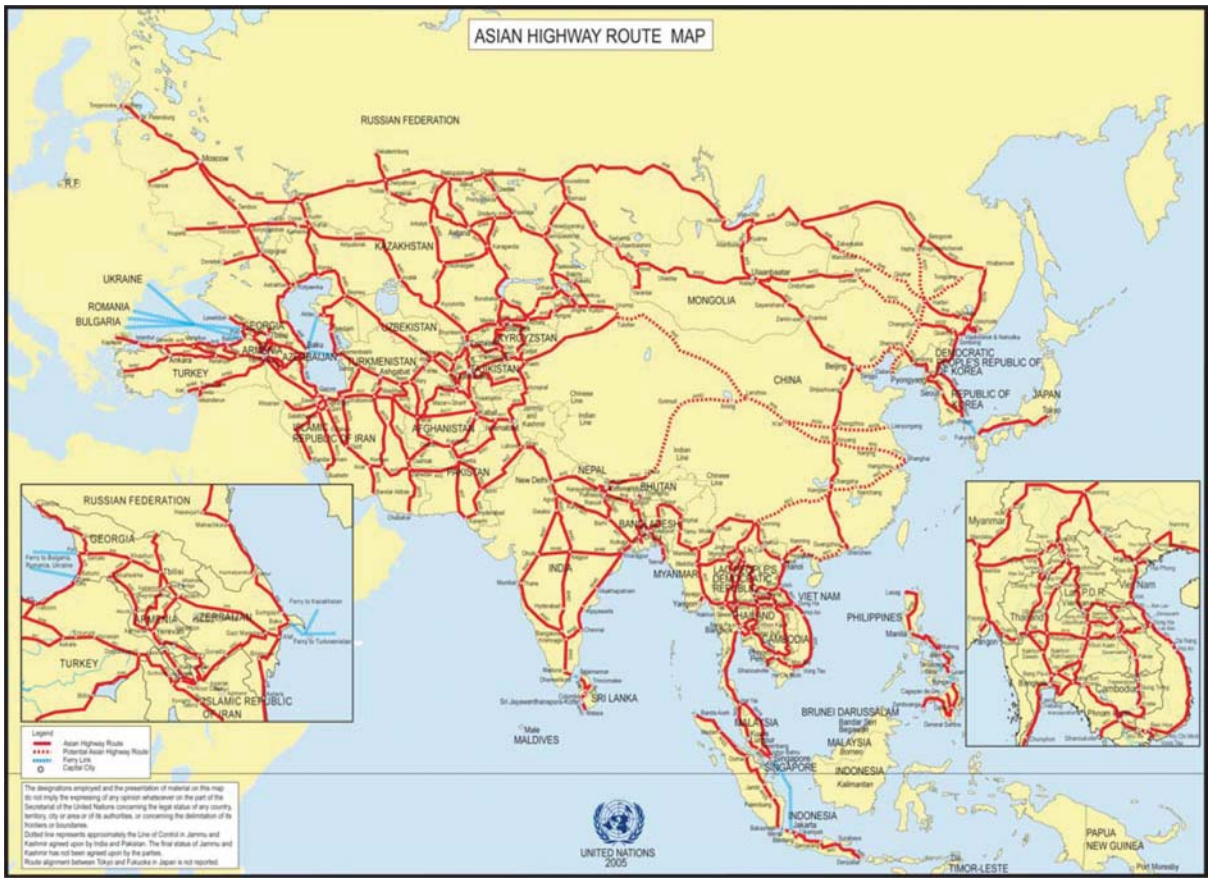

Figure 2-1 Asian Highway network

Recognizing the importance of the Asian Highway and the catalytic role that road transport plays in regional economic growth, the priority road network has been formulated for the North-East Asian region. The purpose of a priority road network is the acceleration of economic and social development in all countries of the subregion and the promotion of greater economic cooperation. Its development would open up opportunities throughout the region. The objective is to develop a road network for the mutual benefit of all countries concerned through national commitments and coordinated development .

2.3.3 Trans-Asian Railway development and North-East Asia

The Trans-Asian Railway 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 a lessening of political tensions between the countries involved, the rapid economic development of China, the possibility of greater economic exchanges with the Democratic People's Republic of Korea and the prospects of accelerated economic development in Mongolia and the Russian Federation. Accordingly, ESCAP concluded a feasibility study on connecting the railways of China, Mongolia, the Russian Federation and the Korean Peninsula with a view to identifying the Trans-Asian Railway 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 Asian and Europe that could compete with shipping services. The Trans-Asian Railway network now comprises of 81,000 km of railways in 28 member countries (see Figure 2-2).

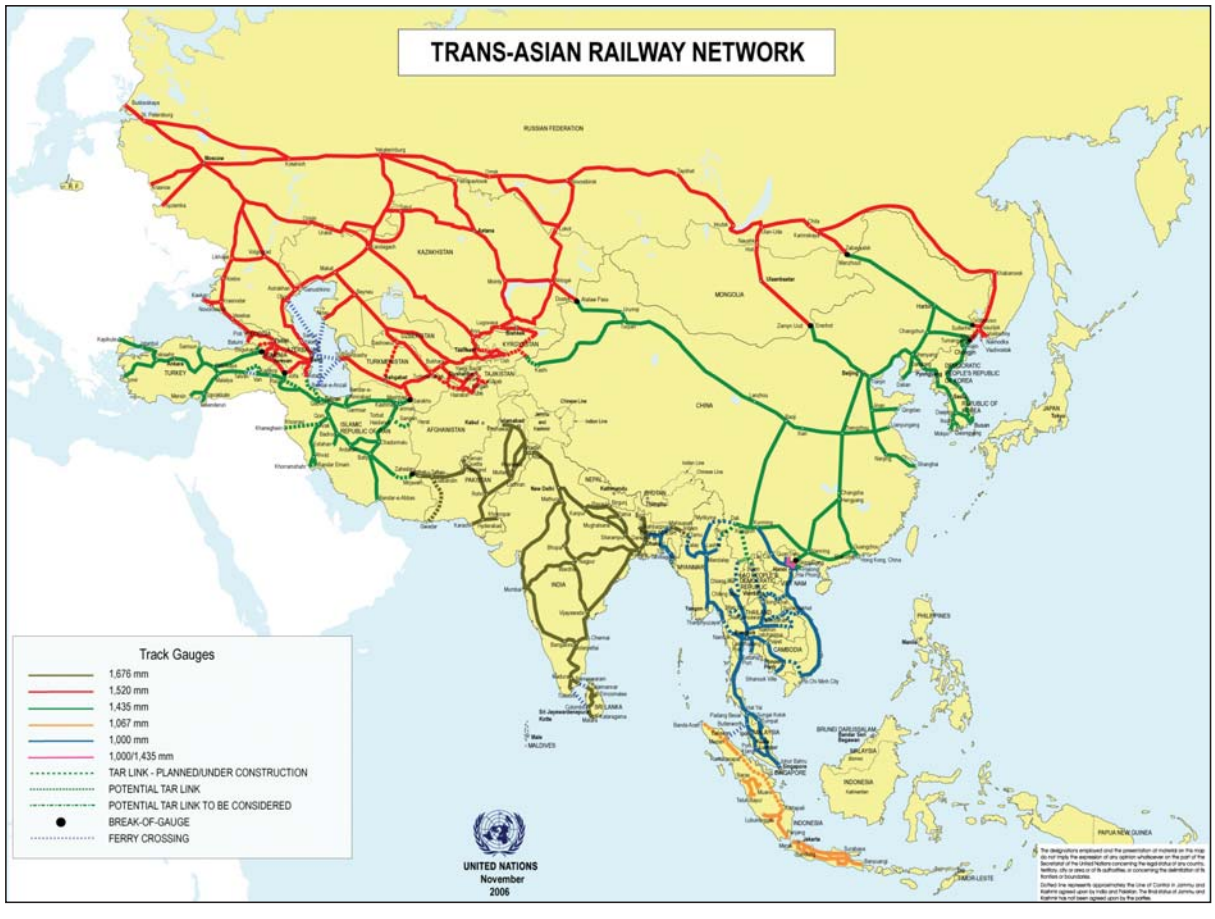

Figure 2-2 Trans-Asian Railway network

The Trans-Asian Railway network has also been formalized through the Intergovernmental Agreement on the Trans-Asian Railway Network. The agreement was adopted by the Commission in its resolution 62/4 of 12 April 2006 with a view to its being opened for signature on 10 November 2006, during the Ministerial Conference on Transport, scheduled to be held in Busan, Republic of Korea, from 6 to 11 November 2006.

The links forming the Trans-Asian Railway network (as well as the Asian Highway network) were identified by the participating countries in accordance with agreed criteria. The link had to fulfil one or more of the following:

- capital to capital link (for international transport)
- connection to main industrial and agricultural centers (link to important origin and destination points)
- connection to major sea and river ports (integration of land and sea transport networks)
- connection to major container terminals and depots (integration of rail and road networks).

Selected Trans-Asian Railway route data received from national experts in each North-East Asian country are provided in the appendix.

2.3.4 Major ports in North-East Asia

Given the physical geography of North-East Asia, ocean transportation is essential, if not unavoidable to access markets. From the early stages of cargo transportation, sea trade routes and rudimentary cargo movement always seems to have existed, regardless of political circumstances. In recent years, transport volumes of intraregional trade have increased significantly because of the reinforcement of economic cooperation in the region, with far more emphasis placed on development of coastal shipping than ocean shipping.

In the North-East Asian subregion, it is generally known that port facilities are quite sufficient in Japan and the Russian Federation relative to their trade volumes. In China and the Republic of Korea, however, even massive port construction has been unable to keep pace with the dramatic increase in maritime traffic.

Faced with serious problems due to lack of infrastructure, countries in North-East Asia have implemented new approaches to port development and management, which were traditionally funded and managed by the public sector. These new ways include deregulation, improvement of foreign direct investment and private sector involvement in ports.

In **China**, where 90 per cent of its trade volume is transported by sea, one can see the bustle of activity from ports dotted along the coastline stretching 18,400 km. At the end of 2002, the number of berths in operation in China totaled 33,600, among which 835 were deep-draft berths.[1] As China's exports and imports of container cargoes increase rapidly, Chinese ports increasingly dominate the rankings of world container port throughput. There were seven Chinese ports included in the top 30 container ports as of 2003 – Shanghai, Shenzhen, Qingdao, Tianjin, Guangzhou, Ningbo and Xiamen.[2] The Port of Dalian, which is located at the southern tip of the Liaodong Peninsula, serves as the gateway to the Northeastern provinces of China. The port is linked to an inland container transport network with dedicated train services to the inner cities of Changchun, Harbin, Shenuang and Yanji, with more than 40 departures every week.

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[1] The Ministry of Communications of the People's Republic of China, *The 2002 Report on China's Shipping Development,* July 2003, p.17.

[2] *Containerisation International*, March 2004, p.85.

In order to meet the increasing demand for port capacity, China has wide range of long-term port development plans supported by the central government budget and foreign direct investment. Emphasis is on the development of container terminals at the major ports including the Yang Shan deep-draft port project, the first phase of which began construction in 2002.[3]

In the **Democratic People's Republic of Korea,** with its heavy dependence on railway transport, road and maritime transport have played only supporting roles in the transport system. It is generally understood that the quality of port facilities in Democratic People's Republic of Korea requires improvement.

There are seven international trade ports in the Democratic People's Republic of Korea, i.e., Nampo, Chongjin, Rajin, Wonsan, Songrim, Haeju and Hungnam.[4] Nampo Port on the west coast is located near to Pyongyang and has a total of nine large berths with a combined length of nearly 2 km. Chongjin Port on the east coast has two main harbour areas: one specializing in coal and iron ore exports, while the other mainly handles imports of general and bulk cargo. With floating and multi-purpose cranes, container handling is available at Chongjin Port.[5] Rajin Port, located at the centre of the Rajin-Sonbong Free Economic and Trade Zone, has 13 berths totaling 2,520 m with the depth of 8-10.6 m. Rajin Port is capable of accommodating ships of the 5,000 to 30,000 ton class. Containers are handled using ordinary wharf cranes.[6]

Japan has established a network of around 1,100 ports including 21 specific important ports (trade ports) and 133 important ports that handle 42.2 per cent (based on ton-km) of domestic cargo and 99.8 per cent of international cargo. National port and harbour policy in Japan provides for planned long-term development of the country's ports in response to changing socioeconomic development and port-related demands. According to the 1996 *Council for Ports and Harbours Report*, in consideration of their significant affect on the country's distribution channels and costs, investment in container terminals has been emphasized due to their contribution to lowering distribution costs. In 1998, new government policy on the development and operation of container terminals, the core of international container distribution, was formulated as a means of reducing usage costs and correcting the high cost structure of the local and national economies.

To this end, Japan is moving towards developing gateway ports and subsidiary gateway ports. Deepwater, high standard international container terminals will be established at gateway ports in Tokyo Bay, Ise Bay, Osaka Bay and Northern Kyushu. These terminals will accommodate post-Panamax container vessels, which will further enhance multi-functioning as international distribution ports. Enhancing these ports will enable them to serve as global shipping channel network hubs, frequently providing port of call services and connecting each port of Japan with the rest of the world. The central ports are to be located in Hokkaido, Nihonkai-Chubu, Eastern Tohoku, Northern Kanto, Suruga Bay Coast and Chugoku. Southern Kyushu and Okinawa will be designated subsidiary gateway ports to complement gateway ports. They will serve as bases for a shipping network that connects Japan with Southeast Asia and other regions exhibiting remarkable growth.[7]

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[3] The Yang Shan deep-draft port project is designed to have 50 container berths that can accommodate the fifth and sixth generation of container vessels with the designed annual throughput capacity of 2.2 million TEU. The first phase of the project is expected to complete and put into operation by the end of 2005. (The Ministry of Communications of the People's Republic of China, *The 2002 Report on China's Shipping Development*, July 2003, p.18.)

[4] Presentation by the Delegation of the Democratic People's Republic of Korea at the Regional Seminar on Commercial Development of Ports as Logistics Centres, 11-12 July 2002, Bangkok.

[5] Lloyd's List, Port of the World 2005.

[6] ERINA, Vision for the Northeast Asia Transportation Corridors, ERINA Booklet, Vol. 1, June 2002.

[7] Ministry of Land, Infrastructure and Transport of Japan, Ports and Harbours in Japan 2002.

Japan is also forging ahead with the Super Hub Port project to compete with other major ports in Asia in terms of cost and service by developing large-scale, integrated terminal systems and taking advantage of information technology (IT). In June 2004, three major ports (Tokyo Bay, Osaka Bay and Ise Bay) met the requirements for designation as super hub ports.[8]

While the **Republic of Korea** has been implementing a long-term port development plan, delays have prevented the timely expansion of port facilities to meet the rapid surge of export and import trade as well as drastic increases in transshipment demand from and to Chinese ports. As of 2002, for example, the total designed capacity of ports in the Republic of Korea was on average only 79 per cent of total demand. Worse is the situation in the case of container cargo. The supply of container handling facilities in Busan Port in 2002 remained around 65 per cent of demand and nearly 30 per cent of container cargo was handled at conventional general cargo berths.[9]

In an effort to realize the nation's vision to play the role as the main logistics hub for North-East Asia, a vigorous port development plan is being pursued to expand the facilities at major ports. The ports of Busan and Gwangyang are to be developed as mega container hub ports and the port of Incheon as a gateway of the Seoul and Incheon metropolitan area, in particular for the trade with China.

Along the coast of the **Russian Federation**, there are a total of 22 large ports and 100 small ports. In the far eastern region of the Russian Federation, the three most important ports are Vladivostok, Nahodka, and Vostochny, which are linked with the Trans Siberian Railway (TSR). Within the region, Nahodka and Vostochny have the single largest port system, which handles mostly container cargo for TSR. The Russian ports in the Far Eastern region have the potential to benefit from possible increase in traffic between North-East Asia and Europe through the TSR. The possibility also exists for Russian ports to handle transit cargo to and from the North-Eastern provinces of China.

2.3.5 Information and communications, and other logistics facilities

In **China**, the companies that operate both container terminals and transport containers have their own information systems (i.e. EDI system). However, subcontractors do not have such sophisticated computerized management systems so they rely on other equipment to connect and communicate with business partners. The equipment provides the location of freight and containers and their status. Some big carriers also have their own GPS and GIS systems to trace their containers and vehicles.

China uses a transport management information system (TMIS). The major ports are able to receive information in advance on arriving containers; and within the next five to ten years they will introduce a multimodal waybill for the transport of containers. In next the five years the railway IT system will connect main ports and customs.

In the **Republic of Korea**, the transport/logistics information system can be divided into the government sector and the private sector. In the government sector, each ministry of government has developed various kinds of the transport/logistics information systems independently. The Port Management Information System (PORTMIS) was developed by the Ministry of Maritime Affairs and Fisheries in 1991 (then known

[8] http://www.mlit.go.jp/kisha/kisha04/11/110723_.html

[9] Ministry of Maritime Affairs and Fisheries, Republic of Korea, White Paper 2002-2003 (in Korean).

as the Korea Maritime and Port Administration) to manage ships entering the ports, as well as cargo transport in the port area, port facilities, and port decision making.

The introduction of PORTMIS provided momentum for promoting the information network among relevant government ministries by reducing logistics costs and providing a paperless process. In 1991, the Ministry of Industry and Energy established the Korea Trade Network Company and developed the KTNet (Korea Trade Network) which is controlled by the Customs Administration. Since 1997, KTNet has overseen imports and exports, customs clearance, finance to trading companies, shipping lines, insurance companies and banks. The KTNet, the first EDI system in the Republic of Korea, developed the KEDIFACT by accepting the EDIFACT developed in Europe as an EDI standard.

Apart from developing the KTNet, Ministry of Maritime Affairs and Fisheries developed the KLNet (Korea Logistics Network) jointly with shipping lines and forwarders because the KTNet did not provide services closely related with cargo flow. In order to reduce the time and cost incurred in the process of exporting and importing cargoes, the KLNet provides EDI service to all logistics related firms such as shipping lines, forwarders, transport firms, ICDs (inland container depots), shippers, the Customs Administration and the National Railroad.

In addition, the Ministry of Construction and Transportation has established an integrated logistics network – the KTLOGIS – supported by manufacturing firms, transport firms and warehousing firms. The KTLOGIS completed its first phase development in 1997, the second phase in 2000. The third phase will be completed in 2015. The main services available from the KTLOGIS are the electronic data interchange (EDI), the database system of import and export information (DBsystem), and commercial vehicle operation (CVO), which are provided to parties such as the manufacturing firms, transport firms and warehousing firms.

Since 1997 the PORTMIS has been interconnected with the KLNet through the sharing of the DBsystem. In addition to that, the KLNet is linked with the KTNet and with KTLOGIS by mediating the information.

Information communication technology, especially Internet technology, has developed rapidly recently, with the private sector promoting electronic commerce actively by using Internet networking systems. Most shipping lines, such as the Hyundai Merchant Marine, Hanjin Shipping Lines and Choyang Shipping Lines, provide their customers with information about ship schedules, cargo reservations, cargo tracking systems, notices of cargo arrival and issues of bills of landing via the Net. These private companies are competing with the KLNet, KTNet, KTLOGIS in the area of the electric commerce. Hanjin Shipping Line is allied with Cyber Logitech, the information and communication company, in order to facilitate quick decision making, to increase productivity and to provide inland transport services. Korea Express, Samsung SDS and SK are also operating a logistics information service for their customers and are connecting their network with KTNet, KLNet, KTLOGIS.

The main and difficult issues that have occurred in the process of providing logistics information are the complexity of working processes and the variety of the interested parties. The first problem is the inadequate interconnecting capability of the service providers in collecting and managing the integrated information, which cannot be provided by individual logistics information providers. The second one is the deficiency of the connections among the information network system. The third difficulty lies in the huge differences between the service levels of the information system among the logistics companies.

In order to overcome these problems, the Ministry of Maritime Affairs and Fisheries is going to set up a shipping and Port - Internet Data Center (SPIDC) by 2005. The feasibility of the system is being studied

by the Korea Maritime Institute. The construction of the integrated EDI network will include the utilization of XML (Extensible Markup Language), the introduction of an advanced logistics management system, including a cargo tracking system, the development of a standard program to connect the ASP (Application Service Provider) and ERP (Enterprise Resource Planning), and the adoption of the existing logistics information system, which has been used fragmentarily by the each of the private companies (see Table 2-16).

In the **Russian Federation**, the TRANSTELECOM Co. operates optical fibre telecommunication network of 52,000 km. Based on such telecommunication network the Russian Railways (RZD) created a unique information system, which allows real time checking of rolling stock at any of 6,000 railway stations of the Russian Federation. The telecommunication network of RZD is already connected to similar networks of China, Finland, Kazakhstan, Lithuania, Latvia, Mongolia and Ukraine, and provides grounds for common information space for international transport corridors passing through the territory of the Russian Federation.

Development of similar telecommunication networks for various modes of transport is also in progress: the telecommunication network for inland waterways is being formulated; all the major sea ports already use the telecommunication network served by TRANSTELECOM Co.; major airlines created their corporate networks covering subdivisions scattered all over the country; Road transporters formed their telecommunication network. However all these networks serving various transport modes of the transport system of the country are not yet integrated.

To improve information interchange between RZD and its customers a pilot project was launched to introduce electronic waybill (ETRAN). The system greatly simplified the application for transport procedures (terminals were established at more than 5,000 enterprises). An e-signature system with a special certifying centre is also being introduced by RZD and the next step will be for the whole transport system.

Table 2-16 Information system in the Republic of Korea

Services	Type and Description	Current Trends and Development Plans
Commercial Vehicle Operation (CVO)	– Real time tracking service of vehicles and freights – Vehicle operation management – Freight transport arrangement – Cyberspace logistic information – Weather, traffic condition, map information	– Used by 25,000 vehicles (less tha1% of total freight vehicles) – Government will subsidize 50% of the purchasing price of CVO machine to increase the usage of this service.
Electronic Data Interchange (EDI)	– Exchange information by logistic industry using standard electronic text data – PORT-MIS service – KROIS Service	– Government: PORT-MIS (11 type), KROIS (5 type), and KCIS (39 type) – Private: land transport (6 type), sea transport (26 type), foreign exchange (31 type), and insurance (4 type)
Integrated import/export logistic information	– Establish integrated data base that provide information on freight status and location for efficient management of import/export freights – Marine transport track service, air transport track service, and transport statistics service	– Logistic industry can receive import/export logistic information service through the internet at KT-Logis starting April 2000. – Other government agencies also provide information on marine transport, customs, rail transport, seaport terminal (KL-Net), and KT-net.