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DEVELOPMENT OF CHINA'S TRANSPORTATION INFRASTRUCTURE AND INTERNATIONAL CONNECTIVITY

EDITED BY

ZHANG YUNLING[1]

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[1] Zhang Yunling as the research director of this project, is responsible for designing and writing the final report paper, while Wu Wehua, Zhao Minglong, Zhang Yushan and Zhong Feiteng as the research team members, are responsible for preliminary research and drafting the designated part.

TABLE OF CONTENTS

LIST OF PROJECT MEMBERS

Project Director:

Zhang Yunling, Professor, Director of Academic Division of International Studies, Academy Member, Chinese Academy of Social Sciences

Research team members:

Wu Wenhua, Professor, Director of the Institute of Transportation, Institute of Macroeconomics of Nation Development and Reform Commission (Chapter 1)

Zhao Minglong, Professor, Director of the Institute of Economics, Guangxi Academy of Social Science (Chapter 2)

Zhang Yushan, Professor, Dean of the Center of Northeast Asian Studies, Jilin Academy of Social Sciences (Chapter 3)

Chen Tiejun, Professor, Director of the Institute of Economics, Yunnan Academy of Social Sciences (Chapter 5)

Zhong Feiteng, Dr., Assistant Professor, the Institute of Asia-Pacific Studies of Chinese Academy of Social Sciences (Chapter 4, 6)

Liu Shixin, PhD candidate, Gradual School, Chinese Academy of Social Sciences (translation)

CHAPTER 1

Overview:

The Development of China's Transportation Infrastructure and International Connectivity

China is a large country with a vast and complex terrain, so that transportation infrastructure plays an essential role in its economic and social development. In general, the development of transportation infrastructure before China's reform and opening up was slow and poor. The trunk highways and railways linking the whole country were distributed very unevenly.

Since the reform and opening up, transportation infrastructure has developed very fast. In recent years, China's highway networks and high-speed railway networks have experienced very fast development.

With so many countries as its neighbors, the international connectivity of China's transportation infrastructure is of great significance for China, as well as for its neighbors. The construction of international transportation infrastructure networks has developed noticeably in accordance with the rapid development of China's economy and increasing economic relations between China and its neighbors.

1. Progress of the Transportation Infrastructure

Since the reform and opening up, especially after 1990s, Chinese government has given strategic priority to the development of transportation infrastructure which has made China achieve a significant improvement of its infrastructure networks. In 1978, the transportation infrastructure in China was quite backward. The total transport route mileage was only 1,235,100 km in 1978, including 51,700 km railways, 890,200 km highways, 136,000 km inland waterways, 148,900 km civil aviation and 8,300 km pipeline. By the end of 2008, the total transport route mileage reached 6,452,800 km, 5.2 fold of the size in 1978. It includes 79,700 km railways, 2,009,100 km highways, 122,800 km inland waterways, 2461,800 km civil aviation and 58,300 km pipeline. (See Table 1-1)

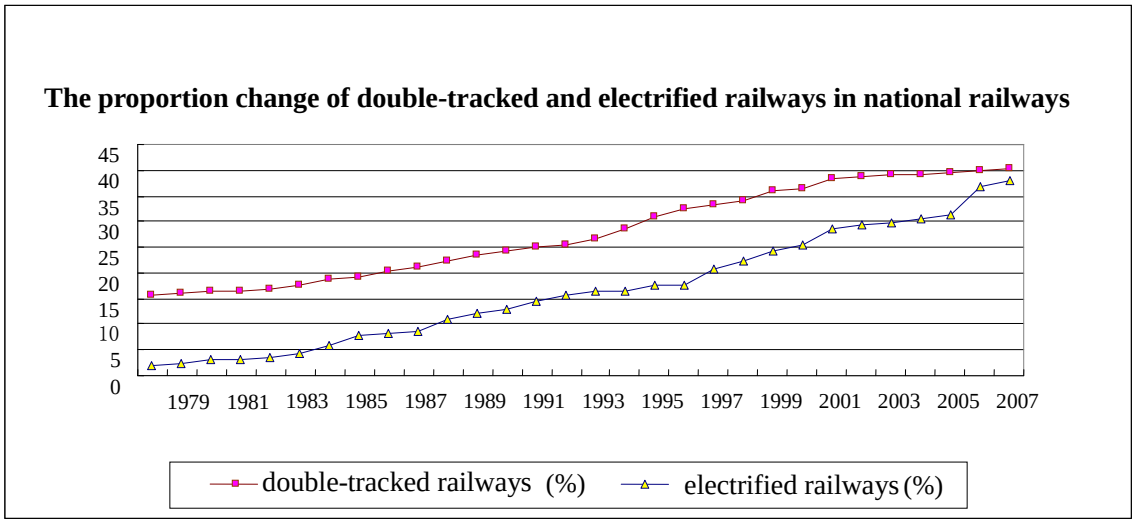
Table 1-1. Transport Route Length in China (10,000 km)

Year	Total Route	Railway Length	Highway (including village roads) Length	Highway (not including village roads) Length	Inland Waterway Length	Civil Aviation Route Length	Pipeline Length
1978	123.51	5.17	--	89.02	13.6	14.89	0.83
1990	171.8	5.78	--	102.83	10.92	50.68	1.59
2000	311.82	6.87	--	140.27	11.93	150.29	2.47
2005	558.64	7.54	141.47	193.05	12.33	199.85	4.4
2006	581.92	7.71	151.2	194.5	12.34	211.35	4.82
2007	618.27	7.8	162.15	196.22	12.35	234.3	5.45
008	645.28	7.97	172.10	200.91	12.28	246.18	5.83

Source: Yearbook of China Statistics 1990-2009, China Statistics Press.

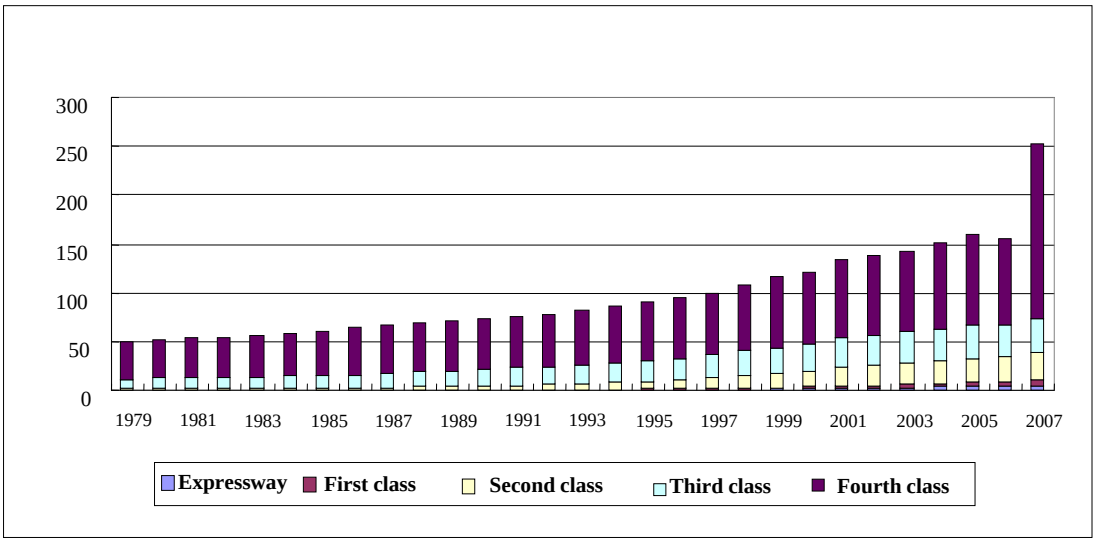
Noticeably, the quality of China's transportation lines has been greatly upgraded. During the period of 1978-2008, the length of double track railway increased by 21,000 km, a 3.6-fold increase. At the same time, the length of electrified railway increased by 25,000 km，a eleven-fold increase. In 2008, double track railways and electrified railways constituted 45.1% and 43.1% of total railways respectively, which made a substantial improvement in capacity and efficiency of the railway transportation system. The length of classified highways (including village roads) was 2,778,500 km in 2008, a 4.2-fold increase since 1978. Its proportion to the total highway length had jumped from 52.8% to 74.5%. The length of Class-II (second class) and above highway roads increased to 399,700 km, a 35.2-fold increase after 1978. It was a miracle that the express highway system grew out of nothing in China and reached to 60,000 km by the end of 2008, ranking second in the world. The role of the highway network as the backbone in China's comprehensive transportation system has been strengthened.

Figure 1-1. Development of the double-tracked and electrified railways (% of the total）



Source: Yearbook of China's Transportation Statistics

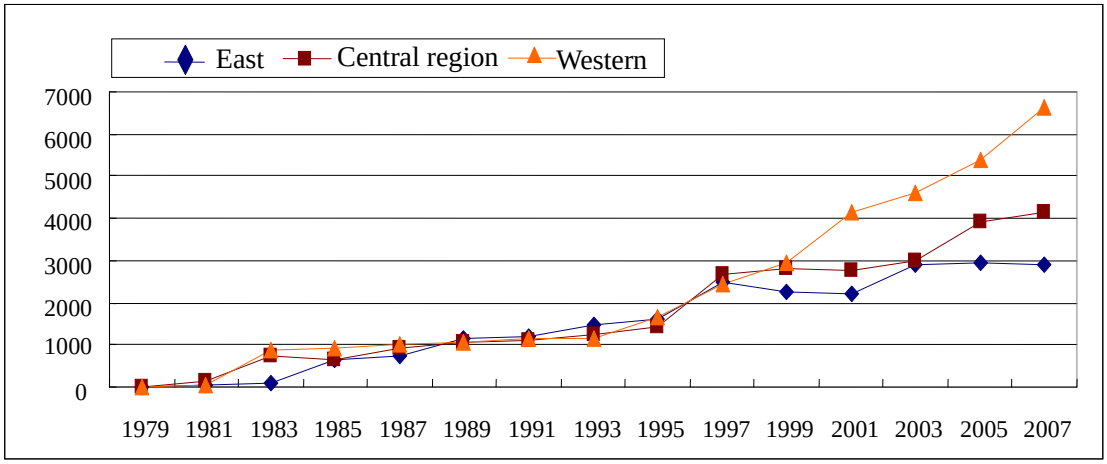
Figure 1-2. The structure of China's highways（10,000 km）



Source: Yearbook of China's Transportation Statistics

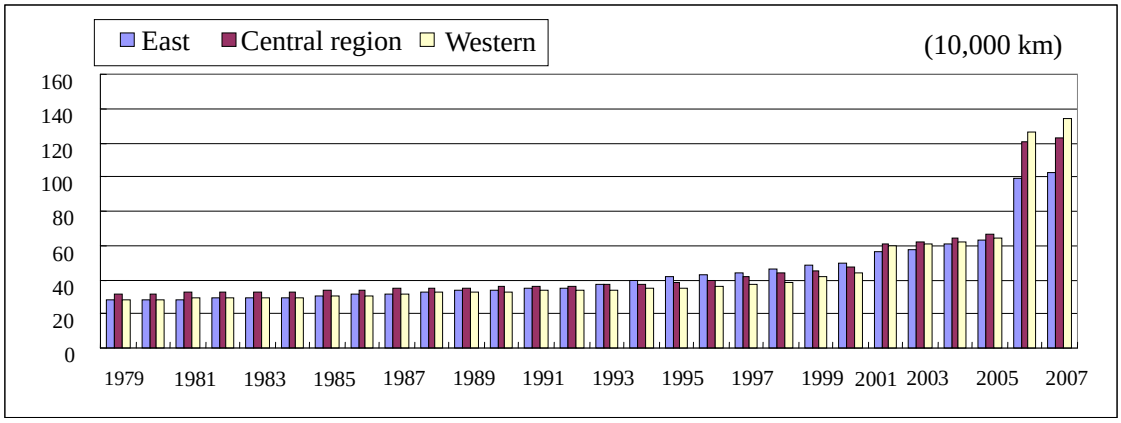
With the massive construction, the transportation infrastructure networks have gradually developed. Both the length and the density of railways have been remarkably improved. From 1979 to 2007, the density of railway networks increased from 1,183 km / thousand km² to 1,453 km/ thousand km² in eastern China, from 1,131 km/thousand km² to 1,381 km/thousand km²in central China, from 268 km/thousand km² to 365 km/thousand km² in western China. Access to highways becomes easier along with the increase of the highway density. In 2007, 99.0% of the towns and 88.2% of the villages had access to highways, while the number was 90.5% and 65.8% in 1978 respectively. The density of highways had increased from 93 km/ thousand km² in 1978 to 373 km/ thousand km² in 2007. There are148 cities that had built civil airports in 2007, while the number was only 80 in 1978. The development of airports with better service facilities including those in western China helps the connectivity of China's regions, as well as between China and the outside world.

Figure 1-3. Length of national railway in operation



Source: Yearbook of China's Transportation Statistics

Figure 1-4. Construction of highways by the Region (1979-2007)

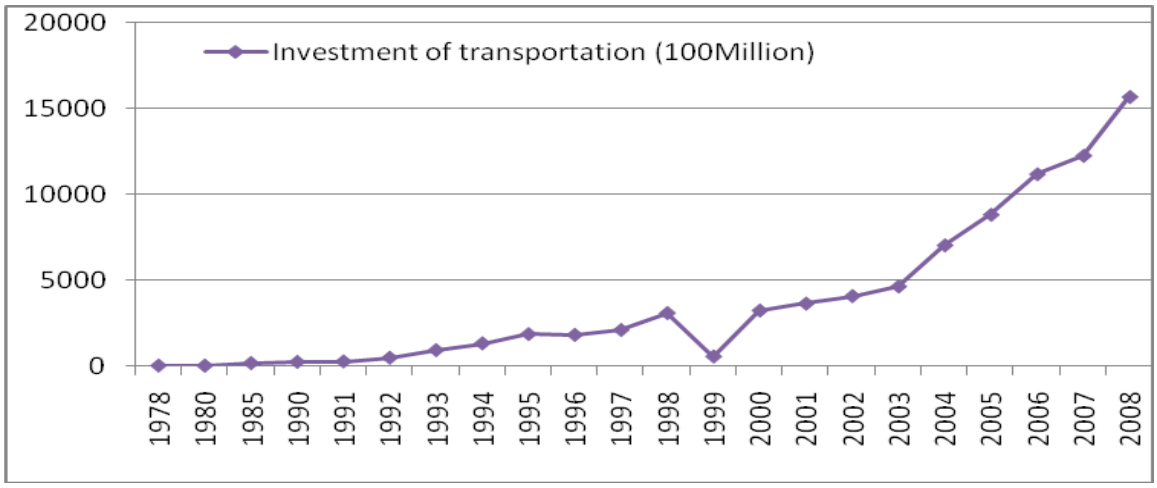


Source: Yearbook of China's Transportation Statistics

In order to further improve the economic and social development environment, Chinese government has increased its investments in transportation since the Eighth Five-Year Plan (1991-1995). In 1978, gross investment in fixed assets of transport industry was only ￥6.36 billion. The average annual investment in transport industry during the Sixth Five-Year Plan (1980-1985) and the *Seventh Five-Year Plan* (1986-1990) was ￥10.3 billion and ￥22.12 billion. Then, the investment increased to ￥81.23 billion in the Eighth Five-Year Plan (1991-1995), ￥199.71 billion in the

Ninth Five-Year Plan (1996-2000) and to ￥531.36 billion in the *Tenth Five-Year Plan* (2001-2005). Due to the ￥4,000 billion stimulus package for dealing with the global financial crisis, investment increased to ￥1,570.05 billion in 2008. The expanding investments plaid a vital role for the fast development of China's transportation industry.

Figure 1-5. Investment of Transportation (1978-2008)



Source: Yearbook of China's Transportation Statistics

1.1. The Development of highway network

After the reform policy, China's economic development entered into a new ear. Along the same line, highway infrastructure experienced a historical change. On the one hand, both central government and local governments paid more attention to the construction of highways, while on the other hand, an integrated highway network in the national wide began to be planned and constructed. From 1978 to 1989, the classified highway lines increased by 210,000 km and those with high grade and sub-high grade surface increased by 102,000 km. However, the development speed of transportation infrastructure still could not catch up with the growth rate of the demand. The shortage of highways was a bottleneck restricting the economic development.

In the late 1980s and early 1990s, the Ministry of Transportation (MOT) formulated the *National Trunk Highway Network Plan* comprising "five vertical and seven horizontal expressways". Massive construction of expressway networks started as soon as the plan was approved by the State Council. In addition to the construction of national trunk expressways, China also paid more attention to the construction of inter-provincial corridors in western China. The class-II and above highways to provincial capitals and district cities were built and upgraded. Highways were connected to most towns and administrative villages, with 98.5% of towns and 85.8% of villages connecting to highways.

By late 1990s, a basic highway network was established in China. However, the highway networks were unevenly distributed. In eastern China, the density is high and also with higher grade of the quality, while in central China and especially in western China with low density and low quality.

From late 1990s, the highway network expanded rapidly. In 1998, China implemented a proactive fiscal policy and prudent monetary policy in order to deal with the impact of Asian financial crisis, which promoted the development of transportation infrastructure, especially highways. China built 4,000 km expressways in operation every year, and annual investment in expressways reached ￥140 billion during late 1980s and early 21 century. In 2005, Chinese government adopted the *National Expressway Network Plan*. The new expressway network is composed of seven expressways radiating from Beijing, nine north-south expressways and eighteen east-west expressways. Its total length reached 85,000 km, including 68,000 km trunk lines, 17,000 km regional lines, connecting lines and others. By the end of 2008, the main part of national trunk highway network had been established. The framework of national trunk highway network was primarily built up, with 70% national expressways in operation and most planned highways being built.

By the end of 2008, the length of highways reached 3,730,200 km, a 4.3-fold increase from 1979, including 155,300 km national highways, 263,200 km provincial

highways, 512,300 km town highways, 1,011,100 km country highways, 67,200 km accommodation highways, 17,210,000 km village roads. The length of Class-II and above highways increased to 399,700 km.

Massive construction of expressways was initiated in late 1980s. The length of expressways was 522 km by the end of 1990 and 2,141 km by the end of 1995. By the end of 2001, the length of expressways in China reached to 19,400 km, ranking second in the world. The length of expressways opened to traffic was 60,300 km by the end of 2008. The expressway network, based on "five vertical and seven horizontal expressways", was established in general.

1.2. The Development of Railway Network

Before reform and opening-up, China had few major trunk lines, such as Jiaozhi Railway (Jiaozuo-Zhicheng), Chengkun Railway (Chengdu-Kunming), Guikun Railway (Guiyang-Kunming) and Xiangqian Railway (Zhuzhou-Guiyang). These lines constituted the basic framework of railway networks in China.

From 1978 to late 1990s, China speeded up the construction of trunk railway lines. By the end of 1997, the railways in operation had a length of 66,000 km, ranking first in Asia. China had 12,000 km electrified railways and became the ninth country in the world owning more than 10,000 km electrified railways. China built Jingjiu Railway (Beijing-Kowloon), a north--south rail corridor, and Nankun Railway (Nanning-Kunming), a southwest rail corridor. Meanwhile, China advanced the technology to upgrade the existing equipments and transport capacity. The establishment of Daqin Railway (Datong-Qinhuangdao), a heavy haulage railway, and Guangshen Railway (Guangzhou-Shenzhen), a quasi-high-speed railway improved further the capacity and quality of China's railway system.

From late 1990s, the construction of railway networks entered into a period of fast development in China. The State Council approved the *Mid-long Term Railway Network Plan* in 2004 which made the construction speed of railways accelerated. The

construction of passenger railways, high-speed railways and intercity railways started. So far, these railway lines have been built or under construction, including Beijing-Shanghai high-speed line, Shijiazhuang-Taiyuan passenger line, Wuhan-Guangzhou passenger line and Guangzhou-Zhuhai intercity line. Some regional railway projects aiming at building, upgrading and extending railways, including Fuzhou-Xiamen Railway, Qianan-Caofeidian Railway and Lanzhou-Chongqing Railway also started. In 2008, the Chinese Central government allocated ￥15 billion to upgrade railway infrastructure to stimulate domestic demand and to ease global financial crisis. As a result, the construction of passenger railways and intercity passenger railways has entered into another new period.

By far, the railway networks have covered all the provinces, autonomous regions and municipalities. Railway networks in western China have enlarged their scales and also have enhanced their regional corridors with huge transportation capacity. A national railway network connecting east-west, north and south has been developed.

Table 1-2. The Length of Railways in Operation, 2001-1008 (km)

Year	New Track Length	New Operational Route Length	Single-Track To Double-Track Railway Track Length	Double-Track Railways in Operation	Electrified Railways
2001	1522.0	1246.0	889.0	1503.5	2680.3
2002	1952.8	1994.2	858.7	538.5	920.1
2003	1574.8	1118.7	222.6	627.9	617.2
2004	1169.6	1501.1	650.5	399.8	413.7
2005	919.7	1230.0	414.7	486.3	865.7
2006	949.0	1657.3	1184.9	856.0	4034.5
2007	1120.5	743.6	1447.5	725.7	930.6
2008	2808.1	1730.1	2210.2	1955.8	1959.3

Source: Yearbook of China's Transportation Statistics.

Now, the railway networks in China tend to increase the speed of existing trunk railways, including Jingha Railway (Beijing-Harbin), Jinghu Railway (Beijing-Shanghai), Jingguang Railway (Beijing-Guangzhou), Longhai Railway (Lanzhou-Lianyungang), Zhegan Railway (Hangzhou-Zhuzhou), and Jiaoji Railway (Qingdao-Jinan). By gradual upgrading the system, the speed of China's railways are much higher, with 24,000 km at the speed above 160 km/h, 6,227 km above 200 km/h, 1,019 km above 250 km/h. Meanwhile, a group of high speed passenger lines and intercity lines began to be built one after another, including Jingjin Line (Beijing-Tianjin), Wuguang Line (Wuhan-Guangzhou), Hewu Line (Hefei-Hankou), Hada Line (Harbin-Dalian), and Jinghu Line (Beijing-Shanghai). In addition, the construction of Jinghu (Beijing-Shanghai) high-speed railway symbolized a new era of high-speed railways in China.

Due to the fact that Chinese economy depends more and more on foreign resources and markets, it is necessary for China to have a global strategic view to seek sustained and steady economic growth. As a result, cross-border transportation corridors connecting neighboring countries have been developed significantly.

China has many land neighboring countries. The economic development of China ties closely to its neighboring countries since reform and opening-up. The construction of international corridors was raised to a high level under the condition that the increasing economic exchanges between China and its neighbors require the better transportation facilities.

2. The International Transportation Connectivity

From the geographical perspective, there are four major transportation corridors connecting China and its neighboring regions. Each of them has great significance to

China's connectivity to the outside world. Thus, the development of international transportation corridors has been greatly emphasized by the Chinese government.

2.1. The Structure of international transportation connectivity

Northeast Asian Corridor

Northeast Asian Corridor includes China-DPRK Corridor, China-Russia Corridor and China-Mongolia Corridor.

China-DPRK Corridor includes:

- The corridor links Dandong port (Liaoning Province) with DPRK, comprising highways and railways. It is the most fast and convenient 24-hour corridor with a high-volume traffic capacity from China to DPRK.
- The corridor links Tumen port (Jilin Province) with northern part of DPRK, composing railways and highways.

China-Russia Corridor includes:

- The train-air-truck corridor links Huichun Port (Jilin Province) with harbors in Russia to the Sea, composing highways and railways in China side.
- The corridor links Suifenhe port (Heilongjiang Province), Dongning Port (Heilongjiang Province) with Russia, composing highways and railways.
- The corridor links Manzhouli port (Inner Mongolia Autonomous Region) connecting Russian railway networks to Europe. It is composed of highways and railways. Its annual freight traffic volume is above 25,000,000 ton.

China-Mongolia Corridor includes:

- The corridor links Erenhot port (Inner Mongolia Autonomous Region) with Mongolia, comprising highways and railways. It is the most important corridor between China and Mongolia. As an indispensable part of Asia-Europe continental land bridge line, it connects railway networks in Russia through Mongolia.
- The corridor links Ganqimaodao port (Inner Mongolia Autonomous Region)

with Mongolia, comprising highways. Railways to Ganqimaodao Port are under construction in China. It will be a major energy transportation corridor.

- This corridor links Ceke port (Inner Mongolia Autonomous Region) with Mongolia, comprising highways and railways in China. It will be a major energy transportation corridor.

Central Asian Corridor

Central Asian Corridor includes China-Kazakhstan Corridor, China-Kyrgrzstan Corridor, and China-Tajikistan Corridor.

China-Kazakhstan Corridor includes：

- The corridor links Alataw Pass port (Xinjiang Uygur Autonomous Regions) with Kazakhstan, comprised highways, railways and pipeline. As an important part of the second Eurasian land bridge line, it connects Russian railway networks to Europe through Kazakhstan.
- The corridor links Korgas port (Xinjiang Uygur Autonomous Regions) with Kazakhstan, comprising highways, railways in China. It goes to Central Asian countries via Kazakhstan.
- The corridor links Jeminay port，Baketu port，Dulat port, Ahitubiek port (Xinjiang Uygur Autonomous Regions) with Kazakhstan. However, these ports are so small that has limited capacity for the regional transportation.

China-Kyrgyzstan Corridor

- This corridor links Turgart port (Xinjiang Uygur Autonomous Regions) with Kyrgyzstan, comprising highways. A part of China-Kyrgyzstan-Uzbekistan railway will be constructed along this corridor in the future.

South Asian Corridor

South Asian Corridor includes China-India Corridor, China-Nepal Corridor, China-Pakistan Corridor, China- Myanmar Corridor, China-Vietnam Corridor, and China-Laos Corridor.

China-India Corridor：

- This corridor links Nathula Pass port (Tibetan Autonomous Region) with India, comprising highways. It was shut down for a long period because of the tension along the border area, and re-opened in 2006. Until now, its function is still quite limited.

China-Nepal Corridor includes:

- The corridor links Zhangmu Port (Tibetan Autonomous Region) with Nepal. This highway corridor is a crucial one connecting China and South Asia. The operational Qingzang Railway (Qinghai-Tibet) and planned Lhasa-Shigatse-Nielamu Railway in Tibetan Autonomous Region will link railways in Nepal and India. They will help to form a better China-South Asian Corridor.\
- The corridor links Yadong Port (Tibetan Autonomous Region) with Nepal. This highway corridor is a crucial one connecting China and South Asia. The planned Lhasa-Shigatse-Yadong Railway will connect railways in Nepal and India to form a better China-South Asian Corridor.

China-Pakistan Corridor:

- This corridor links Khunjerab Port (Xinjiang Uygur Autonomous Regions) with Pakistan, comprising highways. It has much room for improvement.

Southeast Asian Corridor

Southeast Asian Corridor includes China-Myanmar Corridor, China-Vietnam Corridor, and China-Laos Corridor.

China-Myanmar Corridor:

- This corridor links Ruili port, Wanding port, Houqiao port, Mengding port (Yunnan Province) with Myanmar, mainly composed of highways. Railways and the gas and oil pipeline are planned to be constructed to connect harbors of Indian Ocean in Myanmar. It will be a train and truck Corridor linking China and Indian Ocean.

China-Laos Corridor:

- This corridor links Mohan Port (Yunnan Province) with Laos, comprising two-way highways. Its function is quite limited.

China-Vietnam Corridor includes:

- The corridor links Pingxiang port, Dongxing port, Shuikou port, Longbang port (Guangxi Province) with Vietnam. The railways and highways connecting Youyiguan (Pingxiang) have a high traffic capacity. It is mainly highways linking other ports in this corridor.
- The corridor links Hekou port, Tianbao port (Yunnan Province) with Vietnam. The Hekou-Vietnam Section is composed of railways (Kunming-Hekou Railway), highways and waterways (Yuanjiang River). It has much potential for improvement.

2.2. The Outlook of the Future Development

China's future strategy on transportation is to build a modern comprehensive transportation system, which will provide low-cost, safe, efficient and convenient services to sustainable economic development.

Since 2004, the State Council has approved ten comprehensive transportation plans, which comprise a relatively comprehensive transportation system guiding China's modern transportation development. By implementing the *Comprehensive Transport Network Mid-long Term Development Plan* and other related plans, the total length of transportation routes will be more than 3,380,000 km (not including city and village roads) in 2020. The total length of highways will be 3,000,000 km (not including village roads), including 650,000 km Class-II and above highways and 100,000 km expressways. The total length of railways will be 120,000 km, 50% of them with double-track lines and 60% with electrified lines. There will be a modern transportation network that could generally meet the demand of China's economic development.

China will increase investment in international transportation corridors to speed up

the construction of the international transportation networks that link different regions and countries. China will stick to the principle of "mutual benefit, win-win and common prosperity" in developing the international transportation corridors.

During the process of development of international transportation corridors, China and its neighboring countries will cooperate closely on the projecting, investing and financing based on trust and mutual benefit. The factors influencing the constructions of transportation corridors between China and its neighboring countries, such as history, construction conditions, functions and potential demands, are too different at the same pace. It depends on demands, feasibilities and capacity of relating partners.

2.3. The Mechanism of International Cooperation

The development of international transportation corridors will benefit both China and its neighboring countries. Meanwhile, as the major content of regional cooperation in Asia, the international transportation connectivity will surely benefit all countries in the region.

China has made great efforts to promote cooperation on the development of the international transportation corridors. Many mechanisms have been developed for the development of the international transportation connectivity.

- Bilateral cooperation, mainly between China and its neighboring countries. They have cooperated in the planning and implementing of highways, railways, waterways and other projects connecting them. Although each country has actively made its effort for the construction of the agreed projects, China has plaid a key role in providing the fund and technology to facilitate the transportation connectivity.
- Regional cooperation, mainly through East Asia cooperation and the Shanghai Cooperation Organization (SCO). In East Asia, China has taken part in many forms of cooperation under the framework of "10+1" (ASEAN plus China), "10+3" (ASEAN plus China, Japan and Korea), East Asian Summit (EAS, 10+3 plus India,

Australia and New Zealand) and Northeast Asian Cooperation (China Japan and Korea). The role of the regional cooperation has been strengthened along with the progress of the regional cooperation mechanisms. Due to its special geographical location, China has actively participated all regional projects and plaid an important role in promoting the regional infrastructure networks.

- International cooperation. The infrastructure connectivity is well beyond the regional dimension. China and other countries have closely cooperated on projecting and constructing the international highway and railway linkage lines, for example, Asia-Europe Corridor networks.

Since reform and opening-up, especially in the new century, China has actively promotes and taken part in the construction of international transportation corridors. So far, the infrastructure in China and its neighboring countries have been improved. However, the international infrastructure connectivity is far behind the demand of the fast developing economic relations. China will invest more into cross-border transportation corridors along with increasing demand of transportation capacity and growing national strength. China will be a more responsible country for enhancing the development of international transportation infrastructure networks.

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CHAPTER 2

The Development of Transportation Infrastructure and International Links in China's Southeast Region

Southeast China includes ten provinces of Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Hubei, Hunan, Guangdong, Guangxi, Hainan, and Shanghai. It covers 15% of China's total land area and 42.17% of China's total population. In 2008, GDP in this region reaches ￥1.585 billion (48.4% of China's total GDP).

In general, the level of transport infrastructure in Southeast China is above the average. There are many inland waterways and sea ports in Southeast China. Seven provinces in this region and Shanghai are along the coastline. In addition, four out of five port groups[2] are in Southeast China, including port groups in Yangtze River Delta Area, Southeast Coast Area, Chu Chiang Delta Area and Southwest Coast Area.

By the end of 2008, highways in operation in Southeast China had reached 1,301,300 km (34.88% of the total in China), including 25,400 km expressways (42.08% of the total in China). Railways had a length of 21,300 km (26.76% of the total in China).

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[2] There are five port groups in China—Surrounding Bohai Area, Yangtze River Delta Area, Southeast Coast Area, Chu Chiang Delta Area and Southwest Coast Area.

- Surrounding Bohai Area includes the ports in Liaoning Province, Tianjin, Hebei Province and Shandong Province.
- Yangtze River Delta Area is based on Shanghai International Shipping Center. It focuses on Shanghai, Ningbo and Lianyungang. At the same time, it emphasizes the function of ports in lower reaches of Yangzi River, such as Zhoushan, Wenzhou, Nanjing, Zhenjiang, Nantong and Suzhou.
- Southeast Coast Area focuses on ports in Xiamen and Fuzhou. It also includes Quanzhou Port, Putian Port and Zhangzhou Port.
- Chu Chiang Delta Area is composed of ports in East Guangdong and Chu Chiang Delta. It consolidates the status of Hong Kong International Shipping Center. It focuses on Guangzhou Port, Shenzhen Port, Chu Chiang Port and Shantou Port. It also develops Shanwei Port, Huizhou Port, Humen Port, Maoming Port and Yangjiang Port.
- Southwest Coast Area includes ports in West Guangdong, Guangxi and Hainan. It focuses on Zhanjiang Port, Fangcheng Port and Haikou Port. It also develops Beihai Port, Qinzhou Port, Yangpu Port, Basuo Port and Sanya Port.

Table 2-1. Highway and Railway Indicators in Southeast China in 2008 (km)

Indicator / Area	Highways	Classified Highways				Non- Classified	Railways
			Expressways	Class-I	Class- II		
Southeast China	1301253	1028221	25376	25982	107421	273035	21321.5
China	3730164	2778521	60302	54216	285226	951642	79687.3
% of the total in China	34.88	37.01	42.08	47.92	37.66	28.69	26.76

Sources: Yearbook of China Statistics (2009), China Statistics Press.

1. The Land Transportation Infrastructure

1.1. The Development of Highway Networks

Southeast China is one of the areas where a number of transportation hubs concentrate. The fist expressway, Hujia Expressway (Shanghai-Jiading), was established in October 1988. Many expressways designed in *The National Expressway Network Plan* are located in this area, including three expressways from Beijing—Jinghu Expressway (Beijing-Shanghai), Jingtai Expressway (Beijing-Taipei), Jinggangao Expressway (Beijing-Hong Kong-Macao), seven north-south expressways—Shenhai Expressway (Shenyang-Haikou), Changshen Expressway (Changchun-Shenzhen), Jiguang Expressway (Jinan-Guangzhou), Daguang Expressway (Daqing-Guanzhou), Erguang Expressway (Erenhot-Guangzhou), Baomao Expressway (Baotou-Maoming), Lanhai Expressway (Lanzhou-Haikou), and twelve east-west expressways —Lianhuo Expressway (Lianyungang-Korgas), Ningluo Expressway (Nanjing-Luoyang), Hushan Expressway (Shanghai-Xian), Hurong Expressway (Shanghai-Chengdu), Huyu Expressway (Shanghai-Chongqing), Hangrui Expressway

(Hangzhou-Ruili), Hukun Expressway (Shanghai-Kunming), Fuyin Expressway (Fuzhou-Yinchuan), Quannan Expressway (Quanzhou-Nanning), Xiarong Expressway (Xiamen-Chengdu), Shankun Expressway (Shantou-Kunming), Guangkun Expressway (Guangzhou-Kunming). Moreover, 29 out of total 70 national trunk highway network expressways are also located in this area, including four highways from Beijing (104、105、106、107), nine north-south highways (204、205、206、207、209、210、223、224、225) and 16 east-west highways (310、311、312、316、318、319、320、321、322、323、324、325、327、328、329、330).

Table 2-2. Highways in Southeast China in 2008 (km)

Indicators / Area	Highways	Classified Highways				Non-Classified
			Expressway	Class-I	Class-II	
Shanghai	11497	11497	637	364	2775	0
Jiangsu	140930	129326	3725	7423	20590	11603
Zhejiang	103652	97349	3073	3795	8596	6304
Anhui	148827	134669	2506	385	10077	14158
Fujian	88607	66461	1767	509	6988	22146
Jiangxi	133815	77343	2284	1199	8561	56472
Hubei	188366	153665	2719	1566	16043	34701
Hunan	184568	118717	2001	660	6089	65852
Guangdong	183155	154878	3823	9052	18272	28277
Guangxi	99273	73052	2181	819	8115	26222
Hainan	18563	11264	660	210	1315	7300
Southeast China	1301253	1028221	25376	25982	107421	273035
China	3730164	2778521	60302	54216	285226	951642
% of the total in China	34.88	37.01	42.08	47.92	37.66	28.69

Sources: *Yearbook of China Statistics* (2009).

By the end of 2008, highways in operation in Southeast China had reached

1,301,300 km (34.88% of the total in China), including 25,400 km expressways (42.08% of the total), 26,000 km Class-I highways(47.928% of the total), 107,4000 km Class-II highways(37.66% of the total), 869,4000 km Class-III and Class-IV highways (36.55% of the total) and 273,000 km Non-Classified highways (28.69% of the total in China). In general, highway networks in Southeast China have a relatively wide radiation scope and a relatively large share of high-class highways comparing with other regions in China, especially those highways in Guangdong, Jiangsu and Shanghai.

1.2. The Development of Railway Network

Railway networks in Southeast China have developed very fast. Trunk railways include six out of "eight vertical railways" [3] (Southeast Coastal Corridor (Shenyang-Zhanjiang), Jinghu Corridor (Beijing-Shanghai), Jingjiu Corridor (Beijing-Kowloon), Jingguang Corridor (Beijing-Guangzhou), Dazhan Corridor (Dalian-Haikou), Baoliu Corridor (Baotou-Liuzhou)) and four out of "eight horizontal railways" [4] (Ningxi Corridor (Nanjing-Xian), Corridor along the Yangzi River(Chongqing-Nanjing), Hukun Corridor (Shanghai-Kunming), Southwest Corridor to Sea(Kunming-Nanning)). Meanwhile, many cities in Southeast China are transportation hubs. Shanghai, Guangzhou and Wuhan are three out of six national passenger transportation hubs, and Nanchang, Fuzhou and Nanning are regional passenger transportation centers of China.[5] Moreover, there is a railway line linking

[3] Eight vertical railways include Jingha Corridor (Beijing-Harbin), Southeast Coastal Corridor (Shenyang-Zhanjiang), Jinghu Corridor (Beijing-Shanghai), Jingjiu Corridor (Beijing-Kowloon), Jingguang Corridor (Beijing-Guangzhou), Dazhan Corridor (Dalian-Haikou), Baoliu Corridor (Baotou-Liuzhou) and Lankun Corridor (Lanzhou-Kunming).

[4] Eight horizontal railways include Jinglan Corridor (Beijing-Lanzhou), Southern Corridor for Transporting Coal, Northern Corridor for Transporting Coal, Taiyuan-Qingdao Corridor, Ningxi Corridor (Nanjing-Xian), Corridor along the Yangzi River (Chongqing-Nanjing), Hukun Corridor (Shanghai-Kunming) and Southwest Corridor to Sea (Kunming-Nanning).

[5] According to The Eleventh Five-Year Plan of Railways, the layout of passenger stations is as follows: There will be six passenger transportation centers—Beijing, Shanghai, Guangzhou, Wuhan, Chengdu and Xian. There will also be modern national centers to repair and distribute trains. There will be ten regional passenger transportation centers—Harbin, Shenyang, Jinan, Zhengzhou, Nanchang, Fuzhou, Kunming, Nanning, Lanzhou and Urumqi. There will be regional centers to repair and prepare trains.

China and Vietnam in Southeast China—Xianggui Railway (Hengyang-Pingxiang), which leads to Hanoi, the capital of Vietnam.

The railway networks have been well developed in Southeast China. Double-track rate and electrified rate are high in most parts, except a few provinces and autonomous regions, such as Guangxi, Fujian, Hainan. Mountainous terrain and poor railway foundation are the main reasons leading to low double-track rate and electrified rate in Guangxi Zhuang Autonomous Region and Fujian Province. By the end of 2008, Guangxi merely had 2,731.4 km railways in operation, one electrified single-track rail—Nankun Railway (Nanning-Kunming) with a length of 513.91 km and 483 km double-track railways. Fujian Province had 1,618 km railways in operation, 821 km electrified sing-track railways, but no double-track railways yet. Hainan Province, surrounded by sea on four sides, had 387.3 km railways in operation. The only railway in operation was a single track one——West Ring Railway, which was an important part of Yuehai (Zhanjiang-Hainan) Railway and an integrated railway line in Hainan into national railway network.

2. International Transportation Infrastructure in Southeast China

International transportation infrastructure in Southeast China mainly connects Guangxi Zhuang Autonomous Region and Vietnam. There are eight counties and cities in Guangxi share a total of 1,020 km border with Vietnam.

Table 2-3. The Length of Railways In operation in Southeast China in 2008

Indicators	Route Length (km)
Shanghai	316.10
Jiangsu	1657.00

(Table 2-3. *Continue*)

Indicators	Route Length (km)
Shanghai	316.10
Jiangsu	1657.00
Zhejiang	1319.30
Anhui	2871.00
Fujian	1618.40
Jiangxi	2650.50
Hubei	2711.00
Hunan	2894.80
Guangdong	2164.80
Guangxi	2731.40
Hainan	387.30
China	79687.28
Southeast China	21321.50
% of the total in China	26.76

Sources: *Yearbook of China Statistics*, 2009, China Statistics Press

2.1. Highways linking Guangxi Province and Vietnam

In terms of highway infrastructure in Southeast China, there are highways to Vietnam in all of the border ports and border trade points. More specifically, there are twelve border ports in Guangxi, including five category-1 ports[6] (Dongxing Port, Youyiguan Port, Shuikou Port, Longbang Port, Pingxiang Port) and twenty-five border trade points with classified highways to border ports (Table 2-4). Nanyou Expressway (Nanning-Youyiguan), connecting No.1 highway of Vietnam at Youyiguan, is the most convenient and fast way to Vietnam. It was established in December 2005 with a total

[6] The category 1 refers to the national management level.

length of 179.2 km.

Table 2-4. Cross-border Highway Infrastructure in Guangxi

Line	Section in Guangxi			Section in Vietnam
	Route No.	Route Section	Route Length (km)	
Line1	G7211	Nanning—Youyiguan（Expressway）	209	Lang Son—Hanoi—National National Road 1A（Class-II and above）
Line2	G7511	Nanning—Dongxing（153 km expressway， 54km Class-II）	207	Mong Cai—Halong Bay—Hanoi（Class-III and above）
Line3	G7211	Nanning—Chongzuo－Shuikou（122 km expressway）	226	Ta Lung—Cao Bang—Hanoi（Class-III and above）
Line4	the fourth horizontal expressway of *The Guangxi Expressway Network Plan*	Baise—Jingxi（98 km Class-III），Jingxi－Longbang (32 km Class-II) expressway covers the whole section is under construction	130	Bao Anh－Cao Bang（Class-III and above）
Line5	G7211、S325	Nanning－Ningming－Aidian（162 km Nanyou (Nanning-Youyiguan) Expressway, 52 km Class-II Ningming-Aidian	214	Chi Ma－Loc Binh（Class-II）

(Table 2-4. *Continue*)

Line	Section in Guangxi			Section in Vietnam
	Route No.	Route Section	Route Length (km)	
Line6	Country Highway 256	Fangcheng－Tongzhong （Class-III）	68	Tongzhong－Qizhou－Quang Ninh （Class-IV）
Line7	G322、 S219	Nanning－Beijiang－Banlan （Nanning－Beijiang 136 km，Beijiang－Banlan 82km，Class-III）	218	Na ran－Dinh Lap （Class-IV）
Line8	S325、Country Highway 458	Pingxiang－Pinger （Class-III）	22	Pinger－Nahui－Banbo （Class-IV）
Line9	Country Highway 533	Longzhou－Kejia （Class-III）	35	Mihe－Bankou（Class-III）
Line10	S316、S325	Daxin－Shuolong （Class-III）	50	Nandou－Banbang dou－Ha Lang （Class-IV）
Line11	S325、Country Highway 771	Jingxi－Yuewei （Class-III）	58	Ha Quang－Son Duong－Cao Bang （Class-IV）
Line12	Country Highway 781	Napo－Pingmeng （Class-III）	71	Pingmeng－Ha Quang （Class-III）

Note: According to highway technological standards in China

Source: *Guangxi's Chorography: Transportation.*

It is possible to reach to other Southeast Asia countries through Vietnam by the international transport infrastructure in Southeast China. For instance, National Road 1A of Vietnam links Cambodia directly. It also connects National Road 6, National Road 9, National Road 12 and other highways in Vietnam, via which people could reach Laos and Thailand. By the end of 2008, many transportation lines to Vietnam from Guangxi were open for operation.

2.2. Railways Linking Guangxi and Vietnam

In terms of railway infrastructure, there is a 401 km standard gauge railway to Vietnam——Nanning-Hanoi Railway (Nanning—Pingxiang—Dong Dang—Hanoi, 181km). Nanning—Pingxiang line, with a length of 220 km, was established in 1954. It was part of Xianggui Railway (Hengyang-Pingxiang) and linked railways in Vietnam at Youyiguan (Friendship Gate). However, passenger trains from China could not pass through the section of Hanoi—Dong Dang—Youyiguan directly due to its narrow gauge railway at that time. Passengers on the international trains from Beijing to Hanoi had to change trains at Pingxiang. China and Vietnam agreed to rebuild the railway between Hanoi and Youyiguan to dual-gauge railway (1000mm and 1435mm) in 1964. Since then, trains from China could go to Hanoi directly. In recent years, the establishment of the China-ASEAN FTA promotes trade growth of China with ASEAN, especially with Vietnam. A new international passenger train from Nanning to Hanoi (GIA LAM) started on January 1, 2009.

There is Xianggui Railway (Hengyang-Pingxiang) to Vietnam in Southeast China. At the same time, Vietnam is the only country in Southeast Asia that connected China directly by railway.

3. Networks Linking China and Southeast Asia

Guangxi Zhuang Autonomous Region and Yunnan Province share the border with Southeast Asia countries. Guangxi shares a land border of 1,020 km with Vietnam. Yunnan shares a land border of 4,060 km with Myanmar, Laos, and Vietnam. Both of Guangxi and Yunnan have highways and railways to Southeast Asia. The most convenient and fast highways from China to Southeast Asia are Nanning-Bangkok Highway and Kunming-Bangkok Highway.

3.1 Highway Connections

There are highways to Southeast Asia in all of the border ports and border trade points in Guangxi and Yunnan. Most highways are interconnected with each other among Southeast Asian countries. Highways in Thailand, Malaysia and Singapore are widely spread with advanced technology, while, those highways in Laos, Cambodia, Vietnam and Myanmar are relatively backward with low technology.

There are five Category-1 ports, seven Category-2 ports, twenty-five border trade points in Guangxi along the border line with Vietnam. There are twelve major highways (Table 2-4) and several international transportation corridors to Vietnam (Table 2-5) in Guangxi. Furthermore, it is possible to reach to other Southeast Asia countries through highway infrastructure linkages of Guangxi and Vietnam. For instance, National Road 1A of Vietnam links Cambodia. It also connects National Road 6, National Road 9, National Road 12 and other highways in Vietnam, via which people could reach Laos and Thailand. There are also two cross-border bridges, Vientiane-Nong Kha and Savannakhet-Mukdahan, from Laos to Thailand. So far, the most important corridor from Guangxi to Southeast Asia is Nanning-Bangkok Highway, an alternative one is Nanning-Dongxing-Mong Cai-Hanoi-Phnom Penh.

Table 2-5. Cross-border Transportation Routes in Guangxi Province in 2008

Destination	Transportation Mode	Route(China-Vietnam)	Number of Routes
Vietnam	Waterways	Beihai—Hanoi Beihai—Halong Bay	2
	Highways	Nanning—Hanoi Chongzuo（Longzhou）—Cao Bang Pingxiang—Lang Son Nanning—Halong Bay Nanning—Hai Phong Nanning—Da Nang	6

Source: *Guangxi Transportation Yearbook* (2009)

There are twelve Category-1 ports (mainly land ports), eight Category-2 ports, 90 border trade corridors, 103 border trade points, 20 cross-border highways (including four major international corridors, Table 2-6) in Yunnan Province. The part of these highways in Yunnan, from Kunming to Bangkok, Vientiane, Rangoon and Hanoi, are basically high-class ones at present.

So far, the major corridors from Yunnan Province to Southeast Asia and South Asia are Kunming-Bangkok Highway, Kunming-Hanoi Highway and Kunming-Rangoon Highway. Among them, Kunming-Bangkok Highway is the most convenient one.

Table 2-6. International Connection of Transport Infrastructure in Yunnan Province

Destination	Route Section	Route Class	Route Length (km)
Vietnam	Kunming(China)-Hekou(China)-Hanoi (Vietnam)	China: Expressway Vietnam: Class-I	Total:756 Yunnan: 400 Vietnam:356
Laos, Thailand	Kunming(China)-Mohan(China)-Laos-Bangkok(Thailand)	China: Expressway Laos: Class-II Thailand: Expressway and Class-I	Total:1818 Yunnan:688 Laos:240 Thailand:890

(Table 2-6. *Continue*)

Destination	Route Section	Route Class	Route Length (km)
Myanmar	Kunming(China)-Ruili(China)-Muse (Myanmar)-Mandalay(Myanmar)-Rangoon(Myanmar)	China: Expressway Myanmar: Class-IV and above	Total:1899 Yunnan:732 Myanmar:1167 Muse—Mandalay:460 Mandalay—Rangoon: 707
Myanmar	Kunming(China)-Tengchong(China)-Myitkyina(Myanmar) –Ledo(India)	China: Expressway Myanmar: Class-II India: Class-III	Total:1220 Yunnan:698 Myanmar:477 India:45

Source: Transportation resources of Yunnan Province

Besides the corridors to Southeast Asia and South Asia, Yunnan Province also built many international transportation routes with its neighboring countries. There are eighteen such routes to Vietnam, Laos and Myanmar. (See Table 2-7)

Table 2-7. International Transportation Routes in Yunnan Province, 2008

Destination	Major Routes from China	Number of Routes
Vietnam	Mengzi- Van Ban Gejiu- Van Ban Gejiu-Sapa	3
Laos	Kunming- Vientiane:The longest passenger line, total length 1,380 km Simao- Vientiane Jinghong—Vientiane Kunming-Luang Prabang	9

(Table 2-7. *Continue*)

Destination	Major Routes from China	Number of Routes
Laos	Menla—Houayxay Menla—Muong Say Menla—Phongsali Menla—Louang Namtha Menla—Mengsing	9
Myanmar	Kunming(China)-Jinghong(China)-Daluo(China)-Keng tung(Myanmar) Kunming(China)-Dali(China)-Ruili(China)-Myitkyina(Myanmar)-Mandalay(Myanmar)-Rangoon(Myanmar)	2

Source: Transportation resources of Yunnan Province

3.2 Railway Connections

In terms of international connection of railway infrastructure in China, Guangxi and Yunnan have one railway respectively to connect Vietnam. One is Xianggui Railway (Hengyang-Pingxiang), and the other is Yunnan-Myanmar Railway (Kunming-Hai Phong). Vietnam is the only country in Southeast Asia connecting China's railway system.

Nanning-Hanoi Railway, a standard gauge railway with a total length of 401 km, consists of two sections. One of them is Xianggui Railway (Hengyang-Pingxiang) in Guangxi, which was built in 1954 with a length of 220km. The other is Dong Dang-Hanoi Railway in Vietnam with a length of 181 km. Yunnan-Myanmar (Kunming-Hekou-Lao Cai-Hanoi) Railway, as the first international railway in China, was established in 1903. It is a meter gauge railway with a total length of 855 km, including 466 km in Yunnan and 389 km in Vietnam. The traffic volume was 7,140,000 tons in 2009.

These two railways are too old to satisfy the demand of transportation with booming economic and social exchanges between China and ASEAN. Both Guangxi and Yunnan have plan to increase transportation capacity of these two railways.

China participates actively in the Tran-Asian Railway (TAR) project. The construction of TAR sections (eastern route, central route and western route) was listed into China's *Mid-long Term Railway Network Plan* and *Eleventh-Five Year Plan of Railway,* and they are under construction now.

At present, 261 km coastal railways in Guangxi are being rebuilt into high-speed ones with a speed of 250 km/h, which will be complete by 2013. Guangxi-Pingxiang Railway, as part of eastern route of TAR, has been put into the rebuilding project to increase the capacity of Xianggui Railway, which will begin in December 2010, which will make the railway speed reaching to 200 km/h. Meanwhile, Fangcheng-Dongxing Railway (52 km), also as part of eastern route of TAR, has been listed into *Major Transportation Projects of Beibu Gulf Economic Region*, which will begin in 2013 and aims at connecting railway networks in Chinese with Vietnam. At the same time, Guangxi is planning to build Laibin-Tiandong Railway (185 km) via Debao, Jingxi and Longbang Port. This railway, as a crucial part of eastern route of TAR, will establish a corridor from Guangxi to Vietnam.

In terms of international corridors in Yunnan, the part of eastern route of TAR in Yunnan is under construction now. Specifically, the Yuxi-Mengzi section (141 km) and Mengzi-Hekou section of this railway (141 km) are under construction. In addition, all the necessary preparations for rebuilding Kunming-Yuxi section (50 km) are nearly completed, and the project will start in 2010. It is estimated that Yunnan section of TAR will be in operation in 2013. The Yuxi-Mengzi section will be in operation by steps: Yuxi-Tonghai section will be in operation early by the end of 2010, while the whole section will be in operation by the end of 2011. Newly upgraded Kunming-Yuxi Railway will be the fist high-speed railway in Southwest China. It will cost only three hours to travel 334 km from Kunming to Hekou by train.

The New Yunnan-Myanmar Railway (Kunming-Rangoon 1,920 km), as the western route of TAR, including 690 km of Kunming-Lijiang section in China. With respect to the Kunming-Ruili Railway, Kunming-Dali section (Kunming-Guangtong-Dali 350 km) has been established and will be double-tracked by 2010. The construction of Dali-Ruili section (Dali-Baoshan-Dehong-Ruili) began in March,2007. This 338 km railway will cost about ￥15.3 billion and is designed to be a standard gauge electrified one. Its construction will take six year and to be finished by 2013.

Yuxi-Mohan Railway, as part of the Kunming-Singapore Railway in TAR Network, has been listed into the *Mid-long Term Railway Network Plan*. It starts from Kunming, through Yuxi, Puer, Xishuang Banna, and enters into Laos at Mohan, and then goes through Thailand to Singapore. The Kunming-Singapore section of the TAR Railway totals 3,894 km, with 599 km in China. It will become an economic trunk line of the Kunming-Bangkok international corridor. It will also be a trunk line to promote the Greater Mekong Sub-region (GMS) cooperation and economic relations between China and ASEAN. At present, preparations for the construction of the Yuxi-Mohan Railway are under way. It is expected to be started in 2010.

4. The Outlook of International Transportation Infrastructure

The China-ASEAN FTA was fully implemented in 2010 on time, which speeds up the process of economic integration between China and ASEAN countries. With the fast development of trade, social and cultural relations between China and ASEAN, the countries in the region have actively built international transportation linkages, transportation hubs and transportation service networks. They also adopt cooperative measures to facilitate transportation. All of these measures aim at establish a

convenient, fast and safe international transportation system to push forward the transportation integration between China and ASEAN.

China proposed to develop “seven vertical and one horizontal corridors, three networks and one hub”[7], which will connect China and ASEAN closely by sea, land and air. This transportation framework will make the flow of labors and goods between China and Southeast Asia safer and faster. Moreover, many major cities along the transportation corridors will absorb numerous labors, resources and industries. Many regional economic corridors will take shape because of this framework, which integrate sea, land and air transportation.

According to the proposal, the “seven vertical corridors” are: Nanning-Singapore Corridor, Nanning-Phnom Penh Corridor, Guiyang-Bangkok Corridor, Kunming-Hai Phong Corridor, Kunming-Bangkok Corridor, Kunming-Rangoon Corridor, and Kunming-Ledo Corridor. “One horizontal” corridor is Hong Kong-Ruili-Mandalay Corridor. In fact, this is the Third Asia-Europe continental land bridge. (See Table 2-8)

The development of “seven vertical corridors and one horizontal corridor” will increase the existing transportation capacity significantly and cost less time traveling from China to Southeast Asia. Those international connections will help to build a comprehensive, efficient, modern transportation system linking China, Southeast Asian countries and South Asian countries.

[7] Seven vertical corridors are: Nanning-Singapore Corridor, Nanning-Phnom Penh Corridor, Guiyang-Bangkok Corridor, Kunming-Hai Phong Corridor, Kunming-Bangkok Corridor, Kunming-Rangoon Corridor, and Kunming-Ledo Corridor. One horizontal corridor is Hong Kong-Ruili-Mandalay Corridor. Three Networks are International Shipping Network, Inland Waterway Network and International Aerial Network. One hub is Guangxi Province, as a Train-Air-Truck hub linking China and Southeast Asia.

Table 2-8. Seven Vertical and One Horizontal Land Corridor

Section		Details
Seven Vertical Corridor	Nanning(China)-Pingxiang (China)-Hanoi (Vietnam)-Vientiane (Laos)-Bangkok(Thailand)-Singapore	This corridor, including Nanning-Singapore Highway and Nanning-Singapore Railway, is one corridor going through the most countries, China, Vietnam, Laos, Cambodia, Thailand and Singapore, among the seven vertical corridors. It is also the most convenient and fast corridor from China to Southeast Asia. Moreover, it is the only international corridor that is part of Greater Mekong Sub-regional East-West Economic Corridor, North-South Economic Corridor and South Economic Corridor.
	Nanning(China)-Dongxing (China)-Hanoi (Vietnam)-Ho Chi Minh(Vietnam)-Phnom Penh(Cambodia)	This corridor includes Nanning-Phnom Penh Highway and Nanning-Phnom Penh Railway. This coastal corridor links Central-Southern Peninsular, Beibu Gulf, Pearl River Delta, Yangzi River Delta and coastal economic belt.
	Guiyang(China)-Longbang (China)-CaoBang(Vietnam)-Luan-Prabang(Laos)-Bangkok(Thailand)	This corridor includes highway corridor and rail corridor. There is an expressway corridor as follows: Guiyang-Luodian-Baise-Longbang-Cao Bang-Luang Prabang-Sukhotai-Bangkok. The construction of Guiyang-Luodian Expressway will start soon. Luodian-Baise Expressway has been listed into national transportation plan of China. Jingxi-Longbang Expressway is under construction. Highways in Vitenam and Laos are Class-III and Class-IV highway. Highways in Thailand are almost expressways. The rail corridor is as follows: Nanning-Tiandong-Jingxi-Longbang- Cao Bang. Tiandong-Jingxi Railway is under construction.
	Kunming(China)-Hanoi (Vietnam)-Hai-Phong (Vietnam)	Kunming--Hai Phong Highway is 861 km long with 400 km expressway in Yunnan Province. Hanoi-Hai Phong Expressway is under construction in Vietnam. So is Kunming-Hanoi Railway.
	Kunming(China)-Mohan (China)-HuayXai(Laos)-ChiangMai(Thailand)-Bangkok(Thailand)-Singapore	This corridor comprises Kunming-Bangkok-Singapore Highway and Kunming-Singapore Railway (part of TAR). It is an important north-south economic corridor in Greater Mekong Sub-region.
	Kunming(China)-Ruili (China)-Mandalay(Myanmar)-Rangoon(Myanmar)	This corridor comprises Kunming-Rangoon Expressway and Kunming-Rangoon Railway. It is one of the most important land corridors from Southwest China to Myanmar, and then to Indian Ocean, where this corridor could link strategic comprehensive transportation corridor of Indian Ocean.

(Table 2-8. *Continue*)

Section		Details
	Kunming(China)-Tengchong(China)-Myitkyina(Myanmar) -Ledo(India)	This highway corridor is a revival of Stilwell Road. It totals 1,220 km, including 689 km expressways in Yunnan Province, 477 km Class-II highways and 45 km Class-III highways.
One Horizental Corridor	The Third Asia-Europe Continental Land Bridge: Hong Kong(China)-Guangzhou (China)-Nanning(China)-Funing(China)-Kunming(China)-Ruili(China)-Mandalay (Myanmar)-Bengal-Kolkata (India)-Hyderabad (Pakistan)-Quam(Iran)-Malatya(Turkey)-Istanbul (Turkey)-Rotterdam (Netherlands)	This corridor is from China to Southeast Asia, South Asia and Europe. It totals 15,000 km passing through 21 countries (including four countries in West Asia and North Africa: Syria, Lebanon, Israel and Egypt). It is 3,000 km shorter than the route from southeast coast of China to Strait of Malacca and then to Indian Ocean. In terms of the composition of The Third Asia-Europe Eurasian Land Bridge, highways are basics, railways are backbones, aviation is forerunner, waterways are complements, information network are hubs.

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CHAPTER 3

The Development of China’s Transportation Infrastructure and International Links in China’s Northeast Region

Northeast China includes three provinces of Liaoning, Jilin, Heilongjiang and three cities and two districts in eastern Inner Mongolia (Chifeng , Tongliao , Hulunbeier, Hing'an, and Xilin Gol). The region covers 1,458,000 square kilometers, accounting for 15.2% of the country's land area.

From a global point of view, Northeast China is located in the west bank of the Pacific Ocean as well as the northeast end of Eurasia, and is also adjacent to Russia, Mongolia, Korea and Japan. Being the core area of Northeast Asia, the region can be connected with the neighboring countries through the Bohai and Yellow Sea with coastal ports and inland ports around almost every corner of the region.

1. Development of Infrastructure in the Northeast Region

Since 1978, the infrastructure has been developed very fast in the region, especially in recent years. Expanding and integrated transportation networks have connected this region and also to the outside regions in the form of railways, highways, waterways, pipelines, aviation and other kinds of transportation.

1.1. The Development of Highway Network

There are 14 state highways total in Northeast China region, consisting of the “four vertical and five horizontal” trunk road network. “Four vertical” means G102 (through

Central Northeast), G201，G202 and G203. “Five horizontal" means G301，G302，G303，G304 and G305。

Table 3-1. List of National Highways in Northeast

No	From	Cities on the Road	To	Mileage (km)
101	Beijing	Miyun-Luanping-Chengde-Lingyuan-Chaoyang-Zhangwu	Shenyang	879
102	Beijing	Sanhe-Fengrun-Shanhaiguan-Suizhong-Huludao-Beining-Ximin-Shenyang-Tieling-Siping-Changchun—Shuangcheng	Harbin	1311
111	Beijing	Huairou-Chifeng-Tongliao-Ulan Hot-Zalantun	Jiagedaqi	1974
201	Hegang	Jiamusi-Qitaihe-Mudanjiang-Dunhua-Fusong-Baishan-Tonghua-Kuandian-Dandong-Zhuanghe	Dalian	1860
202	Heihe	Sunwu-Kedong-Mingshui-Lanxi-Harbin-Yushu-Jilin-Panshi-Meihekou-Qingyuan-Fushun-Shenyang-Anshan-Haicheng-Dashiqiao-Gaizhou-Pulandian	Dalian	1719
203	Mingshui	Anda-Zhaozhou-Songyuan-Changling-Kangping-Faku	Shenyang	712
221	Harbin	Binxian-Fangzheng-Yilan-Jiamusi-Fujin	Tongjiang	662
222	Harbin	Hulan-Suihua-Tieli	Yichun	358
301	Suifenhe	Mudanjiang-Shangzhi-Harbin-Daqing-Qiqihar-Yakeshi-Hailar	Manzhouli	1608
302	Tumen	Yanji-Antu-Dunhua-Jiaohe-Jilin-Changchun-Nong’an-Da’an-Baicheng	Ulan Hot	981
303	Ji’an	Tonghua-Meihekou-Liaoyuan-Siping-Shuangliao-Tongliao-Bairin Left Banner-Linxi-Hexigten Banner	Xilin Hot	1255
304	Dandong	Fengcheng-Benxi-Shenyang-Xinmin-Zhangwu-Tongliao-Jarud Banner	Huolingele	874
305	Zhaunghe	Gaizhou-Yingkou-Panjin-Aohan Banner	Linxi	816
306	Suizhong	Jiangchang-Lingyuan-Harqin Banner	Hexigten Banner	531

Note: The National Highway is marked by three digits, in which the first digit means the category of the national highway, and the second and the third one mean sequence. National Road is divided into three categories: the radial National Road with Beijing as the center is marked by “1”; the vertical north-south National Highway is marked by”2” , and the horizontal east-west National Highway is marked by “3” .

The structure of the Northeast China highways takes "T" shape, combining Suiman Expressway (Suifenhe - Harbin - Manzhouli) for the horizontal axis with Jingha Expressway (Harbin - Changchun - Shenyang - Beijing) for the vertical axis. By this standard the expressway can be divided as follows: northward Nentai Expressway from Qiqihar to Nehe; northward Heha Expressway from Harbin to Suihua; northward Hatong Expressway from Harbin to Jiamusi and Tongjiang; eastward Huiwu Expressway from Changchun through Jilin, Tumen, to Hunchun; southward Daguang Expressway from Tongliao to Chifeng; southward expressway from Changchun to Liaoyuan; southward Changshen Expressway from Siping to Zhangwu, Fuxin, Chaoyang and Lingyuan; southward Heda Expressway from Baishan, through Huanren, Dandong, to Dlian; westward Xinlu Expressway from Shenyang to Zhangwu; eastward Danfu Expressway from Shenyang to Dandong; southward Shenhai Expressway From Shenyang to Dalian; westward Fujin Expressway from Jinzhou to Fuxin; Danxi Expressway from Jinzhou to Chaoyang westward and Yingkou eastward and so on.

In 2009, the total mileage of highway in Jilin Province reached 88，000 km and highway mileage break up 1,000 km. Currently, 8 expressways are under construction and the length of the highway under construction is 1,750 km. The planned highway project can be completed timely, including railways from Tumen to Hunchun, Changchun to Songyuan, Songyuan to Shuangliao, Songyuan to Baicheng, Yingchengzi to Fumin, Jilin-Caoshi section of highway, Yingchengzi to Meihekou, attempting the projects coming into operation from Wangqing to Yanji, timely starting the expansion of the highway from Siping to Changchun and Changchun to Jilin. Jilin Province will make every county connecting by the expressway. The other projects include building 350 km of first-class and second-class roads, 7,000 km of rural roads and the cement (asphalt) road for 94% of administrative villages. The province will achieve the goal of every county connecting expressway by 2014 with total mileage of expressways reaching 4,800 kilometers by that time.

The length of the highway in Heilongjiang Province in 2009 reached 78,000

kilometers and the highway network is of radial distribution with Harbin as the center along Harbin to Qiqihar, Harbin to Jiamusi (Tongjiang), Harbin to Mudanjiang (Suifenhe), Harbin to Yichun (Jiayin), and Harbin to Heihe. The length of highway directly to Russia is 6,342.8 km, of which expressway is 388.4 km, first-degree highway is 585.6 km, and second-degree highway is 3,007.5 km. In 2009, the expressway in Heilongjiang Province reached 1218 km. Currently, the strength of railway operating to Russia in Heilongjiang Province is 4,083 km and the highway is 6,343 km. There are 13 land transportation routes to Russia.

In 2009, the total mileage of the highway of Liaoning Province reaches to 10,0645 km， with 2,883 km expressway. Currently, 14 expressways have been under construction, including those from Dandong to Tonghua, Zhangwu to Tongliao, Fushun to Meihekou, Fushun to Tonghua, Chaoyang to Chifeng, Kaiyuan to Liaoyuan, Liaozhong to Xinmin, Xinmin to Tieling, Dandong to Haicheng, Shenyang to Kangping (Stage 2), Yongling to Huanren, Tieling to Benxi Highway etc, with the length for 1,182 kilometers. By the end of 2010, the total mileage of expressway will exceed 3,000 km, basically forming the open network structure of the “three rings, seven radiations, five links, six trunk lines”. In detailed, it includes 3 loop lines of expressway in Shenyang, cities in central part of Liaoning, and the Yellow Sea-Bohai, 7 expressways with Shenyang as the center, 5 highway within network and external port, 6 inter-provincial highway lines. The province will have a comprehensive connection to the highways of neighboring provinces.

1.2. The Development of Railway Network

The total mileage of railway in Northeast China is 16,000 kilometers, accounting for 26.4 percent of the total railway mileage of China. The rail density is equivalent to 2 times of the whole country.

Harbin is the connecting point for the Northeast railway networks, with the horizontal lines of “Bin Sui Line (from Harbin to Suifenhe)” and “Binzhou line (from

Harbin to Manzhouli)", with the "Hada line" (from Harbin to Dalian) as the vertical line, as well as "Shenshan Line" (from Shenyang to Shanhaiguan) from northeast to southwest. There also exist "four vertical and four horizontal" lines to match it. "Four vertical" lines include Qiqihar-Tongliao–Jinzhou Line; Daqing-Tongliao-Chifeng Line; Harbin-Jilin-Shenyang Line; Jiamusi-Mudanjiang-Tumen-Tonghua Line. "Four horizontal" lines include Jiagedaqi- Suihua-Jiamusi-Shuangyashan Line; Iersi-Baicheng-Changchun-Tumen Line; Tongliao-Siping-Tonghua Line; Chifeng - Shenyang - Dandong Line. They form the basic pattern of the Northeast rail transportation, connecting to the rest of the railway lines of the whole country by 3 railways: Jingshen Line, Jingtong Line and Jingcheng-Jincheng Line.

2. The International Infrastructure Connectivity

The main framework of international transportation corridors in Northeast China can be summarized as "five verticals and five horizontals" lines. Basically, the trunk lines are in the form of railways, highways, aviation, waterways and ports.

Table 3-2. International Corridors of Transportation Infrastructure in Northeast China

"Five –Vertical" International Channels	
Eastern Corridor	With eastern railway of the Northeast as the main line, from Fuyuan, Tongjiang, Hegang to Mudanjiang (Suifenhe), Tonghua (Ji'an), Dandong, Zhuanghe and Dalian southward.
Central Corridor1	With the Hamei Railway as the main line, from Jiayin, Mayiling, Yichun to Harbin, Jilin, Meihekou, Shenyang, Yingkou and Dalian southward.
Central Corridor2	With the Hada Railway as the main line, from Heihe, Beian, Suihua to Harbin, Changchun, Siping, Shenyang, Yingkou and Dalian southward.
Western Corridor 1	With the Fuxi Railway as the main line, from Mohe,Tahe, Huma, Duobao to Jiagedaqi, Nenjiang, Qiqihar, Daqing, Taipingchuan, Shuangliao, Siping, Shenyang, Yingkou and Dalian southward.
Western Corridor 2	With the Yalini Railway as the main line, from Mangui,Yitulihe to Yakeshi, Qiqihar, Baicheng, Taiping River, Tongliao, and Jinzhou southward.

(Table 3-2. *Continue*)

"Five- Horizontal" International Corridors	
Horizontal channel 1	With Binzhou Line and Binsui Line as the main line, from Suifenhe, Mudanjiang to Hulun buir and Manzhouli westward, with Harbin as core city on the line.
Horizontal channel 2	With Changtu Line as the main line, from Hunchun, Tumen to Baicheng, Ulanhot, Irshi westward, with Changchun as core city on the line.
Horizontal channel 3	With Simei Line as the main line, from Ji'an, Tonghua to Tongliao Huolinguole westward, with Siping as core city on the line.
Horizontal channel 4	With Shendan Line as the main line, from Dandong to Fuxin westward, with Shenyang as core city on the line.
Horizontal channel 5	From Dalian, Yingkou to Chifeng, Bairin Left Banner westward, with Jinzhou as core city on the line.

Heilongjiang Province shares 3,200 km long border lines with Russia and is an important corridor connecting to Russia and European continent by land. Along the border line, there exist 25 first category national level ports, among which there are 15 waterway ports, 4 highway ports, 2 railway ports and 4 air ports. There are mainly 15 waterway ports including Tongjiang, Fuyuan, Raohe, Luobei, Jiayin, Xunke, Sunwu, Heihe, Huma and Mohe; 4 highway ports including Dongning,Suifenhe,Mishan and Hulin; 2 railway ports including Suifenhe and Manzhouli. Except the railway ports in Huma, Sunwu, Fuyuan and Suifenhe, all other ports are open to the international transportation.

At present, there are 45 international passenger and cargo transportation lines between Heilongjiang Province and Russia's 5 border regions being adjacent to China, among which there are 22 passenger transport line, 23 cargo transport lines and 38 regular passenger bus lines.

For Jilin Province, the border line with DPRK is 1,206 km, 232 km with Russia. Currently there are 14 ports and three temporary channels, two of which is the first category ports with Russia and six with DPRK. The border line between Liaoning Province and DPRK is 306 km. There are one land port, five sea ports and two airports.

The main Land ports of the north part in Northeast region are Mohe, Huma, Heihe, Luobei and Tongjiang. Mohe is adjacent to Russian Chita and Amur across the river. Mohe Port is of national level category with two cargo transit accesses all the year round. Border trade is very active in recent years and increases year by year. Luogu River Bridg between China and Russia is the main channel.

Huma is adjacent to Russian Smanov Oblast crossing the river with 378 km border line as a national category passenger and cargo port. So far, there is no cross-border road bridge.

As the only sister city on the 7,000 km border, Heihe Port is adjacent to Russian Blagowershensk, the capital of Amur across the river. So far, there is railway and highway connecting to Russian Belogorsk Station of Trans-Siberian Railway.

Being located in northeastern Heilongjiang Province, Luobei port is adjacent to Russia and a golden waterway because of the excellent depth，width and the water level. The trade with Russia and other Eastern European can be achieved by waterway and conducted by the sea combined transport arrangements. In addition, it can be connected to the rest region of China by Haluo Highway and Hebei Railway conveniently.

Being located in the south bank of junction of Songhua River and River of Heilongjiang, Tongjiang is adjacent to Russian Jewish Autonomous Region across the border River of Heilongjiang with 170 km and also the starting and ending point of the highway from Tongjiang to Sanya. As international transport corridors, highways have been connected to Nizhneleninskoyr, Birobidzhan, Khabarovsk and other places of Russia. The railway has been put to use since 2005. To build Tongjiang as an international corridor, the construction of the cross-river railway bridge from Hayu Island to the ports listed below are under way. By finishing it, the Tongjiang Railway can be connected to Trans-Siberian Railway. The waterway can be connected to Jiamusi, Harbin and Jilin.

The Eastern ports mainly include Suifenhe, Dongning, Hunchun, Tumen, Ji’an,

Dandong and Dalian. Suifenhe is located in southeast of Heilongjiang Province, and is adjacent to Primorsky Krai in Russian Far East. In 1992, it was ratified as the first open city along the border. The Sino-Russian frontier trade zone was set up in 1997. Suifenhe is the starting point of both Binsui Line which is the trunk line of the railway in Northeast China region and the state highway NO.301, which is the second-degree highway with one railway, two highways connecting to Russia. Suifenhe is an important hub of land and sea transportation network between China and foreign countries, as well as the main mechanism for China's participation in international cooperation in the Northeast region.

Being located in downstream area in the eastern part of the Tumen River in Jilin Province and also known as the "geographical hub and the transportation throat", Tumen is adjacent to Wenchengjun of Hamgyeong Bukdo in DPRK across the river, as well as being adjacent to Hunchun which is a national category open city. It is the largest border port city of Jilin Province, being close to the border, the river and the sea. It can be directly connected to the hinterland of DPRK through the border railway and highway bridge across the Tumen River. Tumen Railway, connecting with eastern railways of DPRK through the border railway bridge over the Tumen River, has been a major transport hub between the Northeast region and Korean peninsula since 1954.

There are four ports in Hunchun, of which Changlingzi port is for trade with Russia and Shatuozi and Quanhe ports are for trade with DPRK. Being the national category port, Changlingzi port is the only land port in Jilin Province bordering with Kelasijino in Russia. Besides, there is also one local railway line links to Far East railway of Russia- the 81 Km Tumen- Hunchun railway. The first international cargo transport railway to Russia was completed in early 2000. The line is the third line of major railway lines between China and Russia, following the Manzhouli –Baykalsk Lline, Suifenhe – Bogenaqineiyi Line in the Northeast region.

Being located in the southeast of Jilin Province, JI'an is one of the three Sino-DPRK railway routes. There are two trains to DPRK (back at the same day) daily.

Ji'an railway is connected to domestic Meiji Railway and Northeast railway network, and also connected to the railway loop line of northern part of DPRK by linking Manpu Railway of DPRK across the border.

Being located on the Yalu River of southeast of Liaodong Peninsula and the Yellow Sea, Dandong Port is one of an important meeting points for the Northeast Asian economic area and the Bohai Economic Rim, as well as a major land corridor connecting the Korean Peninsula and the Eurasian continent. It goes to Sinuiju in Korea with railway and highway. Dadong is unique with the advantage of being close to the sea, the river and the land border. Dandong railway is an important part of the Europe-Asia railway artery connecting DPRK, South Korea, Russia and Japan. Dandong Railway is the main channel for international trains between China and the DPRK and also between the DPRK and Russia, connecting the Gyeongui Line of the western Korean Peninsula to the Yalu River Bridge. The Dalian-Dandong and Tonghua ─ Dandong Railways are under construction and the new railway lines (1490 km, the east Road) from Heilongjiang to Liaoning Dadonggang will improve the Dandong Railway's layout significantly. Meanwhile, the project of passenger line from Shenyang to Dandong has been approved.

Dandong Port is a very convenient sea corridor to link South Korea and Japan, only 245 sea miles from Incheon port. According to the blueprint, an international corridor will start from Tokyo, through *Japan-Korea tunnel*, across Korean Peninsula to Dandong, and further to Moscow and Europe.

Dandong is the regional hub for road transportation. The Dandong expressway is directly connected to Shenyang and Dalian. The expressways of Dandong –Haicheng line and Dandong - Tonghua line are under construction.

The main port in the western region is Manzhouli. Being located in the strategic passage of the Eurasia continent. Being in the Sino-Russian-Mongolia triangle and north to Russia, west to Mongolia, backed by the Northeast Economic area, Manzhouli is the major land port of China as well as being the most convenient and most important

large land and sea transport channel and gateway of Bohai ports to Russia, Central Asia and Europe. A railway, highway and aviation transportation network extending in all directions has taken shape.

3. The Development of International Connectivity

Presently, the construction of the Northeast regional network includes three major lines: the first is the railway in the eastern part of Northeast China, the second is the passenger railway from Harbin to Dlian, and the third is the railway to Mongolia horizontally west.

The total length of eastern railway from Mudanjiang, Tumen Tonghua and Dandong to Dalian is 1,380 km. The project started in early 2009 and now is proceeding smoothly. The line from Biahe to Helong has been completed and the other two lines from Tonghua to Guanshui and from Qianyang to Zhuanghe are under construction and expected to be completed in the mid-2011.

Running through the whole northeast region, the passenger railway line from Harbin to Dalian is an important part of the Beijing-Harbin railway network in the country. The total length of the line is 914 km and the project will cost about 98 billion Yuan, and the speed of the train is 350 km/per hour. Beginning in August, 2007, the line is expected to be finished by the end of 2011. By then, the transportation capacity of Northeast railway will be greatly enhanced and it will give full play to the lines from Dlian to Binzhou Line, Changbai Line, Baia Line to DPRK.

The railway from Aersha in Inner Mongolia to Choibalsan in Mongolia will provide the third outgoing sea port for Mongolia after completion. This line will be constructed first and then be connected to Ulan Bator or other locations on the trunk railway. Currently, there is a railway line called Baia to Aer Mountain directly. The

length of Baia Line is 354.7 km, and it is an important horizontal transport route in Eastern Inner Mongolia, as well as an important line connecting Inner Mongolia and Northeast China. Baia Railway refers to the railway line from Baicheng, through Ulanhot, Suolun, Aer Mountain to Iershi. It is called the “Baia” Line because of the passenger vehicle is not available from Aer Mountain to Iershi. By completing the construction, it will be connected to Eastern Mongolia very soon in the future, forming the second Eurasian continental bridge in Northeast China.

In addition, the international corridor projects which are beginning or about to start include: the construction of cross-border highway bridge between Hunchun River Port and DPRK and the construction of Dandong Port and the new boundary bridge of DPRK. On February 25, 2010, China and the DPRK also signed an agreement in Dandong city to jointly build a new Yalu River highway bridge. The construction of Sino-DPRK border railway, and the new cross-border bridge over the Yalu River, will further strengthen the connection between China and the DPRK, benefiting personnel and economic exchanges between the two countries. It will also help to build a new Europe-Asia railway major line from Northeast Asia to Europe. Since April 2010, DPRK has been the tourism destination for Chinese citizens. Being close to DPRK across a river, Dandong is the largest travel center to DPRK. Last year, the total number of tourists to DPRK through Dandong is 2.5 million.

In addition, there are two lines started construction in 2010: the passenger railway line from Shenyang to Dandong and the express railway line from Dandong to Dalian. The length of the passenger line from Shenyang to Dandong is 207 km and the designing speed is 250 km/ per hour and the time duration for completing the project is 4 years. It will only take 1 hour from Dandong to Shenyang. The length of the high speed railway line from Dandong to Dalian is 295.9 km and the time during for the project is 3 and a half years. After the operation of Danda Railway, Dandong port will become the nearest eastern outgoing- sea-port in Northeast China, connecting the railway corridor in the eastern region of Northeast China. These two railways

investing more than 50 billion Yuan will make Dandong to become Northeast Asia's major transport hub. Bordering with DPRK across the river, Dandong is a city that has the most economic and trade ties with the DPRK. Almost 70% of Sino-DPRK border trade is done in Dandong port and most of the tourists to DPRK are through Dandong.

4. Prospects for Future Development

As infrastructure construction in the Northeast region is entering an unprecedented period of fast development， the highways, railways, ports, airports and other transportation infrastructure development will continue to maintain a high growth trend in the future.

The main directions of the investment can be summarized as the following:

Firstly, to expand the “two-vertical and one-horizontal” highways and railways. The “two-vertical” refers to the connection between eastern and western railway in Northeast China by constructing three major lines to Shanhaiguan, and the connection of border points along the border line by easing the pressure of Jingha Line (Beijing-Harbin) and Hada Line (Harbin-Dalian). The “one horizontal” refers to the railway and highway expansion transformation from Tumen to Iershi to form the second east and west corridor and to connecting the new Eurasian Continental Bridge for the future.

Secondly, to complete construction of the branch lines, including the intercity passengers transport line, to form a highly efficient and convenient highway network. The mileage of the railways that Shenyang Railway Bureau currently operates is 5,863.88 Km. According to *Mid-long Term National Railways Network Plan,* the total mileage of which will reach 8700 km during the next three to four years, which is equivalent to the sum of railway construction of Shenyang Railway Bureau built during

the past 120 years. The passenger dedicated line intercity transportation network will be built roughly within next three years in Northeast. During the *Twelfth Five-Year Plan* period, the structure of highway of Northeast region will be significantly improved and the capacity of transportation will be increased greatly.

As for the future major international connections, the construction of international railway corridor between China and Mongolia will be given to high priority. It is expected that an international railway corridor (1300km) from Arihashate Port of Inner Mongolia Autonomous Region to Jilin Hunchun will be built, which will connect Northeast China, Mongolia, DPRK and Russia.

The starting point of the 1388 km long China-Mongolia international railway corridor is located in Arihashate Town (port), which is on the south of Manzhouli and very close to Mongolia Choibalsan, and then along the highway line southward, from Xin Barag Youqi, through Xin Barag Zuoqi to the Aer Mountain, then into the Baia Line by the way of Ulanhot, Baicheng, Changchun, Jilin, Tumen, finally reaches Hunchun (Port). The project will cost 96.4 billion Yuan. After the completion of project, the international railway corridor will come into being from Korean Peninsula, Mongolia, Russia to Europe.

At present, Changji passenger dedicated line is under construction. The dedicated high-speed railway line from Jilin to Hunchun will come into operation in 2010. After completion, these railways will become an important component of the international transportation corridor from Mongolia to the region of Japan Sea.

The “Chang-Ji–Tu” (Changchun-Jilin-Tumen) international corridor is a new initiative. It consists of two parts: the first part is to connect Russia and the second part is to DPRK. Currently both projects have made substantial progress. Hunchun highway port is increasingly convenient for customs clearance to Russia and the connection has been greatly improved in the Hun-Ka railway port. The four countries’ passenger--freight combined transport from Hunchun, through Zalubinuo Port, South Korea Sokcho to Japan Niigata. The 48 km-long secondary road construction projects

from Quanhe in Hunchun Highway Port to DPRK have been launched.

The construction of the railway port from Hunchun to DPRK is now under study. There was an old railway between Shuaiwanzi station of Hunchun and Hunyung-ri station of DPRK. The total distance of this line is less than 7 km, with only 4.5 km in China. Upon the completion of project, Hunchun railway will connect to the northern railway of DPRK, forming the structure of two major international corridors. On the one hand, it links to Russian Far East railway northward and coastal ports, while on the other hand, in the south, Hunchun railway will connect to the DPRK's east coast railway and coastal ports. By completion, the railway ports of Hunchun and Tumen will connect with Korea's north and south railways. This international railway connection has important strategic meaning, not only promoting the development of "Chang-Ji-Tu" economic zone, but also improving "Great Tumen" regional cooperation and development.

5. Prospects for International Cooperation

With great improvement of international connectivity in the region, the economic cooperation will be further strengthened. The ports such as Manzhouli, Suifenhe, Dongning and Heihe will further promote the development of the trade with Russia in northeast region, and various cross border economic and technological cooperation in these areas will further promote economic and technology cooperation between China and Russia. In addition, Hunchun Port and other ports, such as Tumen, Ji'an and Dandong will promote economic and trade cooperation with North and South Korea and Japan. And further reform of the ports such as Dalian, Yingkou and Dandong will lead the trade of Northeast region into the global level. With the completion of passenger dedicated line of Hada (Harbin-Dalian), the ports such as Dalian, will play a more

important role in expanding the international exchanges.

It is anticipated that the completion of the eastern railway crossing northeast will greatly promote the link of eastern border ports and promote the coordination and development of various ports, and promote foreign economic and trade cooperation. In addition, the progress of Sino-Mongolian “Liangshan” railway will enhance the cooperation for trade and energy resources between northeast China and Mongolia. In December, 2009, the Lin he-Ceke railway of the “Sino-Mongolian trade corridor” (length 768 km), which is located in western Inner Mongolia, was opened and put into operation. It forms the land transport link through Mongolia and northwest China.

As “Chang-Ji-Tu” initiative has become a national strategy and DPRK's external economic policy has become more active, the “highway-port-district” integration between China and DPRK and the “highway-port-point” integration between China and Russia have made substantial progress. In particular, the DPRK’s active attitude and participation in regional cooperation will further promote the cooperative attitude of Russia and encourage Republic of Korea and Japan to be more active in participating in the regional cooperation in the Tumen River area.

Recently, the 48 km high-class highway from China Hunchun to DPRK Rason Port was completed. It is anticipated that it will help to link the inland area to sea port. The reconstruction of original railway from Hunchun to DPRK which is now being under study will form a China-Russia-DPRK triangular railway network in Tumen River outgoing sea port area. It will link up inland and coastal ports together, and also link up the eastern railway in Northeast China and northern and the eastern coast railway of DPRK with Far East coast railway in Russia together. By then, the international corridor cooperation in Chang-Ji-Tu will be basically completed and the east corridor of the new Eurasian Land Bridge will also be completed roughly, which will echo the railway in western “Liangshan” railways in northeast region.

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CHAPTER 4

The Development of Transportation Infrastructure and International Links in China's Northwest Region

Northwest China consists of the three provinces of Shaanxi, Gansu, and Qinghai and the two autonomous regions of Xinjiang and Ningxia. It covers 3.1 million square km with a population of 99.6 million. The Northwest China is a major gateway opening up to the outside world in China's national strategy, and Xinjiang Uygur Autonomous Region is a bridge to the west. Xinjiang shares 5,600 km of boundary line with Mongolia, Russia, Kazakhstan, Kyrgyzstan, Tajikistan, Afghanistan, Pakistan and India, which accounts for roughly one-forth of the total frontier of China. In regarding to infrastructure, Xinjiang is definitely one of the most important regions for China connecting the outside world.

During the past ten years, northwest China has achieved great progress with the help of the Western Regional Development Strategy. Since the beginning of the Western Regional Development strategy, Northwest China has entered into a period of high economic growth. It realized 11.6% annual GDP growth from 2000 to 2009. Meanwhile, infrastructure in Northwest China has also made many breakthroughs. Among of them, highways in operation in northwest China newly increased 88,000 km, of which 14,000 km is composed of expressway, and railways in operation newly increased more than 8000 km. By the end of 2008, the number of civil airports in northwest China reached 79, which accounts for 49.4 percent of the total of China. In addition, the length of gas and oil pipeline newly increased 14,130 km.[8]

[8] Department of Western Regional Development of the National Development and Reform Commission, "Brilliant Achievement of Ten Years of the Western Regional Development," *New Western Region*, No.24, 2009, p. 4.

The achievement of infrastructure in Northwest China cannot be separated from the national strategy for transportation infrastructure development. Since 2004, the approved traffic programs at national level include *Mid-long Term Railway Network Planning* (earlier in 2004), *National Expressway Network Planning (August 2007), Comprehensive Transportation Network Mid-long Term Development Planning (October 2007) and Mid-long Term Railway Network Adjusting Planning Scheme (November 2007).* The Ministry of Commerce also initiated *Modern Logistic Model City Plan* in 2009. Northwest China has become closely connected and integrated under those national level transportation projects.

1. The Development of Infrastructure in Northwest China

Northwest China's transportation networks are initially formed by the development of railways, highways, waterways, air and pipelines. This is further strengthened in the *Comprehensive Transportation Network Mid-long Term Development Planning* in 2007, which is the first national level and comprehensive plan for China. This planning covers above five transportation infrastructure areas, and consisting of "five horizontal and five vertical" comprehensive transportation corridors and four international transportation corridors.

1.1. The Development of Railway Networks

After the approval of the Comprehensive Transportation Network Mid-long Term Development Planning by the State Council, the Ministry of Railways announced the *Mid-long Term Railway Network Restructuring Scheme*. According to the new planning, railway length will increase from 100,000 km to 120,000 km up to 2020. Thus, the Northwest China's railway network will increase more than 5,000 km. The

steadily improved transportation infrastructure will definitely lay a solid foundation for Northwest China's sustaining development. The planning added Xuzhou-Lanzhou passenger line into the national high speed railway grid. By this way, it could connect Northwest China and Eastern China.

The railway construction in Northwest China has achieved remarkable progress. According to the Work Report of Shaanxi Government in 2010, the railway length was 2,600 km in 2009, and it will reach to 4,300 km in 2010. Among of them, electrified railways are 3,720 km, and double-track railways are 2,240 km. The Work Report of Gansu Government announced in 2010 that the construction of Lanyu, Xiping, Tianping railways runs smoothly, and the second double track of Lanxin Railway started. At the end of 2009, the railways in operation of Qinghai province reached to 1,651 km. Meanwhile, Xinjiang has constructed the Jingyihuo Railway (connecting Jinhe, Yining and Khorgas at the border with Kazakhstan), the Second Wujing Railway (connecting Urumqi West with Jinhe), the Kuitun-Karamayi section of the Kuibei Railway (connecting Kuitun with Beitun), and the Xiaohuangshan-Wucaiwan section of the Wuzhun Railway (connecting Urumqi North with the coal industry base in the eastern part of Dzungaria Basin) at the end of 2009. The newly increased operation of railways reaches to 641 km, and the total length of the other current construction railways reaches to more than 5,000 km.

Lanyu Railway, an important double line electrified railway planned in the *Eleventh Five-Year Plan*, started to construct in 2008. Lanyu Railway is to run through Gansu, Shaanxi, Sichuan provinces and Chongqing with a total length of 820 km. The project will be constructed in six years. Lanyu Railway connects Lanxin Railway, Baolan Railway, Lanqing Railway and Longhai Railway in north, and Baocheng Railway, Xiangyu Railway, Dacheng Railway, Yuhuai Railway in south, will be the best railway corridor from Northwest to Southwest China. It stands side by side with Jingguang Railway and Jinghu Railway in China's north-south artery, and will be an international corridor to connect Central Asia and Southeast Asia.

The second double track line of Lanxin Railway is a high-speed railway connecting Lanzhou, Gansu and Xinjiang, started in 2010. The 1,776 km long railway routes starts from Lanzhou, through Xining, Zhangye, Jiuquan, Jiayu Pass, Hami, Turpan, to Urumqi (Xinjiang). The finance of the project is pooled by the Ministry of Railways, Xinjiang, Gansu, and Qinghai. On March 19, 2010, the Xining-Datong section of the Lanxin Railway (second double track line) began to construct. On March 25, 2010, the Hami section was also started. It is expected that they will be completed within 5 years. By that time, Lanxin Railway second double track line will connect closely with Lanxin Railway, Longhai Railway, Lanyu Railway, Baolan Railway, and Taizhongyin Railway, and form a western railway network. As a result, the connection between Northwest-North and East-Southeast will be much more enhanced.

The construction of the railway from Kashgar to Hotan started in July, 2008 and is expected to be completed in February, 2011. At the same time, the railway from Korla to Golmud also started. This railway route from Korla to Qarkilik will connect to Qinghai Railway in Golmud, and it will extend to inland China by connecting Tibet or Xining. So far, it will be the second railway corridor in Xinjiang connecting inland China. Xinjiang plans to invest 19.34 billion Yuan in railway construction in 2010. In all 13 current construction projects, Korla to Luntai section of the double-track line from Korla to Aksu, Urumqi-Alashankou electrified lines and Wucaiwan-Jiangjunmiao section of the Wuzhun Railway will be completed in 2010. Besides that, there are also other new projects that will start in 2010, such as Hami railway south ring line, Hongliuhe-Yandun electrified line, and Urumqi new railway station and related projects etc. Furthermore, the second double-track line of Lanxin Railway will be comprehensively pushed forward. As the final year of *Eleventh Five-Year Plan*, 2010 is witnessing many new projects.

Table 4-1. The Approved Railway Construction Projects in Northwest China (2010)

Region	Project
Shaanxi	1. Xi'an-Chengdu Passenger Dedicated Line 2. Baoji-Lanzhou Passenger Dedicated Line 3. Shenmu-Watang Railway
Gansu	1. Dunhuang-Golumd Railway 2. Chengdu-Lanzhou Railway 3. Baoji-Lanzhou Passenger Dedicated Line 4. Yinchuan-Lanzhou Railway Second Corridor 5. Pingtang-Wuwei Railway Second Corridor 6. Pingliang-Qingyang Railway (the north extension of Tianping Railway) 7. Lanzhou-Linxia-Hezuo Railway 8. Tianshui-Longnan Railway (the south extension of Tianping Railway)
Qinghai	1. Golumd-Dunhuang Railway 2. Golumd-Korla Railway
Ningxia	1. Yingchuan-Lanzhou Railway Second Corridor 2. Gantang-Wuwei Railway Second Corridor
Xinjiang	1. Jiangjunmiao-Hami Railway 2. Hami-Ejin Railway 3. Korla-Golumd Railway 4. Fuhai-Fuyun Railway

Source: The author reorganizes data based on database provided by China Industry Analysis System. This database is supported by the State Development and Reform Commission.

1.2. The Development of Highway Network

The State Development and Reform Commission announced the *National Expressway Network Plan* in December 2004. According to this plan, China would adopt an "intensively construction in the East, formulating network in the Central and connecting the west", which laid out the principle to build expressways along the rail passenger dedicated lines. The national expressway network would connect all important traffic point cities around the country, including 50 rail junctions, 67 aero hubs, more than 140 highway hubs and 50 waterway hubs. This would create

complementary advantages by combing various transportation ways. According to the *Layout & Planning of National Highway Transportation Junction* approved by the Ministry of Transportation in 2007, China planned to establish 179 national highway hubs in 196 cities, including 12 central hubs. The Northwest China has 21 cities entered into this list, and accounted for 11.7 percent of total. Xi'an and Jiuquan are the central hubs, account for 16.7 percent of total (see table 4.2).

Table 4-2. The Cities in Northwest China in the List of the Layout & Planning of National Highway Transportation Junction

Region	City	Number
Shaanxi	Xi'an (central hub), Xianyang, Baoji, Yulin, Hanzhong, Yan'an	5
Gansu	Lanzhou, Jiuquan (central hub), Jiayu Pass, Tianshui, Zhangye	4
Qinghai	Xining, Golumd	2
Ningxia	Yinchuan, Guyuan, Shizuishan	3
Xinjiang (including Xinjiang Production and Construction Corps)	Urumqi, Hami, Korla, Kashgar, Shehezi, Kuitun, Yining (Korgas)	7

Source: Same as Table 4.1

By March, 2010, Gansu has a total 114,000 km of classified roads and highways, and a total of 1,644 km of expressways. By the end of 2010, the total length of expressway will reach to 2,000 km.[9] Shaanxi Province will finish the projects of Ankang-Maoba-Shanchuanjie expressway, the Shaanxi section of Qinglan Expressway, and Ankang-Hanzhong expressway, which will make Shaanxi's expressway in operation to 3,000 km.[10] Qinghai province has planned to newly increase 2,000 km of highways,

[9] "Gansu: Four Cities in National Highway Transportation Junction Planning Obtained Specialists' Approval," *Gansu Daily*, 2010-3-12.

[10] "Shaanxi: Expressway in operation will break 3,000 kilometers," www. chinahighway.com, 2010-2-24.

which will make Qinghai's highway in operation to 62,000 km.[11] By the end of 2009, Xinjiang has a total of 150,000 km of highways, and will reach to 152,000 km by the end of 2010. In 2010, there are several major line under construction, such as Lianyungang-Khorgas Expressway, the second phase of the Xingxing Xia-Turpan Highway, the Minghui (the border between Gansu and Xinjiang)-Hami section of the Beijing-Urumqi Expressway. Other current construction projects include Xinjiang-Tibet Highway and Wuqia-Turgart Port.[12]

2. The International Connection of Infrastructure in Northwest China

The relations and connections between Northwest China and its western neighboring countries have a long history. A best case to illustrate is the famous "silk road". However, the real progress in the international connections of Northwest China was not took place until the 1990s. With the increasing economic and trade transactions with neighboring countries, there is an urgent need to improve infrastructure.

By the end of 2006, Northwest China has 61 first class ports to outsider world, which accounted for 57 percent of the total of China. In the *Eleventh Five Year Plan* on Western Region Development, China decided to "propel important border port city to realize leaping development". To further open up to west, it is important to develop the border port cities, and to speed up construction of international corridors. In addition, the plan also suggested that it should make priority to construct international corridors connecting Southeast Asia, Central Asia, Russia and Mongolia.

[11] "Qinghai: Highways will increase 2,000 kilometers in 2010," www.chinahighway.com, 2010-3-2.
[12] "Xinjiang: the Total length of highways will reach 152000,000 kilometers," www.xinhuanet.com, 2010-3-13.

There are four international regional transportation corridors in the *Comprehensive Transportation Network Mid-long Term Development Planning*. The Central Asia international transportation corridor, which bases on two principal axes of Northwest transportation corridor to East costal and land bridge transportation corridor forms an international line from Urumqi to Korgas.

Other international corridors consist of “five vertical and five horizontal” specific routes. In details, the fifth route in “five vertical” is Linhe-Fangchenggang transportation corridor. It starts from Linhe (Inner Mongolia), through Yinchuan, Lanzhou, Chengdu, Kunming, and Nanning to Fangchenggang (Guangxi). Based on railways, highways, civil aviation and partial oil and gas pipelines throughout the full rang of whole corridor, it forms the second north-south comprehensive transportation corridor in Western China. This corridor takes Kunming airport as international air transport gateway to Southeast Asia, and Fangchenggang as major port to connect international maritime with Southeast Asia.

The first corridor of the “five horizontal” is Northwest transportation corridor to East costal area. It starts from Tianjin and Tangshan through Beijing, Datong, Hohhot, Baotou, Linhe, Hami, Turpan, Kashi, to Turugart Port of Xinjiang. Based on railways, highways, civil aviation and partial oil and gas pipelines throughout the full rang of whole corridor, it forms transportation corridor linking northwest to eastern China. This corridor takes Tianjin Port and Tangshan Port as major hubs to connect international maritime transport network, and Turugart Port to link with Central Asia transit network.

The second corridor of the “five horizontal” is Qingdao-Lhasa Transportation Corridor. It starts from Qingdao through Jinan, Dezhou, Shijiazhuang, Taiyuan, Yinchuan, Lanzhou, Xining, Golumd, and to Lhasa, which comprises of railways, highways, civil aviation and partial oil and gas pipelines throughout the full rang of whole corridor. This corridor takes Qingdao Port as major hub to connect international maritime transport network.

The third corridor is land bridge transportation corridor. It starts from Lianyun Port, through Xuzhou, Zhengzhou, Xi'an, Lanzhou, Urumqi to Alataw Port of Xinjiang. It is a part of the Eurasian Land Bridge and comprises of railways, highways, civil airways and partial oil pipelines throughout the full rang of whole corridor.

The border port plays an important role in China's outside connections. As we mentioned earlier, Xinjiang is an important frontier region with 17 first class ports and 11 second class ports. Xinjiang has 101 both inbound and outbound travelers and goods transport routes and is the region with the largest number of highway ports, travelers and goods transportation routes and the longest length of operation. In all operational routes, the important ones include Urumqi-Alataw Port-Semipalatinsk, Urumqi-Korgas Port-Alma-Ata and Kashi-Turugart-Bishkek etc. Among of them, the Urumqi- Alataw Port-Semipalatinsk route is the longest international highway transportation of both travelers and goods with the length of 1,363 km. Xinjiang has trade relations with 148 countries and regions. In 2007, trade between Xinjiang and Kazakhstan, Kyrgyzstan, Russia, Pakistan, and Tajikistan reached 11.649, 3.78, .617, 0.477, and 0.428 billion US dollars respectively. The above mentioned five countries accounted for 92.1 percent of the total trade of Xinjiang.[13]

[13] "Xinjiang Ports' Imports and Exports Exceeds 18 Billions US Dollars," *Xinjiang Daily*, 2008-2-15.

Table 4-3. The List of first class Ports of Xinjiang

Country	Port	Port's region	Opening time	Port's kind	Port's position	Counterpart port
International	Urumqi airport	Urumqi	1973	Aviation	International transport	Alam-Ata,Tashkent
Mongolia(4)	Taskhin	Altay	1989	Highway	Bilateral port	Bulgan
	Hongshanzui	Altay	1992	Highway	Bilateral port	Dayang
	Wulastai	Changji	1992	Highway	Bilateral port	Beitage
	Laoyemiao	Hami	1992	Highway	Bilateral port	Burgastai
Kazakhstan(7)	Korgas	Ili	1983	Railway and highway	International transport	Korgas
	Alataw Pass	Bortala	1992	Railway and highway	International transport	Druzhba
	Baktu	Tacheng	1992	Highway	International transport	Baktu
	Jimnay	Altay	1992	Highway	Bilateral port	Maykapchagay
	Aheytubiek	Altay	1992	Highway	Bilateral port	Alekseyevka
	Dulata	Ili	1992	Highway	Bilateral port	Kolzhat
	Muzart	Ili	1992	Highway	Bilateral port	Narynkol
Kyrgyzstan(2)	Torugart Pass	Kizilso	1983	Highway	Bilateral port	Turgart
	Yearkeshtan	Kizilso	1998	Highway	International transport	Yearkeshtan
Tajikistan	Karasu	Kashi	2004	Highway	Bilateral port	Murghob
Pakistan	Kunjirap	Kashi	1982	Highway	International transport	Suster
International	Kashi Airport	Kashi	1993	Aviation	Bilateral port	Andijan, Osh

Note: By the end of 2008, Korgas upgrades into an international rail and highways transport with the establishment of Jin-Yi-Huo Railway.

Source: Wen Lu, *The Establishment and Development of Xinjiang's Port since Modern Times*, Master Thesis, Xinjiang University, 2005, p.46; Dengfeng etc., "Mathematical Analysis of Spatial Development Mode of Port Region in Xinjiang," *Arid Land Geography*, Vol.29, No.3, 2006, p.423.

Among of them, Alataw Pass, Korgas and Yearkeshtan are the three largest ports. According to Port Administration Office of Xinjiang, the volumes of shipments in above three ports account for more than 90 percent of the total of Xinjiang. In April 1, 1992, an express container railway from Lianyungang to Alataw Pass was completed. In 1997, China, five Central Asian countries and Russia hold a conference of Ministries of Railways (Transportation) and signed a joint communiqué to formulate railway transportation development plan based on the principles of equality and mutual benefit. In April 22, 2004, the train from Lianyungang to Alataw Pass was firstly extended to Alma-Ata, which symbols another progress of the New Eurasian Land Bridge transportation network. In 2005, the shipments in Alataw Pass exceeded 10 million tons. In Korgas port, China and Kazakhstan set up the free trade zone. In 2008, Jin-Yi-Huo Railway was completed and opened for operation connecting Alataw Pass to Central Asia and Europe.

China has actively provided assistance to neighboring countries to develop transportation infrastructure, and plaid a key role to develop the Eurasian international transport corridor. In May, 2004, the first China-Tajikistan land port completed. In July, 2007, the Tajikistan-Uzbekistan highway started to build, which is supported by China's 300 million U.S. dollars soft loan, and it is expected to complete in August of 2010. Before that, China already provided 60 million Yuan official assistance to Kyrgyzstan to build China-Kyrgyzstan-Uzbekistan highway.[14] Based on this highway, it is planned to build China-Kyrgyzstan-Uzbekistan railway, which starts from China through Kyrgyzstan, Uzbekistan, and Kazakhstan to Iran and Turkey. By that way, it links Europe's railway network. With improved transportation infrastructure, the shipments between Xinjiang and Central Asian countries have increased significantly.

The transportation cooperation between China and Kazakhstan has also made progress. In November, 2004, China and Kazakhstan signed an agreement to open 12 new international passengers and goods transportation routes in 2005. In 2007, the shipments in Alataw Pass reached to 12.48 million tons next only to Manzhouli.

[14] He Zhanjun and Fan Yongwei, "China Actively Assist Central Asian Countries to Improve Highway Communication," www.xinhuanet.com, 2008-9-8.

By the end of 2008, Jin-Yi-Huo Railway was completed and connected to Kazakhstan, becoming a comprehensive railway and highway transportation. In October, 2009, the 18th China-Kazakhstan Joint Committee on cross-border railway was held in Urumqi. Railway specialists from two countries revised and supplemented *China-Kazakhstan Cross-Border Railway Protocol*. They defined the objective of the 1.5 million tons of shipments in China-Kazakhstan railway port in 2010.

In regarding to oil pipeline, the west and east sections of the China-Kazakhstan crude oil pipeline from Caspian Sea to Xinjiang were completed in 2002 and 2005 respectively. The transnational pipeline, extending 962.2 km from Atasu in Kazakhstan to the Alataw Pass of Xinjiang, was completed in December, 2005 at the cost of 700 million U.S. dollars. On July 12, 2006, Kazakhstan's crude oil poured into oil tank of PetroChina Dushanzi Petrochemical Company, marking the beginning of the commercial operation for China's first direct oil import pipeline.

The Central Asia-China gas pipeline starts from Turkmenistan through Uzbekistan, Kazakhstan and to Korgas in China, where it is connected to the West-East gas pipeline. The total length of this pipeline is about 10,000 km. In August of 2007, the construction of the Turkmen section of the pipeline began. The construction of the Kazakhstan section started in July, 2008, and the first stage was completed in July 2009. On 14 November, 2009, the whole pipeline was inaugurated.

In addition, the *Eleventh Five-Year Plan* on Western Region Development suggested that China should accelerate the construction and open Kanas port crossing the border of China and Russia. As a result, it could thoroughly utilize large scale storages of various resources in the Siberia federation district of Russia.

3. The Future of China-Central Asia Infrastructure Connectivity

As an important land corridor connecting West China with Central Asia, West Asia, South Asia and Europe, Xinjiang has enhanced transportation infrastructure

development and strengthened transport cooperation with its neighboring countries. However, there are some problems that need to be solved: insufficient capacity of international transportation corridor, unreasonable spatial layout of transportation corridor, less comfortable connection between international and national, and lack of multilateral coordination.[15]

Concerning the future of China-Central Asia international connectivity, in general, increasing economic relations Northwest China and Central Asia is a strong motivation. China and Central Asia countries are strongly complementary to each other. According to the *Mid-long Term Railway Network Planning* and the *Eleventh Five-Year Planning* on China Railway, the Ministry of Railways increased its investment on international railway corridors and port stations crossing the border areas, including newly constructing eight international corridors and rebuilding and enlarging five transport corridors. In addition, China would actively participate in Trans-Asian Railway, Northeast Railway and the Third Eurasian Land Bridge. These railways will not only change Xinjiang and Northwest China's traffic structure, but also improve the south section of the Eurasian Land Bridge, forming the best way to connect East Asia, Southeast Asia with Central Asia, West Asia, and further with North Africa and South Europe.

According to the planning, the length of the new railway lines in Xinjiang will exceed 6,799 km by 2020. The total length of railway will reach more than 10,000 km, with 3,050 km electrified railway and four crossing border railways. Thus, it is expected to form a "five lines, four rings, four ports" network. The "five lines" include the Lanxin Railway, the newly building double-track Lanxin Railway, the Jiangjunmiao-Hami-Linhe Railway, the Hami-Golumd Railway and the Korla-Golumd Railway. The "four rings" represent four railways encircled the Tarim Basin, the Junggar Basin, the Tian Shan and the Turpan Depression. The "four ports" include the existing Alataw Pass and three other newly building Korgas, Torugart Pass and Kunjirap port railway stations.

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[15] Xiao Zhaosheng and Wu Wenhua, "Strategic Thinking on International Transportation Corridor in China's Opening up to West," *Comprehensive Transport*, No.10, 2007, pp.22-23.

A good case to illustrate the international cooperation in railway is the Trans-Asian Railway. As early as in the 1960s, the idea of an integrated freight railway network was raised. In 1995, Mahathir Mohamad, the Prime Minister of Malaysia, suggested that the six ASEAN countries should build a railway network connecting China. In November 2006, the Trans-Asian Railway Network Agreement was signed by 17 Asian nations in the 62 United Nations Economic and Social Commission for Asia and the Pacific Conference. Up to now, there are 21 nations that have signed this agreement, including Armenia, Azerbaijan, Bangladesh, Cambodia, China, India, Indonesia, Iran, Kazakhstan, Laos, Mongolia, Nepal, Pakistan, South Korea, Russia, Sri Lanka, Tajikistan, Thailand, Turkey, Uzbekistan and Vietnam.

The Customs Union between Russia, Belarus and Kazakhstan was set up in January 1, 2010. This customs union plans to establish a single economic space by January 1, 2012. To facilitate economic development, Kazakhstan needs to improve its trade, especially oil trade. From geographic perspective, Kazakhstan is much more close to China than to Europe. Thus, Kazakhstan has the strong will to enlarge trade with China and actively participate in building international infrastructure corridor. Kazakhstan recently announced to build an international railway to connect China with Europe as part of the Trans-Asian Railway that could realize continent transportation without reloading. Meanwhile, Kyrgyzstan also planned to build Andijian-Osh-Yierkstan-Kashi railway and highway connecting with Nanjiang Railway in China. It seems that the land transportation corridor cooperation between China and Kazakhstan has its spillover effect.

Recently, China, Central Asia states and other related countries reached a preliminary agreement to build a modern transportation corridor at cost of 19.2 billion U.S. dollar. This corridor will be a new “silk road” to create closer ties among the related countries. Afghanistan, Azerbaijan, China, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan and Uzbekistan agreed to build railway and highway in 2010 and expected to complete it in 2018. The transportation cooperation between China and Kazakhstan make great stride, however, as noted by specialists, problems still existed.

For example, some contents of the cooperation agreement could not be taken effect. Standards are used in various ways. Transportation infrastructure and capacity are still limited. The effective coordination between international and domestic departments need to be further strengthened, and the market access in transportation still need to be improved.[16]

In South Asia, Pakistan government approved a plan to build a railway from Havelian (Northwest Pakistan) to Kashi in Xinjiang. The Ministry of Railway of Pakistan announced that it would spend 165 million Rupee (about 2.75 million U.S. dollar) to initiate feasibility study on this railway. Some Chinese specialists were invited by Pakistan government to do the feasibility study on technology and capital. Meanwhile, Pakistan suggested that China could build a railway directly reach to Gwadar port and Karachi to promote bilateral trade. The background of suggestion is that China is building Gwadar port. If Quetta-Gwadar Railway was also included in the plan, Gwadar will become a seaport to Xinjiang. As specialist pointed out, however, building cost is a really challenge.[17]

Overall, the future development of transportation infrastructure in Northwest China largely depends on how to develop Xinjiang. As observers noted that, "in 21st century, Xinjiang will become a tie connecting China with Central Asia, South Asia, West Asia and Europe, a catalyst and a propeller to improve economic growth in western region and an international trade center for Eurasian region."[18] With the rising position of Xinjiang in China's grand strategy, Xinjiang will receive much more investment and support from Chinese central government. Thus, the transportation connectivity between Northwest China and the outside world will be greatly improved.

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[16] Wang Haiyan and Liu Yanliang, "Institutional Arrangement and Functional Cooperation in Transportation between China and Kazakhstan," *Xinjiang Social Sciences*, No.4, 2009, pp.47-48.

[17] Wang Wei, "The Construction of China's International Railway Corridor in the Eleventh Five-Year Plan," *Land bridge Horizon*, No.2, 2009, p.39.

[18] Li Yuxin and Ni Chaojun, "The Status and Role of Xinjiang in Regional Economic Cooperation between China and South-Central Asia: Perspective of Xinjiang Economic Zone," *China Soft Science Magazine*, No.6, 2008, p.75.

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CHAPTER 5

The Development of Transportation Infrastructure and International Links in China's Southwest Region

Southwest China shares borders with Southeast Asia and South Asia. Yunnan Province shares borders with Viet Nam, Laos, and Myanmar. The length of boundary is 4,061 km, accounting for 20 percent of the total of China. Tibet also shares borders with South Asia, however, the infrastructure connection is limited due to the obstruction of the Himalayas.

1. Infrastructure Development and International Connection

The transportation infrastructure provides the foundation for economic and social exchanges between different regions and countries. Currently, the comprehensive transportation infrastructure networks in Southwest China have been established with highways, railways, airways and waterways. Those networks have been also extended to the neighboring countries through the international corridors. For example, Yunnan Province as a getaway to Southeast Asia and South Asia, has made great effort to develop the infrastructure network with both Southeast neighboring countries and also South Asia countries. By designing GMS "three verticals and two horizontals" networks, some important transportation routes are put into priority, like Kunming-Mandalay-Yangon, Kunming- Laos- Bangkok, and Kunming-Hanoi-Haiphong highways.

1.1. The Development of Highway Network

At present, the international highway from Yunnan Province to ASEAN countries is almost finished, which will significantly promote the economic and social relations between Yunnan Province and ASEAN countries. The sections of the international highway corridor in Yunnan Province, such as Kunming–Bangkok (Thailand), Kunming-Hanoi (Viet Nam), Kunming-Mandalay(Myanmar), Kunming-Myitkyina (Myanmar), have been upgraded into high rank. With the constructing of international highway corridor connecting ASEAN countries, the international highway for goods transport between Yunnan and ASEAN countries are gradually developing into prosperity. The passenger carrying capacity per year of the international highway is about 3 million, and the freight volume is above 5 million tons.

Yunnan Province has opened 16 international highway lines with Laos and Viet Nam. Some lines, for example, Kunming- Viangchan (Laos), Jinghong (Xishuangbanna)-Oudomxay (Laos) become very busy due to increasing transactions of goods and also personnel flows. At the same time, Sion-Myanmar international highway transport has made a breakthrough. Jinghong-Daruo-Nanban(Myanmar), Ruili-Muse(Myanmar)-Nankan, the two Sino-Myanmar travelling passenger highways coaches have been opened, and Chinese freight carriers could load and unload goods in No.105 freight yard from Ruili port to Muse, Myanmar.

The length of the Kunming-Laos-Myanmar highway is 1,807 km, with 688 km in Yunnan Province. By early 2008, most of part of it in Yunnan Province was built into expressway, and all second-class remaining parts will be rebuilt into expressway in 2011. The 229 km part in Laos was completed and reached to ASEAN's second class level. Actually, 1/3 of the part in Laos was invested by Chinese side with 30 million U.S. dollars. The 890 km part in Thailand was completed for a high class level. China and Thailand has agreed to construct Ban Houayxay- Chiang Khong Mekong Bridge on Kunming- Bangkok highway, and it is expected to be completed and opened to operation in 2011.

The length of Kunming-Hanoi-Haiphong highway is 759 km, with 400 km section in Yunnan Province. This section starting from Kunming to Hekou, a border city with Vietnam, has all upgraded into expressway in April, 2009. The Hekou-Lao Cai highway bridge was finished by China and Vietnam in September, 2009. The Yunnan Province section of Kunming- Hanoi highway (Kunming- Hoodoos-Mengzi) is expected to be built into expressway in 2011, while 100 km Hanoi-Haiphong section in Vietnam for high class highway.

The length of Kunming-Mandalay-Rangoon is 1, 899 km, and the section in Yunnan Province was upgraded into high speed or high rank in 2007. There are 9 main highways from Yunnan to Myanmar, and three of them has been built into high-speed highways. The highway which starts from Kunming, through Dali and Ruili, to Mandalay (Myanmar), has 731 km in Yunnan Province. 577 km of it was built into expressway, and the whole line would be upgraded in the near future. The highway which starts from Kunming through Baoshan, Tengchong, Houqiaon to Myitkyina (Myanmar) has 698 km section in Yunnan Province, and 570 km was built into expressway, the left part is the second class highway. The 105 km long second class highway in Myanmar was constructed by China. It was already open for operation in April, 2007. The highway which starts from Kunming, through Simao, Jinghong, Daluo, to Taungyi, Mandalay, has 672 km in Yunnan Province, and 462 km of it was built into expressway, the left part is still high class highway.

Table 5-1. The Main International Highways of Yunnan Province in 2010

Name	Yunnan		Overseas	
	Mileage	Level	Mileage	Level
Kunming—Hanoi—Haiphong	400	High speed	350	Second or third class
Kunming—Laos—Myanmar	688	High speed or second-class	1119	Second or third class
Kunming—Mandalay—Rangoon	732	High speed or second class	1167	Third class

Resource: 2010 Yunnan Traffic Development Report.

1.2. The Development of Railway Network

The railway construction in Yunnan Province comes into the “golden age” due to increased investments into this sector. It is estimated that the length of railway in operation in Yunnan Province would reach to more than 4,000 km by 2020. According to the plan, by then, Yunnan will have a railway network with Kunming as the enter hub, connecting by 7 main inward railway lines and 4 outward railway lines, which will form the high-speed railway network connecting Yunnan to Pan Yangtze River Delta, Pan Pearl River Delta and Bo Hai Coastal Region and Southeast Asia.

Yunnan-Vietnam Railway

Yunnan-Vietnam Railway is the first railway of Yunnan Province. Yunnan-Vietnam Railway starts from Kunming through Hanoi, to Haiphong (Vietnam) with total length of 854 km. It is one of the oldest railway in China, and also one of the longest narrow gauge railways with one meter width track gauge. The whole line is opened to traffic in 1910. From then on, it opened the door of Yunnan Province to the outside world. However, this railway is very old and cannot meet the demand of increasing economic and social exchanges. Every year, the import and export goods passing through Yunnan-Vietnam Railway is only about 1 million tons. It needs to be upgraded with modern technology.

Trans-Asian Railway

This is a great initiative based on the cooperation of many countries. This railway network can be divided into 4 corridors. For Southeast corridor, it has three designing lines: the east line, middle line and west line. For the east line, it is Singapore-Kuala Lumpur-Myanmar-Phnom Penh-Ho Chi Ming City-Hanoi-Kunming, total length is 5,450 km; for the middle line, it is Singapore-Kuala-Lumpur-Myanmar-Vientiane-Shangyong-Xiangyun-Kunming, total length is 3,900 km; and for the west line, Singapore-Kuala- Lumpur-Myanmar-Rangoon-Rayli-Kunming, total length is 4,760 km. Three lines all start from Singapore and end at Kunming. In fact, the part of this corridor in China has been fully started. If this railway network could

be completed, it will provide a much improved infrastructure environment for Southwest China and Southeast countries.

New Yunnan-Vietnam Railway

New Yunnan-Vietnam Railway is the east line of Trans-Asian Railway, with length of 815 km, and the length on Chinese part is 419 km. Kunming-South Yuxi has been completed for 110 km, and new Yuxi-Mengzi line started construction in September, 2005, is 141 km. The new 168 km Mengzi-Hekou line started to build in 2009 and is expected to be finished in 2012. It passes through Hekou to connect Vietnam railway network and reaches to Haiphong. Vietnam has paid much attention to the construction of Yunnan-Vietnam Railway.

Yunnan-Myanmar Railway

It is actively proceeding. Kunming-Rangoon railway is the west line of Trans-Asian Railway. It is also the international corridor connecting Southwest China to Southeast Asia and South Asia, with total length of 1,920 km. The Chinese section is Kunming-Ruili Railway, with total length of 690 km. The 350 km long of Kunming-Dali section was already completed and is to build the double track line. Dali-Ruili Railway started operation in 2007. The length of Ruili-Lashio (Myanmar) section is 130 km and is a totally new line. By connecting Lashio, it could link 1,100 km Myanmar railway network and reach to Rangoon.

Yunnan-Thailand Railway

Kunming-Bangkok (Thailand) is not only the middle line of Trans-Asian Railway, but also the most convenient international main line connecting Yunnan, Southwest China and ASEAN countries. It started to construct already. The length of Kunming-Vientiane section is about 1210 km, while the Yunnan Province section is 710 km, and the 110 km long Kunming –Yuxi section has already been built. Yuxi-Mohan Railway is 600 km and is to construct soon. The planned railway line in Laos is 500 km and the line Vientiane-Bangkok Railway is 624 km.

Table 5-2. The Main International Railway Connecting Yunnan Province to Foreign Countries

Name	Total Mileage (km)	New Railway	Yunnan Province		The time of starting (Year)	Oversea (km)
			(km)	Investment (billion dollars)		
Kuming-Hanoi—Haiphong	815	419	309	12	2005	396
Kunming—Mandalay—Rangoon	1920	470	340	13	2007	130
Kunming—Vientiane—Bangkok	1830	1110	600	23	2011	500

Resource: Yunnan Province Railway Development Report, 2007.

2. The Transportation Infrastructure with South Asia

China shares border lines with several South Asian countries, but with limited connecting land route capacity. So far, trade between China and South Asia goes mainly by sea lines. Transportation is a bottleneck for economic and social exchanges between China and South Asia.

2.1. The Transport Infrastructure Connection between Tibet and South Asia

Tibet shares borders with four countries of India, Myanmar, Nepal, Bhutan and the region of Kashmir. The length of boundary is more than 4,000 km. The history of frontier trade between Tibet and South Asia's surrounding areas is very long and even could dated back to B.C. The trade area is so wide that even reached Persia Region. The main content of trade in that time is the exchange of tea and horses, and the tie connecting Tibet with South Asia started from Sichuan, through Yunnan, Lhasa to India and Nepal. According to the statistic, there are 312 channels from Tibet to South Asia countries, 44 perennial channels, and 268 seasonal channels. Those regions have had lots of traditional markets, ports and border trade points. The geographical position of Tibet determines that Tibet is the important region for trade between Southwest China and South Asia countries.

Qinghai-Tibet Railway which came into operation in July, 2006, is the first railway in the highland. It provides a major access to South Asia countries, such as India, Nepal etc. In order to improve the location advantage, The Tibet Autonomous Administration government has made great efforts to improve the facility and environment for connectivity with South Asia. The government is planning to extend the Qinghai-Tibet Railway south to Shigatse, passing Yadong the borderland, finally connecting India railway network. In order to construct China-South Asia overland corridor, the railway would become one of the main arteries connecting China to South Asia countries, and further crossing Indian Ocean to the world.

The location advantage of Tibet has gradually been marked. Qinghai-Tibet Railway provides strong support for Tibet to enlarge the border trade with Nepal and India, which could help Tibet to become a new frontier of economic communication with South Asia. Qinghai-Tibet Railway and the planned extension of the line could facilitate China-South Asia regional cooperation. China and India has reopened Natu La to connect Yadong County (Shigatse prefecture, Tibet) and Sikkim. This revives the border trade path which was closed for 44 years. Natu La lies 4545 meters above sea-level, located in 460 km southwest of Lhasa and is 52 km away from Yadong port, Tibet, 54 km away from Gangtok, the capital of Sikkim, 550 km away from Calcutta harbor of India. If Chinese products transit from Lhasa, through Yadong, Natu La to Calcutta etc. harbors of India, the distance could be shortened by 8000 km, and it would greatly lower the cost of transportation.

Nepal hopes to get benefit from the extension of Qinghai-Tibet Railway. There are two main routes for Tibetan foreign trade, one is an ancient path passing through Nepal to India. In 2009, large scale modification works on China-Nepal highway was already completed, which helps to realize the dream “arriving within one day” from Lhasa to Zhangmu Port. Zhangmu Port is the biggest border trade path in Tibet to South Asia. If Qinghai-Tibet Railway extension could put into operation, the time for land transportation between Chinese mainland and Nepal would be greatly reduced. Nepal government hopes that Qinghai-Tibet railway could extension could

also lead to connection to India, Bangladesh etc. Thus, Nepal could become a major trade corridor for China and India.

Qinghai-Tibet railway stimulates Indian active response and seems to give India some inspiration by declaring to start frontier railway and highway construction projects. The Indian government announced that they would plan to have 27 highway projects along India-China border region. Indian government also intends to build “Himalaya Railway”, from the foot of Himalaya mountains to Kashmir valley, with the total length of 900 km. The obstacle of India’s development is infrastructure and has put infrastructure development as one of its modernization projects.

2.2. Transportation Infrastructure Connection between Xinjiang and South Asia

The highway between Xinjiang and Pakistan is the only channel for both China and Pakistan. It is about 2760 km from Urumqi to Islamabad, the capital of Pakistan. Khunjerab land-carriage pass (highway) located in Tajik autonomous county in Tashkurghan which in the Pamir,the southwest of Kashi prefecture, Xinjiang. The port is 4500 meter above sea level. If you enter China through Khunjerab in Pakistan-Xinjiang highway, then it will take 130 km to Tashkurghan, 420 km to Kashgar, and 1890 km to Urumqi; if out of China through Khunjerab, it will take 125 km to Sost, Pakistan, 270 km to Gilgit, the capital of northern area of Pakistan, about 870 km to Islamabad, the capital of Pakistan. Khunjerab pass connects with Sost pass, which is in the north of Pakistan. Thanks to Khunjerab pass’s high altitude, bad weather and lack of oxygen, institution of port’s check and examination moved to Tashkent in 1993. China and Pakistan government came to an agreement that Khunjerab pass could be the open port in September, 1981. On August 27, 1982, Khunjerab pass could be open to both Chinese and Pakistani. On May 1st, 1986, it could be open to third country nationals.

2.3. Transportation Infrastructure Connection of Yunnan Province and South Asia

Due to the Himalayas, the traffic between China and South Asia is inconvenient. It should take an indirect route by Yunnan Province, Myanmar into South Asia. In Qin and Han dynasty, two thousand years ago, China built the road called “Five feet Road” starting from Chengdu, through Yibin, to Zhaotong and Qujing, the northeast of Yunnan Province. Then the road extend to the west, pass through the north of Myanmar, India, Central Asia and Arab area, and shaped the famous business road - the Silk Road, it directly enhance the connection between China’s mainland and Southeast Asia, South Asia, and become the convenient land corridor. As the existence of Silk Road, Yunnan Province play an important role in the material exchange of Central Plain and foreign countries, and become the bridge and tie between China and Southeast Asia, South Asia.

In the 1930s, Yunnan-Myanmar highway was built to revolt against Japanese aggression. In the end of the Second World Wall, “Stillwell Road” was built. It starts from Ledo, the northeast of India, one branch passes Myitckyina (Myanmar) to Wangting (China), and the other passes Kambaiti (Myanmar) to Tengchong (Yunnan Province, China), both connecting Yunnan-Myanmar highway to the highway and railway of India. However, those highways are abandoned and lose the ability of transportation.

3. The Future Plan of International Corridors to South Asia

Economic relations have become increasingly close especially since the 21st Century. China becomes an observer of SARRC. China and Pakistan signed a FTA, and China has become the largest trade market for India. Thus, there is an emerging

demand for improving the transportation infrastructure based on mutual benefits.

3.1. The new Initiative

Yunnan Province is the closest region of China to India Ocean, and the most convenient way for Southwest China to India Ocean is to start from Yunnan, through Myanmar to the sea at Rangoon Port. Recently, the government of Yunnan Province adopted a grand strategy of "building international corridor linking Southeast Asia and South Asia". The planned international corridor consists of four transport corridors, including Kunming-Vietnam, Kunming-Laos-Thailand, Kunming-Myanmar-India Ocean, and Kunming-Myanmar-South Asia.

The Kunming-Myanmar-India Ocean corridor is based on the highway that should be built with high priority. This corridor used to play an important role in history. The most part of this highway is in Myanmar. The planned length of Kunming-Rangoon Highway is 1,899 km, and 732 km in Yunnan Province. The 500 km long Yunnan section has been reconstructed into expressway, and the rest of it is in progress. The length of Muse-Mandalay section in Myanmar is 460 km (equal to the third or fourth level standard of highway in China), and Mandalay-Rangoon is 707 km (equal to the second or third level standard of highway in China). This road was opened in 1930s. The quality of the section in Myanmar is very low. It still could not be upgraded recently due to Myanmar's economic difficulty.

Yunnan-Myanmar-India corridor is the old Stillwell Road in history. The length of the planned Kunming-Ledo (India) is 1220 km. The 698 km section in Yunnan Province was reconstructed to high class highway. The section starting from Houqiao port in China to Myanmar border is 105 km with high class quality already. The length of Myitkyina –Patkai in Myanmar section is 372 km and the length of Patkai-Ledo (India) section is 45 km. They were rebuilt to third-class level funded by Indian government. When accessing Ledo, India, it could connect with Asia highway network, which could lead to Bengal, Pakistan. However, for most parts in Myanmar, they are in a very poor condition and need large amount of investment.

What is more, the highway would pass Arunachal Pradesh, for which China and India have disputed boundary problem.

Bangladesh government is planning to construct transnational transportation connecting three countries, China, Bangladesh and Myanmar's highways and railways. Myanmar government is also planning to build the highway between Myanmar and Bangladesh, which would extend to China in order to realize the interconnection of three countries' highways. China is very much interested on those plans. The highway between Myanmar and Bangladesh was completed in 2008, but it is still in low class and needs to be upgraded in order to meet the demand of increasing economic exchanges. Until now both China and Myanmar, Bangladesh and Myanmar have not made the agreement for improving and integrating the network yet.

3.2. The Trans-Asia Railway to South Asia

China-Myanmar international railway corridor reaching India Ocean would be finished soon. The international corridor connecting Myanmar railway network is Bangkok Bantatongna (Thailand) -Ye City –Rangoon (Myanmar)-Lashiho-Ruili –Kunming (China), which is to implement "Trans-Asia railway " proposed by ASEAN. The newly built Dali-Ruili highway in Yunnan Province was under construction with length of 340 km. In the section of Lashiho-Ruili, the length of oversea part to Lashiho is 132 km, connecting with Myanmar railway network and directly arriving at Rangoon, Myanmar. At present, Myanmar's railway network is out-of-date and backward, transport volume is small, speed is low and the price is high. It needs total reconstruction.

To build international railway corridor connecting Myanmar and South Asia is also under consideration. This corridor connects the north region of Myanmar to India and Bangladesh railway network, further to West Asia, Europe and Africa, which can be a third Euroasia Land Bridge. For Yunnan, the line will start from Baoshan, through Tengchong, Houqiao, Myitckyina (Myanmar) and to Ledo (India). The length of newly built Baoshan-Tengchong-Houqiao railway is about 120 km and

is planned to be completed during the *Twelfth Five-Year Plan*. Up to now, this railway is only a plan. Myanmar doesn't have the ability to build it, and India also seems not to be active for various reasons.

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CHAPTER 6

Infrastructure Development in East Asia and Cooperation between China and Japan

The infrastructure connectivity plays a special role in the economic development and also in the regional cooperation. Currently, East Asian countries are facing two challenges: one is to stimulate the economic growth in dealing with the effects of the global financial crisis, while another is to restructure the economic development model due to the changed international economic environment. In meeting those two challenges, the regional cooperation in East Asia should play a more active role. As China and Japan are two largest economies in East Asia, they should closely cooperate in both stimulating and restructuring the regional economic development and create a new and sustainable development model.

1. Cooperative Mechanism in Regional Infrastructure Development

ASEAN pioneered the regional cooperation in East Asia. However, the cooperation in whole East Asian region really began only after the 1997 Asian Financial Crisis. Several frameworks form the basis of the cooperation in East Asia, including ASEAN, “10+1”, “10+3”, East Asian Summit (EAS) and the triangular cooperation between China, Japan and Republic of Korea (ROK).

The global financial crisis that began in the end of 2007 puts forward new requirements for cooperation in East Asia. In the current situation of financial crisis, East Asian countries should change their development strategy from an export-oriented growth pattern to a domestic demand led growth pattern. This will

be realized by the enhanced regional cooperation.[19]

All governments in the region have adopted the stimulus macro-economic policy in dealing with the negative effect of the financial crisis. For a longer strategy, the emphasis should be given to improve the internal environment for a sustainable development foundation. Of all measures to realize this, the improvement of transportation infrastructure is of great importance. So that, it is necessary to initiate a region wide infrastructure project, either under "10+3" framework, or EAS framework.[20]

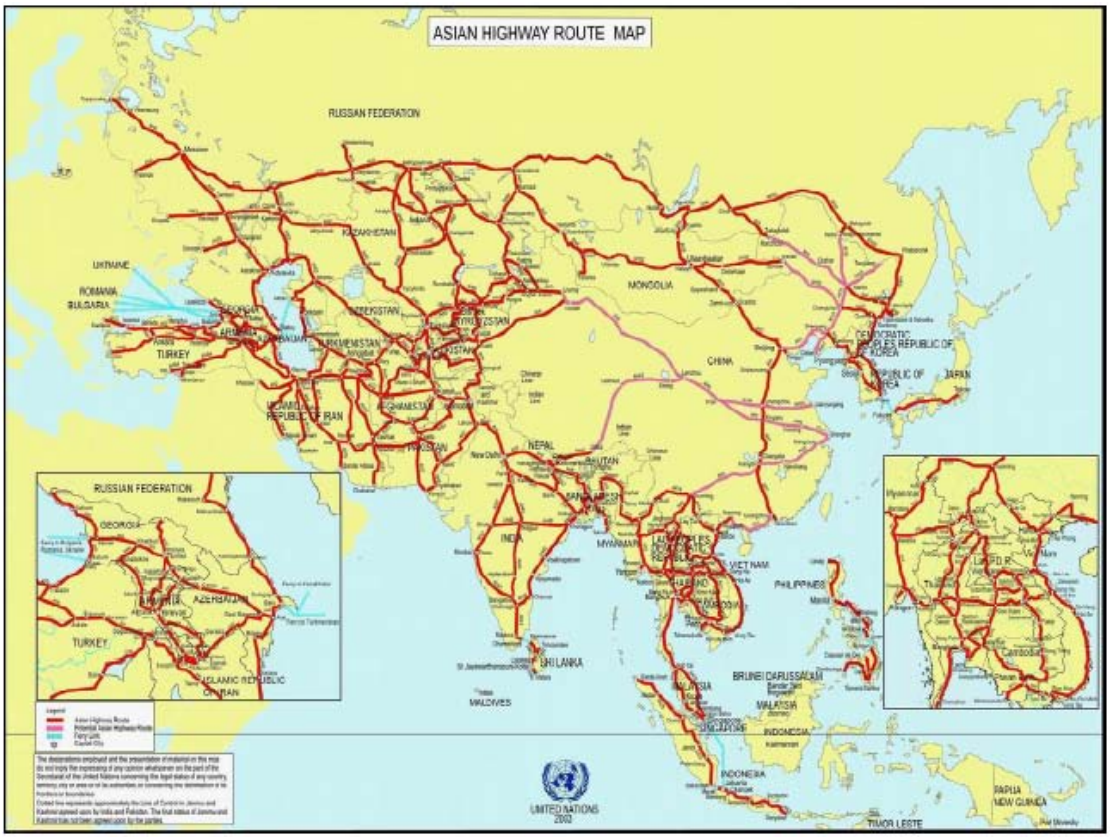
According to the definition provided by Asian Development Bank, regional infrastructure construction is referring to: 1) Programs that crosses two or more neighboring countries and involves mechanical construction work and policies and procedures coordination. 2) A country's internal infrastructure projects have significant cross-border effects: the project's implementation and enforcement requires the cooperation and coordination with other countries; the project aims at promoting regional trade and increasing income; the project is used to connect network with its neighboring country or a third country.[21] If the cooperation between more than two countries is considered as a benchmark, then there is a long history of East Asia cooperation and the cooperation on infrastructure construction.

Since 1960s, some international organizations including the United Nations have been discussing about building international corridors to interlink different Asian countries, among which the highway networks and railway networks receive most attention. *Asian land transport infrastructure development* (ALTID) project, which was proposed by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) in1992, includes two main parts: the building of Asia's highway network and Trans-Asia railway network. The first part involves 32 countries, 141,000 kilometers and it has been launched on July 4th, 2005. Up until now, it has

[19] Sun Lijian, "The Construction of Two-oriented Society should be the Common Theme for East Asian Cooperation," *China Development*, No. 3, 2009, pp.3-5.
[20] Zhang Yunling, "East Asia Cooperation Needs New Ways," *China Economic Weekly*, No.1, 2010, pp.50-52.
[21] Asian Development Bank and Asian Development Bank Institute, *Infrastructure for A Seamless Asia*, Tokyo: Asian Development Bank Institute, 2009, p.20.

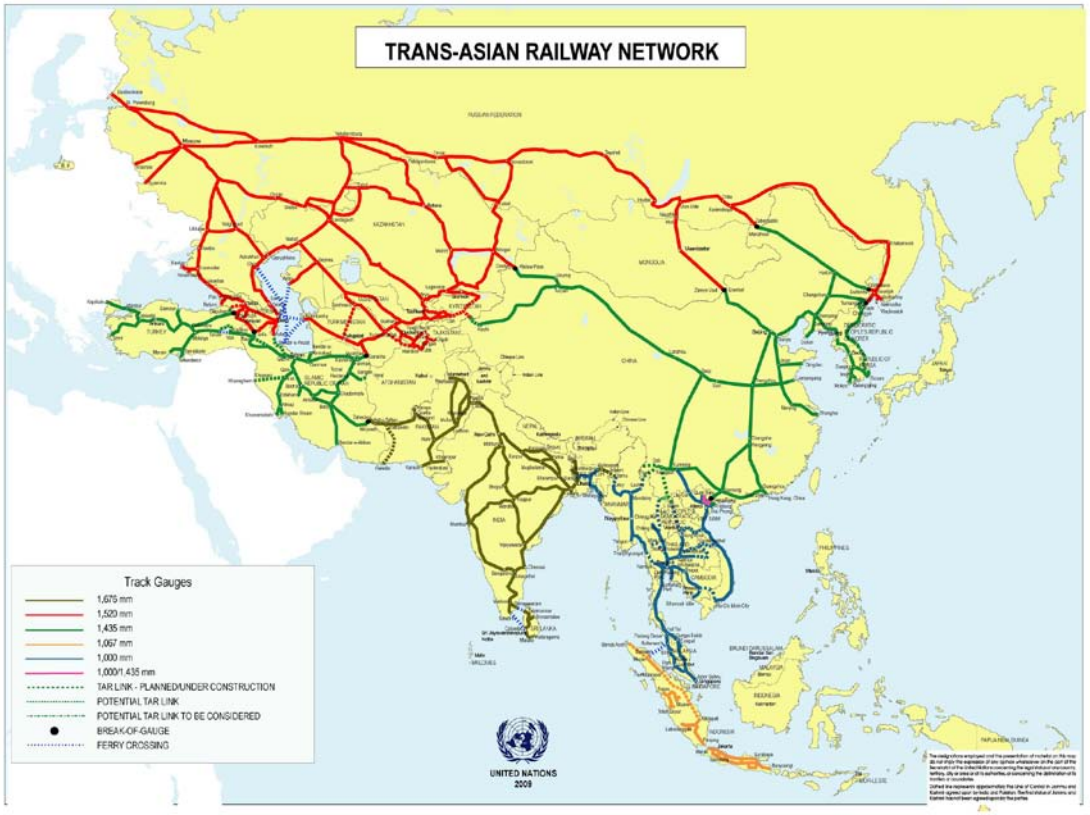
the signatures of 28 countries.

Figure 6-1. Asian Highway Route Map



The idea of building of Trans-Asian Railway (TAR) was put forward as early as 1960s. A proposal was made to build the railway between Singapore with Istanbul in Turkey and further expand it to link Europe and Africa in the future. Due to political and economic constraints, the progress of this proposal seems very slow. One important progress in this area is the construction of Eurasian Land Bridge. On November 10th, 2006, 17 states belonging to ESCAP signed *Trans-Asian Railway Agreement*, and another 24 states agreed to build the trans-continent railway from Europe to the port in China, which is called “iron silk road”. This agreement finally took effect on June 11th, 2009.

Figure 6-2. Trans-Asian Railway Network



The intra-regional trade in East Asia has developed very fast, which is taken as a basic variable reflecting the effects of the regional cooperative mechanisms. The share of intra-trade rose from 35% in 1980 to 55% in 2005, that equals to that of the North American Free Trade Area (NAFTA), though still less than that of EU. This is not only due to the liberalization of the markets, but also the improvement of the regional infrastructure environment.

In the view of the experts from Asian Development Bank (ADB), linking regional infrastructure constructions is beneficial to improve the competitive strength of this region. By linking the production centers with markets in different countries, infrastructure construction can reduce the cost of transportation and logistics, greatly promote the economic exchanges among the countries. Therefore, developing the networks of regional infrastructure will be an important work in the coming decades.

As for the infrastructure development, attention should be given to distinguish hardware and software. Hardware is just a part of the multinational linkage, and sometimes software is more important and vital, such as law, supervision, procedure and supportive policy. In developing the regional infrastructure networks, the government's involvement is very critical, including risk-sharing and creating a credible policy mechanism for financing etc.[22]

Table 6-1. The Investments of Infrastructure Projects by Primary Sector in Asian-Pacific Regions, 1990-2008 (U.S. million dollars).

Year	Energy	Telecom	Transport	Water	Total
1990	44	984	921	0	1949
1991	379	306	2405	0	3090
1992	3528	1938	855	284	6605
1993	5578	2782	2338	2558	13255
1994	6583	2913	4133	821	14450
1995	8371	4058	4821	520	17770
1996	10533	7035	8762	149	26478
1997	13235	9289	6472	8033	37029
1998	5190	1653	2290	943	10076
1999	5176	4581	2180	273	12210
2000	3476	7619	2643	4064	17802
2001	4439	5043	2651	673	12806
2002	3461	5191	1844	934	11431
2003	9455	3077	5670	697	18898
2004	3985	4906	1776	3367	14034
2005	6442	3540	7216	1014	18212
2006	4014	4657	9787	1572	20029
2007	6178	7629	6509	1902	22218
2008	7623	5465	1317	974	15378
Total	107690	82665	74590	28777	293721

Resource: Data was collected from World Bank resource.

[22] Haruhiko Kuroda, Masahiro Kawai and Rita Nangia, "Infrastructure and Regional Cooperation," *ADB Institute Discussion Paper No.76*, September 2007.

2. The Importance of Regional Infrastructure Construction

World Bank in its 1994 *World Development Report* compared the economic experiences of Southern Africa and East Asia with the conclusion that the differences between them can be attributed to much extent to the fact that East Asia pays more attention to the investment in infrastructure per capita. [23] In the later decades, this conclusion was further proven by many empirical researches. It is now a popular consensus that infrastructure can boost the economy by expanding opportunities and improving overall economic efficiency.

In January, 2004, ADB launched a joint infrastructure research program *Infrastructure in East Asia: Leap Way*. Experts argued that the infrastructure investment has been lagged behind compared with the speed of economic growth of East Asia, and there exists an "infrastructure gap", especially in the supply of electric power, transportation and water. According to the experts, East Asia needs as much as 1 trillion dollars investment on the infrastructure construction in the future for supporting a sustainable economic growth. In infrastructure development, the role of the government is vital, but the active participation of the private sector is also important. [24] According to the report in *Connecting East Asia* published by ADB, the urbanization in East Asia has promoted the economic growth and urbanization contributes to as much as 70% of GDP increase. However, many challenges are also following the process of urbanization, especially the newly increased urban population's need for infrastructure service. Another challenge is the unequal distribution of infrastructure, for about 60% of the population of East Asia is living in rural areas. So the political economic significance of the infrastructure construction means who will obtain benefits from the fast-improved infrastructure construction, while the rest will have to bear the cost and consequences of undermining

[23] World Bank, "Infrastructure for Development," in World Bank, *World Development Report 1994*, Washington, DC: World Bank, 1994.
[24] Ruby Anne M. Rubio, "East Asia Needs $1tril. in Infrastructure Investments," *Business World*, Sep21, 2006.

environment. [25]

According to the report *The Infrastructure Operating of Asian Development Bank* published by ADB in March, 2007, the biggest quantity gaps among Asian Pacific regions and industrialized countries lie in the aspects of electric power, highway and sewage disposal, while gaps in telecommunication are relatively small. [26] Entering the 1990s, it has seen a great increase in telecommunication and electric power in this region while the development of other sectors is very slow. At this speed, it will take Asia about half a century to catch up with the current level of industrialized countries. In terms of quality, compared with other regions in the world, railways are better developed in this region, while electric power is lack behind. The development of infrastructure differs much in different countries, sectors or fields. South Asia seems slow in infrastructure development, while Central Asia is also weak in some particular sectors. Importantly, a sustainable infrastructure development requires comprehensive mobilization of the factors, including policy, finance, technology, and also economic, environmental, social and political factors.

ADB has organized series of flagship seminars, for example, "*Emerging Asian Regionalism"*, "*Infrastructure and Regional Cooperation", to* discuss the issues relating to developing cross-border infrastructure projects. In the regional infrastructure development, as pointed out by Masahiro Kawai, China has played a very important role in promoting the linkage between Asia's northern part and southern part, between the eastern part and the western part, as well as among the GMS countries.[27] According to ADB/ADBI in their report on infrastructure, trade within Asian countries is more and more in the form of production networks and the improvement of trade competitiveness depends on an effective, fast, reliable and seamless linkage of infrastructure.[28] However, many regions on the Asian continent,

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[25] Asian Development Bank, The International Bank for Reconstruction and Development/The World Bank, and Japan Bank for International Cooperation, *Connecting East Asia: A New Framework for Infrastructure*, 2005.

[26] Diwesh Sharan, Bindu N. Lohani, Masahiro Kawai and Rajat Nag, *ADB's Infrastructure Operations: Responding to Client Needs*, Asian Development Bank, 2007.

[27] Masahiro Kawai, ADB/ADBI's Falgship Study: Infrastructure and Regional Cooperation, Third Workshop on Book Preparation, 2008, p.4.

[28] Asian Development Bank and Asian Development Bank Institute, *Infrastructure for A*

including some islands and remote areas, are separated both economically and geographically. Though many infrastructures have reached the world-class level, most of infrastructures are still under the world average level. In facing the new situation, the infrastructure development should be given to priority for the regional members and adopt a new approach by creating the close partnership between the public and private sectors, strengthening market system and perfecting policies.

3. Cooperation between China and Japan

China and Japan are two biggest economies in East Asia. The two countries share mutual benefits and great cooperative space in the regional cooperation.

In terms of the infrastructure of the networks of highway, railway, aviation and pipeline in the region, China has a vital position and role in developing the regional infrastructure networks due to its geographical location and size of the market. Japan as a well developed country owns advantage in providing capital, technology, skill of management and especially its position and role in the regional production network. China and Japan could find them complementary in participating and promoting the regional cooperation in East Asia and also other region in Asia. East Asia is facing the new challenge of changing the mode of economic growth. A new infrastructure initiative will play a significantly in building the internal strength both on the national and regional levels. According to ADB's estimation, in terms of the investment on infrastructure in Asia, 8 trillion dollars is needed at the national level, while 290 billion dollars is needed at the regional level during 2010-2020. Therefore, about 750 billion dollars will be spent in Asia.[29]

Seamless Asia, Tokyo: Asian Development Bank Institute, 2009.

[29] ADB, *Infrastructure for A Seamless Asia*, p.25.

Table 6-2. The Needed Investments on Asia's Infrastructure by Sector, 2010-2020 (U.S. million dollars)

Sector/subsector	New capacity	Replacement	Total
Energy (Electricity)	3176437	912202	4088639
Telecommunication	325353	730304	1055657
Mobiles	181763	509151	690914
Telephone	143590	221153	364743
Transport	1761666	704457	2466213
Airport	6533	4728	11260
Ports	50275	25416	75691
Railways	2692	35947	38639
Roads	1702166	638366	2340532
Water and Sanitation	155493	225797	381290
Sanitation	107925	119573	227498
Water	47568	106224	153792
Total	5418949	2572760	7991709

Resourced: Quote in Masahiro Kawai, "Book Dissemination Seminar: Infrastructure for A Seamless Asia," Tokyo, Japan, 29 September 2009, p.9.

Table 6-3. Infrastructures in Stimulus Package in Asia (U.S. billion dollars)

Country or Region	Total Stimulus package	Infrastructure allocation
China	586	263
Japan	250	0
Australia	27	3.12
Malaysia	16.2	0
Singapore	13.6	3
South Korea	13	1.9
Indonesia	7.5	5.7
Vietnam	6	6
Taiwan	5.2	1.7

Resources: Business Monitor International, "Japan Infrastructure Report Q4 2009," Pat of BMI's Industry Report & Forecasts Series, Business Monitor International, UK, September 2009, p.9.

Japan has provided considerable support to develop the regional infrastructure, both economically and technologically. Japan companies are in the core of the regional production network and their investments objectively promote the infrastructure construction in host countries. Through its ODA programs, Japan has provided capital and technological support, as well as capability building to many developing countries in the region in their infrastructure development.

China has invested significantly in its infrastructure development and the international connectivity with its surrounding neighbors on highways, railways, water ways and also air ways. China has also provided capital (including soft loans), technology and management assistance to the regional members.

China and Japan have cooperated comprehensively in the regional cooperation frameworks on transportation infrastructure development. Chinese leader emphasized the cooperative role for two countries in the regional economic development in the areas of energy, environmental protection and infrastructure.[30]

In Japan-China high level economic dialogue in June, 2009, China and Japan signed a joint memorandum for infrastructure construction in Asian developing countries. It encouraged the companies from two countries to bid for Asian projects together, and they thus could get financial and other support from both governments.

To confront the financial crisis, East Asia should change its export-oriented development strategy and develop the economic mode of expanding domestic demand. In this period of transition, resolving the development issues should be the focus of the cooperation, including infrastructure construction, the regional flow of personnel, capital and technology.[31] A domestic-demand-oriented East Asian economy highly needs a better transportation infrastructure system that urges the regional cooperation mechanisms to play a stronger role in initiating, designing, financing the large regional infrastructure programs. China and Japan should the leading role together.

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[30] Zeng Peiyan, " Make Use of Opportunities to Promote to Build China and Japan's Relationship of Mutual Benefits," Xinhua News Agency, Dec 1st 2007.

[31] Zhang Yunling, "East Asia Cooperation Needs New Ways," *China Economic Weekly*, No.1, 2010, pp.50-52.

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