THREE: FORMULATION OF AN INTEGRATED INTERNATIONAL TRANSPORT AND LOGISTICS SYSTEM FOR NORTH-EAST ASIA

3.1. MAIN PRINCIPLES OF FORMULATIONS OF THE INTEGRATED TRANSPORT AND LOGISTICS NETWORK

3.1.1 Main principles of network formulation

As the network is to provide reliable and efficient intermodal international transport linkages in North-East Asia to facilitate international trade and tourism, its development objective should be to eventually provide a choice of alternative competitive routes to any of major economic centers and ports in North-East Asia from any country of North-East Asia.

The availability of competitive routes will provide each country in North-East Asia with a degree of independence and a real choice in accessing expanding markets. It will also result in lower transport costs and an improved level of transport services.

The main principles of the system formulation are as follows:

a) Maximum possible use of the existing infrastructure.

b) Minimum possible number of routes with particular attention to any possible parallel routes as well as missing links.

c) The system should provide intermodal transport routes to major provincial cities/economic centers, including major railway stations with freight and container yards, inland water terminals, container terminals and airports in the following regions:

  – Provinces of Heilongjang, Jilin, Liaoning and Nei Mongol of China
  – Democratic People's Republic of Korea
  – Japan
  – Mongolia
  – Republic of Korea
  – Far East/Primorsky Territory of Russian Federation
  – Tumen River Development Area (TRDA)

d) The system should also include access routes to the following port clusters:

  – Dalian (Ports of Dalian, Dandong)
  – Tianjin
  – Nampo
  – Rajin (Ports of Rajin, Sonbong, Cheongjin)
  – Hakata (Ports of Hakata, Shimonoseki)

    – Kobe (Ports of Kobe, Osaka)
    – Niigata (Pots of Niigatam Fushiki)
    – Tokyo (Ports of Tokyo, Yokohama)
    – Busan (Ports of Busan, Gwangyang)
    – Incheon
    – Vladivostok (Ports of Vladivostok, Nakhodka, Vostochny)
    – Zarubino (Ports of Zarubino and Posjet)

e) The system should eventually meet the requirements of international traffic within the North-East Asian subregion, as well as between North-East Asia and other parts of the world.

f) The system should be designed primarily for efficient transport of ISO and non-ISO containers, which are the main containers used for international trade (Table 3-1).

Table 3-1 Dimensions of ISO and non ISO containers

Freight container designation	External height			External width			External length			Maximum gross weight (tonnes)
	ft	in	mm	ft	in	mm	ft	in	mm	
ISO										
1A	8	00	2,438	8	00	2,438	40	00	12,192	30
1AA	8	06	2,591	8	00	2,438	40	00	12,192	30
1B	8	00	2,438	8	00	2,438	30	00	9,125	25
1BB	8	06	2,591	8	00	2,438	30	00	9,125	25
1C	8	00	2,438	8	00	2,438	20	00	6,058	24
1CC	8	06	2,591	8	00	2,438	20	00	6,058	24
1D	8	00	2,438	8	00	2,438	10	00	2,991	10
Non-ISO										
(1)	9	06	2,896	8	00	2,435	48	00	14,630	35
(1)	9	06	2,896	8	00	2,435	45	00	13,716	35
(1)	9	06	2,896	8	00	2,435	40	00	12,192	35
(1)	9	06	2,896	8	00	2,435	20	00	6,058	35
(2)	9	06	2,896	8	06	2,591	53	00	16,150	35
(2)	9	06	2,896	8	06	2,591	48	00	14,630	35
(2)	9	06	2,896	8	06	2,591	45	00	13,716	35

3.1.2 Main components of the system

To ensure its reliability and efficiency, the transport and logistics system should integrate infrastructure and logistics components in the following composition.

Infrastructure components

- the main port clusters in North-East Asia
- intermodal land transport routes comprising priority road and rail routes in North-East Asia, major

transport nods as well as border crossing facilities
- major container terminals in North-East Asia including ICDs
- information and communication system (ICS) in North-East Asia for international transport
- logistics facilities in North-East Asia.

Logistics components

- provision of a necessary legal framework for international transport through:
  - accession and implementation of relevant international conventions with particular emphasis on the implementation of the ESCAP resolution 48/11 on road and rail transport modes in relation to facilitation measures and the FAL Convention
  - ensuring compatibility with the multilateral agreements already in place and the agreements being formulated by some of the countries such as the members of the Shanghai Cooperation Organization[1]
  - improved bilateral agreements with a wider angle of international and transit transport.
- eventual introduction of multimodal transport with the application of modern e-based information and communication technology

3.2 PROPOSED INTEGRATED INTERNATIONAL TRANSPORT NETWORK IN NORTH-EAST ASIA

As a starting point, the integrated international transport network is proposed as in Figure 3-1. The proposed network is based on previous UNESCAP studies on Trans-Asian Railways and Asian Highways, and in particular recent studies on the priority road network in North-East Asia and integrated shipping and port system in North-East Asia.
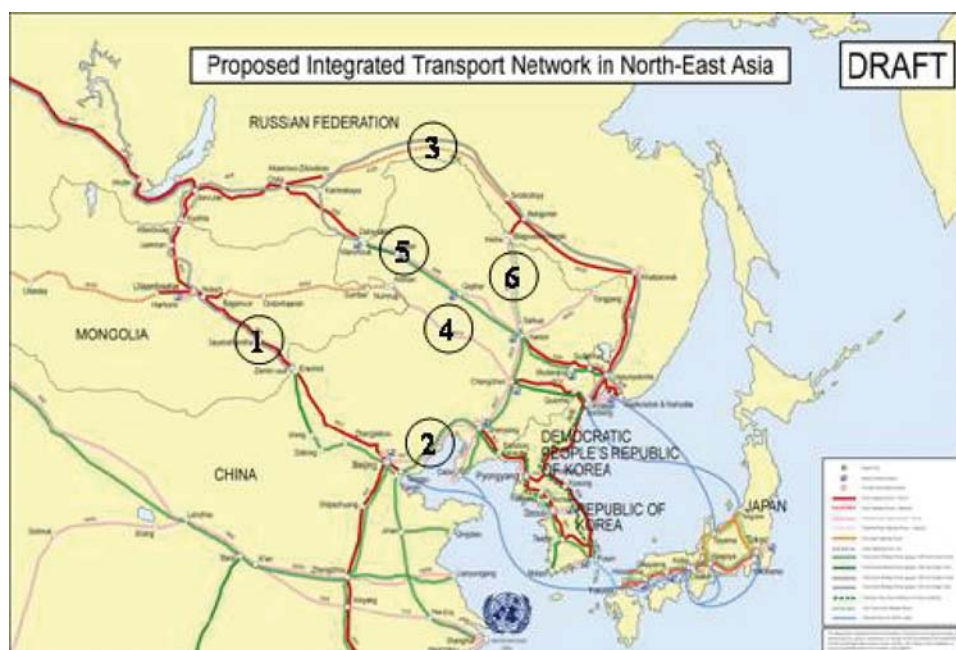

Figure 3-1 Proposed integrated transport network in North-East Asia

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[1] China, Kazakhstan, Kyrgyzstan, Russian Federation, Tajikistan and Uzbekistan (Mongolia as observer)

The proposed network was reviewed by national experts of participating countries, i.e., China, the Democratic People's Republic of Korea, Japan, Mongolia, the Republic of Korea and the Russian Federation. The network was also discussed together with the strategy and actions to develop the network at the subregional policy-level expert group meeting (6-10 September 2004, Ulaanbaatar, Mongolia) and subsequently at a series of national workshops in China (10-11 August 2005, Beijing), Monglia (11-12 April 2005, Ulaanbaatar), the Republic of Korea (9-10 June 2005, Busan) and the Russian Federation (18-23 July 2005, Moscow and Vladivostok), which were organized as part of the project activities.

3.3 SELECTED INTERNATIONAL TRANSPORT CORRIDORS FOR ANALYSIS

From this integrated network, six important international transport corridors in North-East Asia are selected as shown in Table 3-2 for further in-depth analysis in the study. These selected corridors include road and railway networks linking neighbouring countries and providing connections to major port clusters in the subregion.

Table 3-2 Selected international transport corridors for analysis

No	Corridor	China	Democratic People's Republic of Korea	Mongolia	Republic of Korea	Russian Federation
1	Tanggu-Tianjin–Beijing–Eranhot – Zamin Uud–Ulaanbaatar–Darkhan– Ulan Ude	Road/Rail/ Port		Road/Rail		Road/Rail
2	Beijing–Shenyang–Dandong– Pyongyang–Seoul–Busan	Road/Rail/ Port	Road/Rail/ Port		Road/Rail/Port	
3	Busan–Pohang–Kosong–Wonsan– Kimchaek–Sonbong–Hasan-Razdolnoye–Ussuriysk–Khabarovsk–Belogorsk–Chita-Ulan Ude		Road/Rail/ Port		Road/Rail/Port	Road/Rail/ Port
4	Rajin/Sonbong–Jilin– Changchun–Ulanhot–Yorshi-Sumber–Ulaanbaatar	Road/Rail	Road/Rail/ Port	Road		
5	Nakhodka/Vladivostok–Ussurisk–Pogranichny–Harbin –Manzhouli–Chita-Ulan Ude	Road/Rail				Road/Rail/ Port
6	Dalian–Shenyang–Changchun–Harbin–Heihe–Blagoveshchensk–Belogorsk	Road/Rail/ Port				Road/Rail

For each corridor, feasible unimodal/intermodal routes along the corridor are suggested as in Table 3-3. Maritime container or ferry service routes are also selected to provide sea links to Japan from the six corridors.

The next chapter of this study provides details of the analysis to evaluate transport performance and to identify major bottlenecks on the major unimodal/intermodal routes along the six international transport corridors. The analysis is based on the cost/time-distance methodology developed by UNESCAP (see Box 3.1).

Table 3-3 Suggested unimodal/intermodal routes along the six corridors

No	Unimodal (U) / Intermodal (I) routes	Sea links to Japan
1	U-1.1: Rail route: China – Mongolia – Russian Federation I-1.2: China (road) – Mongolia (rail) – Russian Federation (rail)	Kobe–Tianjin (Container vessel)
2	U-2.1: Rail route: China – Democratic People's Republic of Korea – Republic of Korea I-2.2: China (Road) – Democratic People's Republic of Korea (Rail) – Republic of Korea (Rail) I-2.3: China (Rail) – Democratic People's Republic of Korea (Rail) – Republic of Korea (Road) I-2.4: China (Road) – Democratic People's Republic of Korea (Rail) – Republic of Korea (Road)	Busan–Shimonoseki (Sea Ferry) Shimonoseki–Tokyo (Railway and Road)
3	U-3.1: Rail route: Republic of Korea – Democratic People's Republic of Korea – Russian Federation I-3.2: Republic of Korea (Road) – Democratic People's Republic of Korea (Rail) – Russian Federation (Rail)	Yokohama–Busan (Container vessel)
4	U-4.1: Road route: Democratic People's Republic of Korea –China – Mongolia I-4.2: Democratic People's Republic of Korea (Rail) – China (Road) – Mongolia (Road) I-4.3: Democratic People's Republic of Korea (Rail) – China (Rail) – Mongolia (Road) I-4.4: Democratic People's Republic of Korea (Road) – China (Rail) – Mongolia (Road)	Tokyo–Niigata (Railway and Road) Niigata–Rajin/Sonbong (Container vessel)
5	U-5.1: Rail route: Russian Federation – China – Russian Federation U-5.2: Road route: Russian Federation – China – Russian Federation I-5.3: Russian Federation (Rail) – China (Rail) – Russian Federation (Road) I-5.4: Russian Federation (Rail) – China (Road) – Russian Federation (Road) I-5.5: Russian Federation (Rail) – China (Road) – Russian Federation (Rail) I-5.6: Russian Federation (Road) – China (Rail) – Russian Federation (Rail) I-5.7: Russian Federation (Road) – China (Road) – Russian Federation (Rail) I-5.8: Russian Federation (Road) – China (Road) – Russian Federation (Road)	Tokyo–Fushiki (Railway and Road) Fushiki–Vladivostok (Sea Ferry)
6	U-6.1: Rail route: China – Russian Federation U-6.2: Road route: China – Russian Federation I-6.3: China (Rail) – Russian Federation (Road) I-6.4: China (Road) – Russian Federation (Rail)	Nagoya–Dalian (Container vessel)

Box 3.1 Cost/time-distance methodology for analysing transport routes

The UNESCAP Time/Cost-Distance methodology is a practical and simple way of illustrating the time and costs involved in the transportation process and identifying inefficiencies and isolating time bottlenecks along a particular route. The methodology is based on the graphical representation of data collected with respect to the cost and time associated with transport process. The vertical axis of the model represents the time and cost incurred while the horizontal axis represents the distance traveled from origin to destination. The methodology enables easy identification of time and cost related barriers along the entire international transport route.

The methodology is based on the premise that the unit costs of transport may vary between modes, with the steepness of the cost/time curves reflecting the actual cost, price or time. At border crossings, ports and inland terminals, delays occur and freight/document-handling charges and other fees are usually levied without any material progress or movement of the goods being made along the transport route. This is represented by a vertical step in the cost curve. The height of the step is proportional to the level of the charge or time delay.
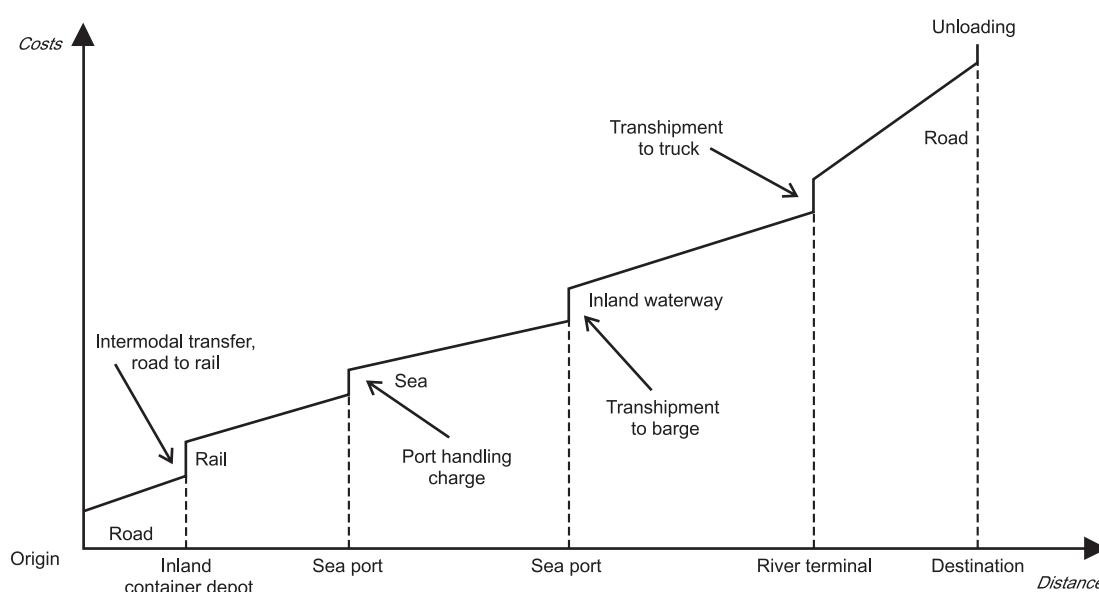
Note: The cost/time-distance methodology has been adapted from A.K.C. Beresford and Dubey R.C., *Handbook on the Management and Operation of Dry Ports* (UNCTAD/RDP/LDC/7) as improved by R. Banamyong in "Multimodal transport corridors in South East Asia: a case study approach", unpublished doctoral dissertation, University of Cardiff, Cardiff Business School, 2000.