

IV. Notes on international trade and transport flows between the Korean Peninsula and Europe; opportunities and challenges in selecting the best transport mode

In this final chapter we will present some notes on the development of international trade between the Korean Peninsula, China and the Russian Federation, and modes of transport that are being used to facilitate this trade. We will also explore opportunities for using the ESCAP Eurasian Transport Corridors for moving goods by rail from the Korean Peninsula to Europe.

IV.1 Trade flows between China and the Korean Peninsula

An enormous amount of trade flows between China and the Republic of Korea. The value of Chinese exports to the Republic of Korea increased from USD 88.698 billion in 2010 to USD 95.741 billion in 2016. Chinese imports from Republic of Korea increased in value from USD 138.348 billion in 2010 to USD 159.023 billion in 2016. The level of Chinese trade with the Democratic People's Republic of Korea is

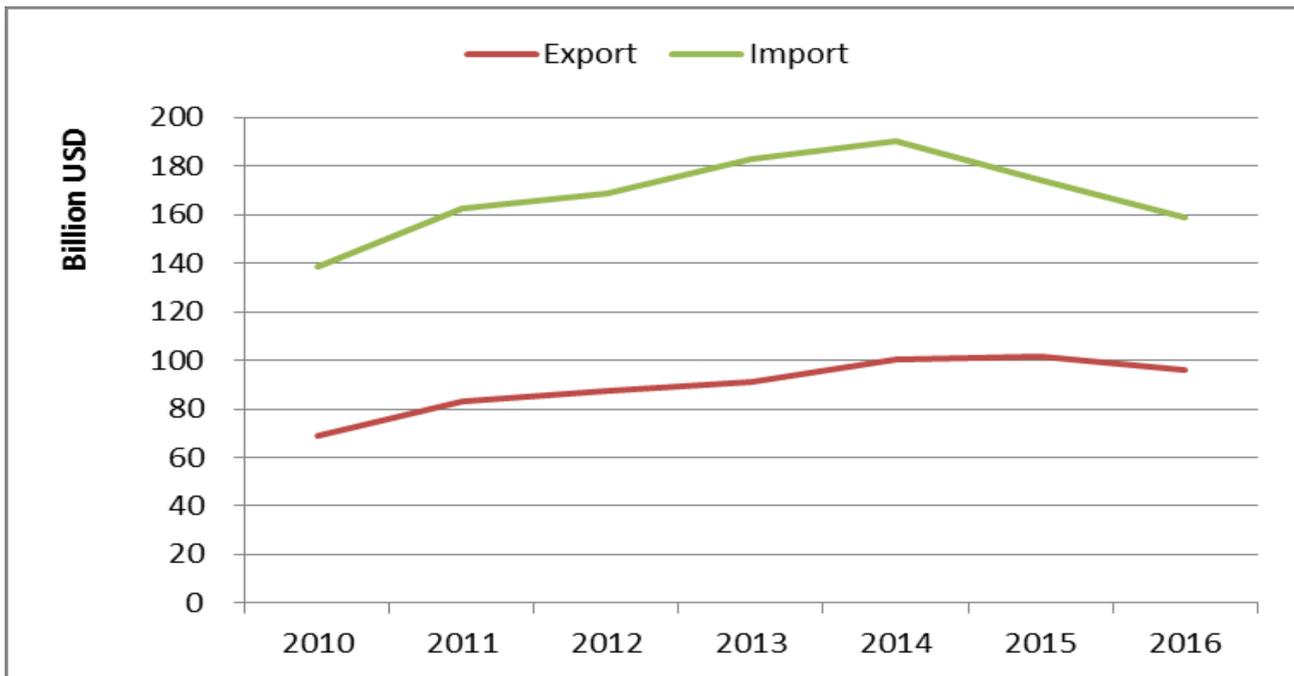
much more modest: exports from China to Democratic People's Republic of Korea increased from USD 2.277 billion in 2010 to USD 3.195 billion in 2016, while Chinese imports from Democratic People's Republic of Korea increased from USD 1.194 billion in 2010 to USD 2.564 billion in 2016 (see the tables and figures below).

Table 13 Exports and imports of China with Democratic People's Republic of Korea and Republic of Korea (USD, million)

Criteria	Year	Democratic People's Republic of Korea	Republic of Korea	Criteria	Year	Democratic People's Republic of Korea	Republic of Korea
Export	2010	2,277	68,698	Import	2010	1,194	138,348
	2011	3,164	82,789		2011	2,476	162,544
	2012	3,532	87,647		2012	2,503	168,709
	2013	3,632	91,149		2013	2,924	183,071
	2014	3,522	100,386		2014	2,861	190,386
	2015	2,947	101,444		2015	2,564	174,557
	2016	3,195	95,741		2016	2,634	159,023

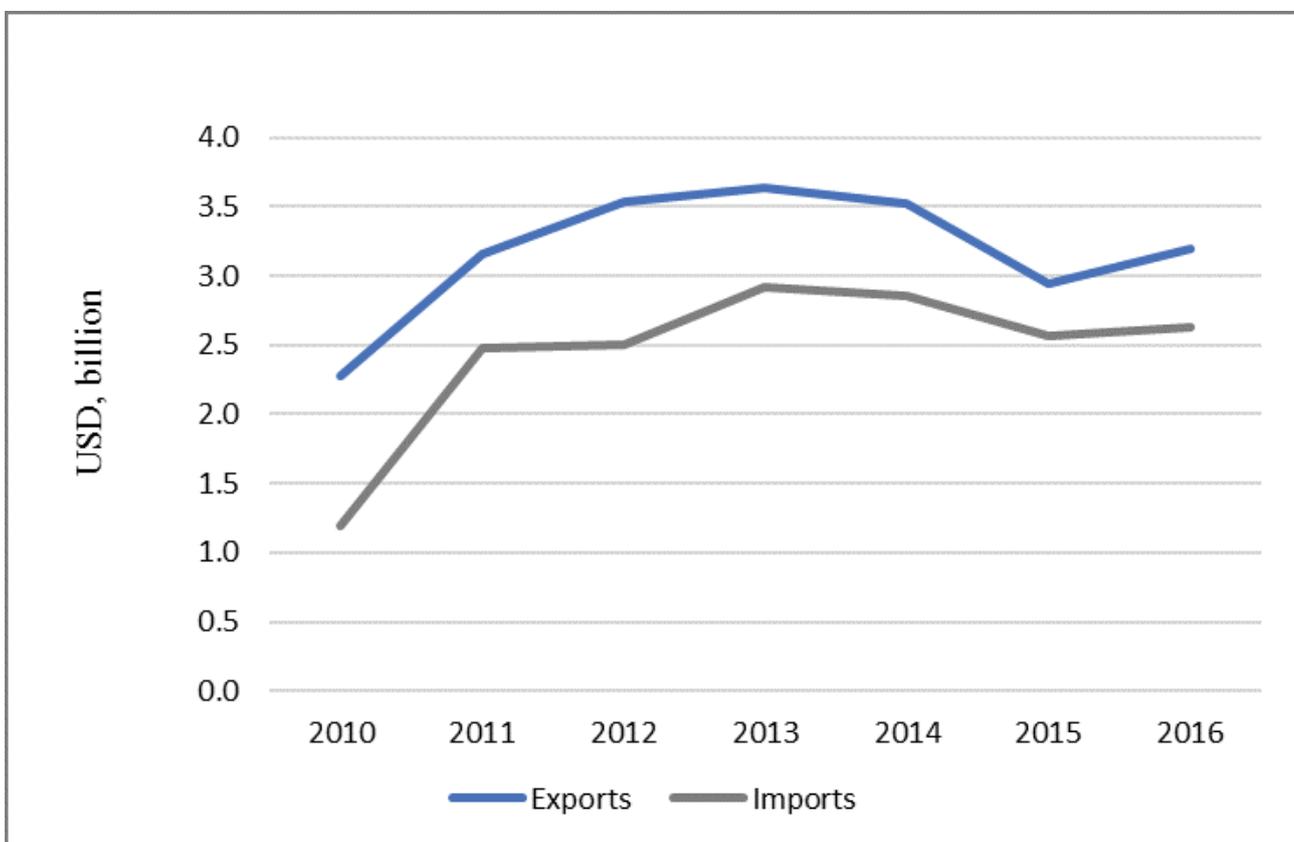
Source: Transport Planning and Research Institute (TPRI).

Figure 35 Trade trend between China and Republic of Korea



Source: Transport Planning and Research Institute (TPRI).

Figure 36 Trade trend between China and Democratic People's Republic of Korea



Source: Transport Planning and Research Institute (TPRI).

The table below shows the transport modes used for trade between China and Democratic People's Republic of Korea, and between China and Republic of Korea. As there are no operational railways, roads or pipelines connecting Democratic People's Republic of Korea and Republic of Korea, 97 per cent of the cargo between

China and Republic of Korea is transported by sea and the remaining 3 per cent by air. Only 3 per cent of the cargo moving between China and Democratic People's Republic of Korea is transported by rail, while 87 per cent travels by road, 9 per cent goes by sea and 1 per cent moves by pipeline.

Table 14 Transport modes used for trade between China and Democratic People's Republic of Korea and Republic of Korea, 2016 (per cent)

Mode	Democratic People's Republic of Korea	Republic of Korea
Shipping	9	97
Rail	3	0
Road	87	0
Air	0	3
Pipeline and other	1	0

Source: Based on data from China Customs.

IV.2 Trade flows between the Russian Federation and the Korean Peninsula

Trade and transport flows between the Russian Federation and Democratic People's Republic of Korea

The 2016 trade turnover between the Russian Federation and Democratic People's Republic of Korea came to USD 76,846,277, a decrease of 8.93 per cent (USD 7,538,450) on 2015. The Russian Federation exported USD 68,050,627 of goods to Democratic People's Republic of Korea in 2016, down by 13.14 per cent (USD 10,291,349) on the previous year. Imports into the Russian Federation from Democratic People's Republic of Korea in 2016 amounted to USD 8,795,650, a 45.56 per cent increase (USD 2,752,899) compared to 2015.

Russian exports to Democratic People's Republic of Korea include oil and derived products; mineral fuel; chemicals; fibres; foodstuffs and agricultural raw materials; machinery, equipment and vehicles; timber, pulp and paper products; fish and shellfish, oil seeds and fruit; products of the flour and cereals industry; furniture; sugar; and various finished products. Imports to the Russian Federation from Democratic People's Republic of Korea include products of inorganic chemistry; fish and shellfish; essential oils; caoutchouc, rubber and related products; paper pulp products; textiles; clothes and accessories; electric machines and equipment; and products from ferrous metals.¹⁹⁸

Trade and transport flows between the Russian Federation and Republic of Korea

In 2016, the trade turnover of the Russian Federation with Republic of Korea amounted to USD 15,140,410,743, a decrease of 16.16 per cent (USD 2,917,439,616) from 2015. Exports from the Russian Federation to Republic of Korea in 2016 came to USD

10,027,147,248, a decrease of 25.71 per cent (USD 3,470,669,428) on the previous year.

The level of imports into the Russian Federation from Republic of Korea in 2016 amounted to USD 5,113,263,495, an increase of 12.13 per cent (USD 553,229,812) from 2015. This can be seen in the table below.

Table 15 Dynamics of Russian foreign trade with the Republic of Korea, 2011-2016

TOTAL turnover (USD, billion)	2011	2012	2013	2014	2015	2016
		24.9	24.9	25.2	27.3	18.1
Russian exports to the Republic of Korea	13.3	13.9	14.9	18.3	13.5	10.1
Russian imports from the Republic of Korea	11.6	11.0	10.3	9.0	4.6	5.0

Source: Federal Customs Service of Russian Federation.

Russian exports to Republic of Korea are meat; fish and shellfish; dairy products; vegetables, fruits, and nuts; coffee and tea; cereals; products of the flour and cereals industry; oil seeds and fruits; sugar; cocoa; tobacco; salt and sulfur; ores, slags, and ashes; mineral fuel, oil and derived products; pharmaceuticals; fertilizers; plastic materials and products, rubber; paper pulp products; clothes and accessories; ferrous metals; tools; equipment; railway locomotives; spare parts for cars, ships, and boats; and various finished products. Russian imports from Republic of Korea are fish and shellfish; living trees and plants; fruit, coffee and tea; cereals, fats and oils; mineral fuel, oil and derived products; organic chemical products; wood and timber; chemical fibres; glass and ceramics; electric machines and equipment;¹⁹⁹ and toys, games and sports equipment. The Republic of Korea plays a significant role in the foreign trade of a number of subregions in the far east of the Russian Federation.

Volume of cargo transport with the Republic of Korea through the Russian railway network

In 2016, the volume of cargo transported between the Russian Federation and Republic of Korea by rail through the Russian railway network amounted to 12.4 million tons, an increase of 3 per cent from 2015, when the Russian Federation exported 11.8 million tons of cargo. The Russian railway network brought in 0.3 million tons in 2016, from Republic of Korea and other countries.²⁰⁰

The main Russian seaports dealing with the transport of cargo to and from Republic of Korea were Vostochny (41 per cent of the total cargo volume), Nakhodka (33 per cent), Vanino (17 per cent) and Vladivostok (4 per cent).

¹⁹⁸ "Foreign Trade of Russia", 2014-2016. Available at <www.russian-trade.com>

¹⁹⁹ Electronic library of JSC Russian Railways.

²⁰⁰ Electronic library of JSC Russian Railways.

IV.3 Competitiveness of the ESCAP Eurasian Transport Corridors in comparison to the Asia-Europe sea route

At present, most of the trade flow between Asia and Europe is served by maritime transport. This transport mode is slow but has the advantages of low costs and minimal border crossings, as cargo only undergo export/import related formalities in the countries of origin and destination. Only air transport can compete in terms of export/import simplicity, but high prices and volume/weight constraints are a serious limitation. Inland transport, notably railways, allows cargo to be delivered to the same destinations over shorter distances and with a shorter duration. However, these modes are often hindered by multiple border crossings that when coupled with inefficient procedures can reduce the time gain to zero.

Comparison of railway and sea shipping

The situation has been changing in recent years, with railway transport becoming an increasingly attractive option for transcontinental shipments. This change has come about due to the growth of the railway network in Asia; advances in railway technologies allowing for greater speeds and loads; and a reduction in times for the coupling/decoupling of wagons. Improvements in the legal environment – such as the creation of a Customs Union between Armenia, Belarus, Kazakhstan, Kyrgyzstan and the Russian Federation within the scope of the EAEU, the introduction of the common CIM/SMGS consignment note, and the adoption of advance- and electronic-document exchange, etc. –

have also helped to reduce border delays.

Among the three ESCAP Eurasian Transport Corridors, the northern and central corridors are well positioned to serve the trade flows between Asia and Europe.

With its extensive railway network connecting China, Mongolia, Kazakhstan, the Russian Federation and the Korean Peninsula, the Eurasian Northern Corridor can offer a high level of performance and acts as the most seamless transcontinental route. For the full integration of this railway network, the further development of the Transport-Korean Railway System is necessary.

Two traditional maritime routes connect Asian and European ports: one goes all the way south and then back north along the coast of Africa, and one uses the Suez Canal (see table 16 below). Maritime transport, however, is much slower than railway transport. On average, 4-6 weeks are required to transport goods between Asia and Europe. But maritime shipping is also cheaper than railways. Research carried out by the Eurasian Development Bank showed that for the Shanghai – Rotterdam route, sea shipping costs were 10 US cents per ton per mile, while railway shipping costs were 30 US cents per ton per mile.²⁰¹ The low costs are partly due to economies of scale: the same study calculated that a new Maersk Triple E Class container ship carries an equivalent of 170 container trains.²⁰²

²⁰¹ Vinokurov. “Transport Corridors of the Silk Road Economic Belt Across the Eurasian Economic Union: Preliminary Estimates for Transportation Capacity and Investment Needs.”

²⁰² Vinokurov. “Transport Corridors of the Silk Road Economic Belt Across the Eurasian Economic Union: Preliminary Estimates for Transportation Capacity and Investment Needs.”

Table 16 Asia – Europe sea routes

Sea route	Time (days)
Asia – Cape of Good Hope – Europe Route: China – South China Sea – Malacca Strait – Bay of Bengal – Indian Ocean – Cape of Good Hope – South Atlantic – West African coast – North Atlantic – Europe	45
Asia – Suez Canal – Europe Route: China – South China Sea – Malacca Strait – Bay of Bengal – Arabian Sea – Red Sea – Suez Canal – Mediterranean Sea – Europe	35
Northern Sea (Arctic) Route: China – Bering Sea – Kara Sea – Norway coast – Europe	26

Source: Transport Planning and Research Institute (TPRI).

The biggest advantage railway transport has over maritime transport is the duration of the journey: block trains take 12-15 days to travel from East Asia to Europe, or vice versa (see table below).

Table 17 Transport distance and travel time of selected block trains between China and Europe

Starting and ending points	Distance (km)	Time (days)
Zhengzhou Hamburg	10,446	15
Yiwu Madrid	13,000	21
Xi'an Rotterdam/Almaty/Moscow	9,850	18
Hefei Hamburg	11,000	15
Lianyungang Duisburg	11,000	12
Lanzhou Hamburg	8,027	15
Dalian Hamburg/Duisburg	11,000	15
Harbin Hamburg/Biklyan	9,820	15
Changchun Schwarzheide	9,800	14
Shenyang Hamburg	11,000	12 14
Tongliao St. Petersburg	9,000	15

Source: Transport Planning and Research Institute (TPRI).

The following table presents a time/cost comparison of sea and land alternatives for 40-foot containers travelling from Tianjin to Antwerp, and from Lianyungang to Rotterdam.

Table 18 Time/cost comparison of sea and land alternatives in illustrative cases²⁰³

Route		Costs (\$/unit)	Time (days)
Tianjin Antwerp (40 foot container)	Sea route: Tianjin Port Qingdao Port Shanghai Port Ningbo Port Singapore Port Piraeus Port Rotterdam Port Port of Hamburg Antwerp Port	~2,600	40
	Land route (railway): Tianjin Manzhouli Trans Siberian Railway Moscow Antwerp	~5,600	16
Lianyungang Rotterdam (40 foot container)	Sea route: Lianyungang Port Singapore Port Piraeus Port Rotterdam Port	~3,500	35
	Land route (railway): Lianyungang Torugart Tashkent Teheran Ankara Berlin Rotterdam	~7,000	14

Source: Transport Planning and Research Institute (TPRI), and references in footnotes.

When time is an important factor due to higher goods value, the nature of goods, manufacturing needs or consumer preferences, such time savings outweigh the increase in costs, making overland transport more attractive. Liquid bulk, large bulk and other massive but lower-value cargoes are more

suitable for sea shipping or, in the case of oil and liquified gas, for pipelines.

A wide network of regular scheduled container railway routes between Asia and Europe would provide freight forwarders and cargo owners with more advantages over maritime shipping lines. These include:

²⁰³ Source: "Tianjin Port. Joint establishment of the China - Europe block train between Tianjin Port and China land Bridge will allow to share profits from the development of the 'One Belt - One Road' (天津港(集团)有限公司. 共建天津港大陆桥中欧班列 共享 '一带一路' 发展红利 (J))."; 鞠海涛, 王从旻, and 张新语, "哈萨克斯坦总理马西莫夫考察连云港 '连云港—哈萨克斯坦—欧洲' 国际班列开行 (J)."; 交通运输部水运科学研究院, "中欧陆海快线发展概要分析 (R)."

- For manufactures, access to the railway stations may be cheaper and closer than using a seaport. These gains are more important when combined with a stable, reliable schedule, meaning that products will not stack up at production sites;

- A large number of container train services and multiple logistics terminals along railways provide a range of options when choosing shipping routes, although for this advantage to be fully realized more regular scheduled train services are needed; and

- The development of solutions for loads of less than one container allows for bigger time savings, as there is no need to wait for the consolidation of cargo for train operations.

The role of railways as an alternative to the maritime shipping is increasing, and the amount of empty backhaul runs on railways is slowly but steadily decreasing.

Comparison of road and sea shipping

Road transport along the ESCAP Eurasian Transport Corridors is mostly used for relatively short distances. The routes have the potential to be used for transcontinental haulage, especially if the TIR carnet is used, which allows a sealed container to pass borders without physical inspection. However, a lack of data makes it difficult to analyze the costs and time involved in shipping cargo between Asia and Europe by road.

The joint International Road Transport Union (IRU) and Economic Cooperation Organization (ECO) study, ECO RMT/NELTI-3, found that travelling by truck along the Khorgos – Bishkek – Astana – Bugristoe/Kaerak – Moscow route (using sections of the routes N2 – N1 of the Eurasian Northern Corridor) in 2011 required 10 days (Bishkek to Warsaw took 12 days) to cover 4,590 km. Maximum costs per trip were USD 7,677.²⁰⁴ This data should be treated with caution when making a comparison with the above train and sea route costs (see table 18). However, it can be observed that road transport is comparable with rail transport in terms of time, but the transport costs are higher. The main advantage of road transport is its high flexibility when it comes to route planning: a driver can make a choice of BCP and road section based on the situation in hand, and is limited more by the agreements of BCPs and which roads are open for international transport than by existing infrastructure. In comparison, a train is bound to the tracks.

²⁰⁴ “ECO Regular Monitoring of Trucks in Partnership with IRU NELTI-3. Final Report.”

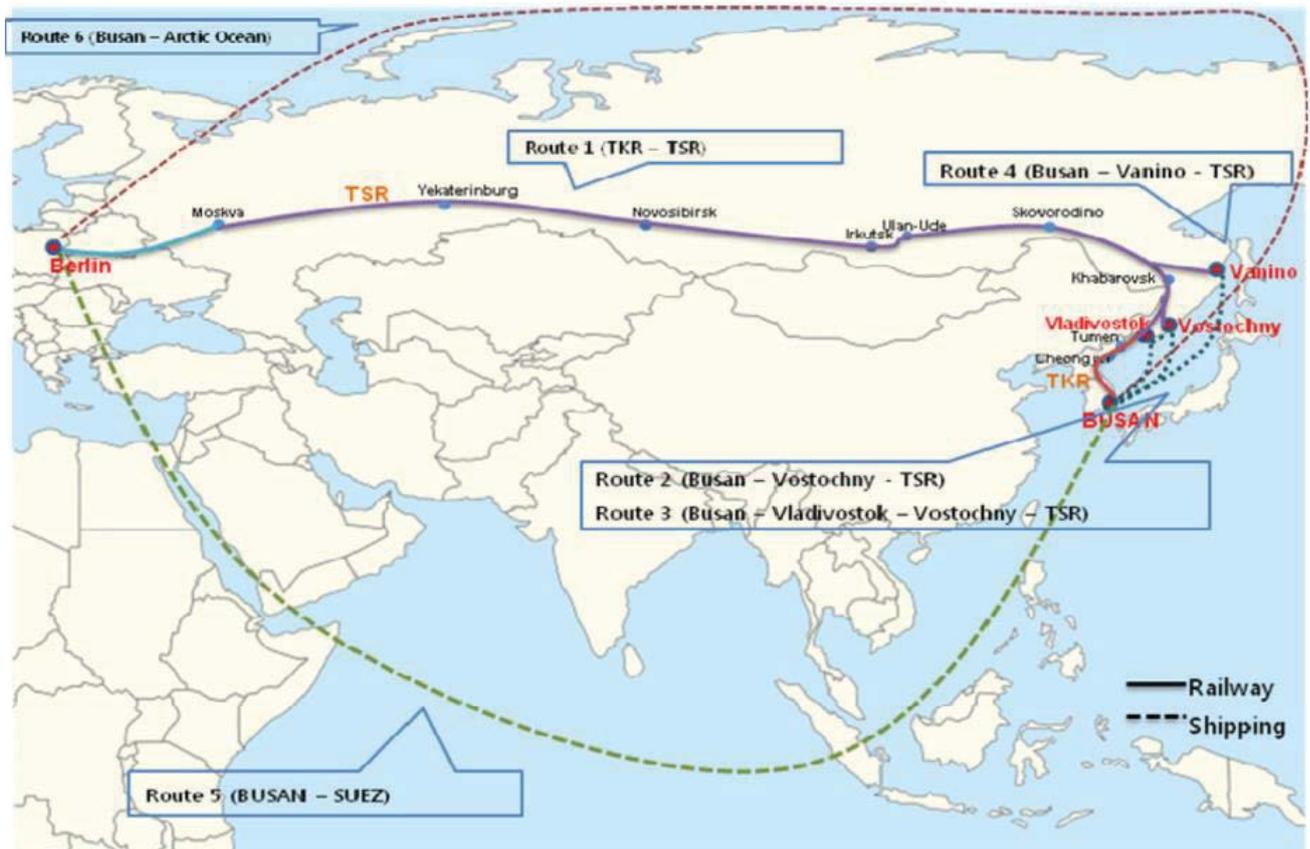
²⁰⁵ Moon, Kim, Lee. “A Study on Competitiveness of Sea Transport by Comparing International Transport Routes between Korea and EU.” *The Asian Journal of Shipping and Logistics*; Volume 31, No. 1, March 2015; pp. 001-020.

Case study on international transport routes between Korea and the European Union

In 2015, Moon, Kim and Lee published an interesting study on the competitiveness of maritime transport by comparing international transport routes

between Korea and the EU.²⁰⁵ The figure below shows the international transport routes studied between Busan in Republic of Korea and Berlin in Germany.

Figure 37 International transport routes between Busan and Berlin



Source: Moon, Kim, Lee. "A Study on Competitiveness of Sea Transport by Comparing International Transport Routes between Korea and EU."

Figure 38 Distance, time and costs of six international transport routes between Busan and Berlin

Transportation routes		Total transport distance (km)	Total transport time (days)	Total transport cost (USD/20ft)
Route 1	TKR - TSR	12,481	26	4,200
Route 2	Busan - Vostochny- TSR	12,002	46.5	5,016
Route 3	Busan - Vladivostok - Vostochny - TSR	12,004	47.5	5,016
Route 4	Busan - Vanino - TSR	11,981	33	5,416
Route 5	Busan - Suez - Europe - Berlin	20,945	35	5,665
Route 6	Busan - Arctic Ocean - Europe - Berlin	12,645	20	5,995

Source: Moon, Kim, Lee. "A Study on Competitiveness of Sea Transport by Comparing International Transport Routes between Korea and EU."

Note: TKR: Trans-Korean Railway; TSR: Trans-Siberia Railway.

The study shows that Route 1 via the Trans-Korean Railway and the Trans-Siberian Railway costs the least and is the second-fastest in terms of transport time. The study also found that this route is the safest, the most reliable and the route which provides the most information for the shipper and other stakeholders.