

Print ISSN: 1738-3110 / Online ISSN 2093-7717
<http://dx.doi.org/10.15722/jds.14.1.201601.17>

Activation Plan for the Eurasia Railway Logistics*

Sungbong Chung**, Baekkyu Namkung***, Moon-Joung Kim****

Received: December 1, 2015. Revised: December 31, 2015. Accepted: January 15, 2016

Abstract

Purpose – Given the increasing interest in the Eurasian Initiative, government-wide studies for the construction of the Silk Road Express are currently being conducted. However, the Korean Government has no experience in operating international freight railroads and has not encountered problems in train service plans, international conventions, and customs clearance, which will arise when TKR is connected to TSR, TCR, and TMGR.

Research design, data and methodology – Given these conditions, the cases of direct services in international freight railroads between China and Europe are investigated to identify the possible problems in the connection between TKR and continental railroads. This study also identifies the plans for activating Eurasian railroad logistics.

Results – For the service of international freight trains, Korea needs to join international conventions, such as OJSD, as a regular member. Furthermore, any relevant international conference after the conclusion of such an agreement is needed for the agreement on train service schedules, fees, and procedures for passing border stations.

Conclusions – Customs clearance and relevant documents must be standardized to address the differences in clearance systems between nations.

Keywords: Mongolia, Russia, China, Customs Clearance, Eurasia Railway Logistics.

JEL Classifications: R420, F530, F130.

1. Introduction

Given the recent vigorous exchanges between Europe and Eurasia at the Summit Meeting of the 10th ASEM (Oct. 2014), as well as the emphasis of Korean President Park in establishing networks for complex logistic transportation by using the new North Pole Route (including railroad, road, shipping and air routes), interest in the Eurasian Initiative is increasing. In 2014, the trade volume between Korea and Europe was 75.2 billion dollars of exports and 50.7 billion dollars of imports, which are 13% and 10% respectively of the total trade volume between Korea and all foreign countries. However, Korea is facing difficulties in trading because of long shipping times (approximately 30 days). Thus, the Silk Road Express (SRX) of railroad transportation has come into the spotlight as an alternative route to marine transportation. SRX covers a total distance of 10,000 km via TSR, TCR, and TMGR and is expected to reduce the transportation time to 10 days.

SRX may reduce transportation costs and increase international trade between Korea and Europe. However, this mode of transport faces a number of problems, including the political issues between South Korea and North Korea, the differences in the customs clearance systems among nations, the non-participation of Korea in the Hamburg Rules, and the imbalance of trade volume between Korea and Europe.

This study examines the status of freight transportation and customs clearance between Asia and Europe to deduce the plan for activating the logistics in the Eurasian railroad, which utilizes the Silk Road. Furthermore, the status of freight transportation and the international conventions related to the use of the Eurasian Continent Railroad are reviewed. Comparative analysis is also conducted on the Korean customs clearance system and the clearance procedures, clearance documents, clearance times, and trading costs of major countries such as Russia, China, and Mongolia with TSR, TCR, and TMGR.

* This study was conducted with research fund support from the R&D Project for Tracking Location of International Railroad Clearance Goods of the Korea Agency for Infrastructure Technology Advancement and the Ministry of Land, Infrastructure, and Transport.

** Associate Professor of Department of Railway Management and Policy, Seoul National University of Science and Technology Graduate School of Railway, Seoul, Korea. Tel:+82-2-970-6875. E-mail: sbchung@seoultech.ac.kr.

*** Corresponding Author. Ph.D. candidate of Department of Railway Management and Policy, Seoul National University of Science and Technology Graduate School of Railway, Korea. Tel:+82-2-975-6696. E-mail: baekkyou@nate.com.

**** Master Course of Department of Railway Management and Policy, Seoul National University of Science and Technology Graduate School of Railway, Korea. Tel:+82-2-975-6696. E-mail: sdfkmj@naver.com.

2. Literature review

2.1. Review of Previous Studies

Various activation plans regarding the Eurasian International Railroad Transportation have been studied. Sung et al. (2005) evaluated the strategies for developing international railroad transportation in Russia and China, along with actual spot-inspections and interviews with those concerned, to identify the implications and strategic value of connecting continental railroads to the Eurasian continent. Choi et al. (2012) analyzed the economic feasibility of the transportation route between Korea and Europe with a focus on transportation distance, transportation time/charge, and additional costs and conducted a comparative analysis of diverse transportation routes such as railroad transportation, marine transportation, and marine-railroad transportation. They concluded that the transportation route of TSR-TKR has the highest economic feasibility. Seo et al. (2014) provided a conceptual definition of the SRX on the basis of the Eurasian Initiative, estimated the regional logistics index along SRX, and established the optimal international transportation route connected to SRX on the basis of interviews with external experts and on-the-spot logistics working groups. They also conducted surveys to determine the strategies for connecting SRX to Korea. Ha et al. (2015) reviewed the probability of the LNG Railroad Transportation between Korea and Russia by studying domestic and foreign cases.

Issues on the customs clearances of Russia, China, and Mongolia, which offer international railroad network services, have been studied by government-funded institutions and agencies that are concerned with trade. Hwang (2011) analyzed the strategies of domestic enterprises for advancing into Russia with the perspective of Russia joining the WTO and making changes to its trading conditions. The Korea Institute of Public Finance has identified Russia's clearance conditions: administrative organization, customs clearance, status of customs duty, import regulation, suggested considerations by clearance with the classified phases of customs examination, goods investigation, customs payment, acceptance of declaration, and goods carry-out. The Korea Institute of Public Finance also discussed the practical problems that may occur when the FTA between Korea and China is implemented. Although the FTA eliminates high-interest tariff and the uncertainty and complexity owing to trade regulations, regulations on the country of origin and its procedures are different for each country. Furthermore, topics such as non-tariff barriers, regulations on the country of origin, procedures for the country of origin, and trading facilitation have largely been ignored. KOTRA (2015) proposed a method for constructing trade relationship with little imbalance by trade expansion by improving logistics and enhancing industrial cooperation. This approach also solves chronic trade-deficits and removes the necessity of plans for securing logistics route when trading with Mongolia.

2.2. Conventions relative to Railroad Freight Transportation

Given the non-existence of any mutual cooperation organization, the continent railroad network may cause many problems in international trade because of the differences in each nation's customs clearance, transportation, and technical standards. Cooperation organizations (e.g., the Organization for the Cooperation of Railways (OSJD) between Eastern Europe and Asia, the Intergovernmental Organization for International Carriage by Rail (OTIF) among Western European countries, and the International Coordinating Council on Trans-Siberian Transportation (CCTT)) can resolve the problems related to transportation policies and railroad transportation technologies by international conventions.

OSJD is an international cooperation organization for the realization of complex railroad transportation between Asia and Europe. This organization has 28 member countries, such as North Korea, China, Mongolia, Azerbaijan, Albania, and Belarus. These countries are operating 2 million freight trains on the TCR and TSR routes with a total travel distance of 0.28 million km. Conventions related to international railroad freight, such as SMGS (Organization for Cooperation of Railways) and ETT (Agreement on Uniform Transit Tariff), have established and managed the standards for international transportation by specifying unified codes for signal systems, operation methods, technology (e.g., toll and other items).

OTIF is composed of 49 nations: 38 European nations, 4 African nations, and 7 CIS countries. OTIF was organized in 1902 for simplifying international railroad transportation procedures. This organization supports the creation of diverse documents, such as contracts, manuals, and forms. Its major business is to develop and improve the international railroad transportation between Asia and Europe, in which international complex transportation is included.

CCTT, an international non-profit organization, was established by the Ministry of Russia National Railroad, Federal Railway Authority of Germany, GETO, and KIFFA. CCTT includes 105 agencies (railroad companies, shipping firms, brokers, freight transportation companies, harbors, and cargo companies) from 23 countries. CCTT participates in the elaboration of codes and regulations by considering the transport process of TSR, suggesting countermeasures to increasing TSR freight volume, and presenting methods for eliminating any restraints to the transportation and foreign trade goods of TSR and the activities of other public agencies or transportation facilities. The major businesses of CCTT include the adjustment of mutual businesses among transport companies using TSR, research for improving freight transportation in both directions of TSR, and adjusting charges of domestic and foreign freight transported by TSR.

Western European nations are controlled by the Convention Concerning International Carriage by Rail of OTIF and Uniform Rules Concerning the Contract for International Carriage of Goods by Rail (CIM). Eastern European nations are controlled by the SMGS of OSJD.

<Table 1> Comparison of OSJD and OTIF

Classification	OTIF	OSJD
Main areas	Western European countries	Eastern Europe and Asian countries
Member	Albania, Algeria, Austria, Armenia, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iran, Iraq, Ireland, Italy, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Macedonia, Monaco, Montenegro, Morocco, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Swiss, Syria, Tunisia, Turkey, Ukraine, United Kingdom, Jordan(Associate Member)	Azerbaijan, Afghanistan, Albania, Belarus, Bulgaria, Vietnam, Georgia, Kazakhstan, China, North Korea, Kirghiz, Latvia, Lithuania, Moldova, Mongolia, Poland, Russia, Tajikistan, Turkmenistan, Uzbekistan, Ukraine, Estonia
Concordat	CIV, CIM, RID, CUV, CUI, APTU, ATMP	SMGS, SMPS, PPV, MTT, ETT
Official language	German, French	Russian, Chinese
Official language	ETT(Common Transit Tariff)	ETT or MTT(International Transit Tariff)
Shipping Cost	Ton x 100km, 13 Swiss Cent	Ton x 100km, US\$ 0.0115
Currency	Swiss Cent	

<Table 2> Status of International Freight Train Services between China and Europe

Section	Opening	Distances (km)	Period (days)	Freight
Chongqing-Germany	Mar 2011	11,179	16	· The first rail operation in China · Highest number of trips in China · IT products
Wuhan-Czech	Oct 2012	10,700	15	· Electronics, Notebooks
Chengdu-Poland	Apr 2013	9,965	14	· IT products
Zhengzhou-Germany	Jul 2013	10,245	15	· Largest number of freights in China · Tires, Clothes and Sports Products in Henan and Shantung
Suzhou-Poland	Nov 2013	11,200	15	· Notebooks, LCDs
Hefei-Germany	Jun 2014	11,000	15	· Home appliances and Electronics in Hefei and Huadong
Changsha-Germany	Oct 2014	11,808	18	· Teas, Clothes, Machines, Chemicals
Yiwu-Spain	Nov 2014	13,052	21	· Basic necessities, Miscellaneous goods
Harbin-Germany	Jun 2015	9,820	15	· Electronics, automobile parts
Kunming-Netherlands	Jul 2015	-	15	· Agricultural, Nonferrous metals

2.3. Status of Freight Transportation between Asia and Europe

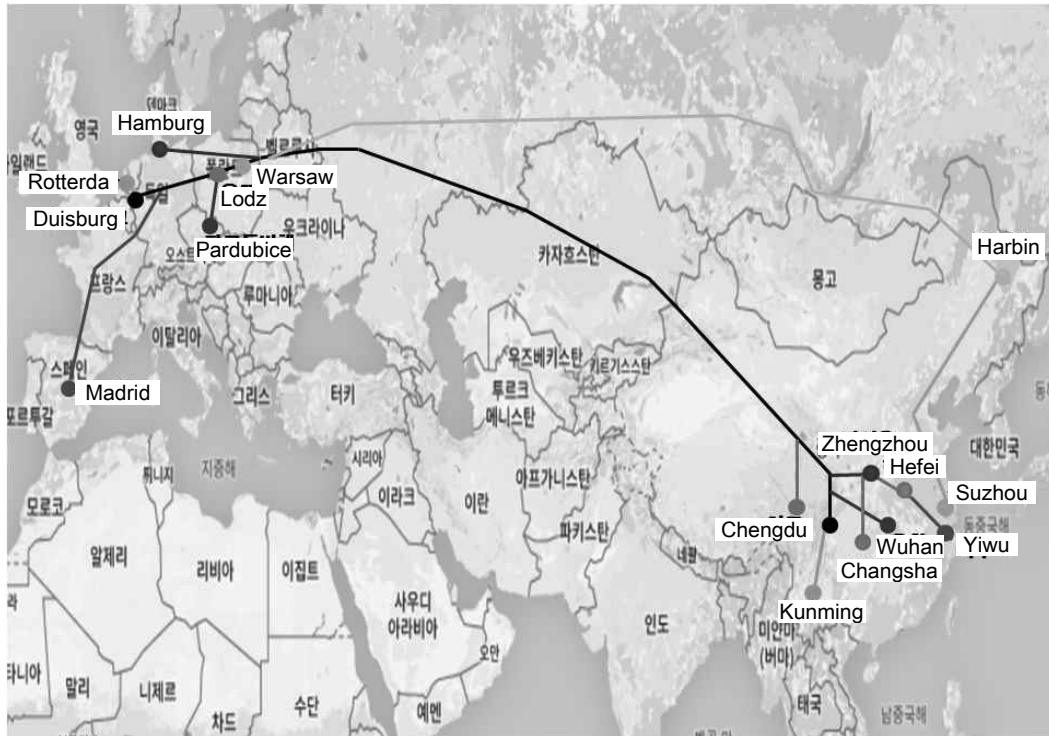
2.3.1. International Railroad Freight Transportation between China and Europe

According to the One-Road for One-Belt strategy, China aims to enable its international freight trains to travel to Europe. One of the key targets of the One-Road for One-Belt strategy is the improvement of the transportation and logistics network in foreign countries wherein many Chinese companies are operating international freight train services since the establishment of the railroad network from Chongqing to Germany in 2011. Approximately 10 trains leave Chengdu in the midwest inland for Germany as the last stop to transport electronics, appliances, miscellaneous goods, and coffee.

In the One-Road for One-Belt policy, each Chinese city diversifies its transport routes and reduces transport time and fees to increase competitiveness. Transportation by train from inland China to Europe can reduce the transport time by 20 days and slash 80% of costs compared with air freight, thus increasing the competitiveness of its railroad freight transportation from inland China to Europe. By contrast, marine transportation is subject to high risks such as maritime disputes and pirate attacks. However, railroad fees are higher than that of maritime transport. Furthermore, the amount of freight from Europe to China is only 15% of that from China to Europe. This situation causes low transport efficiency by freight train. Therefore, transportation by train should be improved.

A close inspection of the international freight train between Chongqing and Duisburg indicates that the route passes through 6 countries, namely, China, Kazakhstan, Russia, Belarus, Poland, and Germany.

The travel duration is 16 days from Chongqing to Duisburg. After a 5-month test run starting from October 2014, this freight train officially started operations from March 2015. The transport charge per container is USD 6,000–7,500 per 40 ft. Given that the standard gauges between China and CIS nations are different, as well as that between CIS nations and European countries, transshipment and wheel changes occur at the stations of Dostyk in Kazakhstan and Malaszewicze in Poland(Oh, 2013).



<Figure 1> Route of International Freight Trains between China and Europe

<Table 3> Status of International Freight Train Services between China and Europe

Classification	Contents					
Name	International Freight Train Services between Chongqing and Europe(Yu Xin Ou Railway)					
Route and Period	5 days (3,350km)	1 day (Clearance/ Transshipment)	3 days (3,102km)	4.5 days (2,574km)	1 day (Transshipment /BL Change)	2 days
	Chongqing → Xinjiang → Kazakhstan → Russia → Belarus → Poland → Germany					
	16-18 days (12 stations)					
Interval	3 times/7 days					
Distance	11,179 km					
Fare	USD 6,000-7,500/40 ft Container					

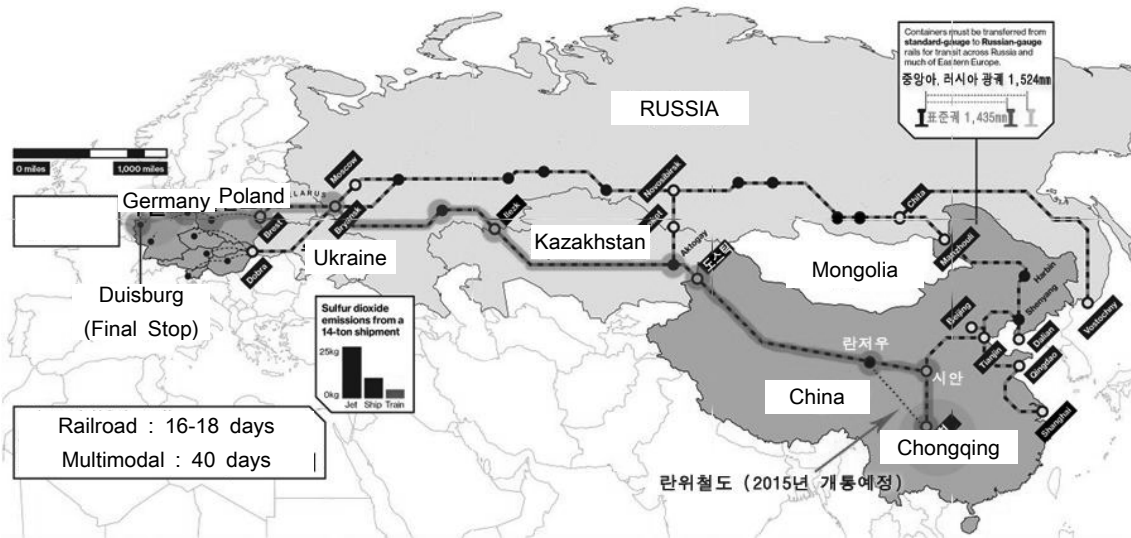
The train service between Chongqing of China and Duisburg of Germany has caused 2 problems: imbalance of trading condition and inefficient operation of railroad logistics facilities. Given that IT companies, such as HP and Foxconn, operate in Chongqing City, the freight demand between China and Europe has rapidly increased. However, the scale of imports from Europe to China is only 15% of its export volume, thus often resulting in idlers when international freight trains return to China. This situation leads to low train service efficiency. At the early stage of international freight train services, the transportation time was long owing to the waiting time at the border station for Russia's complicated customs clearance. This problem has been considered a chronic problem by import/export

businesses and the neighboring countries of Russia, including Korea. In particular, because Russia insists that the documents to be submitted for customs clearance should be in Russian, translation errors often occur, which lead to document rejection. To reduce the transport item, China established a MOU with Kazakhstan, Russia, and Germany, all of which are passed through by international freight trains. China also established Yu Xin Ou Logistics Co. Ltd. to help railway companies in different countries find partners in their target locations. The Secure and Smart Trade Line (SSTL) pilot program, which is a program created for the safety and convenience of trade between Asia and Europe, was passed for the international freight train between Chongqing and Duisburg. The SSTL program includes the ex-

emption of customs inspection at any other border stations after inspections in China. This program reduced the average transport time to 12 hours or 17%. Furthermore, the standardized train service schedules and fees of China have proved to be more effective for regular services than those of other countries.

Given that the train stops at the border station between Chongqing and Duisburg and that each country's signal system, communication system, and operation method is different from one another, engine locomotives are changed. Track gauges differ in Dostyk Station between China and CIS nations and

portation days is 30 days). However, the North Pole Route is only operational for 3 months annually (from July to October). A special ice-strengthened ship is also needed to traverse this route. This type of ship is 20%–30% more expensive than a normal ship and has poor fuel efficiency. Furthermore, this route carries a risk of sinking for a ship because of the existence of glaciers. Thus, an additional escort ship is necessary. This route is subjected to higher transportation costs despite the lower transportation time. Given these diverse problems, the shipping industry is not confident of traversing through this route.

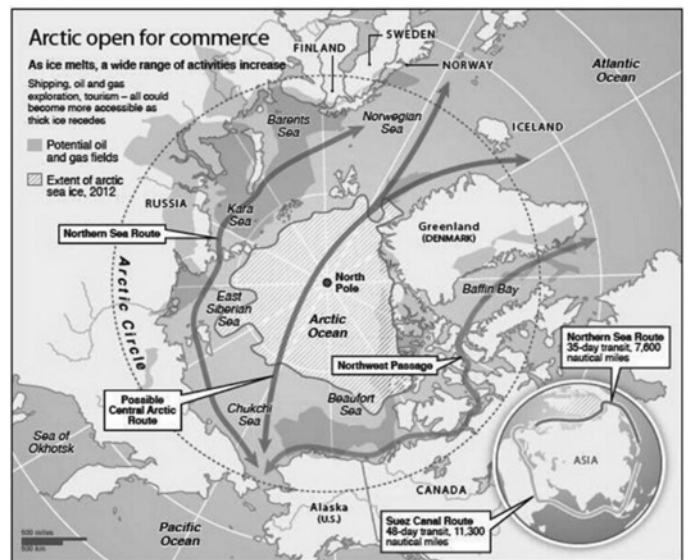


<Figure 2> Route of International Freight Trains between Chongqing of China and Duisburg of Germany

Malaszewicz Station between CIS nations and Europe. Thus, transshipment and wheel changes are conducted in these stations. Furthermore, at these two stations, customs clearances are implemented before passing into the Chinese border and before entering Europe. However, at the other border stations, the customs inspection is exempted by the SSTL program.

2.3.2. International Maritime Freight Transportation by the North Pole Route

Considering that the glaciers in the North Pole are melting owing to global warming, airways utilizing the Arctic Ocean are preferred at the state level. The North Pole Route is classified into the Northern Sea Route and Northwest Passage Route. Research has found that in case of transportation by the Northern Sea Route between Korea and Europe, the distance will be reduced by 32% compared with a route through the Suez Canal (22,000 km, approximately 40 days) and the transportation days will be reduced to 10 days (the average trans-



<Figure 3> Plan for Pioneering the North Pole Route

2.4. Implications

As seen in the previous review, studies are being conducted for the creation of a Eurasian international railroad network and for the standardization of the customs clearances of Russia, China, and Mongolia. However, research is lacking on the problems faced by international railroad freight transportation in terms of the clearance systems and train services of TSR, TCR, and TMGR.

Moreover, an international convention is needed for international freight trains between Korea and Europe through TSR. Although TSR is limited to Russia, railroad transport from Moscow to Europe traverses the railways of different countries. Therefore, international conference membership is needed, such as the Convention Concerning International Carriage of Goods by Rail, for the sake of international cooperation at passing borders and smooth customs clearance. Furthermore, countries should join OSJD, a consultative organization of Eastern European and Asian countries, to abide by the regulations of Convention Concerning International Carriage of Goods by Rail. Furthermore, international freight trains travelling to Western Europe should abide by the regulations agreed in OTIF at OSJD.

The cost of railroad transportation is similar to that by maritime transportation through the Suez Canal between Europe and Asia, although the former has the merit of reduced transportation time by 10–20 days. However, the need for special ice-strengthened ships with low fuel efficiency and escort vessels will lead to a large increase in transportation costs. The North Pole Route also carries inherent risks in terms of safety, transportation cost, and time because of the risk of collision against floating glaciers. To realize the development of SRX stated in the Eurasian Initiative Policy of the Korean Government, railroads can connect TKR and TSR. However, this plan will face various problems, such as the political issue with North Korea and the differences in the customs clearance systems of Russia, China, and Mongolia. Therefore, this study examines the customs clearance of China, which is a leading country in international railroad freight transportation, to propose plans for activating the railroad logistics between Korea and Europe.

3. Analysis of the Customs System of Russia, China and Mongolia

3.1. Clearance at Border Station

A basic customs system consists of six procedures, namely, customs declaration, taxation, inspection of goods and vehicles, goods clearance, reporting of imported and exported goods list, and customs clearance termination (declaration, goods inspection, customs collection and clearance). Exporters and importers must submit to the customs of the relevant country the documents that satisfy the requirements for cost and certification

documents marked with approval for import and export by each nation's customs act.

For customs clearance at borders in case an international railroad is used, engine locomotives need to be changed, freight carriages should be checked, and wheels must be changed to meet the transportation requirements of any relevant nation.



<Figure 4> Clearance at Border Station

3.2. Status of Each Nation's Customs Clearance System Operation

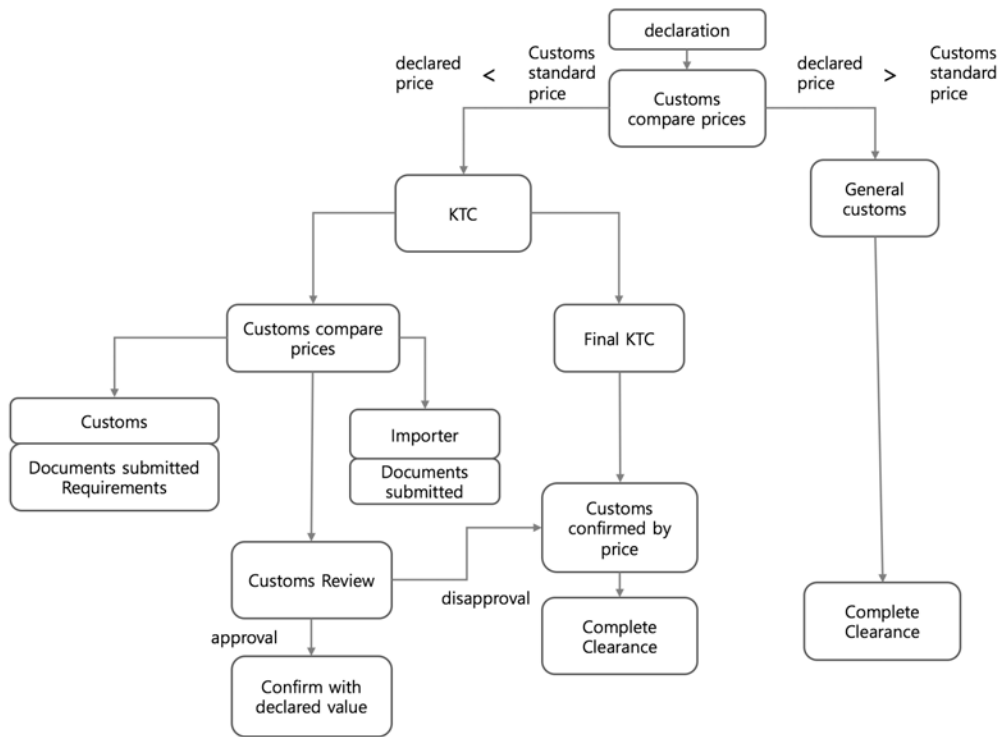
3.2.1. Russia

Russian customs clearance has a higher freight and facilities inspection rate than other countries. When the declared price is lower than the customs base price, customs conducts an investigation to prevent the declaration of low unit price of goods based on the Russian customs base price; otherwise, the general clearance continues.

The Russian Customs Service is composed of 18 agencies, and customs service operates in 8 regions. Russia has formed a customs union with Belarus and Kazakhstan. Therefore, if one nation out of the three has verified or cleared goods, then the goods will not need additional customs clearance in the other two nations.

Given the benefits of tariff and customs clearance, Korea is classified as a developing country. Accordingly, a product of Korean origin is an object for a preferential tariff. The first step in customs clearance requires prior importer registration with a competent customs service to allow an importer to acquire a registration number. Russia operates GOST for National Standard Price. This safety certificate authentication system is established to ensure consumer protection and has a selective effect on customs clearance. Korea Testing Laboratory and CTR Far East have relevant agencies related to this service.

Ten documents are needed for importing into Russia, and nine documents are needed for exporting; these documents have 20-day and 22-day periods, respectively. The cost and period of these documents are three times that of Korea. Russia requires a higher cost and more documents than the required OECD average. Russia requires authentication papers for the protection of its people. However, the certificate of origin and authentication system has a negative effect on importing and exporting businesses. Therefore, Russia plans to reduce the documents needed for customs clearance from 6 in 2015 to 4 in 2018. Moreover, the documents needed for export are planned to be decreased from 8 in 2012 to 4 in 2015. The container charge in Russia is 2.5 times higher than the average of OECD members. A comparison between the costs for import and export in East Asia, the charges for containers, and relevant docu-



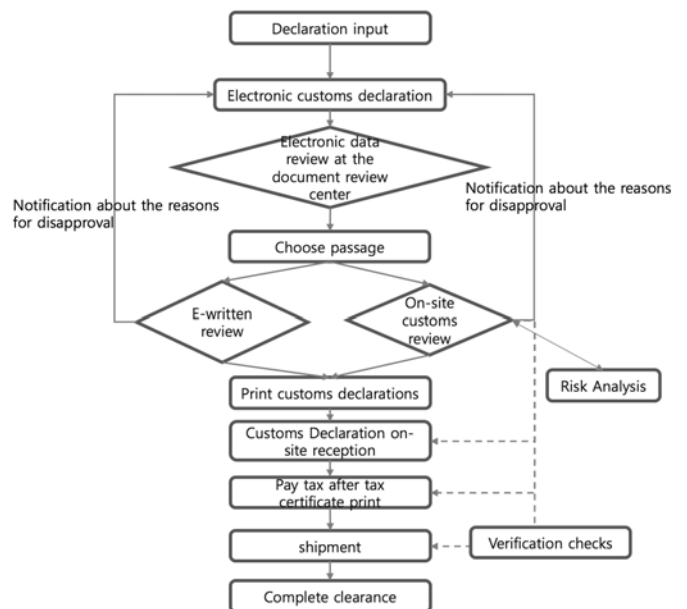
<Figure 5> Customs Clearance in Russia

ments indicates that Russia has higher requirements than East Asia(Ohk, 2013).

3.2.2. China

The Chinese customs clearance process is as follows: cargo list declaration, declaration of import and export to customs, customs inspection, cargo inspection and collection of customs, imported and exported cargo list declaration for clearance, and termination of customs formalities. The most important part among these procedures is the classification of cargo inspection method into all inspection, sampling inspection, and appearance inspection. The electronic customs clearance system gathers data on each import and export business information, flow of funds, and cargo flow in one place for the governmental agencies to provide support for enterprises and government organizations. Chinese customs clearance has a three-level hierarchy based on a vertical control system. Customs clearance and trading between Korea and China are expected to become smooth because of its membership to the WTO and its FTA agreement with Korea(Jeong et al., 2012).

The Chinese customs organization is composed of the General Administration of Customs, its 42 direct maritime customs, and their 562 subordinate maritime customs. A total of 267 maritime customs services operate throughout China. Although China requires more documents for clearance than Korea, the paid cost is lower. However, the customs clearance process of China is longer than that of OECD members.



<Figure 6> Customs Clearance in China

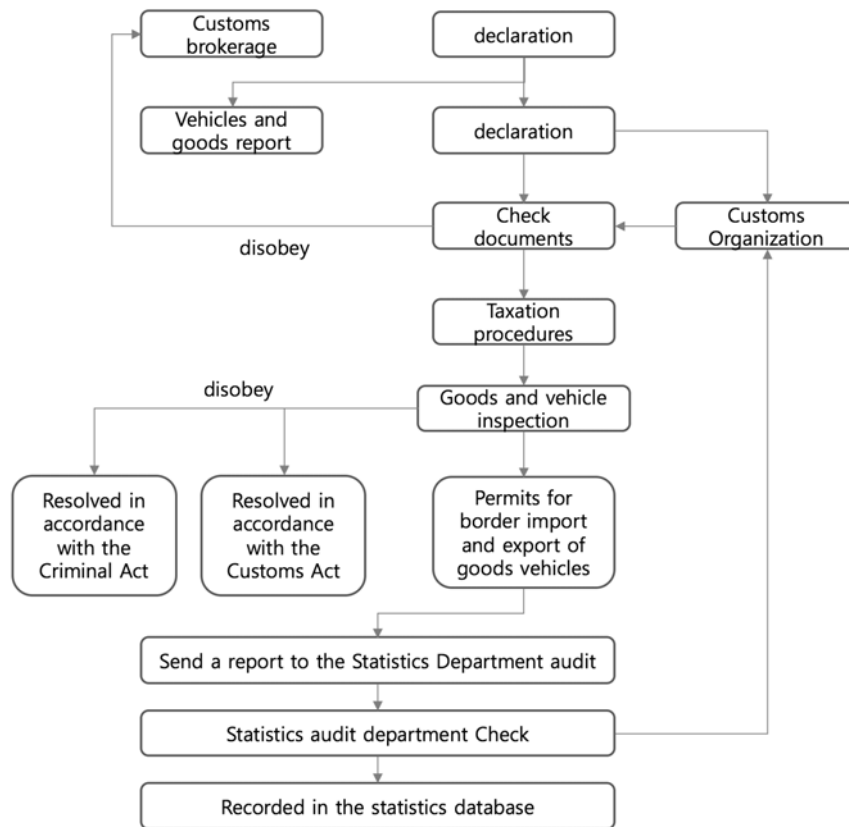
3.2.3. Mongolia

Customs clearance in Mongolia has two more approval and taxation procedures for imported and exported goods than the

basic clearance procedures. Transport by railroad and road in Mongolia is brisk because only air routes and inland transportation are available and ocean transportation is nonexistent. Mongolia is located between Europe and Northeast Asia; therefore, goods to be shipped to Europe need to pass through the country. However, Mongolia is still developing its railroad and road transport facilities to provide customs clearance and railroad facilities; the current system does not meet international standards. Therefore, foreign enterprises are hesitant to invest in the country. However, Mongolia's geographical location makes the country a channel for import and export between Asia and Europe. Its customs requires the Chinese customs for the highest number of clearance documents for import and export among Korea, China, Russia, and Mongolia; such documents are transit transport declaration, certificate of origin, certificate of credit, insurance policy, and bill of entry. Table 1 shows that Mongolia requires 11 and 12 documents for export and import, respectively. Thus, it requires the highest number of documents among OECD members. A comparison of its cost with the average cost of OECD members shows that the former is the highest. Mongolia has an authentication system called MNS. This national quality mark is not a requirement, but simply informs consumers about the quality and safety of the product.

3.3. Comparison of Each Nation's Customs System

The authentication system and documents needed for clearance in particular affect customs clearance, which is supposed to be processed quickly, because of different customs clearance standards in each country. As with documents, the ambiguity of standards for authentication systems and marking of origin, the safety standards for imported goods that people want their government to establish, and the traits of people cause the difference in those standards. Trading statistics presented by World Bank Doing Business 2015 show that the documents, the cost, and the time needed for import and export in Korea are less than the average of OECD members. By contrast, those of Russia, China and Mongolia, which are the key research countries, were higher than those of Korea, while the cost for import and export of China was lower than that of Korea. Import and export clearance was completed in 1 day in Russia. By contrast, import and export clearance took 4 and 2 days, respectively, in China and Mongolia. Consequently, with the goods that are supposed to pass through China and Mongolia, the competitiveness of clearance time is considered low. The clearance cost in Korea was the lowest, while those of China, Mongolia, and Russia are 2.7, approximately 5, and 21.7 times that of Korea, respectively; this result indicates that the cost for clearance in Russia is the highest.



<Figure 7> Customs Clearance in Mongolia

<Table 4> Comparison of Import Customs

Classification	Korea		China		Mongolia		Russia	
	Period (day)	Cost (\$)	Period (day)	Cost (\$)	Period (day)	Cost (\$)	Period (day)	Cost (\$)
Customs clearance and inspections	1	30	4	80	4	150	1	650
Ports and terminal handling	2	100	3	140	5	190	2	550
Inland transportation and handling	2	500	2	135	13	2,500	5	1,385
Totals	5	630	9	355	22	2,840	8	2,585

<Table 5> Comparison of Export Customs

Classification	Korea		China		Mongolia		Russia	
	Period (day)	Cost (\$)	Period (day)	Cost (\$)	Period (day)	Cost (\$)	Period (day)	Cost (\$)
Customs clearance and inspections	1	15	2	80	2	160	1	550
Ports and terminal handling	2	100	3	140	5	190	3	480
Inland transportation and handling	2	500	2	38	14	2,250	5	1,385
Totals	5	615	7	258	21	2,600	9	2,415

4. Problems in and Improving Plans for Eurasian Railroad Freight Transport

4.1. Problems in Railroad Freight Transport

4.1.1. Perspective of Freight Transport

Research on international freight train services between China and Europe revealed a large gap between the import and export volumes of the two regions, thereby causing frequent idlers. An analysis of actual imports and exports between Korea and Europe for the past 5 years shows that import and export annually increased by 10.6% and 7.3%, respectively. The actual export for the actual import was 36.8% on average, thereby indicating a higher import volume than export volume. The imbalance of import and export volume transported by international freight train with the connection of TSR to TKR may result in numerous idlers between Korea and Europe. The additional burden of transport charge caused by this situation is thought to be inevitable.

<Table 6> Actual Imports and Exports between Korea and Europe

Classification	2010	2011	2012	2013	2014	Increasing rate on annual average
Import (thousand-ton)	38,314	41,777	50,343	53,018	63,264	10.6%
Export (thousand-ton)	14,784	18,200	17,040	18,423	21,018	7.3%
Export/Import	38.6%	43.6%	33.8%	34.7%	33.2%	-

Moreover, the difference in each nation's transport schedule, cost, and track gauge causes the difficulty in direct service of trains. Russia and Mongolia give their trains the right of way, thereby delaying the time taken to pass through countries. The transport cost per kilometer is 1.1 dollars in Russia and 0.85 dollars in China. The different methods of calculating transport cost cause inconvenience because separate calculations for each nation are needed when estimating the transport cost between Korea and Europe.

<Table 7> Transport Cost of Each Nation's Freight Train(per 40 ft)

Classification	Korea	Russia	Mongolia	China
per km	0.69	1.1	0.75	0.85

CIS countries, including Russia, use a 1,524 mm track gauge, while China, Korea, and Europe use 1,435 mm. Therefore, the track gauge of carriages and transshipment needs to be changed whenever trains enter any country with a different track gauge.

China has resolved this problem by distributing the profit from transport at the rate of investment through an MOU with the nations through which the international freight train passes and the establishment of a joint company with shipping companies of the nations. At the conclusion of MOU, they enacted the provision that any international freight train should pass first and that the transport cost be unified to \$0.7 per km.

4.1.2. Joining International Treaty

An agreement on the international complex transport in Northeast Asia is necessary for a number of reasons. First, each nation has a different rank when reaching any agreement on international complex transport in Northeast Asia. Second, freedom of access to international waters for any inland state is needed to connect the Eurasian complex transportation network and to enable transit transport. Joining OSJD is necessary to resolve different customs clearance problems during the service of TSR-TKR connection in the future, standardize border passing procedures, simplify professional manpower's entry-departure formalities, standardize documents and data, create plans for controlling and managing the joint use of transportation means,

and standardize and simplify freight's border passing procedures. Moreover, the provisions of OSJD need to be observed, and a conference among the countries concerned should be held for the efficiency of international railroad transport.

4.1.3. Perspective of Customs Clearance System

When an international freight train arrives at a border station, it should go through customs clearance procedures. Each nation has different procedures, and the clearance documents should be translated into the language of the relevant nation. One of the problems in customs clearance is the delayed clearance time due to rejected documents with any error in translation. Therefore, when a train will pass through many countries, individuals in charge should be familiar with the customs clearance procedures of each country to ensure that they are thoroughly prepared. The time for customs clearance in Russia is almost the same as that of Korea, and that of China and Mongolia is at least 4 times that of Korea. The cost in the two countries is 2.7–21.7 times that of Korea. In addition, the difference in customs clearance documents may weaken the competitiveness of transport time and cost.

An examination of each nation's difficulties often reveals that even though the clearance should be completed within 3 days in Russia, which applies a new customs act, customs officials who take bribes prioritizes the brokers who offer the bribes, thereby causing delays. Ordinarily, 10 documents are needed for customs clearance in Russia. However, when those documents are not 100 percent perfect, the clearance will not be approved. Moreover, the tariff in Russia is decided by the commodity value, not the price declared by an exporter; thus, the time and cost for the clearance may be higher than those examined. (La et al., 2012) China is actively implementing its customs system and tariff rate for the protection of its industries; thus, difficulties in customs clearance arise. In addition, China's complicated and inconsistent import and export regulations, quarantine system, and customs clearance procedures cause difficulties, such as selective and delayed customs clearance, excessive customs inspection, nonsensical change of tariff, and limited clearance area. In Mongolia, as a result of deteriorated railroad freight facilities and lack of facilities, the clearance time may be longer, and the complexity of customs clearance is likely to delay the entire transport time.

4.2. Plans for Improving Eurasian Railroad Freight Transport

4.2.1. Perspective of Freight Transport

From the viewpoint of freight volume, the percentage of one-way freight volume in both Korea and China is high, while the volume of transportation from China to Europe and that from Europe to Korea are high with China and Korea, respectively. Consequently, at the time of the connection of TSR to TKR, TSR, the connection of TCR and TKR to one another is expected to construct multinational railroad transportation sys-

tem connections, such as China → Europe → Korea → China or Korea → Europe → China → Korea, for mutual complement of the high one-way transport volume. The service of trains has a circulating pattern. Thus, when trains are concentrically input into sections with high one-way transport volume, the rate of idlers may be reduced, thereby achieving efficient train services.

The participation of Korea in the companies that operate international freight trains between China and Europe is expected to solve the problems of granting priority of train service and standardization of charging systems. Considering the low probability of TKR connection due to political issues with North Korea, ferries should be used for freight transport between Korea and China as a short-term improvement plan to construct a complex transportation system. At present, the maritime transportation between Busan and Najin and TSR transport between Najin and Europe are practiced on a trial basis. However, the clearance delay in Russia undermines competitiveness. The consideration of the standardization of charge and the exemption of customs clearance in the countries through which the international freight train between China and Europe passes implies a higher competitiveness of maritime transport from Korea to China and to Europe and of the complex transportation by international railroad.



<Figure 8> Network of TKR, TCR, TSR

4.2.2. Perspective of Joining International Treaties

To materialize the service of TSR-TKR international freight trains, first of all, joining OSJD is indispensable. A conference with OSJD members is expected to make possible the efficient operation of international freight trains. Recently, the Korean government and the Korean Railroad Corporation held an OSJD CEO conference. However, the objection of North Korea defeated Korea's joining OSJD. Korea is currently an affiliate member of OSJD. The admission of a new member to OSJD is decided unanimously. Therefore, the objection of North Korea prevents Korea from joining the OSJD. However, Chairman Tadeusz Szozda is known to be creating a special agreement with more than 3/4 members to enable Korea to join. When the special agreement becomes effective, Korea will be a member of OSJD.

4.2.3. Perspective of Customs Clearance

The differences in documents, cost, and procedures of customs clearance in the countries that operate TSR, TMGR, and TCR cause problems to the nations that use the international freight railroad.

First, the certificate of origin, which is one of the documents authenticated in the scope of the national law system, and the authentication system required by relevant countries cause additional waste of time and cost due to rejection by concerned countries even though those documents have been certified in their own countries. Thus, reducing the additional cost and time through trade agreements among concerned countries and activation of the AEO authentication system are necessary.

Second, when TSR, TCR, and TMGR are used—except in Kazakhstan and Belarus, which have formed a customs union with Russia—a declaration for a bonded warehouse is needed at each border because of differences of customs regulations. Such differences are a factor that undermines rail transport's competitiveness against maritime transport in terms of reduction of time and cost, which are important for logistics.

Accordingly, a necessary task is to review the plans for applying the customs agreement concluded for the service of international railroad freight transport between China and Europe. The international freight train is exempted from customs clearance in the other countries only if it has been cleared in China. If Korea can enjoy the exemption on the condition that it should take part in international freight railroad projects and use the international freight trains, then it is expected to secure competitiveness in terms of transport time and cost.

In conclusion, the participation of Korean railroad freight companies in the civil railroad transportation businesses, which China, Kazakhstan, and European countries have jointly funded to ensure that Korea is exempted from customs clearance, passing priority, and transport charge, ensures the strong competitiveness of the international freight train service between Korea and Europe. Moreover, the reduction of idlers during train operations from Europe to China guarantees reciprocally complementary and efficient service of international freight trains.

5. Conclusions

So far, Korea has not been able to practice inland transportation for import and export from and to Mongolia, China, and Russia. An examination of customs clearance, relevant documents and authentication system in those countries has been conducted to implement the Eurasian Initiative and the Silk Road Express. Such examination has revealed the cost and documentation problems in Russia and Mongolia, which have selective clearance procedures and authentication system due to deteriorated infrastructures for the clearance of goods. In Mongolia, the railroad is the core freight transportation means. In particular, raw materials, including minerals, take up 90% of exports, thereby aggravating the burden of railroad transportation. The railroad of the inland country of Mongolia is

not only the means of exit to Europe, Russia, and Asia but also a fundamental infrastructure for foreign trade. GOST, the Russian authentication system, may protect its own people. However, it is also causing many problems with regard to the advance to Europe for securing markets or export to Russia.

Today, a high amount is charged for the use of the Mongolian TMGR. To solve this problem, the customs clearance cost and the charge for use of TMGR need to be reduced when the ongoing negotiations for the FTA between Mongolia and Korea are concluded. The major exports of Mongolia are resources; thus, industrial cooperation should be expanded for the construction of a strategic system. Furthermore, investment plans need to be secured for the international transportation network between the two countries to remodel deteriorated facilities. In 2010, Mongolia initiated the three-phase Railroad Development Policy; 1,100 km will be built in the first phase, 900 km will be built in the second phase, and 3,600 km will be built in the phase through the country's own investment.

The authentication system for the protection of Russia's people is generating import and export problems. Another problem is the delayed time and high cost of customs clearance. Russia is planning to slash these costs until 2018 by joining WHO and has made several cost-saving efforts as well, which have not produced any satisfactory outcomes.

The conclusion of the FTA between China and Korea, which will solve the problems related to customs clearance cost and time in China, is expected to ensure convenient clearance and trade. Moreover, the specification of direct control at harbors and the clearance principal within 48 hours through the submission of electronic papers for goods export is expected to reduce time and cost.

To ensure efficient international freight transportation in the northeast Asian countries, including Korea, the Eurasian international railroad freight transport system shall be realized with the connection of TSR and TKR. Korea, which is isolated because of political issues with North Korea, has been conducting trade with foreign countries through maritime transportation and harbors. However, its inefficient logistic system remains in place because of long transportation hours and high transportation charge. Accordingly, Korea primarily has to join the international freight transport organization of OSJD. Doing so was not easy because of the objection from North Korea. However, with the aggressive attitude of the chairman of OSJD in this regard, Korea is expected to become a full member soon. After Korea has joined OSJD, a systematic and efficient Eurasian Railroad Freight Transportation System should be constructed through the establishment of standardization policies for border passing and customs clearance, including plans for the service of international freight trains during conferences with concerned countries and an increase in the size of international freight railroad transport markets.

References

- Choi, Kyoungsoon, Park, Gyeikark, Lee, Roman R., & Yoon, Daegwon (2012). A Study on the Economic Validity of TSR Connecting TKR. *Journal of the Korean Society of Marine Environment & Safety*, 18(4), 345-351.
- Hwang, Joongseo (2011). The Russian Entry into WTO and Korea-Russia's Trade Prospection. *Social science review*, 30(1), 119-150.
- Ha, Ohkeun, Hwang, Jaesik, Kim, Ickhee, & Mun, Youngwoo (2015). A Preliminary Study of Railway Transport of LNG between TKR-TSR. *LHI Journal of Land, Housing, and Urban Affairs*, 6(2), 61-66.
- Jeong, Jaeho, Kim, Miyoung, & Ryu, Taehyun (2012). *China's customs regulations FTA study for Trade Facilitation*. Sejong, Korea: Korea Institute of Public Finance.
- KOTRA (2015). *National Information: Customs Clearance(Russia, China, Mongolia)*. Retrieved November 22, 2015, from <http://www.globalwindow.org/GW/global/trade/info/nation-info.html>.
- La, Gongwoo, Min, Taehong, & Kim, Hyeongcheol (2012). A Study on the customs system and clearance difficulties of Russian. *The Journal of Korea Research Society for Customs*, 13(3), 47-67.
- Oh, Jonghyeok (2013). The main problems and prospects of international cargo between Europe and Chongqing of China. *Provincial Economic Trends in China*, 4(5), 1-12.
- Ohk, Dongseok (2013). *Clearance Environmental Research in emerging trading partners: Russia*. Sejong, Korea: Korea Institute of Public Finance.
- Seo, Jongwon, Ahn, Byeongmin, & Lee, Oknam (2014). *Direction of Developing Silk Road Express for the Eurasia Initiative*. Sejong, Korea: The Korea Transport Institute.
- Sung, Weonyong, Won, Dongwook, & Yim, Dongmin (2005). *A Comparative Study on Development Strategies of International Corridors Using Land Bridges: Cases of Russia and China*. Sejong, Korea: The Korea Transport Institute.