An Analysis of North Korea's International Logistics Capability

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Abstract

This study aims to evaluate the crucial factors that influence North Korea's international logistics capabilities. North Korea is one of the most state-controlled and underdeveloped countries in the world. Although various aspects of the country, including its politics, government policy, and international diplomacy have been widely researched in the literature, the administration of its international logistics capability has remained unexplored. This study evaluates key factors comprising North Korea's international logistics capability using secondary data. The key factors include transportation capability, external risks, information integration, logistics infrastructure, and national law and policy. Using secondary data collected from various sources, the current situation of North Korea's international logistics capability has been diagnosed in terms of these factors. Findings show that North Korea's international transportation capacity, infrastructure construction, international logistics risk factors, and logistics information integration capacity are generally poor, and there is considerable scope for improvement. This study will provide useful suggestions to solve the identified problems and may contribute to greater improvement of the international logistics competitiveness of North Korea, despite many political restrictions. This study may also provide meaningful insight for international business managers who wish to seek business opportunities in North Korea in the future.

Keywords: Logistics Status, International Logistics Capability, North Korea, State-controlled Country

1. Introduction

Until now, research on North Korea's logistics industry has not received much attention due to the lack of available information and data. North Korea has unique circumstances in that it is a developing country with communist ideology and very little openness and accessibility, making it difficult to research international management such as logistics. North Korea, which underwent economic reforms in the mid-2000s, experienced major changes in the maritime and port logistics sector at this time, including the expansion of economic cooperation with South Korea and the promotion of foreign trade with Northeast Asian countries[1]. However, despite recent reforms and trade growth, North Korea has many limitations in terms of the international transport system and the multimodal logistics that connect sea and land.

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Although it may not be meaningful to study the international logistics and competitiveness of internationally isolated or declining countries, research on international logistics in North Korea is very important for the following reasons. First, despite North Korea's militarism and unstable attitudes, the investments it receives from foreign companies has increased since the economic reforms. This illustrates the potential of North Korea's ongoing economic development, as well as South Korea's economic development strategy in preparation for future unification. Second, there are eight international trade ports in North Korea, and most large cities such as Pyongyang are adjacent to the coast. However, North Korea has many difficulties moving goods inland due to the lack of energy, road, and rail infrastructure, as well as the expense of connecting the urban system[1]. Third, the Korean peninsula is in a geopolitical position where the continental and maritime countries meet; as such, many economic and social values can be expected to arise from the reunification of South and North Korea. Recently, North Korea has gained new momentum from the proactive denuclearisation declaration, the inter-Korean summit, and the North American summit. Various variables may contribute to an unfriendly atmosphere between the two Koreas, but there is no doubt that changes will emerge in North Korea's economy in the future[2]. Even then, North Korea has made little investment in social overhead capital, which is the basis of the national economy, due to the fact that national finance has been concentrated towards maintaining the system for the past 30 years. Therefore, North Korea's economic reconstruction should begin with investment into its social overhead capital[2]. Above all, the reconstruction of the international logistics system, especially the shipping and port logistics infrastructure, is crucial for North Korea's development and growth.

As such, it is important to understand the current status of North Korea's international logistics and shipping and port logistics systems, and to analyse the competitiveness of international logistics. In doing so, it will be possible to identify logistics problems in North Korea and discuss ways to improve them in the future. Until now, however, most studies have focused on the importance of establishing a system of economic cooperation between South Korea and North Korea, thereby neglecting North Korea's international logistics system and its competitiveness. On account of this gap in the research, this study aims to discuss the status of North Korea's international logistics system.

This paper will focus on the following topics. Firstly, the significance of North Korea's international logistics system's capacity. The analytic framework is presented, after which the competitiveness of North Korea's international logistics system is analysed. Lastly, the results are discussed followed by a conclusion

2. Literature Review

2.1 Economic Status of North Korea

In 2018, North Korea's population was 25.15 million, one-half of South Korea's 55.51 million. In 2018, North Korea's gross national income (GNI) was 35.89 trillion won, which is one-third of the 53rd share of South Korea's 1898.45 trillion won. In 2018, North Korea's economic growth rate decreased by 4.1% in comparison to the previous year[3].

[Table 1] Major Economic Indicators of North Korea (2018)

Total population	GDP	GNI	GNI per capita	Economic growth
25.13 million people	KRW 35.67 trillion (\$30 billion)	KRW 35.85 trillion (\$30 billion)	KRW 143 million (\$1,400)	-4.1% Compared to 2017

Source: Statistics Korea[3]

In 2018, North Korea's gross domestic product (GDP) was 35.67 trillion won, one-53rd of South Korea's 189.3 trillion and 490 billion won. Meanwhile, in 2018, North Korea's gross domestic product by industry was ranked as follows: service (33.0%); agriculture, forestry, and fishery (23.3%); manufacturing (18.8%); and mining (10.6%). On the other hand, South Korea had services (60.7%), manufacturing (29.2%), and construction (5.9%)[3].

[Table 2] Sectors' Importance (unit %)

Sectors	Importance (%)
Agriculture, Forestry, and Fishery	23.3
Mining	10.6
Manufacturing	18.8
Electric, Gas, and Water industry	5.4
Construction	8.9
Services	33

Source: Statistics Korea[3]

[Table 3] Import and Export Status (2018)

Total trade amount	Export amount	Import amount
\$2.83 billion	\$243 million	\$2,601 million

Source: Statistics Korea[3]

In 2018, North Korea's total trade amounted to \$2.83 billion, one-401th of South Korea's \$140 trillion and \$62 million. North Korea's exports totalled \$243 million and imports were \$2,601 million. In 2018, North Korea's main export and import partner was China, accounting for 80.2% and 97.2%, respectively[3].

[Table 4] Major Import and Export Countries (2018)

Ranking	Export country	Export amount (unit: \$1,000)	Import country	Import amount (unit: \$1,000)
1	China	194,624	China	2,528,316
2	Pakistan	6,352	Russia	32,083
3	India	3,678	India	17,791
4	Bangladesh	3,226	Swiss	3,230
5	Ghana	3,183	Germany	3,191
	Others	31,647	Others	16,163
	Sum	242,710	Sum	2,600,774

Source: Statistics Korea[3]

In 2018, North Korea's power generation capacity was 8,150 MW, and its total railroad length was 5,289 km, 1.3 times longer than South Korea's 4,074 km. In 2018, North Korea's ship tonnage stood at 1010,000 G / T, which is one-third of South Korea's 43.87 million G / T[3].

[Table 5] Other Statistics (2018)

Energy	Power plant capacity (MW)	8,150
	Power generation capacity (billion kWh)	249
Social Overhead Capital	Railway (km)	5,289
	Ship tonnage (million G/T)	101
	Port loading capacity (1,000 tons)	43,610

Source: Statistics Korea[3]

2.2 Prior Studies on North Korea's Maritime Logistics

Research on North Korea's international logistics network has mainly approached the topic from the perspective of its relationship with South Korea, which emphasizes the need to maintain friendly relations in order to focus on mutual economic cooperation. Jung et al.[2] suggested that logistics policy in the Korean Peninsula focuses on increasing the volume of inter-Korean trade, and suggested investment plans for major facilities in the logistics network

of the two Koreas. Jung et al.[4] also proposed the integration and utilisation of the logistics system between the two Koreas. Similarly, Lee et al.[5] studied the step-by-step plan for new exchange and cooperation between the two Koreas, and suggested implementing inter-Korean economic cooperation. Furthermore, Hwang[6] stated that the cooperative tasks in the inter-Korean port logistics field include the development of port experts, the inter-Korean regular route service, and the development of tourism belts through maritime tourism cooperation. These studies address the significance of cooperation between South and North Korea in promoting economic development between the nations and maintaining peace in the Korean Peninsula.

Lee[2] emphasised the importance of modernising Nampo and Haeju ports and developing unloading equipment and new ports for North Korean port development. He also stressed the importance of international logistics networks throughout the Eurasian continent and the West Sea. Hwang[6] suggested four aspects of shipping market infrastructure, laws, institutions, policies, manpower development programmes, labour market, and infrastructure, as a way to build a foundation for maritime cooperation based on changes in inter-Korean relations. In addition, he considered it important to form a logistics network centred around the ports of Najin, Wonsan, Haeju, and Sinuiju special zones, which are the major hubs of North Korea, as a direction of cooperation in the maritime port logistics sector. Ducruet[1] measured hub dependence in the case of North Korea, and analysed the weight and geographical extent of its maritime connections. It showed the spatial shift from long-distance calls to feeder calls: global foreland contraction, regionalisation within Northeast Asia, and traffic concentration in the hubs closest to South Korean ports.

Although many studies have provided meaningful results on the logistics situation in North Korea, as well as suggestions on how to build logistics cooperation between the two Koreas, few studies have systematically analysed North Korea's international logistics competitiveness. Therefore, this study derives key factors for evaluating North Korea's international logistics competitiveness and systematically analyses North Korea's international logistics competitiveness with respect to these indicators.

3. Research Method

In order to analyse North Korea's international logistics competitiveness, it is necessary to derive international logistics competitiveness evaluation indexes. As shown in Table 1, Yang and Chang[7] proposed the following six evaluation factors to analyse the international logistics capacity of inland countries in Africa: Transportation Capability, External Risks, Information

Integration, Logistics Infrastructure, Local Agents, and National Law and Policy.

[Table 6] International Logistics Capability Factors

Key factors	Indicators
Transportation Capability	The capability of foreign agents Transit time/Cargo safety Transportation cost/Selection of carriage The ability to track transit cargo The ability to provide multimodal service
External Risks	National culture/Climate Cargo insurance coverage Political stability Numbers of foreign companies or agents
Information Integration	Information on transshipment port Information on the departure port Information on the destination port The quality of electronic data interchange (EDI)
Logistics Infrastructure	Highway/Railway/Seaport/Warehouse facilities
Local Agents' Logistics Capability	Information feedback efficiency of local agents Customs clearance efficiency of local agents Inland transport efficiency of local agents Financial condition of local agents
National Law and Policy	Import and export restrictions on commodities Inspection and quarantine The efficiency of local government administration The certificate of origin Import tariff

Source: Yang and Chang[7]

This study reclassifies the indicators to make it applicable to the logistics sector in North Korea by referring to the international logistics competitiveness factors presented by Yang and Chang[7]: Transportation capability and related infrastructure; external risks, national law, and policy; and information integration. In regard to local agents' logistics capability, since North Korea does not have a freight forwarding or local logistics agent business, it tends to use brokerage firms in China (including Hong Kong). Some say this allows brokers in other regions, but these agencies are controlled by the state, which restrict the public from accessing port facilities. For these reasons, the local agents' logistics capability factor cannot be used in this study.

Data analysis and collection were done using existing literature and secondary data. Existing studies have mainly analysed North Korea's logistics status by focussing on one or two factors without considering various indicators of logistics' capability. This study is different from previous studies as it analyses factors necessary for competitiveness in international logistics. It

would be meaningful to analyse North Korea's international competitiveness using in-depth secondary data.

4. International Logistics Competitiveness of North Korea

4.1 Transportation Capability and Related Infrastructure

4.1.1 Rail Transportation

In the system of transportation infrastructure in North Korea, roads and shipping are used as auxiliary means, mainly on railways. Although railroads are the central means of logistics, its rail and road infrastructure is very poor. 'In North Korea, passenger trains run at 30-35km and freight trains with a lot of luggage run at 20km'[8]. International trade transport primarily operates on these railroads; for example, as North Korea is bordered by its two major trading partners, China and Russia, trade cargo between these countries is transported by rail.

The problem with North Korean railway logistics is the means of rail transportation itself. Roads can transport things from door to door, while railroads lack stationary transport. In the case of rail transportation, the freight rates and transit time between railroad stations are ahead of the road, but the road is advantageous for short-distance transportation due to the additional cost and time required for shuttle transportation and transshipment. Second is the limitation of national space; North Korea's railroads lack the profitability of freight train operations due to the limitation of long-distance transportation, which is because of the narrowing of national space. In addition, long distance transportation, which is normally a huge benefit of railroads, is difficult due to the scattering of small cargo handling stations. Third, North Korea's railways generally lack rail logistics infrastructure and are in poor condition. The lack of rail networks in ports and industrial complexes also makes it difficult to attract freight. The railroad facilities and equipment are very poor, and the competitiveness is inferior on account of the inefficient operation of logistics bases[4][9].

Another problem with North Korea's rail transportation is the electricity sector. North Korea increased the electrification of its railroads to 80%. Since the late 1970s, the policy of manufacturing electric locomotives, which had been designated as one of the four leading sectors (electricity, coal, metal, and railroad transportation) has been prioritised for financial investment. However, if 97% of the route is disconnected, they have to rely on old coal steam locomotives or diesel engine locomotives. Therefore, the electric railway infrastructure is

considered a serious problem in North Korea's rail transport[10]. These are the reasons why the North Korean railway operating system is very slow. The speed of Pyongyang-Sinuiju is 60.3 km/h, which takes 5-6 hours, but it actually takes at least 12 hours[10].

4.1.2 Maritime Transportation

On the other hand, in terms of overseas maritime transport, North Korea has developed into a coastal shipping centre due to the geographical limitations of the east and west coasts that span 3,000 km. As the shipping and port facilities are aging and the utilisation rate is low, the share of shipping is only 2 ~ 3%. North Korea's foreign routes are very poor and mainly concentrated on the east coast. Major routes include the Chongjin-Vladivostok, Chongjin and Niigata, Wonsan-Vladivostok, Wonsan-Nahodka, and Wonsan-Niigata routes on the East Sea, and the Nampo-Shanghai and Nampo-Singapore routes on the West Sea. Additionally, with the opening of Southeast Asian cargo routes, cargo ships are now going to Hong Kong, Thailand and other places such as the Middle East, the Americas, Europe, and Africa, But these routes only comprise a small proportion of maritime transport. North Korea's maritime and seaports are separated from each other by about 3,000km of east-west coast, which not only hinders the organic linkage of coastal shipping, but also allows them to be transported to major trading partners, China and Russia, by land. The development is very slow, and as a result, the share of shipping is only about 1 ~ 2%[4][6].

Since the 1980s, in accordance with the policy of increasing foreign trade, the major trade ports have been expanded. However, compared to the size of the ports, unloading facilities are behind, resulting in delayed unloading operations. As there are no multi-purpose docks that can handle container cargo, the automation of unloading facilities is barely developed. In terms of port facility management, the lack of management and control functions, as well as the lack of transportation information, have resulted in severe backlogs of coal cargoes (such as coal and ores at several ports including Nampo Port). The ship's berth is limited due to the shallowness of the water, and the deterioration of the utilisation rate of ships and port facilities, due to the aging of the ship and oil shortages, is also causing the North's sea transportation capacity to decrease. In addition, North Korea's port services are very poor; pilot hours are limited to the period between 9:00 and 15:00, and are not available at night. In most other nations, pilots are available 24 hours a day, and can be used all the time, except in special cases. However, North Korea has no port facilities, and it is impossible to supply night lights due to the difficulty of supplying light facilities and energy[4][11].

4.1.3 Air Transportation

North Korea's air transportation infrastructure is very poor in terms of both quantity and quality. In particular, North Korea's aviation demand is so low that it hinders the development of the airline industry. In addition, the management and operation of the entire aviation industry are monopolised by a single civilian aviation station, and therefore, market economic principles are difficult to operate. Air Koryo (KOR), which is in charge of air transportation, was previously called the Joseon Minhang (Chosun Civil Aviation Administration) but was renamed on October 1, 1992. KOR officially joined the International Air Transport Association (IATA) in November 1996. KOR carries out transportation activities and overall operations related to civil aviation such as air administration, safety guidance and supervision, airport management, and air traffic control at the national level. In the 1990s, with the collapse of the socialist system of the Soviet Union and Eastern Europe, the international flight service of KOR in North Korea was reduced. Currently, only KOR's Tu-204 aircraft is permitted to operate in the European Union, and the rest of the operation is prohibited due to its obsolescence[12].

[Table 7] Major Airports in North Korea

Airports	Region	Airstrip(m)	Surrounding Areas
Sunan	Pyongyangsi Sunan region	3,500 × 70	22km from Pyongyang
Earang	Hamgyungbukdo Earanggun	2,400 × 61	40km from Chungjin
Samjiyeon	Yanggangdo Samjiyeongun	3,315 × 60	Baekdu Mountain Ski Resort
Wonsan	Gangwondo Wonsansi	2,438 × 52	5km from Wonsansi
Seondeok	Hamgyungnamdo Jeonpyunggun	2,438 × 50	-
Hwangju	Hwanghaebukdo Hwangjugun	2,500 × 49	40km from Pyongyang

Source: Korea Maritime Institute[13]

Another important issue is the lack of aviation infrastructure. North Korea's airport facilities are generally aging. There is a total of 33 airports in North Korea, but most of them are military airports. Sunan Airport, a major North Korean airport, also expanded the military airfield used during the Japanese colonial era. As a result, most airports have rundown facilities, including runways. In particular, airports other than Sunan and Erlang airports cannot enable the taking off or landing of large aircrafts[5][14]. Table 7 shows major airports in North Korea.

4.2 External Risks, National Law and Policy

The overall risk factor for logistics is first, a matter of passage, which means that foreign companies are not free to enter and exit North Korea for logistics activities. This is a problem for the entire state. At present, foreign companies, including those from China, have to obtain a permit for transportation and passage in North Korea. Second, customs clearance issues need to be improved, as currently, complicated procedures are required to export products produced in North Korea. Various documents, such as licensing procedures and proof of country of origin, must be submitted as part of complex border crossing procedures. In addition, there are many political and diplomatic constraints on the construction of the maritime transport system, and thus, the rationality based on the pursuit of profit tends to be ignored. North Korea's maritime transport legislation is not only anti-market but also inconsistent with international practice. Third, there are not only restrictions on ship porting due to the lack of facilities and equipment of North Korean ports, but also low loading efficiency. This problem seems difficult to solve given the limitations of North Korea's financial capability[4].

In addition to the risk factors in terms of logistics operations, there are risks in shipping operations. For example, when a vessel is docked, a customs officer boards the vessel to inspect the ship using a tugboat (which is, in fact, usually an old ship). In the case of an emergency, there may be a delay because of the difficulty of securing a tugboat. As a result of pilot error, smooth handling is difficult in an accident, and even if a request for arbitration is made through a lawsuit, it is not easy to carry out such procedures. In addition, the shipping company will reimburse the shipper if the unloading workers accidentally drop the container onto the ground and damage the goods[4].

Furthermore, there are many other risks associated with ship operations. For example, in most countries, if repairs need to be made on a ship, they can be done quickly by a specialist; however, there is no such system in North Korea.

4.3 Information Integration

Although North Korea focuses on information and communication due to the advancement of scientific and technology-oriented policies, there are many constraints in information integration-related technologies due to unbalanced development between industries and foreign technology exchange restrictions. North Korea emphasises the importance of science and technology such as information and communication in Articles 27, 50, and 51 of the

Constitution and encourages efforts to promote information technology, such as IT education. North Korea's science and technology investment budget growth rate increased by 5.5% in '16, 8.5% in '17, '7.3% in '18, and 8.7% in '19[15]. Nevertheless, North Korea's information system is still insufficient. In international logistics management, the integration of logistics information systems and operating systems should be achieved. In particular, Since North Korea remains a very closed country, transparent logistics information operations and systems are very poor. North Korea believes that easing or eliminating this is necessary for the establishment of an information system. In addition, it needs logistics-related companies to open a business network and promote the expansion of joint ventures[4][16].

5. Conclusion

This study analysed the current status of North Korea's international logistics and shipping and port logistics systems, and analysed international logistics competitiveness. Through this it was possible to identify the logistical problems that North Korea faces. In particular, North Korea's international transportation capacity, related infrastructure construction, international logistics risk factors, and logistics information integration capacity, were analysed in depth. Until now, North Korea's logistics capacity has been expected to be vaguely poor, but this study classifies specific factors for evaluating North Korea's international logistics capacity and systematically analyses the existing literature on each factor. In this sense, this study is differentiated from the existing research. Such attempts will allow North Korea to deepen its understanding of the problems it faces in terms of international logistics and shipping ports system, and will encourage in-depth discussions on ways to solve these problems in the future.

On the other hand, this study has some limitations that should be noted. For example, it used only secondary qualitative data and subjective analysis in data collection and analysis. Therefore, future studies ought to focus on conducting a more objective analysis through a questionnaire survey on North Korea's international logistics capabilities, as well as problems that companies who have used North Korean logistics services have faced.

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