PRESENT CONDITIONS OF NORTH KOREAN INDUSTRY AND POSSIBLE RECONSTRUCTION PLANS

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Abstract

Since the collapse of industry during the 'Arduous March' (1995-1997), Pyongyang has continuously launched reconstruction plans but has failed to see a rebound. The key is to restore industrial linkages; however, the DPRK allocated a majority of state investment to the defense industry under the 'Military First Economic Policy.' As long as the 'strategic sector' retains priority, a sound outcome seems to be out of reach. In reality, North Korea's comparative advantage lies on labor-intensive business, with abundant labor forces at a low cost. After unification, such industries will have bright prospects with technology and capital not only from South Korea, but also from China and Japan. The economic integration scenario of the two Koreas—whether radical or gradual—will decide industrial policies for the upper half of the peninsula in the post-unification era.

North Korea's Industrial Reconstruction

Facing the sudden disintegration of the Soviet bloc and consecutive natural disasters, North Korean industry collapsed *de facto* in the mid-1990s. Supply shortages in not only manufacturing and mining but also agricultural and food industries resulted in mass starvation; the death toll amounted to at least hundreds of thousands. DPRK calls this period the 'Arduous March' (1995-1997). As Kim Jung-il took control in 1998, he set up 'building a strong and prosperous state' as a new policy goal and initiated industrial reconstruction. Such an objective refers to restoring economic conditions up to those of 1987, when economic prosperity reached its peak.[1] Kim's regime announced 2012 as the deadline for achievement.[2]

As seen in Table 1, however, present production records fall far behind the target. Compared to output levels around 1987, iron ore (57.6 percent), cement (49.4 percent), and electricity (38.9 percent) are only about a half of expected yields; coal (31.9 percent), chemical fiber (20.6 percent), steel (16.5 percent), and chemical fertilizer (9.7 percent) are even worse, mostly reaching below 30 percent of peak level. Only food supplies are showing a relatively solid recovery (89.8 percent). Even if the benchmark was set realistically at the year 1990—the dawn of the collapse of the Soviet Bloc—output performances are not so impressive. Food (125.1 percent) and cement (108.9 percent) surpassed the reference point, but coal and electricity productions are at 81.7 percent and 78 percent respectively. Other sectors such as iron ore (64.9 percent), steel (36.3 percent), chemical fertilizer (56.5 percent), and chemical fiber (20.6 percent) still have a long way to go.

In other words, reconstruction has been delayed as industrial linkages are stuck in the middle of the road. Slow recovery of the metal sector hindered productive circulation (energy → metal → machinery and construction) in the heavy industry; performances in coal and chemicals are not sufficient to restore enough chain-reactions (energy → coal → chemicals → light industry and agriculture) to expand supply of consumer goods. Even though food production overcame the 1990 level, it was not as a result of an increased supply of fertilizers and farming machines or the recovery of industrial linkages. Pyongyang has been emphasizing investment in the metal and coal chemical industries, but focusing on old and economically inefficient technologies such as Juche, iron, fertilizers, and textiles instead of advanced ones.[3]

Why did industrial reconstruction in North Korea turn out to be a failure? Pyongyang adopted the 'Military First Economic Policy' as a means of constructing a 'strong and prosperous state' in the early 2000s. Measures for economic reform and opening up, such as the July 1st Reform, were introduced to first support military-related production industries—'the strategic sector.' Non-strategic sectors, such as light and local industries, could then be recovered through a trickle-down effect. Since the DPRK economy is centered on heavy industry, which systematically supports military production on top of the ladder, North Korean authorities expected that developing the 'strategic sector' first would stimulate the entire industrial system through a multiplier effect. In reality, however, momentum was quickly lost even before trickling down to heavy industry.

Table 1 Production Records of North Korea's Major Products

Products	Circa 1987 (A)*	1990 (B)	1998 (C)	2002 (D)	2010 (E)	2011 (F)	2012 (G)	2013 (H)	2014 (I)	I/A (%)	I/B (%)	1998-2002 Avg. yearly growth (%)	2002-2010 Avg. yearly growth (%)	2010-2014 Avg. yearly growth (%)
Coal	8,500	3,315	1,860	2,190	2,500	2,550	2,580	2,660	2,709	31.9	81.7	4.40	1.70	2.03
Electricity	55.5	27.7	17	19	23.7	21.1	21.5	22.1	21.6	3.9	78	2.97	2.90	-2.14
Food***	560**	402	389	413	450	469	441	492	503	89.8	125.1	2.09	1.26	3.01
Iron Ore	950	843	289	408	509	523	519	549	547	57.6	64.9	9.76	2.91	1.84
Steel	740	336	95	104	128	123	122	121	122	16.5	36.3	3.61	2.71	-1.16
Cement	1,350	613	315	532	628	645	645	660	668	49.4	108.9	14.41	2.14	1.55
Chemical Fertilizer	520	89	39	50	46	47	48	49	50	9.7	56.5	8.39	-0.89	2.27
Chemical Fiber	12.6	5.0	3.5	2.6	3.0	2.5	2.5	2.5	2.6	20.6	52.0	-6.51	1.90	-3.17

* It refers to the best yearly performance circa 1987; the benchmark year for food, iron ore, and steel are 1987, 1985, and 1984 respectively. Other products are based on output levels in 1989.

** North Korea reported production of grains in 1987 as 10 million metric tons, but the standard is rough grains not yet polished. Hence, numbers are converted by Korean Rural Development Administration, in terms of milled grains.

*** Estimates since 2010 came from FAO/WFP (2013).

All Quantities are measured in 10,000 metric tons except for electricity, which is based on billion kWh.

Source: Korea Ministry of Unification (1996); Bank of Korea Economic Statistics System (2015); Kim (2015), pp.41-51.

Furthermore, to execute such a plan, Kim Jung-il had to allow the advent of markets in non-strategic sectors under the 'self-reliance' principle; marketization in North Korea is just a flip-side of relinquishing fiscal assistance on non-military sectors in this manner. The policy also assumes exploitation and transmission of economic surpluses from marketization in order to develop the strategic sector, which severely restrains capital accumulation in market and civilian sectors. While the 'Military First Economic Policy' was a means of achieving a 'strong and prosperous state,' it turned out to be the core cause of failure in North Korea's industrial reconstruction for the last 18 years.

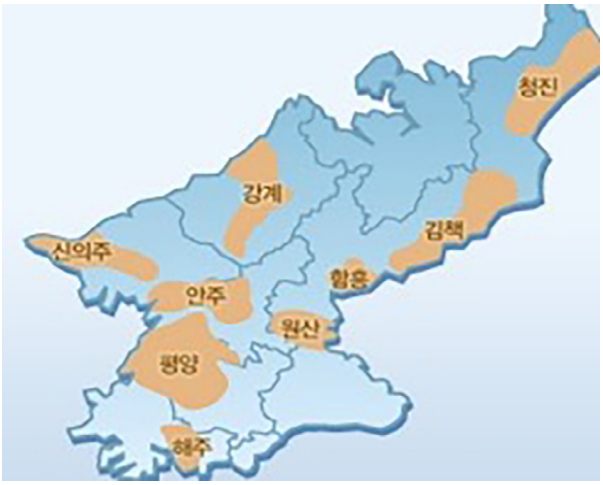
Geographical Distribution of North Korean Industry

The majority of North Korean firms are located in one of the five large industrial zones—Pyongyang-Nampo, Shinuiju, Hamhung, Chungjin, and Gangye—or the four medium to small zones of Haeju, Anju, Wonsan, and Kimchaek. Even before 1945, enterprises had been intensively clustered in maritime regions for proximity to resources, convenience in transportation, and high population density, except for Gangye which was built as a defense industry cluster. All of the other eight zones share these common traits. In addition, there are two special economic zones (SEZ) in Kaesong and Rajin-Sunbong area.

The largest industrial zone in the DPRK is the Pyongyang-Nampo area, conveniently located at the nation's capital and around rich mines. Comprised of Pyongyang, Nampo, Songlim, and Sariwon, it is the greatest in terms of area and economic performance, accounting for 50 percent of GDP and 30 percent of manufacturing industry in North Korea. In Pyongyang, not only heavy industries such as machinery, steel, and construction materials but also light industries, such as food, are well developed. Nampo is centered on manufacturing, so metalworking and mechanical industries such as steel, heavy machinery, and shipbuilding are well established there. This area is also the largest nonferrous metal processing belt in DPRK, which sustains the supply chain of heavy industry flowing from iron and steel to machinery.

Having abundant electric power sources, the Shinuiju zone fostered the chemical fiber, paper, textile, and shoes industries. This area was originally developed for pulp production during Japanese rule; nowadays light industries take up a large share due to comparative disadvantages in terms of skilled labor, port facilities, and energy supply to other zones. Hamhung has grown into the largest complex for chemical industries in DPRK with its ample resources, proximity to production plants, and transport convenience. It is also part of a huge industrial belt extending down to Wonsan, making up the largest machinery production base second to Pyongyang, with 16 percent of total outputs in mechanical industry.

Figure 1 North Korea's Major Industrial Zones



Source: Korea International Trade Association (KITA)

The Chungjin zone is the largest industrial complex in the northeast region. Both heavy (especially iron and steel) and light industries are well established in a balanced way. Its abundant natural resources, including iron ore and brown coals, attracted core heavy manufacturers such as Kimchaek Iron and Steel Complex, the largest steelworks in DPRK. Gangye, the only landlocked industrial zone in the state, has been developed as a military-related production base with its remote location from the coast and truce line. Plentiful stock of iron ore, anthracite, and graphite as well as ease in supplying machine parts from Pyongyang through the Manpo railroad line brought more than 20 large factories, including the nation's largest Huichon machinery plant, to this area.

Potential of North Korean Industry

Assuming that unification occurs, or inter-Korean relationships improve, labor-intensive industries have a bright future with their competitiveness in overseas markets. The wage level is significantly lower than that of major developing countries in Asia; abundant low-cost labor is likely to expedite investments to the North, as labor costs are recently on the rise in China, a current production base for a number of Korean firms. Actually, China's yearly average income growth rate is more than 10 percent, and appreciation of the Chinese *Yuan* is expected.

Among current industrial zones in the DPRK, Pyongyang-Nampo, Kaesong, Shinuiju, Wonsan, Hamhung, and Chungjin seem to be appropriate places to attract foreign investment and trade. They have a large labor force and provide easy access to neighboring countries. On the contrary, landlocked areas such as the Gangye zone need to undergo structural adjustments as they are established for strategic reasons in spite of unfavorable geographical conditions.

Building new production facilities for the iron and steel industries in the North may be another higher value-added business. South Korean firms own high technologies and competitiveness in this field, but they are looking for manufacturing bases in resource-rich countries overseas due to burdensome real estate prices. North Korea has advantages not only in abundant resources but also the possibility of supplying state-owned land at a low cost. However, whether large-scale iron and steel facilities are economically feasible should be scrutinized. In addition to resource-related industries, nonferrous metal processing businesses such as cement, ceramics, glass products, and floor tiles may also be relocated to northern parts of the Korean Peninsula. Even though there are a variety of nonmetallic ores in the south, associated industries are declining for rising production costs following high wages and environmental regulations.

North Korea's prospects are likely to be strong in this area with low labor and land costs and its accessibility to raw materials. Investment incentives in North Korea are also solid in industries where location matters; regarding the depth of the sea and number of rainy days, the Wonsan area has perfect conditions to attract large shipyards.

Since major industrial sites in the DPRK are already well equipped with basic infrastructure including sites, buildings, and roads, it may be possible to develop manufacturing centers at a lower cost than the Kaesong complex. The South Korean government managed the whole process in founding a new industrial zone at Kaesong and offered: grants for constructing infrastructure, investments on power and telecommunications facilities via state-owned enterprises such as Korea Electric Power Corporation (KEPCO) and Korea Telecom (KT), and long-term loans with payment guarantees to firms entering the complex. Such governmental efforts successfully stabilized the project. If these experiences are used effectively to develop North Korean industrial zones after Korean unification, not only traditional labor-intensive businesses such as clothing and textiles but also partly labor-intensive businesses such as electronics, machinery, and metals will have considerable potential.

Industrial Policies on the North Korean Region after Unification

The main framework for post-unification industrial policies in North Korea will depend on how the two economies integrate. If the Korean Peninsula experiences a rapid economic integration similar to the German one, labor-intensive industries may not be as competitive as expected. Current wage levels will quickly skyrocket as the labor market and social welfare system are merged with those of South Korea in a short period of time, thus weakening competitiveness in cheap labor costs. In this scenario, measures would be comparable to actions taken by West Germany; immediate reconstruction of industries in the North and intensive buildup of capital-intensive industries would close the gap between wage and productivity.

On the other hand, a gradual merger of the two Koreas may also take place. In this scenario, the North Korean region would maintain its current wage level for a considerable amount of time and competitiveness of labor-intensive industries would be retained. However, productivity would not rise as much as with rapid integration, so the entire integration process would decelerate as well.

Which integration scenario a unified Korean government would choose is more than just an economic decision. In Germany, socio-political factors played a crucial role in leading unification to take an immediate track. Residents in East Germany were set to receive substantial economic benefits within a brief period in order to gain public support for unification and solidify the ruling party (CDP)'s victory in the upcoming election.

Yet, it should be noted that South Korea has relatively insufficient financial capacity to carry out a radical approach, considering West Germany's top-notch economic strength at that time, and a larger economic gap between North and South Korea than East and West Germany. A sudden integration without efforts to downsize the cost of unification to a manageable level may turn out to be an economic disaster.

A more favorable approach to economic integration after unification is a gradual merger within temporary separation, if the administration is able to control socio-political pressures favoring the rapid integration scenario. After political unification, the North Korean region would be managed as a special economic zone for a designated period. The two economies would merge at a moderate pace when economic development in the North reached a desirable level. The main objective of such a temporary arrangement is to provide enough economic incentives to deter a massive migration from the North to the South. Industrial and development policies should also aim to achieve this goal. In order to implement this kind of unification plan, a political consensus that the economy is the first consideration should be reached beforehand.

When establishing industrial policies for the North Korean region, it is also important to choose between selective and horizontal industrial policies. The former concentrates on promoting strategic industries, while the latter intends to ameliorate industries as a whole. The selective approach improves outputs and constructs vertical integration with industrial counterparts in the South in a relatively short term; however, it also distorts industrial structure in the Northern regions for a long time, thus delaying social integration of the Korean Peninsula. On the other hand, the horizontal industrial policy evades structural distortion problems but experiences rather crawling improvement in economic outcomes. The government needs to finance unification costs for an extended

period, and it takes more time to be compensated for such inputs. Also, structural complementarities between two Korean industries will be attained only in a longer term.[4]

Since it is the government who decides on carrying out either selective or horizontal industrial development, political constraints take a part in the decision-making process as with the integration approach. The degree of socio-political pressures may be less in this case, however, so there will be room to implement economically sounder blueprints. In principle, the ideal plan is as follows: selective promotions take place first and are gradually replaced by horizontal policies in the long run. Such a sequence is similar to South Korea's economic development process from the 1960s to 1990s. It is important to prevent current structural distortions in industries of the South from being reproduced in the North.

If the temporary separation approach and selective industrial development become two pillars of medium-term integration policy, the industrial development plan in the Northern region is likely to prioritize industries with comparative advantages in terms of wage, resources, or location. For comparatively disadvantaged ones, policymakers should pursue gradual improvements rather than sudden rearrangements. Since most of DPRK industries fall under the latter category, an expeditious restructuring based on industrial competitiveness would lead to massive layoffs. A surge in unemployment would also strengthen migratory pressures to the South, becoming impossible to maintain the Northern area as a special economic zone for a sufficient amount of time. Thus, the main objective of a unified Korean government on this subject is to focus on reinforcing industries with an export edge and recovering, not restructuring, others. The only exception is the munitions industry, which has virtually zero investment value—a sudden structural change in this area is inevitable after the unification.

Most of the former DPRK industrial zones would be able to retain their competitive edge as long as their facilities and infrastructure, such as power and transportation, are in line. As mentioned before, they are equipped with basic facilities, are located near the world's demand centers, and have opportune logistical conditions. It is advisable to develop the Sinuiju zone into a light industry complex, Hamhung into heavy industry complex, and Pyongyang-Nampo and Chongjin area into a multifunctional complex covering both light and heavy industries. The uniquely landlocked Gangye area, Mecca of North Korea's arms industry, is the only zone that needs to be restructured.[5] To revamp and utilize former industrial complexes, the government should lead large-scale investments in industrial facilities and infrastructure. Institutional and policy-based support will also help captivate private investments from home and abroad.

To parlay former supply sources, the government should select competitive industries as main export drivers and foster them intensively—the strongest candidates would be labor-intensive businesses. This includes not just the clothing and textile industries, but even those traditionally classified as capital-intensive ones such as electronics and shipbuilding. Division of production may occur naturally within the Korean Peninsula, with southern regions specializing in high-end and northern ones in budget products. Thanks to the lower wage level in northern parts of the state, it is probable that industries in their twilight years may revisit their growth phase and a fair number of firms may decide to reshore their manufacturing bases.

Industries where abundant resources from the North and capital from the South can be combined—such as the steel industry—also have bright prospects. If POSCO, one of the world's biggest steel corporations, constructs a production complex near iron mines in the upper parts of the peninsula, the flagship companies in South Korea would be able to restore price competitiveness. When a bountiful stock of rare earths in the north is utilized, the high-tech materials industry acquires a powerful edge over overseas competition in the long run.

In order to foster export-driving industries, Seoul needs to designate multiple SEZs and help firms attract domestic and foreign capital. A possible development plan is to develop export processing zones by private investments, and save governmental budget spending. The Pyongyang-Nampo-Kaesong-Haeju belt is a strong candidate, thanks to a large labor pool and ideal infrastructure. If expanded in size, the Rajin-Sunbong and Sinuiju frontier districts could be likely contenders.

Future Industrial Cooperation Programs for a Unified Korea

After unification, international economic cooperation would be as crucial as intranational support for industrial development of the North Korean region. The subject of economic cooperation is likely to be different for each industrial zone in the North Korean region. For example, Sinuiju and Nampo mainly interact with China's Pan-Bo Hai area (Beijing, Tianjin, and Liaoning province), while Rason and Wonsan are connected with China's Jilin province, Japan, and Russia. Considering that such cooperation takes place in the North, it is worth suggesting two different programs for each coastal area:

Plan I: Transformation of Nampo-Kaesong-Haeju belt into a labor-intensive industrial complex

Assuming that the North Korean region would be managed as a special economic zone for a designated time period after unification, the Nampo-Kaesong-Haeju belt has great potential to be the center for labor-intensive industries in Northeast Asia, in terms of labor, infrastructure, and market. First, the Korean government constructs an international industrial complex using public funds; then production facilities can be prepared

by attracting foreign direct investment. Finally, abundant labor in the region creates final goods that can be sold in China, Japan, and Korea. This plan may attract labor-intensive industries from not only Korea but also Japan and China, where wage levels are continuously rising. In order to support the plan, the Nampo port should be expanded so that it can be developed into an international logistics hub. Opening up the expressway and high-speed railroad connecting Seoul, Kaesong, Pyongyang and Sinuiju will enhance the supply chain from Tokyo to Beijing, through the Korean Peninsula.

Plan II: Development of Rason-Chongjin-Wonsan-Sokcho belt into a center of tourism and logistics

From Mt. Chilbo in the north to Mt. Sorak in south, the eastern coast of Korea is famous for its superb natural landscape. 'The Eight Famous Spots in Eastern Korea' have been popular tourist attractions since the Chosun dynasty (A.D. 1398-1910). The southern part is already designated as a special tourist zone with Mt. Sorak as its center, and Pyongyang is recently carrying forward a tourism complex from Mt. Chilbo to Mt. Geumgang. If the two zones are connected after unification, the area may rise as the center of tourism in Northeast Asia. Since the high-speed railway in China now runs from Shanghai to Hunchun, the border area with Rason, Chinese tourists are likely to flow into the region. The tourist belt is not necessarily limited to the peninsula; it can be extended internationally, covering Mt. Baekdu (Mt. Changbai in Chinese)-Hunchun-Rason and Zarubino in Russia's Far East.

In order to develop the above area into a center of leisure, railroad and highway infrastructure improvements along 'The Eight Famous Spots in Eastern Korea' are essential. Since South Korea will host the 2018 Winter Olympics in Pyeongchang, high-speed railways and expressways from Seoul to Pyeongchang are soon to be opened. When current coastal railways are expanded, it is possible to establish a railroad network connecting Seoul-Pyeongchang-Wonsan-Rason-Hunchun.

Considering Rason as the core of logistics in pan-Pacific areas, China and Russia are seeking ways to upgrade harbor facilities and infrastructure around Rason. If Rason, Sunbong, and Chongjin are renovated into international transit ports and connected to Busan, the Korean Peninsula can become a logistics hub bridging the Eurasia continent and Pacific Ocean. If the North Pole route is developed, the importance of the greater Rason area will be magnified.

Development progress of the Rason special economic zone is barely noticeable except for infrastructural linkages with adjacent areas. After unification, it will be necessary to foster the area further with investments from abroad including China and Russia; the final role model will be a cosmopolitan city similar to Singapore.

[1] Lee, Kyung-Chul, "Democratic People's Republic of Korea is truly the nation for people and the socialist state centered on the general public," statement in a conference for International Association of Korean Studies held in Shanghai, 27 August 2009 (a North Korean publication).

[2] Lee, Ki-Sung, "Chosun economy, paving the way to strong and prosperous state with revolutionary high tides," statement in a conference for International Association of Korean Studies held in Shanghai, 27 August 2009 (A North Korean publication).

[3] Lee, Seok-ki, et al., North Korean Industries and Firms in the 2000s: Recovery and Operation Mechanism (Seoul: Korea Institute for Industrial Economics & Trade, 2010).

[4] Kim, Seok-Jin, et al., Industrial Development Strategy for North Korea After Unification (Seoul: Korea Institute for Industrial Economics & Trade, 2011), Chapter 4.

[5] Kim, Seok-Jin, et al., Industrial Development Strategy for North Korea After Unification (Seoul: Korea Institute for Industrial Economics & Trade, 2011): pp.163-167.