

# Challenges of North Korean Industrial Transformation

북한산업 구조전환의 도전

Won Bae Kim

Senior Fellow

Korea Research Institute for Human Settlements

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## I. Introduction

Speculations about the pessimistic fate of North Korea have been surfaced on and off for the last 10 years at least. The near-crisis situation of the North Korean economy was and still is the main reason for such pessimistic outlook. Several policy attempts to salvage its economy in the 1990s seem unsuccessful. The North Korean economy does not produce enough output to sustain its population and therefore depends on foreign countries and international agencies for food. However, Pyongyang's preoccupation with the regime survival and its hesitance to open up the country and positively engage with the international community put continued international assistance even for food in doubt. Without the peaceful settlement of the nuclear issue through the six-party talks, increased hardship is very likely for the population. Although there are signs of economic reform in the North, no one is certain about the continuation of reform due to the complexity and variability of situation under which North Korea is in.

Despite such uncertainties, it is not futile to discuss about possible reform paths and associated industrial transformation processes in the North. The current system of the North Korean economy cannot be sustained for long. The paper begins with a short review on the status of the North Korean economy and its industrial structure. Secondly, the paper discusses possible courses of reform and industrial transformation in the North on the basis of the current and prospective conditions. Anticipated spatial consequences of industrial transformation are briefly examined in the third part. Finally, the paper discusses some of policy issues arising from the likely industrial transformation processes in the North.

## II. North Korean Economy and Industries: Where do they stand?

Prior to the partition of the Korean peninsula at the end of the Second World War, most Korean industries were located in the North and the South was the breadbasket. Under Soviet tutelage, the North established an orthodox centrally planned economy in the early 1950s. Since then North Korea pursued an autarkic economy under the national ideology of *juche* or self-reliance. In terms of economic policy, the North as other socialist economies did, consistently applied a policy of emphasizing heavy industries, while light industries and agriculture were treated as secondary to heavy industries. For example, the proportion of machinery and metal processing in the total industrial production increased from 8.1% in 1949 to 33.7% in 1980 (KIET 2002). This

remarkable growth of machinery industry is obviously closely related to the North's emphasis on military industries. Although it is hard to evaluate the size and the level of technology, defense industries in North Korea are very important in two respects: as a source of foreign currency earning and as a pillar of the North Korean economy.

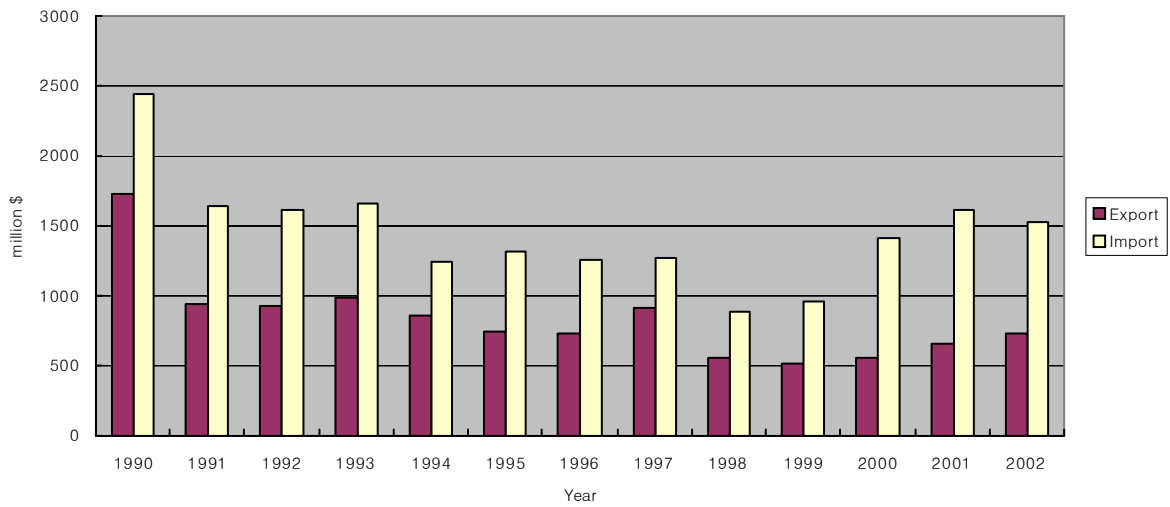
It is known that the gross national product (GNP) of the North was bigger than that of the South until the early 1970s, whereas per capita GNP of the North was still higher until the mid-1980s (Hwang 1992).<sup>1</sup> The North Korean economy is, however, known to have experienced setbacks since the 1980s. The command type planning emphasizing self-reliance is the fundamental cause for the decline of the North Korean economy. But a few factors specific to the late 1980s contributed to the near-crisis of the North Korean economy. One was the withdrawal of the Soviets support beginning in 1987 (Noland 2002). Another factor was a set of wrong policy initiatives taken in the late 1980s including agricultural policies. Most of all, the disintegration of the Soviet Union brought a tremendous trade shock to the economy. The Soviets had supplied North Korea with most of its coal and refined oil and one-third of its steel. Trade with the Soviet Union accounted for more than half of North Korean two-way trade. North Korea proved incapable of reorienting its commercial relations in the face of the massive trade shock. The North Korean industrial economy imploded and, deprived of industrial inputs, agricultural output plummeted as well.

As a result, the North Korean economy experienced a negative growth in gross national income during the most of the 1990s (Figure 1). Also, North Korea's total trade shrank in the 1990s (Figure 2). It is notable in the graph that the volume of export declined from 1,730 in 1990 to 510 million dollars in 1999. Even though there is a sign of increase in the North's export in recent years, the export amount is very small, which indicates the lack of export products other than food-related items and textiles products (Table 1). The composition of export and import by commodity provides an interesting feature. Between 1995 and 2002, the share of animal products in total export increased substantially, whereas that of textiles, the major export item of North Korea, declined rapidly. Fuel counted as the largest import item and followed by machineries.

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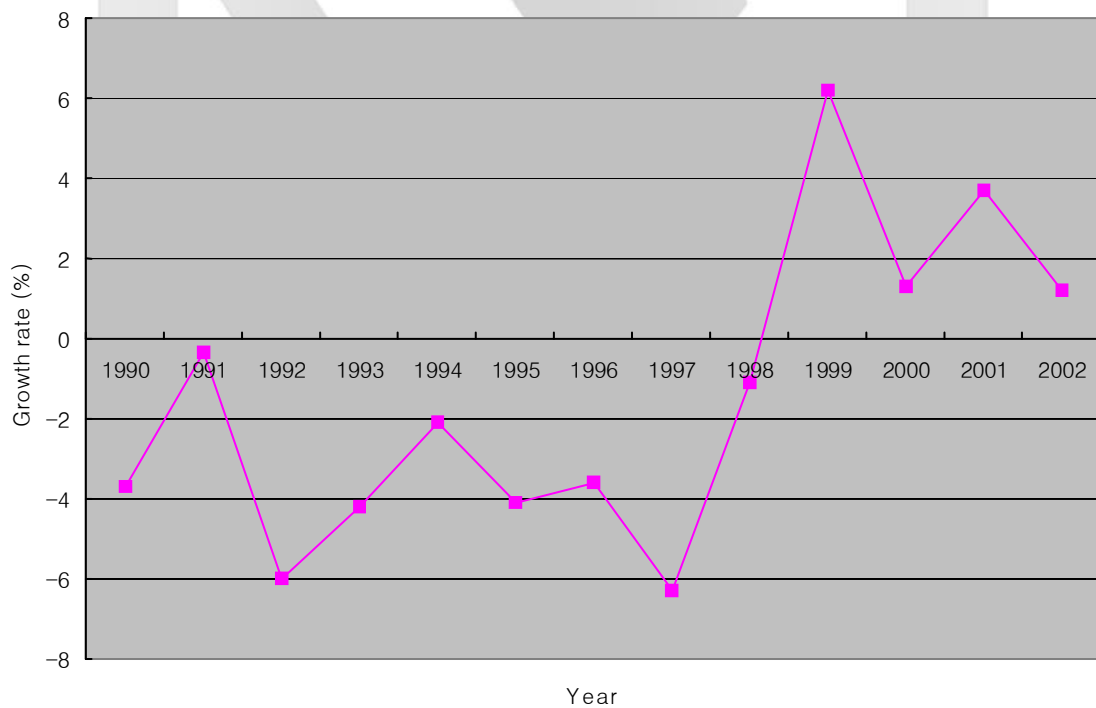
<sup>1</sup>Controversy surrounds the estimates of the GDP and per capita GDP of the North Korean economy. The estimates quoted here are based on the figures published by the Central Bank of Korea and they may be overestimated because the Bank uses Korean prices and exchange rates in order to make comparisons of the North and South Korean economy easily (Cho 2003).

Figure 2. Export and Import of North Korea



Source: <http://www.bok.or.kr/>

Figure 1. North Korea's Annual Growth Rate of Gross National Income



Source: <http://www.kotra.or.kr/main/trade/nk/research/sub0.jsp>

Table 1. Ten Largest Exports and Imports of North Korea

(unit: %)

	Export		Import	
	1995	2002	1995	2002
Animal products	11.3	35.5	-	6.8
Plants & vegetables	11.7	3.7	9.3	7.8
Minerals	7.1	9.5	21.8	15.5
Chemicals and plastics	1.7	5.8	11.6	12.3
Wooden products	-	1.4	-	-
Textiles	31.7	16.7	15.0	10.4
Gold & other expensive metals	-	2.0	-	-
Non-metals	13.1	7.8	6.0	5.8
Machinery, electric & electronics	7.8	11.6	13.5	15.4
Others	15.6	5.9	22.8	26.0

Source: [http://www.kotra.or.kr/main/trade/nk/research/sub09\\_1.jsp](http://www.kotra.or.kr/main/trade/nk/research/sub09_1.jsp) connected on September 30, 2003.

The composition and value of export partially reflect the status of the North Korean economy. First of all, trade dependency is very low, a little over 13% of the North's gross national income in 2002 (in comparison, the trade dependency of the South was 66% in the same year).<sup>2</sup> Secondly, a small value of export, which depends greatly on primary products and cheap textile products, indicates the weakness of the North Korean industrial economy. Considering the endowment of production factors, labor is the only source of the North's comparative advantage except for a little bit of mineral resources.<sup>3</sup> However, the continued policy emphasis on heavy industries distorted the industrial structure of the North. Realizing the importance of light industry as a source of export earning as well as a necessity to satisfy the needs of its population in the early

<sup>2</sup>Between 1999 and 2001, the trade dependency of North Korea has increased from 9.4% to 14.5%, although the ratio dropped somewhat in 2002. However, the figure of 13% in 2003 does not include inter-Korean trade. If included, it increases to 17.0% in 2002 (Cho 2003).

<sup>3</sup>One can add that North Korea has a comparative advantage in arms production. But the details are unknown.

1990s, Pyongyang adopted the three-first policy (emphasizing agriculture, light industry, and trade) in 1994. But this was just a temporary measure to maintain the minimum consumption needs of the population in the midst of an extreme hardship and was not an indication of any fundamental shift in the economic policy. Economic policies announced since the late 1990s demonstrate that priority is still accorded with the heavy industries.

Nonetheless, the industrial structure of North Korea has changed according to the command planning until the early 1980s. Since the late 1980s, however, the changes in industrial structure were more or less the consequences of ad hoc policy shifts responding to crisis situations. Prior to the early 1980s, the agricultural sector and the light industries had declined with the growth of the heavy industries. But the reversal process has been going on since the late 1980s when the North began to feel the consequences of its autarkic economy. For example, the light industry in the North occupied an important position in the 1950s but declined continuously since the 1960s when the North introduced a Soviet-style command economy. In 1949, the share of the light industry in total industrial production was about 33% but it declined to about 26% in 1980 and remained around 26-27% until 1993. After 1994 when the three-first policy was adopted, the share of the light industry continued to rise to 39% in 2002. We can observe the rise of the agricultural sector as well, from 21% in 1980, to 27% in 1990, and to about 30% in 2002. The rise of agriculture and the light industry in the composition of production does not mean, however, the development of the agricultural sector or the light industry. Instead, the shift in relative proportion is a result of the severe setback in the heavy industries of the North, which depends heavily on imported fuels.

Table 2. Industrial Composition of North Korea based on value added

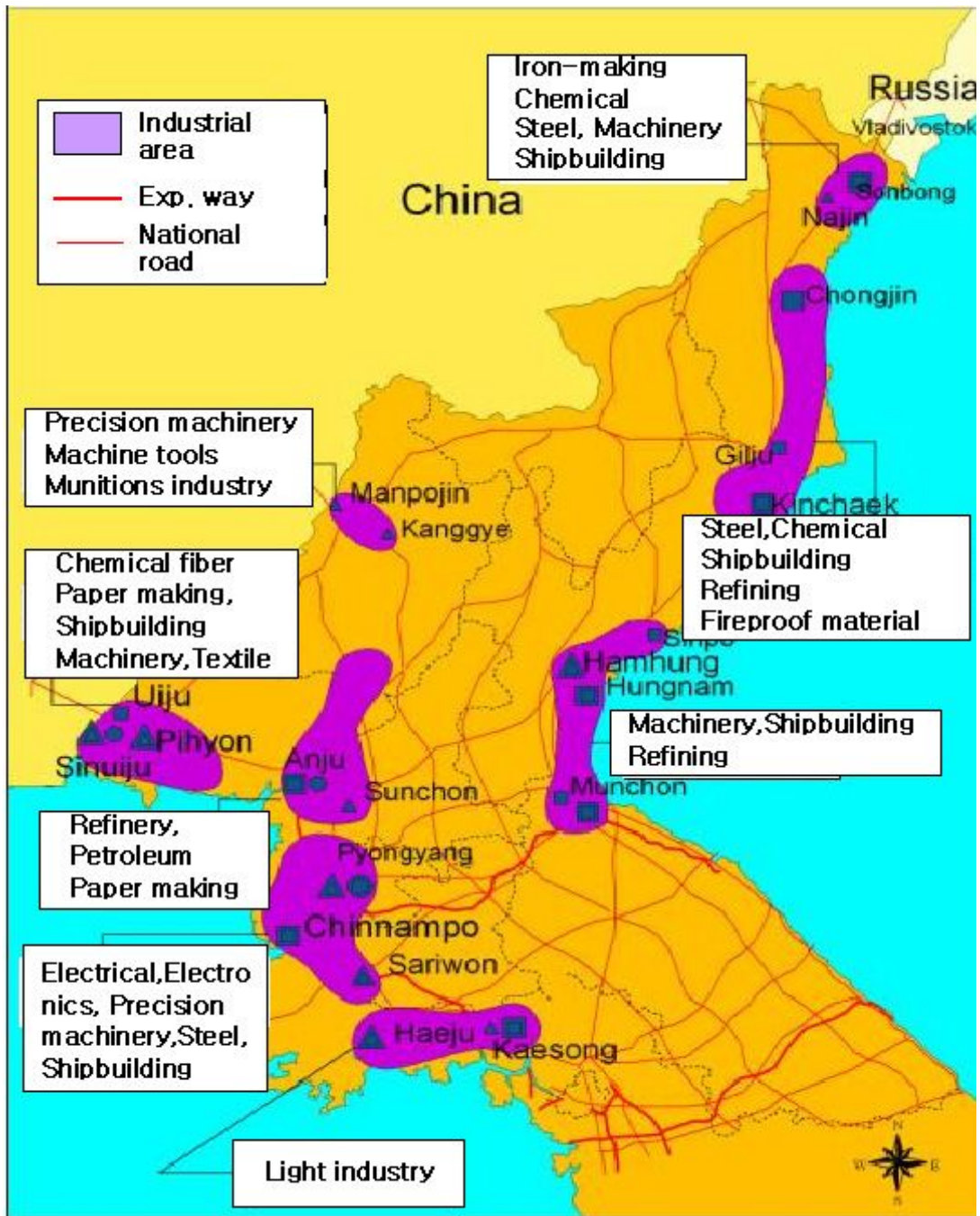
	1957	1960	1970	1980	1990	1995	2002
Agriculture	28.6	28.9	21.5	21.0	27.4	27.6	30.2
Mining & manufacturing	37.6	41.3	57.3	63.6	40.8	30.5	25.8
(Heavy)	(52.4)	53.0	66.0	-	67.3	69.8	61.1
(Light)	(47.6)	47.0	34.0	-	32.7	30.2	38.9
Others	33.8	29.8	21.2	15.4	31.8	41.9	44.0

Source: <http://bok.or.kr/>

### III. Structural problems of the North Korean industrial economy

On the whole, the North Korean economy can be characterized as a cellular economy, wherein each industry or even each enterprise pursues a full-set structure. Inter-industrial linkages do not work efficiently. Of course, this cellular economy is derived from the ideology of self-reliance. Chronic shortages of materials and goods force each economic unit to solve their own shortage problems. Moreover, industries are distributed not optimally. In terms of geographical distribution, North Korean industries seem to follow the self-sufficiency principle. There are eight major industrial districts and each of them relies on locally produced raw materials and intermediate inputs (Figure 3). Thus, each industrial district cannot help but seek a self-contained structure. As a consequence, the economy as a whole suffers from redundant investments. Weak inter-industrial linkages, for example, between the heavy industry and the light industry (and agriculture) pose a serious problem. The ‘overdeveloped’ heavy industrial sector (called a leading sector in the North) does not supply equipments and materials needed for the light industry and agriculture. And thus, enterprises in the light industry sector and agricultural production units make their own efforts to produce equipments and materials for their use. All in all, these weak inter-regional and inter-industrial linkages result in redundant investments and economic inefficiency.

Figure 3. Major Industrial Districts in North Korea



Source: Drawn by the author

Furthermore, the self-reliant economy tends to emphasize production technologies using locally produced raw materials. For example, North Korea developed vinalon fiber using coal and soda with a high cost in terms of energy consumption. Local technologies developed in the North, coupled with the large proportion of energy-consumptive industries such as non-ferrous metals, make the North



Korean economy vulnerable to energy shocks. The level of industrial technology in the North is known to be far behind most countries.

Perhaps, the most fundamental structural problem stems from the emphasis on arms production and the separation of defense industries from the civilian industrial system. Some branches of defense industries like missiles production is assessed to have reached an advanced level but they are no use for household electronics enterprises in the North.

Lastly, most industrial equipments in the heavy industrial sector are known to suffer from aging. These dilapidated industrial equipments make normal operation almost impossible. Marginal improvements can be made with repairs but they are only temporary. Without the replacement of those old equipments, production level cannot pick up. In summary, some structural problems in the North require immediate attention, whereas others require longer-term strategic responses by policy-makers in and outside of North Korea.

#### IV. Possible Paths of Reform and Industrial Transformation

##### **1. Recent policy changes: a departure from the past?**

Whether North Korea will take economic reform is highly uncertain. Considering that the imminence of economic reform has been a feature of speculation for nearly 20 years, no one can say definitely that economic reform will take place in North Korea soon. One can be sure, however, that there will be no genuine reform without the peaceful settlement of the nuclear issue. Nevertheless, policy changes occurred in July 2002 hint a possibility of major reform in coming years (Newcomb 2003). The 2002 policy changes include four components: decentralizing decisions, adjusting prices and wages, improving enterprise management, and expanding external economic relations (Oh 2003).

One of the conspicuous changes in Pyongyang's economic policy since 1998 has been increased local autonomy. Local governments have been given the responsibility of managing light industries and cooperative farms in local areas. This can be regarded as part of policy action designed to merge the local economy and the market system and to provide local administrative organizations with incentives to develop local economies as China did in the early years of reform. Now, local governments are provided with the autonomy to establish the production plan for local industries and decide prices.

The North Korean government abolished its decades-old policy of coupons for food grain and other daily necessities, while increasing wages and commodity prices more than 20-fold. Under the new system, wages and prices are calculated on the basis of costs related to production. The price of rice increased by 550 times. The increase in the procurement price for grain was motivated in part to counter the supply response of the farmers. Also, it was aimed at reducing the negative impact of the expanding underground economy.

In the industrial sector, Pyongyang attempted at transferring the decision-making power of the party to cadres to the managers of enterprises. Compared with the vague campaign in the past for an independent accounting system, recent measures accompanied by decentralization and price adjustments are designed to bring about a real impact on the economy. Enterprises are now allowed to set more realistic production plan with purchasing decisions of a portion of their needed raw materials and parts and components from the market without government directives. In addition, depreciation funds and unanticipated profits can be used as a fund for investment by the enterprises themselves.

Faced with serious shortages in energy and food grains, Pyongyang has been desperate in seeking foreign currency. The overvaluation of the won combined with the government's relatively relaxed attitude with the possession of foreign currency by its citizens created the hoarding of foreign currency. In July 2002, the North Korean government abolished the exchange script and depreciated the exchange rate from 2.2 won to a dollar to 150 won to a dollar. The measure was designed to secure foreign currency in the government's hand and to use it as a safety valve against any possible economic crisis in the future. Such currency depreciation does not seem to aim at inducing foreign investment since the currency depreciation does not apply to foreigners.<sup>4</sup> For example, hotel charges are still the same in dollar terms before and after the depreciation (Cho et al 2002). In addition, Pyongyang adopted a policy of opening up a few areas for foreign investment. The Sinuiju Special Administrative District, following the Hong Kong model, was announced in late 2002, although it did not materialize due to the mishaps involved in appointing a Chinese<sup>5</sup> with Dutch citizenship as a head of the District. Besides Sinuiju, Pyongyang agreed to develop the Gaesong

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<sup>4</sup>Interpretations differ among specialists. Some (Oh 2003) strongly suggests the North had an intention to invite foreign investment by taking this measure

<sup>5</sup>Mr. Yang Bin was appointed by Pyongyang but the Chinese government prosecuted him for some illegal dealings in China.

Industrial Park in cooperation with the Korean company. The Guemgang Mountain area was officially approved as a special tourist district. Furthermore, the governments in both North and South Korea agreed on details for communications, quarantine, and customs clearances for the Gaesong Industrial Park. Starting from July 2003, direct charter flights from Incheon to Pyongyang operate to carry South Korean tourists to Pyongyang and other tourist destinations around Pyongyang.

Recent changes in North Korea's economic policies suggest a substantial departure from the policies in the past. However, a comparison with the experiences of reform in transition economies indicates that North Korea is still in very early stages of systemic reform. Some regards those changes as a first step towards a market economy, whereas others still interpret them as an attempt to return to a planned economy (Noland 2003; Cho et al 2002). Given the ambiguous results of the 2002 policy changes, Pyongyang can go either way. The current leadership's hesitancy in the implementation of reforms and a strong reliance on the international safety net supplied by the rest of the world seems to support the second argument, while Pyongyang's acceptance of increased inter-Korean contacts and economic cooperation suggests that the leadership at least understands clearly the necessity of revitalizing its economy. Whatever the interpretation of the 2002 policy changes in the North, the success of those policy changes cannot be guaranteed unless Pyongyang overcomes the problems of a shortage economy. Experiences in the former socialist economies suggest that adjusting prices and wages cannot solve chronic supply shortages (Kornai 1992). If the sufficient supply of goods and materials is not secured by the measures taken by the North, the function of formal sector will further weaken and the informal sector will grow back again. There are already some indications of inflation and resurrection of the informal economy. The black market price of rice soared to 150 won from 44 won per kilogram and the exchange rate for the US dollar increased to the 900-won level.<sup>6</sup> Unless inflationary pressures and black market expansion can be curtailed, Pyongyang might find itself in odd position.

## **2. Industrial restructuring options**

What can North Korea do? It should adopt reform policies in particular to induce

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<sup>6</sup>As of October 2003, Pyongyang authority was known to have depreciated the value of won again from 150 to 900 won to a dollar and expressed an intention of a flexible exchange policy

<http://chosun.com/w21data/html/news/200310/200310050287.htm>

foreign investment and technology. Without capital and technology inflow from the outside world, the North Korean economy will not break the vicious cycle of shortages. Agricultural reform, like the household responsibility system of China, will certainly help increase agricultural production. Enterprise reform allowing cooperative forms of enterprises will also help increase production of daily necessities. But neither agricultural reform nor enterprise reform will fundamentally resolve the shortage problem of the North. The North Korean economy resembles more closely Romania and parts of the former Soviet Union than it does the agriculture-led Asian reformers, China and Vietnam in terms of the degree of macroeconomic stability and the sectoral composition of output and employment (Noland 2000; Cho et al 2002).

Table 3. Comparison of Industrial Structure between North Korea and Transition Economies

	North Korea		China		Vietnam		Romania	
Year	1990	2001	1978	1998	1985	1998	1990	1998
Agriculture	27	30	28	18	35	24	23	16
Industry	41	38	49	49	25	33	49	36
Service	32	32	23	33	40	43	28	48

Source: Cho et al (2002).

The ultimate resolution of North Korean economic problems requires the revitalization of its industrial economy. As mentioned already, agricultural reform can be helpful but cannot solve the problems. A permanent solution must lie in an expansion of industrial exports that would allow North Korea to import grains, oil and capital goods. What would be then best ways to expand industrial exports for North Korea?

The traditional industrial development follows a process beginning from the labor-intensive (light industries), through the capital-intensive (heavy industries), to the technology-intensive stage. Given the need to expand the production of daily necessities and the relative abundance of labor, the promotion of light industries is very much desired in North Korea. However, the heavy industry development model that has been pursued in the past does not allow policy-makers in Pyongyang to completely ignore its heavy industrial bases. Realistically, the North Korean economy cannot function without the normalization of the heavy industrial sector. Therefore, a few heavy

industries need to be salvaged to regain international competitiveness. In other words, selective promotion of heavy industries is necessary in conjunction with the intensive growth of light industries with export potential.

There is, however, an alternative model, which stresses the promotion of high-tech or new industries (KIET 2002). With the dilapidated and inefficient industrial structure of the North, this high-tech centered model seems very attractive. The example of Ireland or India provides a success story of achieving a rapid economic growth through the promotion of information technology industries. Indeed, Pyongyang expressed a keen interest in this model in recent policy announcements. This technology-based model, however, requires a modernized industrial structure in general and moreover a social and institutional system, which can facilitate and spread the developmental effects of information technology. Given the low level of technology infrastructure in North Korea, the promotion of information technology industries would not generate substantial effects to lead the economy.

Whichever model is taken, North Korea cannot expect a sudden leap because industries are deemed to have such potential.

The selection of a model inevitably touches on the issue of trade-off between short-term and long-term perspectives (KIET 2000). As observed in transition economies, industries with long-term growth potential or comparative advantage tend to die out, whereas industries with short-term ability to survive tend to grow and expand. In the case of North Korea, labor-intensive industries such as textiles, food and electric/electronics do have comparative advantage but focusing solely on these industries will not guarantee a sustainable economic development.<sup>7</sup> Two reasons at least can be listed (Kim 2003). One is whether North Korea can compete with China and other labor-abundant Southeast Asian countries. The other is socio-economic integration of two Koreas in the future. South Korean policy-makers need to consider the implications of the industrial development in the North on the economic gap between the North and the South in the future. Here, the experiences of transition economies in central and eastern Europe can provide important lessons. The German example

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<sup>7</sup>Noalnd (2000s analysis suggests North Kores prospective comparative advantage. Using disaggregated trade and investment data for North Korea, South Korea, and Japan, Noland finds that North Kores prospective comparative advantage would largely be in primary products sectors, in which North Kores natural resources convey a comparative advantage, and light manufacturing industries, which are declining in Japan and South Korea but could be competitive in lower wage North Korea.

suggests a policy of indirect intervention to support industrial restructuring through investment subsidy, eliminating administrative bottlenecks, expanding infrastructure, adopting labor and regional policies (Lee et. al. 2000).

The scope and speed of industrial restructuring in the North will have to be determined by Pyongyang because industrial restructuring involves policy changes in related fields including internal reform and external relations. Here, we can speculate likely sequence of opening and reform assuming the peaceful resolution of North Korea's nuclear problem.<sup>8</sup>

- 1) Limited opening with the regime survival reform
  - Preferential North-South opening
- 2) Limited opening with a systemic reform
  - Non-preferential opening
- 3) Complete opening with reform for a North Korean style market economy

Recent policy changes in the North described earlier suggest that North Korea is still in the stage of limited opening with the regime survival reform. As a few western analysts predict, North Korea's 50-year run as a centrally planned economy is drawing to a close (Newcomb 2003). Muddling-through will only prolong the agony (Noland 2003). There are many signs that, if a package deal with the U.S. is worked out through the six-party talks, North Korea is likely to embark on the path towards 'opening with a systemic reform.' Perhaps, the first stage would be preferential North-South opening, followed by non-preferential opening in the second stage (KIET 2002). Assuming such a staged opening with reform in the North, we can speculate industrial restructuring as follows.

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<sup>8</sup>Two scenarios are possible here: a peaceful resolution and an ending of the stalemate by force. A protracted peaceful resolution with ups and downs is a variant of the first scenario. During the first sequence of limited opening with the regime survival reform, inter-Korean economic cooperation and Sino-North Korean economic cooperation are possible and in fact they have been undergoing for a few years now. But this partial opening by a few special economic zones and regime-saving reforms by the Pyongyang regime may not lead to sustainable industrial transformation unless the nuclear issue of the North is peacefully resolved. South Korea and China may prolong the life of the North Korean economy but cannot help provide a foundation for its long-term survival. Without substantial inflows of foreign investment, industrial restructuring in the North cannot secure the momentum to lead into the revitalization process of the North Korean industrial economy.

- 1) In the first stage, industrial restructuring would occur in limited sectors and in limited places due to resource constraints. Available capital from internal sources would be small and foreign capital would come only from neighboring countries like South Korea and China. Labor-intensive export industries such as textiles and electric & electronics would be the target. Contract processing combining North Korean labor and imported raw materials, parts and perhaps production equipments from neighboring countries will be a prevalent pattern of industrial exports. In addition to the industrial economy, tourism would be a very important growth industry in the North. As demonstrated in the Mt. Guemgang tourism project, tourism may be the best service industry, which can earn foreign currency with little capital investment requirements. Through the first stage, the North Korean industrial economy is expected to build a threshold capacity for export and employment generation.
- 2) In the second stage, light industries with an export-earning capacity will be the major focus of industrial development. As North Korea opens up the country and begins systemic reforms towards a mixed economy of market and planning, foreign investment will flow into a few light industries, which have a promising prospect for exports. At this stage, North Korea will have some prospect for developing information technology industries in major cities, where educated manpower is readily available. Software industry would be a priority for promotion. In addition, steel and chemical fertilizer industries would be renovated if resources were available. Other heavy industries would have to be either scrapped or slimmed to reduce inefficiencies. As the volume of trade grows between North Korea and neighboring countries, the logistics industries would be another growth industry.
- 3) In the third stage, North Korea is expected to have an enlarged capacity to mobilize internal resources and an improved environment for foreign direct investment as it deepens market-conforming reforms and opens up the country for the international community. The objective of this stage of industrial restructuring would be to upgrade the structure of major export industries, the modernization of selected heavy industries, and the promotion of IT industries. The key principle in the third stage would be to gain international competitiveness of those industries. The categories of heavy industries could expand from steel and chemical fertilizer to non-ferrous metal and machinery.

The conversion of military production facilities into civilian uses would be another important task in the second stage.

Changes in resource allocation from heavy and military industries to light and technology industries are a must for the above industrial restructuring strategy to succeed. External opening is another prerequisite for the revitalization of the North Korean industrial economy. Considering the preference on special economic zones by the Pyongyang regime, opening would be selective in the first stage. North-South cooperation together with cross-border cooperation with China and Russian would be the major component of external economic relations in the first stage. Japan and selected EU countries like Germany might be target countries of North Korea for foreign capital and technology inflow toward the end of the first stage. Without the settlement of the nuclear problem, however, the industrial transformation process of North Korea will face an impasse. On the other hand, if Pyongyang finds a peaceful solution to its nuclear problem at the six-party talks, its industrial transformation scenario will follow the aforementioned sequences. Only then can the North establish normal relations with the U.S., which is prerequisite for North Korea to obtain international financial assistance for industrial restructuring and infrastructure development. In short, a successful industrial transformation of North Korea in the second and third stages will depend critically on its policies dealing with three elements: capital, technology and markets, all of which are intimately related to Pyongyang's security policies.

## V. Anticipated Spatial Consequences of Industrial Transformation

The foregoing discussions about prospective industrial transformation in the North poses another issue concerning regional transformation. Restructuring of industries with foreign capital inflow would undoubtedly create spatial impacts, which would then trigger regional transformation process involving internal migration and capital movements. The promotion of labor-intensive export industries, creation of new industries like tourism, logistics and information industries, and selective intervention in heavy and high-tech industries will definitely change the industrial landscape of North Korea. As summarized in Table 4, the sequence of opening and reform and the different emphasis in industrial restructuring will shape the spatial outcomes of industrial transformation in the North. On the whole, the morphology of North Korea's industrial economy is expected to change from points to lines and planes. Special economic zones



will be the primary agent of change in the industrial geography of North Korea. The impetus of change will then expand into a linear form along major transport corridors and then eventually in a grid form covering the major part of North Korea's territory.

In the first stage, border locations in close geographical proximity to South Korea and China will be preferred. Geographical proximity is an important criterion in the case of limited opening and reform. As we recently observe, Gaesong and Sinuiju will be the places where industrial change can begin in the North. In addition, Mt. Geumgang, Mt. Backdu and other tourist areas will help the industrial transformation process in the North by their foreign exchange earnings.

Coastal locations will be favored in the second stage. As seen in South Korea's export-oriented development in the 1960s and 1970s and in China's development in the 1980s, industrial growth will flourish in coastal locations because of their advantage in the importation of raw materials and the exportation of finished products. For new industries like information technology, large cities like Pyongyang have definite advantage over smaller cities due to the availability of educated manpower and relatively superior infrastructure. Logistics industries will follow where external trade occurs most actively.

In the third stage, when North Korea opens up its territory and engages fully with the international community, industrial growth will be concentrated along major transport corridors and major nodes along those corridors. Also, a successful industrial renovation will enable a few heavy industry centers emerge into North Korea's new industrial landscape. In brief, geographical location, transport accessibility and the size of labor pool will be three major determinants of new industrial geography of North Korea. Border locations, coastal locations and major nodes along transport corridors will be favored respectively in the sequence of industrial transformation in the North.

We can easily guess that, for export industries, Nampo and Wonsan would be additional bases to the list already announced by the North.<sup>9</sup> Software industries require educated manpower and minimum technological infrastructure and thus Pyongyang would be the best location. However, Gaesong could be an alternative location for the development of software industries if the North Korean government is willing to relocate some of its talents from Pyongyang to Gaesong. The renovation and consolidation of selected heavy industries such as steel, metals, chemical fertilizer and machinery could be carried out in selected plants, which have a prospect for production normalization and are situated in locations near to the source of raw materials (Kim

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<sup>9</sup>They are Rajin-Sonbong, Sinuiju, and Gaesong

2003). Although a cost/benefit analysis is required to examine the possibility of renovating specific industries or firms, we can take a look at the steel industry in Cheongjin, the chemical industry in Hamheung, and the machinery industry in Nampo as a first step.

Table 4. North Korean Industrial Transformation and Anticipated Spatial Consequences

Stages and strategic options	Opening & reform	Industrial restructuring	Anticipated spatial consequences
First stage	Preferential opening of border areas and limited reform	Light industries focus, primarily of contract processing type and the capitalization of tourism resources	Border locations preferred and special economic zones established
Second stage	Non-preferential opening and expanded reform	Export-oriented light industries plus selective renovation of heavy industries and new industries promotion	Coastal locations preferred and more special economic zones established to induce foreign direct investment
Third stage	Nation-wide opening and deepening reform for a Northern style market economy	Enhancing the value adding capacity of export industries including some heavy industries and expanding information industries	Major cities located at transport corridors preferred and a few heavy industry centers targeted for renovation

In terms of location for special economic zones, Sinuiju, and Gaesong are already selected for trade and economic cooperation with China and South Korea respectively. The Mt. Guemgang tourist district can be regarded as a special form of special economic zone for inter-Korean cooperation. Considering that the preference of South Korean and Japanese investors, such coastal cities as Haeju, Nampo and Wonsan can be candidate locations for special economic zones specialized for export industries. Those inland cities specialized in heavy industries such as Manpo, and Ganggye would

have negative impacts if the aforementioned restructuring process takes place in the North.

The geographical consequences of industrial restructuring will be as follows (Kim 2003, Lee et al 2000). In the first stage, border cities in the west coast will benefit from policies of export promotion and technology enhancement. During the second stage, selected coastal cities in the east coast with industries of prospective international competitiveness will benefit from export-oriented development. Moreover, cities with international access will benefit from increased trade flows. Coastal cities with land and marine transportation network will become a center of logistics and partially export industries. In the third stage, agglomeration economies including the availability of a large labor pool will be an overriding factor of industrial growth and thus will favor large cities along major transport corridors linking to South Korea and China/Russia. Given the existing transport networks, two major transport corridors are likely to emerge in the North in the future. One is the west coast corridor connecting Seoul to Pyongyang and Sinuiju through Gaesong and the other is the east coast corridor linking Gosung to Cheongjin (Kim 2003).

Given resource constraints, imbalanced development across sectors and regions are inevitable. With the already highly distorted industrial structure, North Korea's capacity to engage in balanced regional development appears very limited. Even if it has the capacity, policy intervention for balanced regional development would entail heavy costs of economic inefficiencies. Considering the experiences of Germany and other eastern European countries, some form of regional policy conforming to the national comparative or competitive advantage concept will be necessary.

## VI. Discussions

The current industrial structure of the North is a result of a command planning economy and therefore is unrelated to comparative advantage in the global market. Although restructuring can depend on market forces, it is not applicable to the countries like North Korea that is in early stages of economic transition. Government intervention is necessary because market is absent or in formation. The problem, however, lies in that government cannot a priori set an optimum industrial structure and distribution at certain point of time in the future. Industrial transformation is, in other words, a process, wherein government has only limited influence. Government intervention, therefore, should be conforming to market principles.

As explained in the foregoing sections, North Korea faces enormous challenges

of industrial restructuring in coming decades. Having the most distorted economic structure in the world, North Korea needs to eliminate distortions and normalize its industrial economy. Possible paths charted in this paper provide a very rough outline of industrial restructuring in the North. The major rationale behind the proposed path of export-oriented industrial development stems from the restoration of North Korea's comparative advantage. The concept of comparative advantage, however, needs to be used in a qualified manner. For the North and perhaps for the South in anticipation of economic integration of the two in the future, "dynamic and joint comparative advantage" should be a more desirable concept. Although South Korean planners cannot chart a detailed course for industrial restructuring in the North, they can suggest that a successful industrial restructuring in the North requires opening with reform. Also, it can be pointed out that the Pyongyang authority has no choice but to adopt an export-oriented development strategy as did South Korea in the 1960s. Therefore, the likely course of industrial transformation in the North tends to place an emphasis on the light-industry in the early stage and then to move on considering the possibility of promoting new industries and renovating selected heavy industries in the later stages.

In accordance with the sequential opening and reform suggested in this paper, industrial transformation in the North is likely to produce spatial consequences. The major implications revolve around the three key factors: geographical location, transport accessibility and the size of labor pool. In the early stages of limited opening and reform, geographical location will have a larger weight than other two factors. In other words, the importance of geographical location will shift from border locations in the early stage, to major nodal points along transport corridors in the later stage, through coastal locations in the middle stage.

With respect to the renovation and expansion of production facilities, we can learn a great deal from eastern and central European transition economies. To encourage private investment and enterprise creation, incentives such as tax exemption and investment credit could be used. Moreover, the emphasis on small and medium sized enterprises could be beneficial since they can generate more jobs than large enterprises. Investment subsidy can be provided to capital investment as has been done in Germany. This investment subsidy can be used to satisfy for both purposes of industrial restructuring and regional transformation. Long-term low interest loans or special depreciation allowances can be extended to investment.

In the immediate future, however, industrial restructuring in the North will depend largely on North-South economic cooperation and partially Sino-North Korean cooperation since the nuclear issue is unlikely to be resolved in a short period of time.

At this stage, both the North and the South should jointly work hard to make the Gaesong industrial park a success. If successful, this case will set a good example for other would-be special economic zones such as Nampo and Sinuiju in the North. South Korean capital, technology, management and marketing know-how can provide the lacking elements in the North Korea economy. Inter-Korean business cooperation experiences, if accumulated, will help North Korea build a foundation for further opening to other economies and eventually integrating with the world market. Compared with eastern European transition economies, North Korea has an advantageous location. In addition to South Korea, Japan and China, to a lesser extent, Russia can provide export markets for North Korea. Japan, moreover, is willing to compensate for its sins in the past if the Japanese abduction issue is resolved. Russia can provide energy and other natural resources for processing within North Korea. In the future, growing intra-regional trade in Northeast Asia will offer an opportunity for North Korea to exploit increasing traffic associated with trade. Most of all, the forum, the six-party talks, is open now for a peaceful settlement of the North's nuclear problem. One bold step forward by Pyongyang will help solve not only its security concern but also its serious economic problems.

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## 국문초록

### 북한 산업구조전환의 도전

김원배

주요단어: 북한, 경제개혁, 산업구조전환, 공간적 효과

북한의 산업경제는 장기간의 자급자족 정신에 입각한 계획경제체제로 인해 취약한 산업간 연계, 만성적 물자부족 및 왜곡된 산업분포 등의 심각한 문제를 노정하고 있다. 이러한 문제는 부분적인 개선조치로서는 해결할 수 없으며, 본격적인 체제개혁을 통한 산업구조의 전환이 필수적이다. 본 논문에서는 북한산업경제 회생을 위해서는 일반적인 노동집약적-자본집약적-기술집약적인 산업이라고 하는 단계발전이 아니라 세 가지 단계가 혼합된 절충형 산업발전 모형이 더욱 적실할 것으로 전망하였다. 그 이유는 노동집약형 수출산업의 육성만으로는 북한의 장기적 성장잠재력을 오히려 약화시킬 수 있고, 동시에 장래 남북간의 2중 구조를 심화시킬 가능성이 크기 때문이다. 그러나 북한의 산업구조 전환은 체제개혁과 개방이 전제되어야만 하는데, 개혁과 개방의 시나리오는 현재와 같은 제한적 개방/개혁과 보다 진전된 개방/개혁의 두 가지로 유추해 볼 수 있다. 전자의 경우 남북한 협력이나 조-중간 협력을 우선으로 하는 개방이 개연성이 높고, 후자의 경우에는 일본과 미국 등 서방세계의 자본유입이 결정적인 역할을 할 것으로 예상된다. 이에 따라 북한의 중단기 및 장기적인 산업구조전환 전략을 설정할 수 있다는 것이 본 논문의 주요 결론이다. 또한 비교우위관점에서 보면 북한은 당분간 경공업 중심으로 수출위주의 성장전략을 채택할 수 밖에 없으므로, 산업입지측면에서 접경지역이나 항만연안지역이 초기 수출산업성장의 주요 장소가 될 것이며, 중장기적으로는 북한에 구축될 주요 간선수송 축에 위치한 도시나 집적의 이익을 갖춘 대도시가 북한의 산업경관재구성에 있어서 주도적인 역할을 할 것으로 추론하였다. 그러나 산업구조 전환에서 발생하는 북한내 지역간 불균형은 중단기에서 불가피하므로, 정책적 차원에서 독일방식의 전략적 고려의 필요성은 인정되나 과도한 정책개입은 북한산업의 구조전환을 지체시킬 수도 있음을 강조하고 있다. 지역간 불균형성장에 대한 대책은 중동구의 경험에서 알 수 있듯이 공간정책만이 아닌 고용이나 조세정책 등 부문정책과의 적절한 조합을 통해서 시행하는 것이 효과적일 수 있을 것이다.