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**Research Report**

## Industries and enterprises of North Korea: Facts, concepts, and trends

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# Dialogue on the North Korean Economy

February 2022



Industries and Enterprises of North Korea:  
Facts, Concepts, and Trends

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Seogki Lee

## *Dialogue on the North Korean Economy*

### **Industries and Enterprises of North Korea: Facts, Concepts, and Trends**

In the study of the North Korean economy, industrial and business activities still remain uncharted territory. They are the most basic components of an economy, yet the scarcity of information makes those in North Korea almost impossible to understand from the outside world. Today, the general perception is that North Korea's industrial and business activities have completely changed from those of past socialist economies. In fact, rather than central plans, capitalist factors such as markets and profit are becoming the daily standards, and North Korea's industry and business activities are by no means exceptions to these so-called changes and economic reforms. To understand the present status and future direction of the North Korean economy, it is important to grasp how industry is managed and business activities are conducted.

Against this backdrop, we have invited the leading expert in the field, Dr. Seogki Lee, Senior Research Fellow at the Korea Institute for Industrial Economics and Trade (KIET). Dr. Lee has pursued the goal to better understand North Korea through research and observations of its industry and business activities.

Dialogue on the North Korea Economy

 Date and Venue

KDI Seminar Room, July 14, 2020

 Interviewer

Lee, Suk (Senior Fellow at KDI)

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Interviewee

Lee, Seogki  
(Senior Research Fellow at KIET)

KDI's *Dialogue on the North Korean Economy* is a monthly series that features interviews with the foremost experts on North Korea. The first publication was released in March 2021 in connection with the *KDI Review of the North Korean Economy*. Each edition tackles a different facet of the North Korean economy, and offers valuable insight into prominent issues and aspects.

The views and opinions expressed by the contributors are their own, and do not reflect the official views and position of KDI.

— KDI Review of the North Korean Economy Board of Editors

## Industries and Enterprises of North Korea: Facts, Concepts, and Trends

In today's <Dialogue>, we would like to discuss North Korea's industries and enterprises. From the outside world, these areas are the most basic yet most unknown aspects of the North Korean economy. Despite serving as both the basis and core of the economy, the lack of data has made discussing any future cooperation with and incorporation of North Korea into the international community very difficult. To further our understanding, we have invited world-leading expert Dr. Seogki Lee from the Korea Institute for Industrial Economics and Trade (KIET) to share his thoughts. Dr. Lee has dedicated the last 30 years of his career to the study of North Korean industries and enterprises and so, I firmly believe that we will have much to learn from today's Dialogue. Our discussion will be divided into four major time points with the 1990s as the base year. First, we will examine the basic forms and concepts of a typical industry and enterprise model in a socialist economy prior to the 1990s. Second, we will discuss the substantial changes North Korea's industries and enterprises have undergone, particularly following the economic crises in the 1990s. Third, we will explore the industrial and entrepreneurial landscape following the economic crises in the 2000s. Finally, we will learn about the current issues faced by the North's industries and enterprises, and present suggestions on how research can be further encouraged in this field.



## The Industrial and Entrepreneurial Landscape Before the 1990s

Lee, Suk Q.

Let's open our discussion with the state of North Korea's industries and enterprises before the 1990s. It is widely known that until this period, North Korea maintained the basic components of a socialist economy, albeit with some deviations. This is considered a critical point as it serves as the foundation for understanding the subsequent changes and activities. Could you define the basic concepts of North Korea's industries and enterprises, and provide an outline of the economic conditions during this time?

Lee, Seogki

North Korea was among the few in Asia to achieve socialist industrialization, and reach a relatively advanced stage. Above all, the initial conditions in North Korea were more favorable for industrialization in comparison to South Korea. During Japanese colonial rule, the South was mainly used for plundering rice and cotton, while the North was readied for Japan's entry into Eurasia, equipping it with basic industries such as electricity, railway, chemical, and steel, among others. Roughly 70% of South Korea's electricity was acquired from its Northern counterpart. The division of the Korean Peninsula, however, suspended the supply which, in turn, ramped up the availability of electricity in North Korea. The surplus was channeled to the military (for metal and machinery), agriculture and the light industries. This forged a structure that produced consumer goods and food which would then generate more labor. At the same time, South Korea had only begun to

build power stations and establish key industries. As I said, in many aspects, North Korea had a more advantageous start. Through socialist trade, it was able to procure crude oil and rubber—which were not produced internally—on favorable terms. Trade between socialist countries was conducted based on “friendly prices” reached through negotiations, which was a special price that was much lower than the market price. In this manner, North Korea imported crude oil from the former Soviet Union and exported its domestic-made oil to other countries at a higher price. It was also able to sell its domestic-made machinery through socialist trade, which, in truth, was closer to aid than trade as the products were unmarketable due to their absolute lack of global competitiveness.

The socialist system functioned well at the outset, with production and investment being generated regardless of market demand. Even when efficiency is set aside, North Korea achieved a fairly high level of industrialization by the 1970s. Indeed, despite a

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lagging light industry and service industry similar to most socialist countries, the energy sector (electricity, coal, etc.), and capital goods industry including steel, metal, raw materials, chemicals, and machinery, began gaining momentum. This new drive eventually extended to the light industry and agriculture consequently creating a single cyclical structure that encompassed the entirety of industry.

North Korea's industrial development is not unique and can be observed in all socialist states, particularly in the former Soviet Union where it was first established. The Soviet Union aimed to create a special type of economic system that would outlast the capitalist system. Hence, it sought to create a closed but self-sufficient system that could support itself when beleaguered by capitalist foes. This was the foundation for the industrial development that was implanted in former socialist countries such as those in Eastern Europe, China, and North Korea.

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sung explicitly ordered the creation of an industrial structure capable of producing essential goods with only local resources. This applied to all production of



goods with the exception of some that required raw materials that could not be sourced domestically. For example, industries used water and coal to generate electricity, and the electricity and iron ore sectors worked together to produce metal materials for the production of machinery. At the same time, the coal and electricity sectors were combined into the coal chemistry sector which produced chemical materials for other industries. And, this self-sustaining form of industrial development was complemented by the essential resources imported via socialist trade.

To maintain the workings of such a system, the production of basic raw materials such as coal and iron ore must increase much faster than the GDP. After peaking in the early 1970s, North Korea's labor force began to shrink from the latter half of the decade. Subsequently, entering the early 1980s, the economy was faced with a situation where further growth was difficult, and with the continued stagnation, it began to deteriorate from the 1990s.

Thank you for your explanation. In the past, North Korea pursued a Soviet-style socialist economy, and it seems that the industrial movement was very different from that of a market economy.

I am curious as to how the industrial sector under a general socialist economy worked at the time, and whether it was thoroughly planned during the promotion of industry. A closer look at the overall policies shows that North Korea has consistently pursued the parallel development of its military and economy. In order to facilitate our understanding of the early development and general trends of North Korea's industries, could you explain how that has been realized in the industrial sector? How is the sector composed, and how has it been supported through policy?

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*The inward-oriented industrialization strategy, called “Building a self-reliant national economy,” was considerably volatile until the 1970s.*

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The inward-oriented industrialization strategy, called “Building a self-reliant national economy,” was considerably volatile until the 1970s. In the mid- to late 1970s, there was introspection that the existing economic growth strategy would be insufficient, and hence, large-scale loans were taken out from the West to supplement the coal chemical industry with petrochemicals. The original plan was to build a new economy with the funds from the West and boost economic growth to pay off the foreign debt. However, this plan was completely stymied by the oil shock. In the 1980s, the Joint Venture Act was enacted, and economic revival was sought once more using foreign capital. In the earlier days, pro-Pyongyang Korean Japanese entrepreneurs who sympathized with the North invested mostly to show their patriotism and as a result, substantial investments and outcomes were gained. However, this also failed due to the excessive intervention and exploitative burdens imposed on these pro-Pyongyang companies by the regime as they began to reap the profits. Eventually, the companies withdrew from the North, ultimately sabotaging its economic revival strategy. The biggest misconception of the North Korean authorities was the belief that



all profits belonged to them rather than sharing with the market players.

North Korea's industrial policy is very straightforward. That is, based on socialist principles, the capital goods sector must grow first for the consumer goods sector to expand in the long run. The pursuit of the parallel development of the military and economy was laid on top. Following the Soviet method, North Korea made huge investments in heavy industries while minimizing those in agriculture, the light industry, and consumer goods. Fiscal investment was concentrated in the heavy and chemical industry which is connected to the military industry. The standard of living was consistently very low in the late 1970s to the 1980s even as the economy marked record-high growth. This was because investments in the heavy industries did not have a trickle-down effect on the light industries.

By the late 1980s, conditions further deteriorated to the point where existing practices could not continue any further. North Korea had managed

its economy in a simple and direct manner. For example, if the military made plans to build more tanks, another steel mill or blast furnace was built within the existing mill in order to procure the scarce metal. This approach worked well in the 1960s-1970s, however, as the efficiency of capital gradually declined, it was no longer possible to carry out business as usual. In another example, construction projects to build large-scale chemical factories were never completed resulting in a loss of billions of dollars. One case in particular was the Suncheon Chemical Vinylon Complex in the 1980s. Once a factory project is launched according to the plan, it must be completed with the intent that factories are put into operation to manufacture goods in order to avoid losses. Yet, in many cases, projects were suspended, and even when they were completed, production did not meet the goals.

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This vicious cycle continued until the late-1980s when the focus of economic policy shifted. The regime began to strengthen its economic policies by setting far-reaching goals and plans, and promoting their importance. When these virtually impossible goals were not met, Kim Jong-Il began to use the term, “Speed Battle” which refers to the early use of capital (human, materials, etc.) as investment for the future. Naturally, short-term results were achieved, and this became Kim Jong-Il's brightest achievement and also his political foundation. However, the growth was short-lived, and North Korea had to face a much longer adjustment period. By the late 1980s to early 1990s, the damage done to the North Korean economy was almost irrecoverable with the overall economy crippled by the fall of socialist states, floods, and the death of Kim Il-sung, the leader Supreme.

If we divide what you have said thus far into pre-1970s and post-1980s, it is evident that inward-oriented industrialization, which took a central role until the 1970s, gradually hit a wall, and attempts made by the regime to revitalize the heavy and chemical industry through foreign loans failed due to the oil shock in the 1980s. Furthermore, although efforts were made to revive the economy by enacting the Joint Venture Act and using the funds of pro-Pyongyang Korean-Japanese entrepreneurs, these also failed due to the authorities' excessive

interference. North Korea's industrial policy was characterized by its emphasis on the heavy and chemical, and capital goods industries in conjunction with its pursuit of the simultaneous development of the military and economy. If successful, the policy would have invigorated the heavy and chemical industry, and the benefits would have trickled down to the light industry and then to agriculture, ultimately enhancing living standards. However, it never reached this stage, and economic conditions worsened. In reality, the policy was impeded by the recession which intensified after the 1980s following a series of damaging events. You mentioned earlier about large enterprises such as alliance enterprises, but I know there are also small enterprises such as local factories in North Korea. Could you explain how enterprises are classified, and who operates them?

The capital goods industry is under the direct control of the central government through central enterprises that include large production enterprises in, for example, the heavy and chemical industry. Meanwhile, in terms of consumer goods, factories that produce final goods are, by principle, located in regional areas, and the goods are distributed to the residents of those areas. Food-related agriculture is a separate industry, and up until the 1980s, the final consumer goods mainly included textiles, clothing, processed food, resin-based chemical products, and steel farming equipment. Factories that manufacture these final

consumer goods are located in and named after *guns* (county), the smallest administrative unit in North Korea. For instance, a clothing factory in Changsung-gun is simply called the Changsung-gun clothing factory. These factories are classified as “local industrial factories” and thousands have been built in gun-level administrative areas.

Under the principle of unification and specification, a management policy of the planned economy, the National People’s Planning Committee has overall command, including control over local factories. Unification integrates the highest National People’s Planning Committee to the lowest industrial factories into a single plan as one system while specification, in theory, bases the input and output of all manufactured goods on the central plan. For example, in order to produce garments, the textile must be supplied from the central textile factory, and so, both must be connected. In other words, the final consumer goods factory is managed and controlled by the light industry factory (eg., Central Textile Factory in the

case of clothing factories), which is essentially a top factory in a planned economy based on unification. In addition, it is simultaneously controlled by the local People’s Committee—this is dual control.

Naturally, the degree of control is different. In the case of local factories, although the materials are supplied by the central government, the final product is distributed only within the region. Therefore, the power of the central authorities is relatively weak. But, that does not mean the factories are affiliated to local governments, as was the case with Xiangjin Enterprises in China during its reform and liberation period. They are just small in scale and account for only a small share of the total economy. Moreover, they are managed under a different mechanism to that of larger factories. From the perspective of the central government, due to its capital constraints, the investment in the consumer goods sector is passed on to the local governments to minimize responsibility.

Please could you explain how North Korean enterprises are classified and who operates them?

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Enterprises in North Korea are broadly divided into two categories: large enterprises and medium and small enterprises. The criteria for each category are based on its significance to the national economy as well as the production scale, and measured by the number of employees, amount of fixed capital, and production capacity. Specifically, enterprises are classified into special (complexes and general enterprises), first, second, and third grade enterprises, and so-forth, and local industrial factories.

By scale, they are usually classified into central enterprises (special to third grade), and local enterprises (fourth to seventh grade, and local industrial factories).

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Central enterprises, built with the investment from the central government, receive materials from the central authorities, and special-grade enterprises, such as the Kim Chaek Iron and Steel Complex, Hwanghae Iron and Steel Complex, and Pyongyang Kim Jong Suk Textile Mill, manufacture military and other special-purpose goods. First, second,

and third grade factories include the Heecheon Machine Tools Factory and Chongjin Thermal Power Station; Nakwon Machinery Factory and Suncheon Pharmaceutical Factory and; the Hamhung Silk Mill and Sinuiju Paper Mill, respectively. Meanwhile, local enterprises, built with the investment from local governments, receive materials from the local authorities, and manufacture daily necessities such as clothing, tableware, food, beverages, snacks, and flour.

Enterprises can be classified by their style of business operation as opposed to by scale. This classification is usually applied to large enterprises, such as complexes and general enterprises. Complexes can be divided into vertically-integrated and horizontally-integrated complexes. The former refers to large enterprises that manufacture strategic goods with affiliated factories connected along the manufacturing process. This type of integration is found in the metal, machinery, and chemical industries. Classic examples include the Kim Chaek Iron and Steel Complex and 2.8 Vinalon Complex. Otherwise, complexes are formed by horizontally-integrated factories operating in



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*Complexes and general enterprises were introduced to improve the feasibility of central plans and make it easier for the authorities to manage the factories and enterprises.*

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the same industrial field and geographical area. This type of integration is common in the mining industry and is similar to the horizontally-integrated corporate groups in South Korea. A prime example is the Pukchang Area Coal-Mining Complex.

Complexes and general enterprises were introduced to improve the feasibility of central plans and make it easier for the authorities to manage the factories and enterprises. However, management proved difficult as the number of production facilities and volume increased. To resolve this issue, the government integrated these factories and enterprises into larger units and gave them the authority to set up plans in regards to production relations between affiliated entities.

Until the 1970s-1980s, central and local enterprises were managed in a generally similar manner except that local industrial factories were relatively free from the central implementation of resource supply plans. This was because they were able to produce the raw materials they needed or procure materials from cooperative farms to manufacture goods for

local residents. This limited the need for intervention by the central government to meet the planned goals. For example, clothing factories manufactured clothes with textiles provided by the central government while paste/sauce factories made their goods with beans produced by nearby farms. Textiles and food are different in terms of their relation to the central plan and level of control. In the case of food, the central plan or control were often only nominal. In contrast, central factories under the influence of the principles of uniformity and specification received inputs and generated outputs according to detailed plans set by the central government.

Initially, this manner of business operation worked relatively well due to the limited number of factories and type of goods manufactured. However, through the 1970s, as was the case in other socialist countries, it became increasingly difficult to maintain this approach. Reportedly, the number of enterprises classified as a complex was in the tens. Power stations across the country became complex enterprises as did steel and iron producers, chemical factories such as the 2.8 Vinalon Complex, large machinery manufacturers, and manufacturers of heavy electrical equipment related to generators. The famous Daehan Heavy Machinery Complex, Seungri Automobile Complex, and shipyards in Nampo and Wonsan were classified as special grade enterprises. Thereafter, during the 1990s economic crisis, North Korea enforced the organizational restructuring of the enterprise sector, substantially lowering the number of complexes. Today, the total number of enterprises of special, first, or second grade is estimated in the hundreds.

In sum, there are largely two type of enterprises in North Korea; central enterprises and local enterprises. Central enterprises are classified into special, first, second, and third grades by scale while local enterprises are small factories that manufacture final consumer goods for local communities. Complexes refer to groups of horizontally-integrated enterprises and some, especially the larger complexes, are vertically integrated (central to local enterprises). In terms of function, North Korean enterprises are all controlled by the central authorities in terms of both input and output.

You mentioned the principles of uniformity and specification in planning. Could you explain how these principles have been applied to the operation of enterprises in practice? It has been said that business operations in North Korea are different for each sector, particularly in the case of state-owned



enterprises. While other socialist countries adopted the one-man management system for state-owned enterprises, North Korea established its own factory management system, called the *Tae'an Work System*. Could you please explain what this is, and how North Korean enterprises were actually managed?

At first, North Korea adopted the Soviet-style one-man management system. As other socialist countries, however, internal criticism was raised over the abuse of power by factory directors. In response, North Korea introduced the *Tae'an Work System*.

The *Tae'an Work System* is a unique economic management system developed with the aim of implementing the communist principles of living in the spirit of collectivism. Under this system, factories and enterprises conduct their operations following the collective leadership of the party committee, fulfill their economic tasks by mobilizing the people as a productive force under the banner of political missions and, take responsibility of supporting both the higher and lower levels of the system. The

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party committee is the highest managerial authority within a factory, and members discuss, make decisions, and implement resolutions on issues related to management and factory operations. A smaller executive committee is responsible for ensuring that the correct action is taken. To be specific, this smaller group consists of the party committee secretary who serves at the party level; factory manager who deals with administrative affairs and; chief engineer who provides technical guidance on production issues. The party committee then conducts a collective performance review on how its decisions are implemented.

In essence, the *Taeon* system is the factory-based equivalent of the political system whereby the Workers' Party of Korea makes the policy decisions and the cabinet executes them. The system has also often been described as a "planning mechanism that is based on the people's opinion." This is because although the factory party committee is the most influential body and possesses the power to make all decisions, the production plans of a factory are set up by a "working people's organization" that includes all members of the factory. In sum, the factory manager steers the rest of the members and the party secretary makes the final decisions and, at least formally, all members participate in the decision-making process whilst ensuring compliance with the political directions of the committee.

Within the *Taeon* system, policy/political issues and administrative/technical issues are functionally autonomous. The party committee, the highest rank in the hierarchy, deals with policy issues whilst factory managers, who are essentially the executive branch of authority, deal with technical issues related to factory management as well as administrative and financial affairs. However, in practice, factories are managed in a hierarchical structure that obscures the distribution of power, and ultimately, the party

committee has the final say in the decision-making and execution processes. This includes personnel management (e.g. replacement of workers) despite the fact that managerial decisions are made by the factory manager alone. As such, despite being a distinct branch of management, factory managers have to follow the decisions made by the party committee chaired by the party secretary. In the early stages of growth, this ambiguity was not a cause for concern. However, since the 1990s, survival has become an increasingly important priority for factories due to the rise of markets. Thus, this ambiguous distribution of power has become a major source of internal conflict.

From a technical perspective, the *Taeon* System is a production system that operates under an intense concentration of supply from the central authorities. That is, the system enabled factories to focus on production by providing them with comprehensive guidance and guaranteeing a stable supply of materials for production and delivery of goods as per the plan. To a certain extent, this was an implementation of the principles of uniformity and specification. For example, a factory which has ten units of manufacturing equipment, reports an

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initial plan to manufacture 100 units of a product on the condition that a specific amount of intermediate goods is supplied. The central authorities collect these plans, and based on the data, sends the required materials to each factory: this is often a repetitive, back-and-forth process that involves time consuming negotiations between the factories and central authorities. In principle, decisions are made and negotiations are conducted by the members of the general meeting of the factory. But, in reality, the final decision is made by the party secretary, and once the plans are set, procurement contracts are carried out accordingly. When an agreement is made, contracts containing the specific details are drawn up, for example, about buying and selling prices. This process, from planning and negotiating to receiving the materials, and drawing up the final contract, is mere formality to minimize the unnecessary waste of resources. There is also a “materials trading company” in the procurement process which acts as a middleman between factories. For example, if Factory A needs to send materials it produces directly to Factory B, it must first sell the materials to a trading company which then sells them to Factory B in accordance with the plan.

Another unique feature of the *Taeon* system is that the factory itself is responsible for the livelihoods of its workers. A department dedicated to back-end services is responsible for not only production but also personnel management and improving productivity. These departments also procure and supply daily necessities, such as food and clothing, build homes, and distribute stipends and rations for the workers residing in their communities.

Similar work systems have also existed in other socialist countries. However, in North Korea, back-end services play a more explicit role. Specifically, currency and wage belong within the scope of the planned economy. However, some consumer goods

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are supplied to state-owned stores via separate channels, meaning that workers are required to purchase them with their own earnings. These include rice, toothpaste, and other daily necessities

The *Taeon* system seems very distinct. Please could you explain how it works in practice? Considering the nature of business management, it seems unlikely that the party decides on all matters as a collective, and ultimately, the one-man management system would have been followed in reality.

While the party and party secretary are unpaid, every stakeholder of the factory including the manager are affected when a problem arises. Therefore, production plans are formulated in a way that accounts for every potential issue. For example, if a factory requires 50 units of raw materials to manufacture 100 units of a product using 10 machines, technically they should request the exact quantity that is required. However, in reality, they are supplied with 40 units of raw materials and asked to manufacture



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*When it comes to the products themselves, some are promoted by the party for political purposes while others are not due to the higher possibility of collusion.*

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120 units. To account for this discrepancy, the factory reports that with 10 machines, 60 units of raw materials are required to produce 80 units. It has become routine practice for factories to lower their targets as much as possible, thereby concealing their genuine production capacity. This is not a unique problem to North Korea and has occurred in other socialist countries.

When it comes to the products themselves, some are promoted by the party for political purposes while others are not due to the higher possibility of collusion. For example, if the emphasis is student education, factories are required to produce goods specifically related to students. If there are options for the same type of good to manufacture, then naturally, the factory manager would choose the easiest. In terms of producing different items, because materials and methods vary, the manager and party secretary have to reach an agreement regarding the manufacturing protocols and plans. The ease at which they can reach a compromise is determined mostly by political priorities, and partly by the party secretary's understanding of the reality.

Ultimately, within a socialist economy, similar problems exist under the one-man management system. In a planned economy, since what and how much factories and enterprises produce are already decided, the only contrast is whether the plan goes through the factory party. In the broader sense, however, there is little difference, and thus, North Korea is highly likely to suffer the consequences of inefficiency. The production plan for any factory is based on the workers' opinions to boost morale and inspire them to mobilize with political purpose. This can encourage patriotic enthusiasm from the workers for a certain period of time. However, when this passes, problems can arise both internally and externally.

The existence of a factory party committee is not unique to North Korea. This concept also existed in the former Soviet Union and China. But unlike in North Korea, the committees were not involved in financial decisions and only served as a watchdog for political issues while the factory manager drafted and set up business plans using past financial performances as a guide for production and profit. So, is it correct

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*The production plan for any factory is based on the workers' opinions to boost morale and inspire them to mobilize with political purpose.*

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to say that the engagement of a party committee in the planning process is a distinct component of the North Korean factory management system? Also, considering that the central resource office is the sole supply channel for materials, is there any bargaining at the planning stage? For example, Factory A is required to provide 50 tons of steel to Factory B in order for 100 units of tractors to be manufactured, in accordance with the plan. At this point, would the factories engage in bargaining or open negotiations when Factory B makes the request for the materials?

Finally, the role of back-end services is interesting. It is thought that there is a large disparity in living standards depending on which factory individuals work for. For instance, the employees of the Kim Chaek Iron and Steel Complex potentially have better benefits compared to those of a local paste/sauce factory. How is such a disparity acceptable in North Korea's socialist society?

Similar to the work systems of the former Soviet Union and China, North Korean party committees are only supposed to deal with political matters while business operations are managed by the factory manager. However, the principle of the importance of the people's opinion that underpins the *Tae'an* Work System requires all key decisions to be made by the people's council. As a result, the party committee assumes the role of the people's council and holds the power to make all key decisions. The same problem occurred in China, which ultimately led to the separation of the political and economic processes. Therefore, Chinese enterprises are currently operated under a separate mechanism.

Under the *Tae'an* system, there is bargaining but it is managed by a higher level of authority. To give an example, if the Kumsong Tractor Factory plans to procure iron from the Kim Chaek Iron and Steel

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Complex, the bargaining with the central resources office would be carried out between the Ministry of Metallurgical Industry or another lower-level intermediary agency. After the amount of iron to be supplied is agreed upon, the materials are delivered in a top-down manner.

Employees of the Kim Chaek Iron and Steel Complex and those of local paste/sauce factories receive the same wage, but a different level of benefits. Indeed, while the former has its own construction unit to build homes for the workers, the latter cannot afford such luxuries. Instead, local administrative bodies such as the Provincial People's Committee step in to build the homes although the quality may fall short. These disparities in benefits depending on the employer and location is the reason why most North Koreans seek employment at large factories in Pyongyang.

Could you please describe the industrial activities of North Korea in the past?

Initially, North Korea enjoyed rapid industrialization on the back of the relatively favorable environment and manufacturing conditions. However, it was not able to avoid the problems that have plagued other socialist economies. These challenges emerged as rapidly as the industrialization itself, and further intensified as the authorities sought to increase the central supply of materials. Supply disruptions were at the core as factories were forced to resolve the shortage of resources by either making a request to the relevant authorities or producing the materials themselves. As a result, iron and steel producers began to manufacture machine parts in their own workshops, for example. This was a widespread issue and the practice was not limited to one industry or region.

For a country as large as Russia, this would not engender any serious setbacks. But, for a country as small as North Korea, if every region has fully equipped production lines, it causes major investment overlap and inevitably, inefficiency. Because facilities investments and resources were distributed based on the central authorities' inclinations and not on the international markets and consumer demand, large factories had no alternative but to move in line with the regime's directives. But, theories are just theories, and in reality, the central authorities were unable to implement the intended plans and instead, established production units at every provincial, local, and factory level which diminished the efficiency of investment considerably.

Another troublesome variable was that North Korea was completely disconnected from the outside world and thus, its technology continued to fall behind. It was not immediately evident when factories

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were newly operational, but by the 1980s, when additional investments began to ebb, technical problems emerged. Therefore, it may seem from an outside perspective that the North Korean economy collapsed abruptly in the 1990s, the forces behind it had actually been accumulating for decades. Approaching the 1990s and 2000s, this seemed to be both a beneficial and detrimental legacy. If there had been no system in place, North Korea could have started anew, but since the foundations had already been laid, this presented a completely different challenge in recovering losses.

Overall, North Korea is a failed industrial economy. When evaluating North Korea in comparison with the least developed countries, such as those in Africa, there are many aspects that cannot be explained if only income level is taken into consideration. Rather, it should be viewed on the premise that North Korea was a country that achieved industrialization. Accordingly, industries were able to swiftly adapt to the rapid changes that accompanied the shift to a market economy. Services, for example, did not suddenly appear with marketization. A wide range of services such as public bathhouses and barber

shops were already available in the form of socialist services in the industrialized North Korea. However, when the socialist economy began to fall apart, these services rapidly transitioned to take the form of market services. In comparison, in underdeveloped countries, the very concept of even a bathhouse must first be established. Therefore, North Korea cannot be compared to these countries as a method to understanding its economy.

## Changes in North Korean Industries and Enterprises after the 1990s

Thanks to its favorable initial conditions, North Korea succeeded in reaching a certain level of industrialization by implementing an inward-oriented policy that focused on the heavy and chemical industry and establishing the *Taean* system. However, like other socialist economies, it faced numerous problems that resulted in inefficiency and redundant investments. Soon thereafter, North Korea endured an economic crisis (1990s) that ended prevailing industrial practices, and closed most complexes and other special-grade enterprises and local factories by the mid- to late 1990s. Please could you elaborate on this process?

Following the economic crisis, North Korea's industrial landscape environment changed drastically. Could you also tell us about these major changes and how the industrial structure has shifted? For example, were failed enterprises dissolved following bankruptcy as is the case in market economies? And, was this procedure different between industries and enterprises?

As we previously discussed, North Korea already had favorable conditions for industrialization. This was especially true for the energy sector and the advantages it offered were factored in the design of the overall industrial structure. Despite this, when socialist economic principles broke down, the import of key energy sources rapidly declined. This went on to cause a negative chain reaction in the already-staggering energy sector, which consisted of coal and iron mines, etc. A decline in coal production immediately hindered electricity generation, which in turn, had serious negative consequences for the supply of electricity and transportation. The sheer bulk of coal, a key resource to the North Korean economy, made it difficult to transport, which caused the coal chemistry sector to also come to a halt resulting in massive shutdowns in the materials sector. The disruptions in the electricity supply and coal transportation also led to the closure of iron producers.

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backbone of the economy, and when they closed, numerous industries had to be suspended, including the intermediary goods, heavy and chemical, and light industries as well as agriculture. The heavy and chemical industry was given priority in terms of the electricity supply and the shortage caused a complete shutdown of the light industry. The agricultural sector was also designed to use vast quantities of electricity to operate its irrigation systems. So, despite being initially unaffected, farms all eventually suffered as electricity was needed to power the motors that watered the fields, etc. There was also a shortage of fertilizers because coal chemical factories were the primary producers. At the same time, the reduced imports of crude oil negatively affected petroleum chemical plants built in the 1970s that were also another source of fertilizers. Indeed, while it started in the capital goods sectors, the breakdown eventually engulfed almost every facet of industry.

However, North Korean enterprises are not corporate entities and as such, there is no legal bankruptcy system and they cannot close down. Rather, local

factories, such as those for clothing, soy sauce, and bean paste, among others, are left deserted as factory workers stop showing up because there is nothing to produce. Eventually, only the building remains until that also crumbles away. State-run stores face the same fate until, in some cases, the store is bought by an individual with money.

As for the employees of these factories and stores, most become unemployed. There was a huge number of workers who found themselves out of work after thousands of local industrial factories were shut down. Therefore, in order to make a living, many individuals become merchants or began private economic activities, such as opening a brewery at the market. Overall, approximately 70-80% of local industrial factories closed down. And, although this was not the case for larger factories, it has been reported that only a third or fourth of the employees were retained due to the decline in demand.



Does the State Planning Commission reassign those who become redundant to other jobs? Also, what happened to the previously discussed welfare benefits that were managed by the back-end service departments?

New jobs do not suddenly appear because a factory closes. Technically, the workers are still employees of the factory. There are factories that are reorganized at the national level and officially recognized as closed. For example, many of the affiliated factories of nonferrous metal production facilities such as the Nampo Refinery, which were heavy electricity users, closed down and ultimately, the enterprise itself was wiped out. Large factories are either shut down in such a way or merged with other facilities.

The majority of enterprises large enough to provide welfare services have survived. Of course, there are those like the Nampo Refinery, but in such cases, the authority is passed onto to other institutions at the local level, etc. Still, during the 1990s, the industrial environment was desperate, and providing welfare services became no longer feasible. People continued to reside in the houses that were built for them but the lack of income led to poverty and severe malnutrition or even starvation. Nevertheless, factories were not legally dissolved or made bankrupt, so employees would clock-in and then conduct their private business activities elsewhere. If business was good, some would pay a fee to the factory to work elsewhere whilst leaving a record of attendance and on paper, the factory continued to operate. These employees were called “8.3 workers.” In border regions, 8.3 workers would sometimes pay in foreign currency rather than North Korean won.

Please could you elaborate on the term “8.3 workers” and who they were?

The term derives from “8.3 consumer goods,” which appeared in the directive issued by Kim Jong-Il on August 3, 1984, to launch a consumer goods manufacturing campaign. The central government demanded that residents produce consumer goods without a supply of extra materials. For example, daily necessities were manufactured from iron chips that were left over from iron factories. Products made in this way were allowed to be distributed freely since it was not part of the central plan, and these products were named “8.3 consumer goods.” These goods were controlled not through the meticulous planning of quantity (based on physical amount), but by the sum (based on the cash equivalent). The fact that the production of these goods was measured this way meant that factories were given some leeway. For example, if a factory reported that it would make wooden dishes as 8.3 consumer goods with wood scraps, the production was managed based on the total sum (of money)

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and not the total quantity.

Meanwhile, as supply stalled, factories were left only with liquidity planning for 8.3 consumer goods. Consequently, meeting the planned goals through the production and sales of 8.3 consumer goods became the primary objective. However, most enterprises were unable to do this, and instead, sought to collect money from workers to hit their targets. From the workers' perspective, it made more economic sense to pay a fee to the factory in return for conducting their own private business activities. It was far more attractive than going to work and earning a mediocre wage, especially when rationing was not operating efficiently. In all, 8.3 workers were borne from the demand of both the enterprises and workers resulting in a win-win scenario.

As a result, a novel type of contract was created. Previously, a contract between an enterprise and a worker was unheard of, and workers were assigned to a factory by the party committee. However, 8.3 workers had a direct agreement with the factory, and as improbable as it may seem, through this type of contract, some enterprises survived while others were closed or forced to downsize through national restructuring.

To summarize, in the 1990s North Korea was hit hard by an economic crisis as industries based on a stable supply of energy collapsed. This affected enterprises in three ways. Many closed down, some major enterprises underwent organizational restructuring, and others just disappeared. Against this backdrop, the concept of 8.3 workers came to the fore, and the meaning of the term has changed over time. Please could you outline what has changed since.

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*The primary cause of such dramatic changes in the 1990s was the famine, or the “Arduous March,” in the early to mid-1990s.*

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The primary cause of such dramatic changes in the 1990s was the famine, or the “Arduous March,” in the early to mid-1990s. During this period, North Korea suffered not only food shortages but also labor shortages at labor-intensive production sites, such as mines. As international aid began to arrive, mining production slowly started to operate again and external trade was resumed initially through inter-Korean economic cooperation projects. This helped the North Korean government restore its fiscal capacity.

The second most catastrophic event was the death of former president Kim Il-Sung who had dominated the decision-making body. His death paralyzed the regime as nobody was ready to take over his position. Public rationing stopped and there were no markets at that time. Construction projects were also immediately suspended despite there being materials in stock and workers assigned. Moreover, the supply of other additional materials and rice was disrupted, and thus, the workers did not work.

From the mid-90s, resources began to flow in, first via international aid, and then, through external trade. The central decision-making process was still



at a standstill, but thankfully, the economy slowly began to recover from the bottom-up. Workers found ways to survive by trading imported goods in the markets. In addition, individuals and even central government agencies began to take materials from non-operating factories, and those who bought rice from China with these materials were praised by the government. According to a media report on the 2.8 Vinalon Complex, “Several thousand tons of scrap metal were disposed of.” Government agencies dealt with large volumes of scrap metal while workers did so on a smaller scale. In the end, many factory buildings were left empty with only the walls and roof remaining.

From the late 1990s to the early 2000s, the central government slowly walked away from the shock of the economic crisis and managed to gradually restore its resource allocation function. However, North Korea’s overall industrial capabilities were so severely damaged that the electricity, metal, and chemical sectors could not recover. Until the early 2000s, due to its fiscal constraints, the government remained committed to the repair and maintenance of factories in an attempt to increase its operation capacity under a policy titled ‘technological renovation and modernization.’ Previously, North Korea had opted to simply rebuild factories when similar issues arose, but now it had no resources to do so.

To quote Kim Jong-Il, “Recovery makes progress at the speed of ants eating away at bones.” Eventually when there was fiscal capacity available to maneuver, the first step the government took was to pour most of it into the energy and transportation sectors. Moreover, food aid was distributed to miners as a priority so that they could continue their jobs. When enough coal was produced, it was sent to power stations to generate electricity. Through this process, North Korea was finally able to manufacture and

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export goods to earn foreign currencies that were channeled back into the process to expand the overall scale. Other areas of the economy such as the consumer goods sector also began to operate again through marketization. Initially, consumers sold corn, noodles, and other food products. But as time went on, enterprises such as the Kumsong Tractor Factory became directly engaged in the transactions with cooperative farms through the market mechanism.

**Were enterprises able to use their own judgement and will in conducting their activities in markets without the need for permission or direction from the government?**

Not only did enterprises not ask for permission, the government was also acutely aware that its directives would not be followed. Therefore, enterprises were allowed to distribute 20-30% of their production at their discretion and create a cycle of trade. For example, if iron producers were given the right to distribute 20% of what they produced, the Kumsong Tractor Factory could request the Kim Chaek Iron and Steel Complex to provide the amount of steel they required. The tractor factory would then manufacture and provide farm equipment to cooperative farms that would send food to iron

complexes. Essentially, when transactions were carried out, prices were set, whether it be in kind or in cash. This is how markets were created. This kind of system, including *jangmadangs*, took shape in the early- to mid-2000s as enterprises became increasingly active participants in transactions amongst themselves.

Another turning point came in roughly 2010, at which point statistics show a surge in North Korea's anthracite exports to China and imports of intermediary goods. This indicates that recovery in the final consumer goods sector was followed by the recovery in the manufacturing sector that assembled imported intermediary goods into final products. In other words, a favorable environment was created to conduct transactions of capital goods at market prices, thereby revitalizing the manufacturing sector. To give an example, when fishery markets were created, markets for fishing boats were also created to meet the growing demand. Consequently, the number of fishing boats ready for operation grew. Statistics show that North Korea's imports of fishing boat engines, which could not be built domestically, expanded in the mid-2010s, while the remaining components were manufactured at home. Trucks were also manufactured in a similar manner by importing engines and chassis.

This structural characteristic is probably the main force behind the visible growth of the machinery industry. Although materials were still being imported from China, the domestic production of capital goods increased slowly as the recovery in the consumer goods sector had a steady ripple effect on other sectors, including the machinery industry which was now able to manufacture consumer goods once more. From the 2010s, prior to the UN sanctions, the manufacturing sector had been expanding, particularly in food processing where the majority of activities took place near the

residential areas of consumers, and the growth of the industry was dependent on the local production of raw materials. If there was an adequate supply of raw materials, the industry could grow by importing other materials such as textiles, processing machinery, packaging materials, and additives. Other industries, including shoes, apparels, and information and communications technology (ICT), also followed with a similar structure. ICT products were assembled in local factories for export with imported chips, liquid display panels, and other components. However, these industrial activities were suspended by the UN sanctions in 2017.

In the 1990s, when almost all industries had come to a halt, the North Korean government took three important measures. First, when allocating financial resources obtained from international aid or economic cooperation projects with the South, the regime prioritized the energy sector. Second, it allowed citizens to engage in economic activities through the market mechanism. Last, it partially allowed enterprises to use their own judgement in operating their businesses. As the energy sector, particularly mining, slowly recovered, consumer goods markets visited by the average North Korean person began to grow. Enterprises also engaged in transactions with one another, giving rise to business-to-business markets. As a result, overall production gradually increased again, and from 2010, growth in coal exports led to the growth of intermediary goods imports. This provided the basis for factories to produce more final consumer goods and intermediary goods which spurred the gradual recovery of the North Korean economy in the era of Kim Jong-Un until the imposition of US sanctions in 2017.

## Analysis of the Current Status of North Korean Industries and Enterprises

We will now discuss the research techniques behind the study of North Korean economics. What approaches do researchers outside of North Korea take when analyzing North Korean industries and enterprises? What sources of information and types of data do the researchers have access to and how is it collected?

There is virtually no reliable data on the status of the industrial activities in North Korea, except those on trade, and the remaining data is usually anecdotal in nature. Official sources of information from North Korea include Rodong Sinmun (newspaper) and the Korean Central News Agency. However, these official sources provide very little information on industrial activities and, as such, it is challenging for outside researchers to observe activity in these sectors.

At present, the primary method used is to collect

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the information on industrial activities from these official sources and attempt to complete the big picture using prior knowledge. For example, if a Rodong Sinmun article reports that a new oxygen-blast furnace has been built, we will meticulously read through the article and deduce that the approach was similar to the smelting-reduction process. Then, we would study what the process is and what issues it may incur. An article may state “The Ministry of Coal Industry announced that this year’s coal production grew approximately 10-20% from the year before” and although the figure is unreliable, we must assume that the statement on the growth of coal production itself may be accurate. If coal production shrank in 2019 from the year before or fell far short of the target, the media would not have made any comment. Having said that, what truly deserves our attention may be what is not discussed. Meanwhile, it is reasonable to assume that sectors often mentioned for good performance have made more progress than sectors that have not been discussed at all.

Researchers will then propose potential explanations based on their prior knowledge of North Korea, economics, and industrialization. For example, the UN sanctions were expected to deliver a blow to the processing-on-commission production in the textiles sector. However, imports of chemical products actually continued to rise. This became an area of interest and researchers began working to try and find an explanation. After investigating many avenues, we came to the conclusion that food processing continued to operate, which may have been the source of the consumption of chemical products, such as plastics, that are not under the purview of sanctions. Of course, we cannot present accurate figures and quantities but we have attempted to provide as accurate estimates as possible. Sometimes this method of estimation requires an enormous amount of work. To give

an example, when North Korea laid a long water conveyance tunnel for the Tanchon Power Station, I attempted to estimate the quantity of reinforcement steel that had been used for the tunnel with seemingly unrelated data, as aforementioned. On the other hand, if it was South Korea, I would have been able to come to a conclusion by using a standardized formula. In summary, there is nothing concrete or verifiable, and therefore, we can only try to collect as much information as possible from official sources and sometimes even attempt to fill the gaps ourselves.

I am aware that you have been building a novel database on North Korean industries and enterprises. Please could you tell us about this database and whether you are planning to disclose it to the public?

Until the 1980s, North Korea disclosed information on the factories they were operating, such as where they were located. Since the 1990s, however, this information has not been available. Therefore, we can only confidently know the names of factories which had existed, but not necessarily which factories are no longer in operation. Therefore, I have collected and classified this data up until the 1980s and then from 2000, I have collected the names of manufacturing factories that appeared in official sources such as the Rodong Sinmun. In doing so, I assumed that, at least, the factories whose names appeared in newspapers were in operation. If the names of factories were mentioned, there would also often be information on their locations, fields of business, managers, products, and organizational structure. This data was then used as criteria for classification.

The first, and most important, criterion was the reliability of information. For example, a Rodong

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Sinmun article that reported the construction of a new factory was coded #1 because the information is considered hard fact. Other reports reading, “An investment was made” or “An oxygen-blast furnace has been newly built” were coded #2 if the information was considered true given the specificity. Reports that mentioned the construction of new facilities, but lacked information on the scale were coded #3, and reports that only briefly mentioned technology developments were coded #4. The same approach was taken for information on production. Reports on a factory that, for example, produced 1 million tons of steel were coded #5 because, although the figure was not reliable, the information contained was relatively specific in that it mentioned the item and volume. In short, the less specific the information, the higher the code number is.

Through this process I was able to produce databases that showed how many articles were released on production or investments, and how many enterprises were engaged in investment activities in a given period. This data was then sub-categorized according

to geography and type of business. This process allowed us to elucidate what types of enterprises were located in a particular region, the details of the investments they made, and what kinds of activities they conducted. Now, using these databases we are able to compare Pyongyang with Chongjin in terms of their industrial activities or create time-series data. Of course, they provide general information only as they lack accurate figures on production, employment, value-added, and so on.

In the future, I do hope to disclose the databases on a pilot basis, and in such cases where we have to keep it confidential due to restrictions, we will disclose what we can. Since the primary source of data is the Rodong Sinmun, I have also included summaries of relevant articles. For example, an article on a newly built oxygen-blast furnace in the Kim Chaek Iron and Steel Complex is accompanied by summaries



of follow-up reports. And so, although we may not be able to disclose the raw data, we would like to disclose these summaries at least. However, the possibility of this is uncertain.

I am hopeful that the databases can be shared. Now, I would like to discuss the current status of North Korean industries and if there have been any changes to major sectors. It is known that the Kim Jong-Un regime has implemented economic development plans. Where do you think this policy is heading and what are the potential areas that will help raise the competitiveness of the North Korean economy?

The heavy and chemical industry remains the backbone of the North Korean economy. North Korea prioritizes four areas, which likely make up a large proportion of the industry landscape. They are metal, coal, electricity, and transportation, and they are supported by the metal, chemical, electricity, and machinery industries, respectively. Rail transportation and mining are the next most important. However, when it comes to industrial growth, you will see a different picture. In the context of external trade, the fastest growing industry is mineral mining. On the other hand, if there had been no sanctions on the export of light manufacturing goods, sewn clothes and other goods manufactured on commission would have created the highest demand rather than anthracite. This disproportionate industrial structure seems to be attributable to the concentration of labor and facilities in particular industries that generate high income.

The fastest growing industry in the domestic economy is services, which was also a key component in the recovery of the North Korean economy. Remarkable

growth has been observed not only in commercial distribution but also in private services. To be specific, the number of public spas, restaurants, and photo studios has been on the rise. Despite some limitations, the light industry has also expanded. This could be attributable to the growing demand in domestic consumption but only when assuming that the import of intermediary goods has continued. However, the metal and chemical sectors, where an investment worth 200 billion dollars was planned during the Kim Jong-Il era, are unlikely to grow for the time being.

It appears that Kim Jong-Un is taking the government's fiscal status and the country's technological level into consideration when making decisions. To be specific, investment in light industries, which have a higher potential for growth than the heavy industries, has increased. The same goes for sectors that primarily utilize already existing technology. More recently, North Korea seems to have increased investment in the chemical industry, namely the CI chemical industry, and metal engineering.

The Kim Jong-Un regime has implemented economic development plans which appear to be designed to obtain foreign currency by conducting export processing in so-called export processing zones near Nampo and Pyongyang, the two major cities in North Korea, similar to the Masan Free Trade Zone in the South. This approach seems to have also been

applied to the tourism industry. In the meantime, the basic economic development strategy of the Kim Jong-Un regime has been government-led growth while leaving the light industries in the hands of the private sector. Presently, it emphasizes not only the heavy industries, but export processing industries, including electronic parts, metal processing, and machine parts. This seems to be the major difference from the past.

Another key area is the information and communications industry. In North Korea informatization has been mainly led by software rather than devices. The term "informatization" usually reminds people of the informatization industry but also science and technology. The term science and technology is used in two ways. On one hand, it refers to an industry that utilizes advanced technologies and on the other emphasizes the improvement of efficiency. North Korea has a fast-aging population. Given this, the government seems to have promoted labor-saving technologies as part of its long-term economic development policy. It has also created economic development zones to secure necessary funds from outside or attract foreign direct investments by establishing equity joint ventures through its Ministry of Foreign Trade.

The foreign investment policy in the Kim Jong-Un era is quite different from that in the Kim Jong-Il era. In the past, the North Korean government limited

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the application of institutions related to special economic zones (SEZ), thereby prohibiting economic relations between SEZs and nearby regions. But since the inauguration of Kim Jong-Un, the government has recognized the importance of such relations in its pursuit of the SEZ policy. Now, when establishing a new SEZ plan, relations between the zone and nearby regions are considered from the beginning signaling a shift in the government's direction for the policy from a closed system to an open system. For example, the plan for the Chongjin Economic Development Zone mentioned connections with metal and machinery factories in nearby regions, including the Kim Chaek Iron and Steel Complex. These changes suggest that the purpose of the SEZ policy is no longer about developing the zones but rather to revive regional economies by using the zones as a springboard. If the SEZ policy continues to change in this direction, attempts to limit economic activities within these zones will likely decrease. Naturally, this should attract foreign investments. However, there is currently no foreign capital invested due to the nuclear issues.

Overall, it seems that the key components of North Korea's economic growth strategy are 'the export-processing industry' and 'the technology-oriented industry focused on informatization.' North Korea is not likely to take an entirely different path in the future. This is because the export-processing industry, mainly led by the light manufacturing sector, is likely to continue to be the main source of foreign currency income. In the meantime, the government will remain committed to nurturing software and other technology-oriented sectors. It is difficult to predict for how long North Korea will continue to maintain the labor-intensive processing industry, however, if two to three decades have already passed since the creation of the industry, it may not be for much longer. Given this, the basic direction of the economic growth strategy, which is to achieve

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factory automation and build a digital economy is appropriate. Nevertheless, in practice, successfully executing the plan is a vastly different matter.

To summarize, similar to the past, the priority areas of metal, chemical, electricity, and machinery account for the largest share of North Korean industries today. Mining and iron production also take up a measurable share. Economically feasible sectors include underground resources, mining and manufacturing, services, and light manufacturing. The basic direction of the economic growth policy in the Kim Jong-Un era seeks to combine export processing, informatization, and the latest scientific developments and technologies, which you agree is the appropriate action to take.

I would now like to discuss enterprises. Other than how they interact with each other or how they operate, please could you give us an overall explanation on how they are different from the past?



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*At the core of North Korea's socialist command economy is the central allocation of resources.*

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At the core of North Korea's socialist command economy is the central allocation of resources. However, conditions have made it increasingly difficult for the system to function properly which has, in turn, impeded the planned economy: leaving the system just partially operational. In the 1990s, the North Korean economy turned away from the planned economy to a form of war communism in which everything functioned under a central directive. However, direct control has been possible only because the central authority has focused its control on enterprises that are strategically key while the majority of enterprises operate outside the scope of the central plan. Essentially, there is a disconnect between system and reality as most of the resources supplied from the top only reach a certain level of the top-down supply chain which has been a source of conflict. In response, the authorities have tried to resolve the problem through institutional modifications.

At present, North Korean enterprises can manufacture goods if they have the capacity and market. One of the biggest problems of a socialist command economy is that the supply side does not adapt to changing demand and enterprises were required to remain in the field of industry of which they

belonged. However, North Korean enterprises appear to have regained the ability to adjust supply in response to demand. For example, they are now able to channel their resources from one area to another, if production becomes subject to sanctions. This ability to move to other fields of industry is likely have been a contributing factor to their resilience.

The ability to adjust supply responses requires a level of entrepreneurship and, of utmost importance, is whether there are entrepreneurs who can truly adjust supply in response to an ever-changing demand. When the controversial *Taeon* system was officially abolished, technically, the factory party organizations should have no longer been able to interfere with business operations. Instead, factory managers should have received orders on how to operate the factories directly from the government, whilst party organizations dealt with political activities only. However, I am doubtful this would have really been possible in North Korea. Along with the collapse of the central allocation system, the physical foundation of the *Taeon* system was totally broken. This is why North Korea adopted the Responsible Management System for Socialist Corporations, ending the *Taeon* system. However, the new system does not deal with the matter of governance and, although the

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new system has been introduced, no one is certain the old system has been replaced. Consequently, it becomes all the more important for the existence of entrepreneurs who are able to quickly adapt supply in response to changing demand.

The second most important issue is how to raise funds. At present, North Korea has no system in place to raise the required funds because state-owned enterprises in North Korea are not legal entities. Thus, because ownership structure does not exist, there is no way to make investments. An investment can work only when the stake bought in a company continues to generate profit. However, because there is no such system, it is theoretically impossible for North Korean enterprises to make investments. Instead, they can set up commissioned processing or lease/rent out their facilities. However, while renting of facilities may be feasible for service enterprises due to their high turnover rates, it is not for manufacturing factories.

As I mentioned however, there are some exceptions, one of which is the Ryugyong Kimchi Factory

founded in 2016. The factory is relatively large in scale and has the level of automation that compares to that of South Korea in the 1980s. To be specific, cabbages on automated conveyor belts are dipped into salt water, picked up, and then cut. In the past, such equipment was all imported from China, however, the equipment used in the Ryugyong Kimchi Factory was supplied by the Pyongyang Metal Products Factory and the Taedonggang Brewing Company in North Korea at market prices or their equivalents. In addition to the funds from the central authorities, the factory secured funds to finance purchases of machinery equipment by creating its own equipment procurement committee. Once orders and payments were received, machinery factories manufactured the required equipment by importing materials they lacked from China.

The success of the Ryugyong Kimchi Factory has led to the creation of similar kimchi factories in other regions and has become a model on how to operate factories in the light or other consumer goods sectors. In the past, the central government built the entire factory and provided all materials



This is now no longer the case. Rather, the central government invests a set quantity of money while attracting extra funds from elsewhere in order to build factory as per the model. Then, it allows the factory to conduct business independently by using the market mechanism. Some factories are given to party elites for free, publicly announcing that the way of business operation has been approved by the state. Then regional governments follow suit. This is how the light manufacturing sector has been managed recently but the problem is, once again, that there is no official way to raise funds. Unfortunately, the Ryugyong factory model can be imitated within a very limited scope because there is neither an effective commercial banking system nor ownership structure. If a channel is established to receive foreign investments, significant changes may occur.

## Suggestions for the Research of North Korean Industries

North Korean enterprises have undergone considerable changes in all aspects, including governance structure, management systems, and relationship with the government. Hopefully we will have more opportunities to further discuss the changes in detail in the future. To bring this discussion to a close, do you have any advice for our readers interested in North Korean industries and enterprises and for students or other researchers in the field?

For those who wish to study the topic there are two things to remember. First, you should understand that our current knowledge on North Korean industries and the economy is lacking. Second, you will need to read the materials extremely closely, to be able to elucidate something, even if it seems insignificant. To be honest, I would just recommend you to not study North Korean industries, which is of course a joke. I say this because no matter how much work you put in, there is no guarantee that you will discover anything meaningful. Nevertheless, persistence is the key to uncovering something new little by little. Recently, through my own hard work I have found that North Korea is trying to execute industrial policies harder than ever before. And although the scale of the efforts or capabilities is not comparable to ours, it does appear to be bearing some fruit. Ultimately, if you stay focused on your work, you will succeed.

Even though North Korean industries may seem unusual at first glance, you should take them as they are at face value because, ultimately, all modern industries share some common technological features. Therefore, you should also build your general understanding of industries as well, otherwise you

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*Even though North Korean industries may seem unusual at a first glance, you should take them as they are at face value because, ultimately, all modern industries share some common technological features.*  
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may not be able to analyze even trade statistics. However, even if you can interpret macroeconomic statistics, you may then find it difficult to understand the effects of trade on industries. Therefore, if you truly wish to understand North Korean industries, I would advise you to study a diverse range of industries first. Without a deep understanding of these industries, you will forget everything you have just read once you close the book.

If you do go on to investigate trade statistics after studying industries, at this point you will be able to contribute to the knowledge pool in this field. There is a plethora of topics and relevant trade statistics that still need to be explored and analyzed further in the field of North Korean industries. One example is the added value created by packaging in the food processing industry. It is possible to estimate the market value of the food processing industry, with the added value of packaging, by considering the characteristics of North Korean industries. Assuming that packaging materials are

all imported, we can calculate the overall market value of the food processing industry, with the added value of packaging, drawn from statistics on the import of packaging materials. Earlier I introduced the method of estimating the production of the Kim Chaek Iron and Steel Complex with the amount of reinforcement steel used for the construction of a water conveyance tunnel of 100 kilometers in diameter. This way we can only generate approximate numbers, but it is a worthwhile endeavor.

I often compare the North Korean economy to a live-action movie that has been heavily blended with computer-generated imagery. If such a movie is to be successful, visual artists need to meld their work with the live action seamlessly. This is also true for the North Korean economy. If you are to complete the gaps in the overall picture of the North Korean economy, you should watch it in live action as much as possible. The more you watch, the more you will know and I hope you will surpass me as an expert on North Korean industries.



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