

Industrial Cluster Policies in Korea

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1. Introduction

Korea has achieved fast economic growth based on unbalanced growth strategy, which is evaluated to be successful overall. However, it came to suffer undesirable problems in the process such as excessive industrial and population concentration in the Seoul Metropolitan Area (SMA), and diminishing vitality in the other provincial areas outside the SMA. Furthermore, as the industries in the provincial areas have been developed in the form of branch plants specializing in production functions under large companies, they are poorly enabled to deal with the drastically changing economic environment.

The gap between the metropolitan areas and local areas in terms of income and social infrastructure has been the major bottleneck that inhibits social integration and economic development. The majority of various resources, such as financial and human

ones, have been concentrated on the metropolitan areas in the process of condensing economic growth in Korea. The metropolitan areas held 47 percent of total population, produced 47 percent of gross domestic products, had 57 percent of manufacturing firms, and earned 59 percent of local tax revenues in the year 2001.

The new government that started its term in 2003 recognized the seriousness of this problem, and it chose balanced national development as one of the nation's top priority tasks. Since then, it has made efforts to help the provincial areas gain economic autonomy by establishing the regional innovation system. The success of the plan to create more dynamic regions may depend on how greatly innovation can be encouraged through joint learning and efficient information exchanges based on close relationships among companies, universities and business support institutions within each region.

To establish innovative clusters that are tailored to each region, the current government revised relevant laws and systems and also provided extensive support necessary for encouraging strategic industry. The industrial cluster policy in Korea, after established officially in 2000, has now formed a systematic framework and is being executed nationwide. Recognizing the importance of the innovative capacity of a region, the current Participative Administration focused on the construction of regional innovation systems in formulating its policy for balanced national development. The major ingredients of the policy for the balanced national development are reflected in the First Five-Year Plan for Balanced National Development completed in June 2004.

In the following, we will review the progress to date in cluster policy and major policy details, and the future tasks faced by the Korean economy as well as the government.

2. Industrial Clusters and Cluster Policies

1) Economic Growth and Industrial Clusters

Since the year 1962 when the first stage of the five-year Economic Development Plan commenced, the primary target of Korean industrial policy was to build a self-sustaining economic foundation through industrialization led mainly by exports. In line with this objective, the basic direction was to expand exports through growth in labor-intensive light industries and to replace imports through investment in infrastructure industries such as fertilizers, oil and cement.

As an initial type of industrial cluster, Korea's first industrial complex was constructed in Ulsan, and from 1965 onward, six export-focused industrial complexes were established in Seoul and Incheon. At that time, the Korean government placed higher priority on enhancing external economic impact by organizing the companies in clusters through large-scale industrial complexes. As many as 15 industrial complexes were constructed in the 1960s.

In the 1970s, the Korean government selected the steel, machinery, shipbuilding, electronics, non-ferrous metals and petrochemical industries as its strategic industries for shifting its industrial structure from light industry to heavy and chemical industries. To foster heavy and chemical industries, large-scale industrial complexes were established in Changwon (machinery), Gumi (electronics), Ulsan (petrochemicals), Geoje (shipbuilding), and Pohang (steel), and these areas were developed into the foremost industrial clusters in Korea. In addition to industrial complexes, research park such as Daedeok Science Town were built mainly with the R&D centers funded by the government in 1973, and efforts continued to create a stronghold for national research and development.

In the 1980s, there had been awareness that the previous development scheme of the 1970s that focused on large-scale industrial complexes created an imbalance among different other provincial areas outside the SMA, and based on this recognition, small- and mid-scale industrial complexes began to be allocated to all the different parts of the country in accordance with a strategy for balanced development. Moreover, to increase the income level in agriculture areas, small-scale industrial complexes were also built, but due to difficulties in supplying resources, the results were less than satisfactory. In the late 1980s, there was insufficient land for industrial purposes, and under the situation large-scale industrial complexes began to be constructed primarily in the southwestern parts of Korea, which had been left behind during the process of industrial development. Through these efforts, an infrastructure was established for building clusters in dilapidated areas with balanced national development in mind.

In the 1990s, some provincial cities were designated as advanced science industrial complexes to keep up with shifting trends towards informatization and knowledge accumulation in the economy, but only the science and industrial complex in Gwangju is still developing into an optic industry cluster with the support of the central government.

In 1999, starting with Daegu, which is an industrial city for the textile industry, and in Busan, Gwangju, and South Gyeongsang Province, the Regional Industry Promotion Project started to nurture the textile, shoes, optic and machinery industries, which are strategic businesses in those regions. However, the validity of selecting these strategic industries was questioned, and there was criticism that too great a portion of the budget was poured into regional industries.

The cluster policy was established in 2000, and a cluster model befitting the actual situation in Korea and a master plan for regional industry development from a mid- and long-term perspective were prepared. In 2001, a plan was established to foster three or four strategic industries in nine cities and provinces outside the SMA and four previously-developed regions. Execution of the project began in 2002 and will continue until the year 2007.

The objective of the regional industry promotion project that is implemented in 13 provinces and cities outside the SMA is to strengthen the innovation capabilities that other provincial areas lack, and to convert the clusters into one practical cluster with organic links between R&D and corporate support functions, rather than the original focus on production.

As detailed above, Korea succeeded in transforming agricultural land into an industrial complex for industrial production activities through its economic development plan. However, since it focused too much on the expansion of production space, it failed to further develop industrial concentration areas in remaining regions into a cluster. In the knowledge-based economy of the 21st century, balanced development of the nation is unlikely to occur solely with regulations governing entry into the SMA and the fostering of large-scale industrial complexes in provincial cities. The new government that was launched in 2003 is focusing all its capabilities on the development of regional industry by establishing clusters with an awareness of this issue.

2) Basic Framework of Cluster Policies

As regards policy execution direction, a regional innovation governance system is being put in place for decision-making with consensus among the parties leading regional innovation. For each city and province, a regional innovation council will be established

and joint learning and innovation will become possible among such parties as local autonomous organizations, universities, companies and research institutes, thereby maintaining a close network of cooperation. In addition, in order to amass autonomous capabilities, strengthen innovation and planning capabilities and simultaneously expand the participation of residents, various organization and institutions suited to the situation and conditions of each region will be activated in the form of public and private partnerships.

Second, to achieve dynamic and sustainable localization, strategic industry should be above all supported and fostered in each region, leveraging the characteristics and strengths of each region. To make this happen, a five-year plan for balanced national development has been implemented for 13 cities and provinces, complementing and further developing the regional industry promotion projects. In addition, the highly location-specific industries in ten regions will be fully supported.

Third, human resource projects will be more actively implemented. Projects for human resources are a prerequisite for establishing a regional innovation system, and it is necessary to foster the growth potential of each region. For this objective, aggressive efforts will be made to accumulate manpower with an innovative mindset through projects to strengthen innovation resources for universities in provincial cities (NURI project) supported by the Ministry of Education and through the Regional Human Resources Development project (RHRD).

Fourth, to solidify R&D capabilities linked with specialized industries in each region, greater support will be provided for universities focusing on industrial and academic cooperation and research-focused universities in provincial cities. To fulfill this objective, the Ministry of Education and the Ministry of Commerce, Industry and Energy will lead the efforts for R&D projects involving industrial and academic cooperation and education and training projects. The Ministry of Science and Technology will also support projects to strengthen R&D capabilities for developing technology for future specialized sectors among local areas and for basic technology development.

Fifth, efforts will be made to build an innovative cluster with organic connections between production and R&D functions through the qualitative improvement of national industrial complexes and R&D complexes at which the two functions are not

linked. To fulfill this objective, of the 35 national industrial complexes that represent the industrial concentration areas in Korea, pilot innovative clusters will be launched with priority on Changwon, Ulsan, Gumi, Gwangju, Banwol and Sihwa, and Gunsan complexes. In addition, a special R&D district will be established in Daedeok to link R&D with production functions to ultimately build an innovative cluster that can promote the commercialization of technologies.

3) Detailed Examples of Cluster Policies

(1) Special Act and Innovation Council Establishment

The Special Act on Balanced National Development, which was passed by the National Assembly in December 2003, provides a very important legal rationale for resolving the imbalance among different regions and to support self-sustainable localization. In accordance with the Act on Balanced National Development, the Presidential Committee on Balanced National Development was established, and a five-year plan for the balanced national development was created in 2004. It is also significant that a special accounting system for balanced national development was established in accordance with the act to secure stable sources of financing for balanced national development and national cluster creation.

The Regional Innovation Councils are established in 16 local autonomous organizations to aid in joint learning and innovation creation for various innovation parties in universities, companies, local autonomous organizations, NGOs, and other parties in the region. The councils are responsible for the review of regional development plans and settling conflicts of interest within the region. The number of local autonomies which have the regional innovation council is on the increase according to the need of each region.

(2) Fostering of Strategic Industries by Region

In 16 local autonomous governments, four regional strategic industries will be selected befitting their regional situation, and based on the principle of "select and focus," efforts will be made to achieve the development of regional industries. Moreover, the support of the central government is also focused on the strategic industries of each region, and

particularly on policies such as strengthening technology innovation support centers, fostering technology staff, and bolstering science and technology capabilities.

Even though the same industry may be chosen as a strategic industry, the industrial development underway focuses on differentiated sectors in each region according to the regional situation, and the central government is focusing on the activation of links among the industrial clusters.

Based on the cluster policy, both sophistication in the structure of regional industries and the creation of businesses in strategic industry sectors will be actively promoted. Together with this, efforts to attract foreign investment will be carried out in connection with the regional industries to help both foreign investors and each region benefit fully from industry integration.

(3) Development of Regional Human Resources and Fostering of Provincial Universities

The backwardness of regional industries leads to the concentration of other provincial human resources in the SMA, ultimately aggravating the management situation for local universities and limiting the potential for development as local human resources leave the region. Therefore, if the development of regional human resources, focusing on parties in need, and further activation in local universities are not achieved, it would be very difficult to generate innovation in different regions. Various surveys of the industry situation show that companies operating in other provincial areas share the opinion that the acquisition of technical staff is one of the greatest challenges.

For the development of regional human resources, education in elementary schools, junior high schools and high schools should first become more substantial, and continuous education opportunities should be provided for the residents in the communities. Second, active efforts should be made to induce structural reforms and to achieve distinctive features among local universities, while at the same time cooperation among industrial, academic, R&D, and government sectors should be strengthened. To enhance the research capabilities of local universities, the support scale should also be upgraded, thereby narrowing the disparity in R&D budgets as compared to the SMA.

Lastly, it is necessary to come up with various support measures to promote employment in regional areas and to enhance the utilization of human resources. In particular, by providing a proper education in the production field and opportunities for job experience, the employment competitiveness of graduates of local universities can be enhanced. Various support measures are being prepared to encourage superior talent to settle in regional areas.

(4) Promotion of Regional Science Technology

As investment in national research development is very much concentrated in the Seoul Metropolitan Area and the Daejeon region, other provincial areas are faced with a lack of R&D staff and of an infrastructure that can support production functions. The government's view is that strengthening the science and technology capabilities of provincial cities is essential for balanced national development, and based on this notion it is planning to increase the governmental R&D budget support from 27% in 2003 to 40% in 2007.

Another plan involves the construction of an information infrastructure that will allow SMEs to access and utilize information more quickly and cheaply, with efforts to strengthen the science and technology infrastructure and to make scientific and technological information available through the Internet. Together with these efforts, technology development initiatives suited to the industrial characteristics of each region will be identified and their execution will be led mainly by local universities, thereby strengthening competitiveness in each focused industry.

A project to foster and support R&D complexes was initiated this year to strengthen regional R&D, and aggressive support is provided by designating outstanding science and technology departments in provincial colleges. Furthermore, regional branches of R&D institutes in science and technology that are supported by the government and which are mainly concentrated in Daejeon, will be established in other provincial cities. Research institutes will be established to take the lead in R&D for specialized sectors, and particularly in those sectors that are the strength of each region. To identify the core technology required for each region and to draw up a technology development strategy, a road map for science and technology innovation will be prepared for each year up to 2012.

(5) Innovation Clustering of Industrial Complexes and R&D Complexes

As of the end of 2003, there were 525 small- and large-scale industry complexes in Korea. Industrial complexes comprise 71.6%, 49.2%, and 37.6% respectively of exports, production in manufacturing industries, and employment in manufacturing industries. However, most industrial complexes focus on production alone, and they are heavily dependent on the parent company located in the Seoul Metropolitan Area for R&D and corporate support.

The government is planning to support R&D functions and corporate support services in production-focused industrial complexes, and to build a cooperative network among industrial, academic and research sectors, ultimately transforming them into innovation clusters. In order to achieve this objective, seven industrial complexes will be designated as pilot complexes and priority projects will be implemented. The pilot project will then be expanded to other parts of the country.

Construction of the Daedeok Science Town started in 1973, and it is the largest R&D concentration area in Korea, housing a total of 247 institutions, including 56 R&D institutes (18 of these being government-funded R&D institutes) and 171 venture companies. A total of 18,000 research staff, including 5,000 PhD's, are employed there, and 19% of the theses on scientific topics in Korea are generated by the Science Town. However, the rate of commercialization of the R&D results is very low. Moreover, there are no efforts being made to attract foreign advanced technology companies or additional R&D centers, and there is insufficient knowledge sharing and a poor cooperation network among the companies and research institutes located in the center. To aid in boosting the sophistication of R&D capabilities in Daedeok Science Town and the commercialization of the R&D end-product, the Act on Daedeok Special District has been prepared and will come into effect this year.

3. Concluding Remarks

For the Korean economy to be transformed into an innovation-oriented economy, a variety of efforts should be made simultaneously toward both enhancing total factor productivity and maintaining the stability of the national economy. Establishing an innovation system with cluster bases should be the core strategy in Korea with the population of 47-million. The relevant challenges are as follows.

The economic activity zone concentrated in the single-nucleus Seoul Metropolitan Area should be diversified into multi-nucleus economic zones, and the connection between clusters for each zone and small- and medium-scale clusters should be established. This network type of innovation system will effectively result in harmony between national efficiency and regional variety. Through this, the growth potential of both the nation and individual regions will be strengthened, and it will contribute to the continuous development of the national economy.

Therefore, in line with the implementation direction of the cluster policy, a master plan for industrial development should be developed for strategic positioning. The Korean government has already established a five-year plan for balanced national development as part of its mid-term plan for industrial development befitting regional characteristics. The five-year plan for balanced national development is the bottom-up plan that pursues dynamic and sustainable localization based on each region's capabilities and selection. The plan will be executed in accordance with the master plan and ultimately carried out by the region itself. However, from a nationwide perspective, efforts should be made to establish a more detailed business model based on the cluster, particularly considering the core capabilities of the Korean industries and the value chain of international industries.

On the other hand, the widening gap between the growth of the Seoul Metropolitan Area and of other regions that significantly hampers nationwide cohesion be resolved, and through this effort, sustainable development of the Korean economy can be achieved. Accordingly, the objective of cluster policy should be not only promoting the growth of the national economy but also reducing the gap in growth among different regions. For the detailed implementation of these objectives, more aggressive support is required of the central government in order to strengthen the growth potential and intrinsic innovation capabilities of each region. In enacting and executing the cluster policy, the requirements of system framework should be revised to solidify the self-determination of each region.

The current cluster policy in Korea is primarily implemented based on physical boundaries such as municipal and provincial administrative zones. However, since corporate activities extend beyond administrative zones, there are cases in which the physical scopes of government support and of corporate activities do not correspond to

each other. Therefore, it is necessary to provide government support according to economic zones, factoring in connections among different companies. Through this approach, issues such as excessive competition among regional clusters and overlapping scope within similar industries can be resolved, while cooperative projects among cities and provinces can help increase the efficiency of budget support.

With regard to governance, in order to resolve the issue of overlapping projects among the central government ministries and for organic coordination within clusters, it is necessary to establish a project-based agency for at least a certain period of time. It may be necessary to grant this agency leadership in matters of budget support and legal support. The agency would have functions that are required for the development of clusters, such as planning, business execution and evaluation, and would also play a role in inducing the participation of various innovation parties within the relevant region.

For the efficient implementation of cluster policy, it is necessary to establish a continuous and systematic evaluation and monitoring system. For the execution of regional projects with a performance-oriented mindset, the Korean government is in the process of preparing a method to further activate the convention on investment for regional development, and it has been strengthening the monitoring and evaluation of projects. Through consulting provided by experts from the planning stage of each project, the central government is attempting to provide full support to render the plans established by each region more feasible. In the future, regular monitoring at the execution stage will help clarify the direction of project targets, and an incentive and reward system for business execution parties will be strictly implemented through interim and final evaluations.