

Past Experiences and Future Perspectives

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Human Resources
Development Policies for
the Industrialization
of Korea
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Introduction

Economic development can best be achieved with the appropriate mix of both natural and human resources, but Korea is recognized to be abundant in human resources while poor in natural resources. This being the case, our development strategy has been naturally more inclined to effectively cultivate and utilize our manpower. In this connection, human resource development has always been an integral part of our Economic Development Plans. In this lecture, I would first like to describe our nation's manpower, development system, including the formal education system and then present an overview of our human resource development policy, focusing particularly on the science and technological manpower.

Manpower Development System

Machinery for Manpower Planning

The Minister of Science and Technology is responsible for overall technical manpower planning in the Republic of Korea. These manpower plans are drawn up as an integral part of the national Economic Development Plans, using their major economic indicators as guidelines.

The manpower plans are reviewed by the Manpower Development Committee composed of the Deputy Prime Minister (Minister of the Economic Planning Board) as Chairman and sixteen other Ministerial-level members, for overall coordination of manpower programs, ranging from planning to training.

When a manpower plan receives final approval as a national plan, each Ministry and agency concerned develops programs within its own jurisdiction in accordance with the plan's guidelines. The Ministry of Education carries out formal education including technical education, the Ministry of Labor conducts vocational training programs and others develop their own manpower programs.

Formal education

The modern Korean educational system, basically a 6-3-3-4 year structure, was founded in 1948, and has continued since with only minor changes. After six years of compulsory primary education, students are offered three years of junior secondary education (middle school), which includes some pre-vocational elements but is basically of a general type. In senior secondary education (high school), the main options include three-year general, technical, agricultural or commercial curricula. After school graduation, students may continue on

to a two-year vocational junior college or to a four-year University course.

① Primary Education

Since primary education became compulsory in 1948, the number of pupils at this level has increased sharply. The enrollment rate for the eligible age group (6 to 11) rose from 95.1% in 1965 to almost 100% in 1982. As of 1986, there were 6,535 schools with 4.8 million pupils and 126,000 teachers.

Educational policies have, therefore, shifted emphasis from quantity to quality, such as reducing the number of pupils per class (thus improving the teacher-student ratio), eliminating classroom shortages, and completely subsidizing educational expenses. The Government also plans to extend compulsory education from the present six year of primary education to nine years, through the middle schools level, by 1991.

② Junior Secondary Education (Middle School) The elimination of entrance examinations at this level of education in 1969 caused a rapid increase in the number of primary school graduates entering middle school. As of 1986, the ratio of primary school graduates entering middle school stood at 99.4%. Currently, there are 2,412 schools, 2,765,000 students, and 72,000 teachers.

③ Senior Secondary Education (High School)

The goal of high school education is to provide a broader general and vocational education, based on the foundation laid by the middle school.

High school education has also increased rapidly, due to the rising aspirations of the Korean people and the Government's support for education. Of all middle of the Korean people and the Government's support for education. Of all middle school graduates in 1986,

91.2% entered high school.

High schools can be divided into two categories : general and vocational. Vocational high schools are again divided into technical, agricultural, commercial, and marine and fisheries high schools. There are also comprehensive high schools and art high schools.

In spite of the traditional concept of education in Korea, the importance of technical education in modernizing the nation has recently witnessed an upsurge of interest, with special efforts having been made to induce a substantial portion of graduating junior high school students to enter vocational high schools through the construction of upgraded facilities, scholarships, and other incentive measures, all of which naturally serve to enhance the prestige of vocational competency.

④ Vocational Junior College Education

Since the legal founding of this system in 1971, vocational junior colleges have been encouraged to expand their function of supplying the skill-oriented technicians required by industry, through two-year curricula.

However, they face such problems as the general preference for four-year universities and increasing difficulties on the part of junior college graduates in competing for employment with four year graduates.

The Ministry of Education is currently pushing a vocational college education reform program with the aims of : a) establishing a closer link between the curricula and the requirements of industry : b) expanding the scope of in-plant and overseas training for faculty members : and c) securing adequate financial support and closer academic-industrial cooperation.

⑤ University Education

This education aims at searching for the truth and developing the methods for its application

to the development and welfare of the nation and society as a whole. While educating students to assume leadership roles in society. Universities offer four and six-year courses of study, the six-year programs consisting of the curricula offered at medical and dentistry colleges. During the 1960's, higher education showed the greatest quantitative growth, as compared with that of other education levels. As of 1986, there were 100 universities, with 971,000 students and 28,000 professors. On the other hand, qualitative improvement has been modest. Accordingly, higher education policy is now giving priority to the upgrading of quality through innovation.

Under the student quota system, the number of students at each college is established and adjusted by the Government on the basis of manpower development policies.

Since 1981, the Government has been carrying out major reforms in university education. Efforts are being mounted to : a) upgrade the qualification standards of faculty members through the expansion of opportunities for study abroad, granting of research subsidies, introduction of the exchange professor system among universities, reinstatement of retired professors, and invitation of foreign scholars : b) create an atmosphere conducive to study by introducing an all-day teaching system and a graduation quota system, increasing scholarships, and granting superior students special exemptions from military conscription : and d) increase financial support for private universities, create college education councils, and "generalize" experimental Universities with a view to encouraging their autonomous administration.

과학 기술 진흥 창달

An overview of Manpower Policy in Korea

The First Stage : the 1960's

During the first stage of development in the 1960's, the main goal of industrialization policy was two fold, concentrating on laying the foundation for future economic growth by developing basic industries for import substitution, while also expanding export-oriented light industries. In view of this, fertilizer, cement, oil refining and steel industries were geared up for import substitution while textiles, plywood, and other consumer goods industries were strengthened for export promotion.

However, there was no local technological capability for establishing production facilities and operating plants. Accordingly, packaged technologies were imported from overseas, including assembly processes, product specifications, production knowhow, technical personnel and component arts, providing an initial base for the technological development of Korea's industries. In line with this, the emphasis of manpower development was laid on the quantitative expansion of vocational education in urgent technical fields both in the public and private sector.

To meet this end, an organized vocational training system was established in 1967 with the promulgation of the Vocational Training Law, and since has continued to expand and improve under the administration of the Ministry of Labor.

Vocational training programs were divided into three broad categories : public vocational training programs conducted by the Korea Vocational Training & Management Agency, as well as central and local government organizations : in-plant vocational training programs

by industry, and : authorized vocational training programs by general juridical bodies.

In-plant training was particularly emphasized in this stage to help employers recognize the importance of training and to make vocational training more effective.

Under the Vocational Training Act, enterprises with more than 300 employees, in the fields of mining, manufacturing, electricity and gas, water supply, transportation were required to train at least 10% of their total employees, or send them to training institutes.

The percentage was flexible within 10% from year to year and from one field of industry to another, however.

The second Stage : the 1970's

In the second stage, the National Economic Development Plan mainly emphasized the development of the heavy and chemical industries through the absorption and adaptation of imported technologies.

Emphasis was also given to shifting major export items from consumer goods to durable goods. Under such policy direction, shipbuilding, machinery, electronics, and petrochemicals became target industries.

In the process of the heavy and chemical industry development, the demand for university graduate level technical manpower increased tremendously both in quantitative and qualitative terms. Also, as the strengthening of science and engineering college education became essential, the Government drastically expanded university and graduate education with special emphasis on such fields as mechanical engineering and electrical and electronic engineering. Qualified faculty were recruited from abroad and the funds required to expand educational facilities were greatly increased.

The "brain drain" was another problem facing the nation in this period. Most Korean students who were overseas were reluctant to return to Korea for various reasons including the lack of job opportunities and the poor research environment, as well as the fact that many of them received educations abroad which did not meet Korea's scientific and technological needs, making it difficult to utilize them at home. Education at the graduate school level, which was the prime means for cultivating scientists, had to be reinforced and promoted to solve the problems involved in the development of scientists and to cultivate their capabilities so that they could play the leading role in the development of science and technology.

To this end, the Korea Advanced Institute of Science(KAIS) was established to provide a major demonstration of the type of advanced education required. It was conceived that such an exceptional institute was required as an example and stimulus for reorientation graduate education and research at all Korean universities. A major effort was made to establish a faculty of very high excellence to provide the leadership in science and technology-one which would be fully dedicated to achieving the highest quality in education and research to serve the national industrialization goal.

Major emphasis was also stressed on engineers and craftsman. Traditionally, the individual skilled in fields of technology has not been highly regarded in Korea. The Technical Qualification System was designed to change this tradition and to assign the qualified individual status and recognition equivalent to that of any professional.

The ultimate objective of this system was to help bridge the social status gap between engineers, Ph.D. holders and craftsman while

eliminating the traditionally frowned upon attitude toward technical personnel in Korea.

Under the authority of the National Technical Qualification Act promulgated in 1973, all classes and categories of engineers and craftsmen were identified and defined. In each case, the responsible Ministry or government agency to conduct testing and issuance of certification was identified, detailed plans for preparing, securing, issuing, and scoring qualification tests were formulated, policies and procedures for assuring recognition of individuals successfully qualified were determined and, lastly, administrative mechanisms were planned to continuously review and up-date classes and categories, responsible ministries and agencies, and qualifying examinations.

The Third Stage : the 1980's

In the current third stage, industries are faced with an entirely different environment than that of the first two stages of development, in which two factors made rapid industrialization possible in Korea. First, it was relatively easy of importing mature foreign technology at low cost, since such technology had limited in the exporting countries. Second, since this technology was mature and did not change significantly, the economy was able to realize its growth only by producing the same products over several years. These technological factors, coupled with the Government's aggressive development policy and the availability of local entrepreneurs and skilled technicians, made development possible in Korea.

However, this type of development strategy can no longer be used in the 1980's. The demand for technology by industries has changed. They require more sophisticated high technology than ever before. Importing advanced techno-

logy needed for the development of high technology industries is no longer an easy task, though because of the current trend of protectionism and the tremendously high cost of technology transfer, Pressure for liberalization from other countries and the need for increasing the productivity and international competitiveness of local industries makes protection of local markets difficult. Rapid wage increases have reached the point where some of the labor intensive industries are no longer as competitive as they once were.

Such a changing industrial environment makes it imperative to develop self reproducing technological capabilities domestically. Increasing local R & D efforts have become necessary for Korean industries not only to improve imported technology, but also to implement their own novel ideas. This experience shows that research and development becomes critically important in this stage. With this industrial background in mind, human resource development policy is given special emphasis in the training of the high-caliber technological manpower needed to meet the rapidly increasing demand for R & D both in the public and private sector. Toward this end, the Korea Institute of Science and Technology(KIST) and the Korea Advanced Institute of Science(KAIS), a graduate school, were merged together in 1981 to form the Korea Advanced Institute of Science and Technology(KAIST). Merging an industrial research institute with a graduate school facilitates student participation in research work for the solution to applied technical problems, thus accelerating development of the high caliber manpower currently needed in the industrial sector. The graduate program at KAIST has been drastically expanded to produce 1055 Ph. D's and 3041 Master degree

holders with in the next five years. In parallel with the KAIST program, the strengthening of university graduate courses has also been emphasized by improving the quality of faculties, training facilities, and scholarship programs. In addition, the Korea Institute of Technology(KIT) was founded as a four-year university level program with the purpose of education young people who are specially gifted in the field of science.

KIT is located in Daeduk Science Town, enhancing its educational effectiveness through active interchange and cooperation with Government-funded or privately-supported research institute in vicinity.

Science high schools, currently numbering four have also been established to educate science-gifted students of a younger age than usual. In this view, the Government is exerting efforts to link KAIST, KIT, and science high schools to provide a integral educational program for science-gifted students.

The securing and training of high-calibre manpower for science and technology

In order to systemize our industrial structure in the areas of knowledge and intelligence, conforming to the phenomena of rapidly advancing science and technology, the manpower for science and technology must be given high priority, especially in the securing and training for creative. These are the primary prerequisites to be solved.

The R & D manpower in Korea as of 1985, having steadily increased since the 70's stood at 41,000 equal to 10 people per 10,000 population. However, this is a very low standard when compared to advanced nations in terms

of and absolute scale. Therefore, the securing and nurturing of research development manpower is the number one priority to be actively promoted on a strategic level for national development. In particular, to realize the goal of becoming one of the ten most technologically advanced countries in the world by the year 2000 and to become the most advanced nation in the world in given fields, by effectively promoting the important works in each technological field illustrated in the "Long-Term Plan for Science and Technology toward the year 2000" we must emphasize qualitative aspects, and concentrate all our efforts on the international-level research development, planning and development of products. For this, the basic goal was established to secure 150,000 research manpower by 2001, which amount to 30 persons per 10,000 population, while furthermore training 10% of this total as the key leaders of international-level science and technology. To implement this idea, policy direction was set to enlarge the training base of the superior manpower by improving the qualitative standard of the higher education in science and engineering.

Emphasis was also placed on constructing a cooperative manpower development system in which research institutes-subsidized by the Government, private enterprise, and Government-run organizations-will jointly participate, and also on easily securing needed financial resources by sharing the expenses of the demanders obtaining Technology. In this regard, major policy instruments can be illustrated by the following 5 points: First, research functions of graduate schools in the science and engineering field will be reinforced. Supportion of expenses for the goal-oriented basic research through the Science Foundation, activating the

research functions of the college-attached research institutes for basic science and expansion of research activities by professors will be included in the area. Second, the manpower training function of the KAIST will be expanded and reinforced.

By expanding and reorganizing the educational system, centered around a doctoral course, 4,000 persons will be educated during the years 1986 to 2001. For an early discovery of genius potential in science and technology and for securing consistency and systematization in the training works, the linkage among science high schools, KIT, and KAIST will be strengthened.

Third, to satisfy the realistic demand of the high-level manpower in science and technology in the country, inducement and utilization of Korean scientists overseas in science and technology will be expanded.

Through close analysis in advance of the domestic major fields and needed manpower, appropriate personnel will be selected and induced who have substantial experience in research. A total of 2,000 persons are planned to be invited during the period 1986~2001.

Fourth, 10,000 persons who earned doctoral degrees at home will be sent abroad for 1-2 years for training to contribute to the domestic technological revolution through an early learning of the most recent top technology. In support of this, specified research fields and goals will be assigned for more effective training benefit.

Fifth, a system for the domestic post-doctorate researchers will be carried out to induce effective research by enabling them to complete their post-doctoral program and the earliest possible time immediate after acquiring doctoral degree. Three thousand participants are expected in this 1986-2001 program.

Perspectives and Conclusions

The importance of human resource development can not be overemphasized in the process of economic and social development of a nation since development largely depends on how effectively human resources are cultivated and utilized.

Korea has been successful in meeting the industrial needs of fastly developing technology over the past 25 years, but there will also arise many problems to be solved for the coming changes.

Due to the expected active participation in the economic activity of women and middle and older aged people, the manpower supply will be quite different from that of the past. In this sense, we must fully take this trend

into consideration to minimize overall unemployment, thus effectively utilizing all possible manpower for the economic development and the national level and individual welfare at the personal level.

At the same time, the demand trend for manpower is also likely to change in the future along with the rapid technology development of the current times. Factory automation is becoming more and more common, pushing towards a laborsaving industrial structure. A restructuring of industry, as a from simple skilled labor to highly sophisticated manpower.

In this regard, future manpower policy must be established by integrating all these problems aforementioned, throughh which less unemployment and higher productivity can be achieved.



표지그림

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