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# COMPARATIVE DEVELOPMENT STRATEGIES OF SOUTH KOREA AND TAIWAN AS REFLECTED IN THEIR RESPECTIVE INTERNATIONAL TRADE POLICIES

*J.W. Wheeler* \*

## I. INTRODUCTION

This paper examines the interplay of economic development and trade policies in South Korea and Taiwan.<sup>1</sup> Although many differences exist between the two states, both have identified economic development as a central national policy goal linked explicitly to national security, even national survival. Both have targeted international trade as a key means of promoting economic development. Thus, trade policy, broadly defined, has served as one of the principal components of their economic development strategies. Of course, many other factors impinge upon trade policy formation — the national imperatives against which all policy must be weighed, economic opportunities and constraints, the domestic political process through which societal interests and pressures are managed, and the international political process through which competing interests are accommodated — but far more than in most other developing states, trade policy in Korea and Taiwan has given primacy to economic growth.

There are similarities as well as great differences between the two states. Both have experienced rapid economic growth and, in each, growth has depended strongly upon exports. Economic progress itself came to be a key aspect in both governments' legitimacy. There has been widespread support for detailed government intervention, but in the context of a firm commitment to market-based economies. Both states also have faced a severe and persistent external threat. The perceived need for economic progress and an external security threat have

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1. This paper draws heavily on a series of Hudson Institute research studies. The most important include: J. WHEELER & P. WOOD, *TRADE POLICY FORMATION IN DEVELOPING COUNTRIES* (1986); J. WHEELER & P. WOOD, *BEYOND RECRIMINATION: PERSPECTIVES ON U.S.-TAIWAN TRADE TENSIONS* (1987); M. ERNST & J. WHEELER, *THE IMPACT OF INDUSTRIAL COUNTRY PROTECTIONISM ON SELECTED LDCs* (1987); R. COHEN & J. WHEELER, *GOVERNMENT INVESTMENT IN INDIGENOUS ELECTRONICS INDUSTRIES: INTERNATIONAL COMPARISONS AND IMPLICATIONS FOR THE UNITED STATES* (working title) (to be published by Westview Press in Summer 1990).

justified strong government intervention and, in turn, have been used to justify relatively authoritarian political systems.

The economic success that occurred under authoritarian direction now challenges that high degree of control. Both countries face great pressures for political liberalization and wider participation in policy decisions, pressures that have been accommodated remarkably well. Expanding participation in policy decisions in both countries probably has gone further in economic policymaking than any other area.

These and many other factors have sharply altered the economic and trade policymaking process over the past three decades. In particular, economic success has altered development goals, which, in turn, have changed trade policy priorities. Further, use of trade policy has become more constrained as export growth has brought both countries into conflict with their trading partners. In order to address these issues, it is necessary, first, to review the evolution of economic development strategy in each of the two countries and, second, to summarize the trade policies used to implement that strategy. Subsequently, an assessment of both the common and the unique roles that trade policy has played in the economic development of each country will be provided.

## II. EVOLUTION OF ECONOMIC DEVELOPMENT STRATEGY IN TAIWAN<sup>2</sup>

### A. Overview

Few countries have ever achieved the rapid and stable growth that Taiwan has experienced since the 1950s. This success was all the more remarkable because of extraordinary burdens faced by Taiwan in 1949

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2. This section provides a brief overview of a complex history. More detail can be found in: J. WHEELER & P. WOOD, *BEYOND RECRIMINATION*, *supra* note 1; Lee & Liang, *Taiwan*, in *DEVELOPMENT STRATEGIES IN SEMI-INDUSTRIAL ECONOMIES* at ch. 10 (Bela Balassa & Associates eds. 1982); *MODELS OF DEVELOPMENT: A COMPARATIVE STUDY OF ECONOMIC GROWTH IN SOUTH KOREA AND TAIWAN* (L. Lau ed. 1986); Y. WU, *BECOMING AN INDUSTRIALIZED NATION: ROC'S DEVELOPMENT ON TAIWAN* (1985); *EXPERIENCES AND LESSONS OF ECONOMIC DEVELOPMENT IN TAIWAN* (K. Li & T. Yu eds. 1982); Conference of U.S.-Taiwan Economic Relations (Mar. 27-28, 1985) (published by the Chung-hua Institution for Economic Research, Taipei); *Foreign Industrial Targeting and Its Effects on U.S. Industries, Phase III: Brazil, Canada, the Republic of Korea, Mexico, and Taiwan*, USITC Pub. No. 1632 (1985) [hereinafter *FOREIGN INDUSTRIAL TARGETING*]; *1984 JOINT CONFERENCE ON THE INDUSTRIAL POLICIES OF THE REPUBLIC OF CHINA AND THE REPUBLIC OF KOREA* (Dec. 27-28, 1984) (published by the Chung-hua Institution for Economic Research, Taipei) [hereinafter *1984 JOINT CONFERENCE*]; *INDUSTRIAL POLICIES OF THE REPUBLIC OF KOREA AND THE REPUBLIC OF CHINA* (Nov. 21-22, 1985) (published by the Korea Development Institute, Seoul) [hereinafter *CONFERENCE ON INDUSTRIAL POLICIES*]; Liang & Liang, *Trade Strategy and Industrial Policy in Taiwan*, *ECON. REV.*, Sept.-Oct. 1986, at 1-2; *Ninth Medium-Term Economic Development Plan for Taiwan (1986-1989)-External Sector*, *ECON. REV.*, Jan.-Feb. 1987, at 11-16.

when the Kuomintang (KMT) retreated to the island. The island was cut off from its former major trading partners (Japan and China), inflation was out of control, the infrastructure had been damaged severely during the war, and there was a severe shortage of management personnel. Among the most important factors behind Taiwan's success has been its stable government combined with a commitment to a steady, financially conservative, pragmatic, and growth-oriented policy mix.

In the early postwar years, the main initiatives were land reform, stabilization of inflation and the exchange rate, infrastructure construction, and protection of local producers (import substitution policies) to build industries to meet domestic market demand. It was clear by the mid-1950s that the domestic market was too small to maintain rapid economic progress under an import substitution umbrella. Slowly, policy shifted towards an export orientation. Some changes were made as early as 1955, but it was not until 1958-1960 that major policy reform actually occurred.

The process of reorienting industrialization strategy toward exports involved a wide variety of policy initiatives, ranging from correcting the seriously overvalued exchange rate to reducing foreign exchange controls, easing import barriers — especially for inputs to the production of exported commodities — and progressively tightening the criteria for providing protection to domestic manufacturing industries. More explicit export incentives included tariff and tax rate cuts, special privileges for the use of exporters' foreign exchange earnings, low interest rate loans, privileged financial access, export promotion facilities, and the establishment of duty-free export processing zones, among others.

With the economic uncertainties of the early 1970s, it became obvious that there were certain weaknesses in the Taiwan economy that required policy attention.<sup>3</sup> Most important, it became clear that continued economic success would require that domestic industries accelerate their transformation from reliance on relatively unskilled labor to the production of products requiring more skilled labor, higher technology, and greater capital intensity. The government was particularly interested in expanding the backward links from exports to domestic production and introduced a variety of import substitution measures. Even so, the overall policy structure remained export-oriented and change was evolutionary.

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3. Such economic uncertainties included global inflation, the first oil shock, the breakdown of the Bretton-Woods system of fixed exchange rates, the precipitous American withdrawal from Vietnam, etc.

This industrial policy focus on the promotion of higher skill and technology-intensive industries increased dramatically at the end of the decade. Informatics (advanced electronics, software, and various related activities and industries) became a central focus of Taiwan's vision of the future. Since then, investment rules facing foreign firms have been eased, transfer of technology has been encouraged, and a variety of specific incentives to encourage high technology firms have been introduced, including low interest rate loans, extended tax holidays, liberalization of venture capital regulations, the formation of the Hsinchu Science Park, and extensive public support of R & D.

In contrast to South Korea, however, the policies used in Taiwan tended to rely more on indirect incentives than on direct levers to influence economic development. Nevertheless, the desire to upgrade domestic production led to the use of a variety of direct grants, loans, and other measures targeted at selected firms in the 1982-1986 four-year plan. Even so, the identification of firms to receive promotional benefits was based more on qualifying criteria than on firm-specific targeting. Besides the general support measures, the government committed special assistance to strategic industries by directly investing in selected projects and by underwriting a variety of research and development initiatives. The basic structure laid out in the 1982-1986 plan carried over into the Ninth Medium-Term Economic Development Plan (1986-1989).

Taiwan has pursued a somewhat more cautious and pragmatic industrial development strategy than South Korea. Its approaches to directing economic decisions are more indirect, but nonetheless extensive. The government has played a particularly strong role in maintaining a stable investment climate, in investing in needed infrastructure, and in the use of government corporations to develop key large-scale, high-risk basic industries. However, the Taiwan government does not exercise nearly the same level of influence over the business sector as does the South Korean government.

Although the more cautious and pragmatic approach to economic management in Taiwan has created a sounder economic structure than that in South Korea, the approach also has had its drawbacks. Taiwan's great strength has been its highly successful small and medium-size companies, which possess great flexibility. But this strength is also a weakness: there is a shortage of large firms capable of moving into high technology areas requiring very large investments.

### B. *Overall Industrial Policy*

As noted, Taiwan's authorities have pursued an array of policies

designed to increase the competitiveness of domestic industries and promote the industrialization of the island. They have done this through a variety of broad macroeconomic and structural policies, combined with selective industrial policy tools.

The basic framework guiding industrial policy is a series of interrelated annual, mid-term (four- to five-year), and long-range (ten-year) plans. This planning process, under various guises, has been in place since 1953. The plans are not rigid directives. Rather, they are flexible descriptions of a central policy thrust, around which details adjust frequently as economic conditions change.

The central entity in the planning process is the Council for Economic Planning and Development (CEPD). Besides planning, the CEPD is deeply involved in economic projections, monitoring major development projects, and reviewing budget proposals and policy initiatives by other ministries. Depending upon the CEPD's chairman, it can play an extraordinarily powerful role, or it can be relatively ineffective.

The Ministry of Economic Affairs (MOEA) has the operational responsibility for the administration of industrial policy and trade. The Industrial Development Bureau of MOEA develops sector-specific plans to meet the overall economic plans. It also serves as the initiating entity for changes in tariffs and in investment and financial incentives to support planning goals. Other responsibilities of MOEA include public enterprise policy, administration of import licensing, and administration of Taiwan's export processing zones.

The Ministry of Finance is involved in industrial policy through its oversight of tax and investment policies, while the Central Bank of China plays an important industrial policy role through its administration of foreign exchange controls and its oversight of the central industrial policy banks.

Industrial policy strategy has gone through a variety of distinct phases reflecting the major challenges confronting Taiwan and important shifts in the goals selected by the government. Figure 1 shows these basic strategies and policy directions.

Figure 1

PHASES OF INDUSTRIAL STRATEGY

<i>Development Strategy</i>	<i>Changing Structure of Industry</i>
1950s	1950s
A. Introducing Economic Planning in 1953 after the Completion of Postwar Rehabilitation	A. Sugar, Flour, Edible Oil, Canned & Other Processed Food Products
B. Implementing a "Land-to-the-Tiller" Program, Stimulating Agricultural Production, and Improving Rural Living Standards	B. Textiles
C. Developing Labor-Intensive Import-Substituting Industries to Promote Economic Stability	C. Plywood, Cement, Sheet Glass
1960s	1960s
A. Improving the Investment Climate and Encouraging Saving	A. Consumer Electronic Products: Transister Radios, TV Sets
B. Establishing Export-Oriented Industries to Create New Job Opportunities	B. Refrigerators, Air Conditioners, Washing Machines, Sewing Machines
C. Developing New Agricultural Products and Promoting Agricultural Exports	C. Plastic Products, Man-Made Fibers, Chemical Fertilizers, Garments
1970s	1970s
A. Increasing Infrastructural Investment and Eliminating Transport Bottlenecks	A. Petrochemical Intermediates
B. Promoting Backward Integration by Establishing Intermediate Goods Industries	B. Iron & Steel, Machine Tools
C. Developing Basic and Heavy Industries to Improve Industrial Structure	C. Shipbuilding, Motor Vehicles
D. Accelerating Rural Development and Raising Farm Income	
1980s	1980s
A. Raising Energy Efficiency, Improving Energy Conservation, and Obtaining Secure Supplies	A. Electrical and Non-Electrical Machinery
B. Speeding Transformation of the Industrial Structure by Promoting the Growth of "Strategic Industries"	B. Information
C. Encouraging the Merger and Modernization of Labor-Intensive Enterprises and the Automation of Labor-Intensive Production	C. Other Allied Industries
D. Strengthening Development of Manpower and Science and Technology	
E. Continuing to Promote Balanced Economic and Social Development	

Source: CEPD, *Economic Development: Taiwan, Republic of China* (April 1985), pp. 15, 22.

The changed global economic conditions following the second oil shock and America's recognition of the PRC led to a substantial revision in Taiwan's overall industrial policy framework. The tendency

towards promoting large scale projects of the late 1970s was scaled back considerably and industrialization plans were more finely honed. Moreover, the Taiwanese government adopted a variety of narrowly targeted supports for private firms in key sectors. Concurrently, the authorities slowly opened domestic markets to foreign competition and aggressively sought greater foreign investment. Policy has focused on accelerating the shift from labor-intensive to more capital and technology-intensive products. In particular, the government has been seeking ways to expand the transfer, development, and adoption of new technology and management know-how.

The change in policy focus can be demonstrated by contrasting the policy direction identified by Premier Chiang Ching-Kuo in a speech to the ROC legislature on February 25, 1977 with the events that followed. This speech identified issues and problems that needed change, yet viewed the policy adjustment process as a gradual one, building around the slogan "Growth with Stability."

In 1978, the broad direction of economic policy remained the same, though with some changes in emphasis. The priority given to technology-intensive industries was increased and a strong initiative was taken to expand science and technology manpower. It was at this time that the science-based industry park at Hsinchu was founded and a variety of initiatives were taken to expand research and development. A variety of other emphases were changed, but the basic goals remained the same. In some ways the policies inaugurated in 1978 can be viewed as the transition to the policy emphasis that was to come.

The rupture of diplomatic relations with the United States in 1979 forced economic planning to focus on an array of options that eventually would permit Taiwan much greater independence. It was at this time that industrial electronics was singled out for special preference along with several other high-technology industries, later expanded to include a variety of microelectronic and computer industries loosely called the "Information Industry."

The broad consensus that Taiwan must restructure itself rapidly towards more knowledge-intensive industries led to a variety of experiments, new initiatives, short-, medium- and long-term plans, etc., as the government and private sector searched for appropriate measures to meet this goal. These various experiments may be seen as addressing and implementing policy in five specific categories.<sup>4</sup> Promotion and support of knowledge-intensive industries requires:

- 1) Initial support of domestic entrepreneurs who already pos-

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4. Y. WU, BECOMING AN INDUSTRIALIZED NATION, *supra* note 2.

sess capabilities that can be built upon, combined with efforts to attract foreign entrepreneurs;

2) Longer-term acquisition of new knowledge through public and private domestic R & D investment — both in order to adapt foreign technology to local enterprises and to lay the foundation for the creation of new and better technologies in the future;

3) Allocation of scarce resources — including both choices among *industries* regarding incentives and preferences, as well as choices among *subsectors and firms* within targeted industries;

4) New manpower skills and experience for which planners must allow both immediate acquisition and long-term training of qualified individuals. [Education, training, and experience are all required, not only for scientists and engineers, but also for technicians, managers, planners, and administrators who are needed to run the knowledge-intensive companies that R & D seeks to stimulate;]

5) Adapting legal, regulatory, and other institutions to the new characteristics of technology-intensive firms and products. [One may ask, for example, what trade-off between proprietary and public rights is best for the nation's economic health.]

The ten-year economic plan adopted in 1980 was the vehicle used to set these new strategies into motion. It clearly focused on a deepening of the industrial structure through selected import substitution, the promotion of higher technology industries, the shifting of traditional exporters into using higher technology production methods, and diversification of both the export product mix and of Taiwan's main trading partners.<sup>5</sup>

The industrial priorities in this ten-year plan were embodied in six criteria to be used to screen industry requests for priority treatment.<sup>6</sup> These included the following:

- Linkage to other major industries in Taiwan,
- Low energy intensity,
- Low pollution,
- Contribution to net exports,
- High domestic value added, and
- Technology intensity.

Apart from these screening criteria, three strategic industries were

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5. Diversification of trading partners was particularly unsuccessful. Over the subsequent six years, U.S. absorption of Taiwan's exports rose from approximately thirty percent to over fifty percent.

6. For a detailed discussion of policy instruments, see Foreign Industrial Targeting, *supra* note 2, at 236-82.

identified: information, electronics, and machinery. Within each of these industries, a variety of products was also identified for priority. Some of those selected in the electronics industry, for example, were instruments, video cassette recorders, telecommunications equipment, and computers. Moreover, during the plan's term, the government explicitly targeted support to seventeen major research and development projects in the higher technology industries. Table 1 sets out the planning goals.

Table 1

## TAIWAN'S INDUSTRY-SPECIFIC OUTPUT GOALS, 1980-89

Sector	1979	Share of total	1989	Share of total	Average growth 1980-89
	<i>Million dollars</i>	<i>Percent</i>	<i>Million dollars</i>	<i>Percent</i>	<i>Percent</i>
High technology:					
Transportation	1,002	7.3	3,700	10.1	40.0
Telecommunications	841	6.1	3,316	9.0	14.7
Electronics		4.4	2,087	5.7	13.2
Machinery		3.7	2,285	6.5	16.7
Household appliances	334	2.4	992	2.7	11.5
Total	3,290	23.9	12,438	34.0	14.3
Minerals and metals:					
Iron and steel		3.6	1,711	4.7	13.2
Other metal	791	5.7	2,974	8.1	14.2
Other minerals	584	4.2	1,475	4.0	9.7
Total	1,870	13.5	6,160	16.8	13.2
Chemicals and petrochemicals:					
Petroleum products	664	4.8	1,358	3.7	7.4
Petrochemical stocks		1.9	664	1.8	9.7
Manmade fibers	541	3.9	1,226	3.3	8.5
Plastic materials	205	1.5	565	1.5	10.7
Plastic products	680	4.9	1,429	3.9	7.7
Other chemicals	1,249	9.0	2,689	7.3	8.0
Total	3,601	26.1	7,931	21.5	8.2
Other industries	5,040	36.6	10,232	27.7	7.3
Textiles	1,950	14.1	3,916	10.6	7.2
Lumber, wood products	439	3.2	697	1.9	4.7
All other	2,655	19.2	5,619	15.2	8.9
Total, manufacturing	13,801	100.0	36,803	100.0	10.3

Source: American Institute in Taiwan, Taipei, AITGRAM 02413, May 13, 1980, and AIT air pouch No. A-019, May 15, 1980, as reported in USITC Pub. No. 1632, January 1985.

The plan also identified a variety of other targeted investment projects (twelve major and one-hundred-twenty smaller projects) to-

talling some \$86 billion, with most of the funds to be provided by government authorities. These projects related almost entirely to infrastructure.

The plan was also explicit about the intent to impose export and local content requirements on foreign direct investment to help direct the patterns of domestic industrial development. Both traditional and new methods were relied on to implement these plans. The more traditional methods included market protection, investment and export incentives, and low cost loans. Various new programs were introduced to meet a variety of special needs, including the central satellite firm system, the Hsinchu Science Based Industrial Park, new manpower development programs, and a variety of centrally sponsored research projects.

### 1. *Market Protection*

Domestic market protection has always been an important aspect of Taiwan's industrial policy. Import licenses, access to foreign exchange, screening of foreign investment, and preferential government procurement have served as the main instruments to protect local industries and expand the domestic industrial base. Indeed, protecting the domestic market while providing preferential access to imported inputs proved to be a particularly powerful device for promoting targeted industries.

Since the late 1970s, Taiwan has liberalized many aspects of its import regime. Average tariffs remain fairly high and many import products continue to face specialized bans and case-by-case import licensing. Restrictions have been reduced substantially since the early 1980s.

Taiwan's trade (both imports and exports) must usually be licensed. However, most products are now in the automatic approval category. In the mid-1980s, about twenty percent of the value of Taiwan's imports, mostly luxury goods and certain products competing with local production, fell into the controlled category. Controlled items require specific approval by the Board of Foreign Trade of the Ministry of Economic Affairs and must be imported directly by the end users.

Besides licensing, imports are subject to tariffs and procedural delays by the Customs Bureau of the Ministry of Finance. The highest protection, mostly in the form of tariffs, is assessed on products of importance to Taiwan, such as electronics, and on luxury goods. Permanent tariffs on most goods must be approved by the legislature, but the Executive Yuan has the authority to raise or lower tariffs by fifty

percent, without new legislation, for a period of up to one year. Moreover, the authorities can increase tariffs on products that compete with domestic industries without legislative approval. Despite the relatively high duty structure, the actual value of duties collected is low. Imports into the export processing zones are duty-free. Firms in targeted industries often qualify for rebates or deferred payment of import duties.

Foreign investment is highly promoted. In the past, approvals have usually hinged on a firm's willingness to commit to purchasing a certain percentage of its inputs locally, as well as committing to export a certain percentage of its output. More recently, approvals have also included commitments to transfer technology. Foreign firms have not complained much about these rules since the market was small and exports were the main investment goal. In any event, performance requirements have been eased in recent years.

Government procurement has been another important technique for protecting the domestic market. Various government entities are the major market for sophisticated research and scientific equipment, computers, telecommunications products, and the output from a variety of other targeted industries. Not only does this permit the government to tailor specific procurements to reflect products available locally and to reduce investment risk by assuring long-term orders, but it also permits it to establish standards that will fuel private sector development.

This process is aided by having most public procurement handled through two entities: The Central Trust of China and the Taiwan Supply Bureau. In principle, however, all contracts with a value over US\$100,000 are open to foreign bidding. As of the mid-1980s, procurement competitions granted a fifteen percent price preference to domestic products. In other words, foreign goods could be imported to meet government agency needs only if their delivered cost was fifteen percent less than that of essentially identical domestic products.

## 2. *Tax Policy*

Tax policy has been one of Taiwan's more important industrial policy tools. In general, foreign and domestic firms receive equal treatment under the tax code. The Statute for the Encouragement of Investment has been the principal legal framework permitting the tax system to be used to advance industrial policy. Specific incentives are spelled out in this statute. Various criteria used to qualify firms for special treatment are identified in implementing regulations. These

criteria are altered as industrial policy goals and market conditions change.

Taiwan has used two types of tax incentives to promote industry. First, incentives are provided to firms in particular segments of existing industries that the authorities feel will be competitive in the future. Eligibility criteria are spelled out on a detailed industry-by-industry basis and may include very specific characteristics related to exporting, achieving economies of scale, increasing domestic content, acquiring and upgrading production technology, etc.

The second approach uses tax incentives for designated strategic industries. Under the first approach, a few firms in many industries would qualify; under the second approach, most firms in a few targeted industries would qualify. For example, many firms in such industries as electric machinery, computer system products, consumer electronics products, electronic components, electronic communication equipment, electronic industrial systems, and computer software fall within the scope of the strategic industry definition.

Various tax benefits apply to firms that fall within one of these two categories. The main benefits for targeted industries include tax holidays, accelerated depreciation, reduced income tax rates, and exemptions or deferrals of import duties. A variety of additional tax incentives are available for exporting firms, although most of these measures are designed to avoid double taxation. Besides export incentives, there are a variety of other general tax incentives designed to achieve various goals. Some of the more important goals are acquiring foreign technology, encouraging listings on the stock exchange, and providing support for mergers.

### 3. *Financial Market Policy*

Taiwan's financial system remains tightly controlled by authorities and, as such, has been a strong mechanism of industrial policy. Since private industry depends on debt financing for some seventy to eighty percent of its capital, the government has considerable leverage. Because the economy is dominated by small and medium-sized businesses, governmental direction of financial flows has been rather more indirect than has been the case in South Korea. Even after some liberalization of Taiwan's financial system, beginning in 1982, the government retains extensive control.

Two of the eleven state-controlled banks have special roles in industrial targeting: The Bank of Communications and The Export-Import Bank of China. The Bank of Communications is the most important for carrying out industrial policy. It is charged with pro-

moting the development of the manufacturing, mining, transportation, and public utilities sectors. The Bank of Communications extends a variety of concessionary loans and credit guarantees to capital intensive industries, and provides advice to customers on management and technical innovation issues. The Bank of Communications was only officially designated a development bank in 1979; before that, it was principally involved in infrastructure financing. The Export-Import Bank of China (founded in 1979) provides loans and credits. It extends loan guarantees for exports of plant and equipment as well as for overseas construction projects. It also offers export insurance. In addition, it underwrites imports of raw materials and technical services. Loan terms generally comply with OECD guidelines.

Besides these two, a variety of other specialized funds have been created. A Small and Medium Business Credit Guarantee Fund was founded in 1974 to help smaller firms secure private financing. It provides credit guarantees to financial institutions that lend to small and medium-sized businesses. The China Development Corporation (CDC), a semiprivate trust company, also invests directly in targeted industries. The CDC, in particular, is favoring technology intensive industries in its lending policies. Most of the funding for the industrial policy related banks comes from the postal savings system.

### C. *New Directions in Industrial Policy*<sup>7</sup>

Special weaknesses of the Taiwan economy have led to the adoption of various new industrial policy initiatives, combined with changes in the detailed implementation of the more traditional measures discussed above. Two particular weaknesses stand out: 1) the scale barrier faced by even the most successful small and medium-sized firms in mounting the capital investment required to achieve competitive stature in higher technology industries, and 2) limited domestic research and development.

The main mechanisms of Taiwan's science and technology promotion policy have been government research laboratories, government-sponsored private research efforts, a variety of inducements for private firms to expand their own R & D, and programs to develop or attract the necessary skilled manpower. The science and technology development plan covering 1982 to 1989 called for raising national expenditures on R & D by fifteen percent a year. About half of this increase would come directly from government budgets, another twenty per-

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7. Besides the source noted above, see Simon & Schive, *Taiwan*, in NATIONAL POLICIES FOR DEVELOPING HIGH TECHNOLOGY INDUSTRY: INTERNATIONAL COMPARISONS at ch. 9 (1986).

cent from public enterprises, and the remainder from private companies. A variety of mechanisms were introduced to try to meet these goals.

The government of Taiwan set up a general purpose development fund, a science and technology development fund, and a defense industry development fund, all under the Ministry of Finance, to assist in the formation of technology-oriented firms. Moreover, the Bank of Communications was to provide seed money to a limited number of firms in strategic industries.

In 1983, a ten-point plan for encouraging technology development was adopted. The Industrial Development Bureau (IDB) of the Ministry of Economic Affairs was given implementation responsibility. A Committee for the Development of New Products was to oversee the IDB's activities. Although it acts under the auspices of the Ministry of Economic Affairs, the Committee includes representatives from the Council for External Trade and Development, the National Science Council, the Institute for the Information Industry, the National Bureau of Standards, as well as the IDB. The plan introduced a technology development subsidy program to encourage research and development into new industrial products and technology.

The IDB prepared an initial list of products whose developers would qualify for development studies. This list is now updated annually. The program has focused mainly on computers and electronics research. Applications for development subsidies must be submitted to the IDB, although actual funding comes from the New Industrial Product Foundation set up under the plan. The Foundation is funded by direct appropriations from the Executive Yuan's development fund, as well as from private sector contributions and receipts from successful ventures.

The Hsinchu Industrial Park, started in 1980 with the full financial backing of the Taiwan government, was designed to bring together a variety of public and private research institutes, academic institutions, and high technology firms. Firms investing in the park receive substantial tax benefits, concessionary financing, subsidized land costs, and a variety of centrally provided support services, such as warehouses, factories, and telecommunications facilities. Despite these benefits, initial occupancy rates lagged behind expectations. The park has been more successful in recent years. Specific incentives to investors in the park include the following:

- Exemption from import duties on machinery, raw materials, supplies, fuels, and semi-finished goods for use by the firms. If

goods are sold domestically, however, then duties will have to be paid.

- Commodity and business tax exemption for exported products.
- A waiver on foreign exchange restrictions on interest, dividends, and invested capital remittances.
- Potential access to funding from the National Science Council and two designated financial institutions for up to forty-nine percent of the investment.
- Tax deductions on all expenditures on research and development.
- A variety of other privileges, such as subsidized land rental and low interest rate financing.

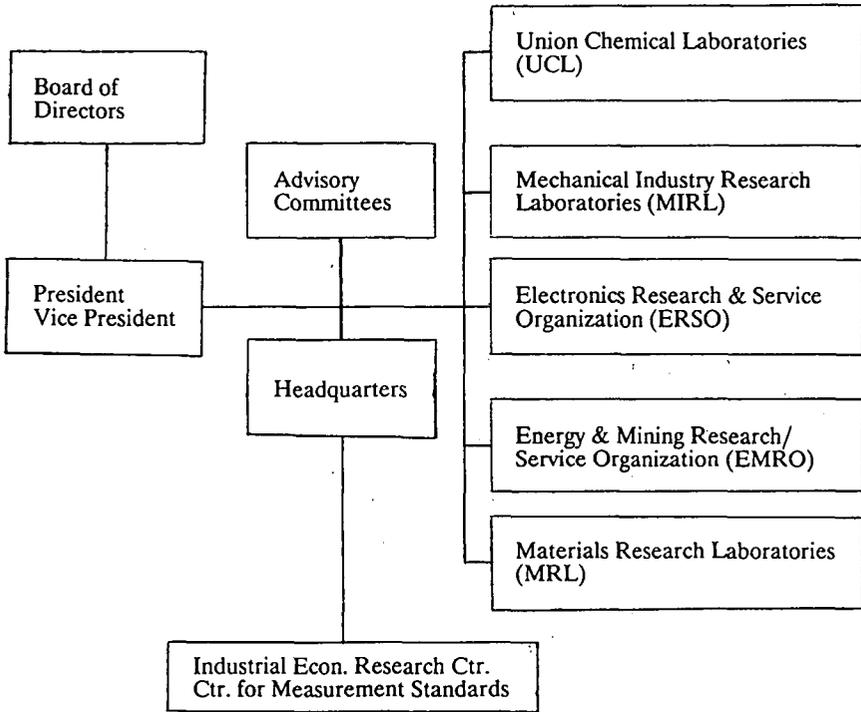
The Taiwanese government has founded a variety of research institutes that work with private firms to develop new products, to identify and acquire new technology, and to conduct research and development for ultimate transfer to private enterprise. Perhaps the premier laboratory is the Industrial Technology Research Institute (ITRI), founded in 1973. (Figure 2 presents a basic organization chart.) Its mission was to develop and acquire key technologies in a wide range of industries, including electronics, information, and production automation. The Institute is organized as an autonomous body and, in close cooperation with industry, conducts some of the most advanced manufacturing research in Taiwan. Indeed, the Institute often undertakes research and development for manufacturers for a straight fee or on an equity sharing basis.

A major initiative has been the development of human resources. This effort has focused not only on scientists and engineers, but also on the array of managers, social scientists, and administrators required by business and government operations in a more advanced society. New and expanded programs have sought to attract immigrants from the large pool of highly educated, ethnic Chinese outside Taiwan. Some of these individuals left the island to attend school and never returned, but this is only a part of the total. Professionals from Hong Kong are a key target at present. Programs have also drawn foreign non-Chinese nationals, especially as visiting experts, but also as permanent residents. Second, of course, is the major push dating back to the early 1980s to expand the training and research activities of universities, to promote training activities of research institutes, and to establish other training institutions.

Figure 2

**INDUSTRIAL TECHNOLOGY RESEARCH INSTITUTE**

**Organizational Chart**



Efforts to expand the size of local firms in order to improve their ability to undertake both R & D and investment in more capital-intensive industries have been made. However, there is a great deal of political ambivalence about large firms in Taiwan. Large trading firms have been promoted since 1978. Various tax benefits are given to firms that list on the stock exchange. Other tax benefits support mergers. A Central-Satellite firm system was established to provide incentives for firms to develop direct links with their subcontractors. None of these programs has been particularly successful. However, the average firm size is growing.

As noted above, companies manufacturing goods that fall within the identified strategic industries are entitled to a variety of incentives.<sup>8</sup> Reduced interest rates loans are available for,

8. The following policy outline is summarized from F.B.R. PTY. LTD., TAIWAN COMPUTER AND RELATED EQUIPMENT 44-66 (1987) (prepared for the American Institute in Taiwan).

- i) Investment in strategic industry,
- ii) Purchase of locally produced machinery,
- iii) Purchases of automation equipment,
- iv) Investment in new products, new technology, or overseas marketing.

In addition to the above, companies, including those with foreign ownership, may apply for help under the auspices of "Encouragement of Technology Intensive Industries." The objectives of this program include:

- i) Encouraging the development of key high technology industries;
- ii) Encouraging the development of new products;
- iii) Continuing to provide incentives aimed at encouraging high technology foreign firms to set up operations in Taiwan, as well as encouraging technological cooperation between local and foreign firms;
- iv) Introducing new technology to stimulate development of the local information industry;
- v) Encouraging the application of new information technology, with a view toward promoting automated production processes and scientific management practices.

The "Statute for Encouragement of Investment" provides the following tax incentives:

- i) Technology-intensive industries shall be exempt from corporate income tax for a period of five successive years, starting from any fiscal year designated by the enterprise concerned, provided it is within four years after the enterprise begins marketing its products and rendering services.
- ii) A technology-intensive enterprise expanded through capital increase is eligible for one of the following privileges:
  - 1. The enterprise shall be entitled to exemption from corporate income tax of the portion of income generated by the increased investment for a period of four successive years, starting from any year, provided it is within four years after commencement of operation.
  - 2. The enterprise will be allowed accelerated depreciation.
  - 3. The enterprise may deduct fifteen percent of the increased investment for the year of capital increase from its taxable income for corporate income tax, and may spread this tax deduction over the next four years.
- iii) Corporate income tax and surtaxes imposed on a technology-

intensive enterprise shall not exceed twenty-two percent of its annual business income.

#### D. *Outlook*

Recent trends and export successes have only strengthened the consensus in Taiwan that forcing producers towards higher technology is central to Taiwan's economic success and that the informatics industry is of particular importance to this high technology push. Policy is consistently focused on establishing both a technological and a manufacturing base on the island.

Although the government continues to play a major leadership and interventionist role, a constant long-term goal has been the promotion of private industry. Even when large capital infusions were provided to selected key product areas, the government always retained private management and control. Policy, however, has been more successful in developing a manufacturing base than in building a technological base. Research and development still very much depends on "government pull." The private sector has not expanded its own research and development spending anywhere to the extent targeted by the authorities.

The overall strategy of fostering rapid development of firms that have identified a market niche will continue. The direction of policy development has not always been entirely successful. Indeed, the continued fragmentation of the software industry and the lack of success in stimulating private sector R & D investment are the most important failures retarding future development. Other problems include the very limited response to policies designed to promote the growth of large firms, legal difficulties that have prevented taking full advantage of some of the tax incentives, and delays in the provision of financial support that have resulted in postponed projects and investment.

Some of these problems reflect inherent conflicts between policy goals and Taiwan's economic structure. For example, the small size of the average firm and broad-based entrepreneurial spirit have been key sources of Taiwan's flexibility and economic dynamism. Yet larger, professionally managed firms have become even more important to Taiwan's future as technology, capital, and global marketing have become more central to the state's most competitive exports. Unlike some larger countries, Taiwan is too small to use a sheltered domestic market to subsidize exports for very long or for very many products — the costs are far too high. Moreover, with enormous trade surpluses and a desire to play a growing role in multilateral economic organizations (as a partial substitute for their lack of diplomatic recognition),

there are great external pressures on Taiwan's remaining trade barriers.

Nonetheless, the state's economic development plans clearly contain a strong export bias, as well as a series of powerful, if selective, import substitution goals. The trade policy levers used in the past to help guide domestic development have now been largely negotiated away. However, various industrial policy incentives will continue to be manipulated to achieve trade objectives.

### III. EVOLUTION OF ECONOMIC DEVELOPMENT STRATEGY IN SOUTH KOREA<sup>9</sup>

#### A. Overview

Like Taiwan, South Korea is one of the most successful export-oriented developing countries. Many factors have contributed to this success: the largely positive international trade environment, a good relationship with the United States, the hard work and savings-oriented aspects of its neo-Confucian culture, and a political and social commitment to economic progress. However, many other countries whose external environment and internal resources were equal or superior to those in South Korea have not performed nearly as well. Government policy has played a key initiating and supporting role.

The instruments used by the South Korean government to support economic progress look much the same as any list of development policies, ranging across tax benefits, domestic market protection, allocation of often subsidized credit, the use of state enterprises, direct political influence on business decisions, granting selective monopoly power to large local firms (*chaebol*), and a variety of other inducements. One characteristic that distinguishes the extensive government intervention in South Korea from that in many other developing countries is the commitment to building large, internationally competitive firms. In those industries targeted by the Korean government, bureaucratic and other interests have always been repressed, if necessary, to ensure economic success on world markets. The policy style of both the government and the large companies has also been characterized by a relatively aggressive, high-risk approach. Rather than taking

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9. This section draws on a variety of sources; the most important general sources include: A. KEARNEY & P. WOOD, *SOUTH KOREA: THE POLITICIZATION OF TRADE POLICY* (1986); Westphal & Kim, *Korea*, in *DEVELOPMENT STRATEGIES IN SEMI-INDUSTRIAL ECONOMIES* at ch. 87 (Bela Balassa & Associates eds. 1982); P. HASAN & D. RAO, *KOREA: POLICY ISSUES FOR LONG-TERM DEVELOPMENT* (1979); THE WORLD BANK, *KOREA: DEVELOPMENT IN A GLOBAL CONTEXT* (1984); Y. RHEE, B. ROSS-LARSON & G. PURSELL, *KOREA'S COMPETITIVE EDGE: MANAGING THE ENTRY INTO WORLD MARKETS* (1984); 1984 JOINT CONFERENCE, *supra* note 2; and CONFERENCE ON INDUSTRIAL POLICIES, *supra* note 2.

small steps to feel out the marketplace, the South Koreans have tended to take large, fairly elaborate jumps (steel and semiconductors are examples).

Economic policymaking has gone through three oft-discussed stages since the conclusion of the Korean War: recovery and reconstruction, industrialization, and progress toward high technology. The primary goals just following the war (1953-1961) were to establish political stability and reconstruct the devastated economy. The policies followed were largely inward-looking, focused on infrastructure-building, agricultural development, and land reform. Although economic progress was unimpressive by subsequent standards, important gains were made during this period.

With the ascent to power of Park Chung He in 1961, outward-focused industrialization became the central economic strategy. Import substitution policies were not eliminated. They were modified and augmented with policies to make Korean exports competitive on world markets. President Park and his advisors made the strategic decision that successful economic progress required major industries to become internationally competitive, eventually without government help. Free enterprise remained the central engine of economic progress, but all economic decision-making had to operate under the umbrella of strong direct or indirect government influence.

There were two phases of industrialization strategy during the Park era. From 1962 to 1972, the main structural policies were focused on 1) rapid modernization of agriculture, and 2) forcing industry to make the transition from producing behind protectionist walls to contending effectively with foreign market forces. Labor-intensive manufacturing, primarily of light manufactured goods, was the major beneficiary. Economic growth rates accelerated, the export share of gross domestic product expanded from five-and-one-half percent in 1962 to over twenty-nine percent in 1973, and the high inflation rates of the early postwar years began to be brought down.

By the late 1960s, government incentives generally favored exports over import substitution and the magnitude of those incentives was quite substantial, accounting for some thirty percent of the total value of merchandise exports in 1968.<sup>10</sup> For manufacturing exports, however, the value of the incentives largely offset the recurrent overvaluation of the won and the tariffs on imported inputs, with no net subsidy relative to world prices. For domestic producers, production for ex-

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10. Westphal & Kim, *supra* note 9, at 217.

port was still favored over domestic sales. Domestic sales were heavily taxed while exports were not.

The second industrialization phase of the Park era dates from 1973 to 1979. Policy focused on the development of heavy industry. Although this shift upstream was a natural evolution of successful light industry production, several factors accelerated the policy change: the impact of the first oil shock, growing protectionism in industrial country markets for textiles and shoes, and the perceived need to develop an arms industry in order to reduce Korea's dependence on the United States.<sup>11</sup> Priority was given to investments in steel, shipbuilding, industrial electronic equipment, petrochemicals, and machinery industries, all of which required the acquisition and use of foreign technologies.

After 1973, the currency underwent a substantial devaluation; government policies were introduced that selectively supported import substitution in producer goods, consumer durables, and automobiles; some specific export promotion programs were eliminated; and slow import liberalization continued. The drive to produce internationally competitive exports had resulted in an unexpectedly large discrimination against domestically produced machinery and equipment. Exports had an undesirably large imported input component. Some of the policy changes during the 1970s addressed this particular problem. The policies were not static, however, since the import substitution policies were selective and changed continuously over time as targeted industries became competitive. Despite the use of selective protection to promote heavy industry, the system as a whole retained an export promotion bias.<sup>12</sup>

Rapid industrial growth was successful, but unbalanced, with significant political and economic strains. The concentration of the industrializing effort in a handful of large, modern plants permitted South Korea to leapfrog over many other developing countries, but left it vulnerable to shifts in international demand. The economy became overheated, foreign debt accumulated, and inflation reemerged. A series of major economic shocks added to the pressures on South Korea, including weather-induced declines in rice production, the second oil shock, a recession in the major industrialized countries, and sharp increases in interest rates on South Korea's foreign debt. More-

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11. This was driven both by America's precipitous withdrawal from Vietnam and by the support for a U.S. military withdrawal from South Korea early in the Carter Administration.

12. See H. Rhee, *Protection Structure of the Developing Countries in South and East Asia* 14-16 (1983) (unpublished paper).

over, enormous political and economic uncertainty emerged following the assassination of President Park Chung He in 1979.

These political and economic instabilities were short-lived. Shortly after the coup bringing President Chung Du Wan to power, the government moved promptly to introduce a variety of adjustment policies, including relaxation of the heavy industrialization drive, selective liberalization of economic activity, and a significant devaluation of the won. Perhaps the most important part of this economic adjustment program for industrial policy was the explicit adoption of a more market-oriented strategy.

Presidential statements confirmed and legitimized the groundswell of concern that had emerged earlier among government and business leaders that South Korea was becoming too complex an economy for the level of detailed government intervention that existed.<sup>13</sup> South Korean exports were encountering increasing difficulty as protectionism increased in industrial countries. In addition, the country was attempting to meet its commitments under the GATT Subsidies Code, adopted in 1980. Government policies thus became much less industry-specific. Incentives became more oriented toward sectors. The private sector was given greater freedom of choice and many of the special preferences were reduced or eliminated.

The dramatic emergence of democratic pressures on the government, resulting in the election of President Roh and a new parliament, has not, as yet, altered the basic economic strategy. However, the policy process has become much more complex.

With the rise in wages and the emergence of a variety of competitors to South Korean products, the policy focus has shifted away from labor-intensive industries towards promotion of higher value added, technology-intensive industries. The policies implemented under the fifth and sixth five-year plans have been designed to support the development of science and technology generally, combined with special promotion of specific high-priority industrial areas. There has been a much stronger emphasis on the development of indigenous technology. Explicit plans have been developed for targeted sectors. Specific high technology initiatives include a strong emphasis on education and training of scientists and engineers with advanced degrees, improvement in the productivity of government-supported research and development institutions, and pursuit of a variety of major "national projects" to be developed jointly with industry around technologies of "critical importance" to future growth. Semiconductors and com-

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13. See State-of-the-Union address by President Chung (1982).

puters were designated as two of these critical technology areas under the fifth plan.

These initiatives have had a substantial impact on research and development spending in the country. Before 1982, private companies' investment in R & D averaged less than one percent of their turnover, but jumped to around three percent before mid-decade. In 1979, there were only forty-three private corporate research institutes; by the end of 1983, there were 139 and by late 1987 there were over 400. These private research institutes have been stimulated by a variety of tax incentives, special privileges, and government funds. Public assistance has helped the larger business firms establish their own central R & D laboratories. Incentives have also been provided to smaller firms to establish research and development cooperatives. Some resources have been devoted to the promotion of basic research. More is planned under the sixth plan. Government funded R & D institutes have been instructed to carry out joint projects with private institutes. Moreover, researchers at both public and private institutes are exempted from military service.

### 1. *The Legal and Institutional Framework for the Promotion of Higher Technology Industry*

Promotion of higher technology activities which became a central goal of economic policy in the fifth five-year plan (1982-1986), continued in the sixth five-year plan (1987-1991). However, these programs built on prior plans and institutions. The broad government policy guidelines from the 1960s through the 1980s for industrialization and science and technology are shown in Table 2.

*Table 2*

#### KOREAN GOVERNMENT GUIDELINES OVER THREE DECADES

Period	Industrialization	Science and Technology
1960s	1) Develop import-substitute industries 2) Expand export-oriented light industries 3) Support producer goods industries	1) Strengthen S & T education 2) Build scientific and technological infrastructure 3) Promote foreign technology import
1970s	1) Expand heavy & chemical industries	1) Expand technical training

	2) Shift emphasis from capital import to technology import	2) Improve institutional mechanism for adapting imported technology
	3) Strengthen export-oriented industry competitiveness	3) Promote research applicable to industrial needs
1980s	1) Transform industrial structure on the basis of comparative advantage	1) Develop and recruit high-level scientists and engineers
	2) Expand technology-intensive industry	2) Promote productivity of R & D
	3) Encourage manpower development and improve productivity of industries	3) Localize key strategic technology

Source: Ministry of Science and Technology as reported in Korean Exchange Bank, *Monthly Review*, Vol. XIX, No. 5, May 1985, p. 15.

High technology industries in general and the electronics industries specifically, are relative latecomers in the South Korean development process. As recently as the late 1970s, research and development and technology acquisition were primarily focused on expanding the heavy and chemical industries and offsetting the very large share of capital and technology imports from abroad required to maintain competitiveness. Even so, the concern about technology can be traced back to the 1960s.

The history of the relevant legal and institutional structures can be summarized briefly.<sup>14</sup>

- In 1961, Korea created the Economic Planning Board (EPB) to lead in the formation and implementation of economic policy.
- In 1962, the Foreign Capital Inducement Law was enacted both to control and promote foreign investment and technology transfer. Under this law, the acquisition of foreign technology was subject to the approval of the government. This policy was relaxed during the 1970s in an effort to expand the flow of foreign technology into Korea.
- In 1966, the Korea Institute of Science and Technology (KIST) was founded to engage in contract research with industries. Although its spectrum of activities was broad, KIST initially focused on solving relatively straightforward problems of absorbing technology transfer. Their work became more sophisti-

14. This list draws from a variety of sources, but most heavily from an excellent overview by Lee, *The Role of the Government and R&D Infrastructure for Technology Development*, 33 *TECH. FORECASTING & SOC. CHANGE* 33-54 (1988).

cated in the 1970s as companies sought research to enhance productivity, to increase the local content of their production, and to improve upon technologies imported from abroad (similar to earlier Japanese experience). In the 1980s, KIST assumed a different role as industrial firms set up their own research activities. KIST projects came to be dominated by research into areas of special national interest with the characteristics of high risk, large externalities, and extended gestation periods. Over time, KIST has spun off various satellite institutes designed to specialize in specific areas of high industrial priority in government planning. These specialized institutes serve as centers of active research projects and also as centers of expertise in their fields.

- In 1967, at the end of the successful conclusion of the first Five Year Economic Development Plan, the Ministry of Science and Technology (MOST) was created. MOST was given the responsibility of coordinating all science- and technology-related policies previously managed by other ministries. In some ways the overall coordination role was equivalent to the role that the EPB played for economic policy.
- In 1967, the Law for Advancement of Science and Technology laid the basis for the government to initiate policy in support of science and technology.
- In 1969, an industry-specific law to promote the electronics industries established the strategic importance of electronic products to Korea's future. At the same time, the first eight-year electronics plan (1969-1976) was adopted.
- In 1971, the Korean Advanced Institute of Science (KAIS) was established as a "mission-oriented postgraduate school to complement existing universities and colleges." Concurrently, the faculty and students of KAIS focused on research projects of interest to Korean industries.
- In 1972, the Korea Scientific and Technological Information Center (KSTIC) was restructured into an information clearinghouse for scientific information, primarily designed to help local companies and research organizations absorb international transfers of knowledge. KSTIC was later merged with the Korea International Economics Institute to become the Korea Institute for Industrial Economics and Technology (KIIET).
- In 1972, the Law for Industrial Technology Promotion pro-

vided a variety of fiscal and financial incentives to private enterprises for technology development. Specific instruments included tariffs on imported research, development, and engineering equipment; tax deductions for annual noncapital RD&E facilities; a tax credit for investment in RD&E work or in the commercialization of locally developed technology; and the establishment of technology reserve funds by large companies.<sup>15</sup> Initially this legislation was relatively restrictive, but various amendments have broadened the scope of the legislation to include small and medium-sized firms.

- In 1973, the Engineering Services Promotion Law was developed to support local engineering firms and improve their product.
- In 1973, the National Technical Qualifications Law introduced an examination and certification system for professionals in technical fields.
- In 1973, the Law for the Development of Specially Designated Research Institutes provided legal, financial, and tax incentives for both public and private research institutes in specialized fields.
- In 1973, the National Council for Science and Technology, an intergovernmental council chaired by the prime minister, was established to mediate among conflicting interests and integrate science and technology into economic development policy in a way that could not be managed by MOST.
- In 1977, the Korea Science and Engineering Foundation was founded as a funding agency to support research by university professors.
- In the late 1970s, the "Technopolis," Daeduk Science Town, was founded as a home for government-funded research institutes and central laboratories for private enterprises. The goal, of course, was to stimulate research and development by providing common research facilities, personnel, and information pools.
- In 1981, the changing functions of KIST were recognized, and it was merged with KAIS to become the Korea Advanced Institute of Science and Technology (KAIST).

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15. Large firms (measured by annual turnover) could set aside up to twenty percent of corporate profits before tax in any year to be used for their R & D work in the following two years.

- In 1981, the Electronics Industry Promotion Law was revised to emphasize the shift to higher technology production, especially in products for industrial use.
- In 1982, the National Technology Promotion Conference and the Technology Promotion Council replaced the National Council for Science and Technology. The Conference, chaired by the President of Korea, is held quarterly or semiannually to focus on issues of utmost national importance and numbers among its participants a total of about two hundred cabinet members, national assemblymen, industrialists, scientists and engineers, etc. The Council is a small group of vice-ministers of relevant agencies and civilians, appointed from selected relevant organizations, that focuses on practical policy application issues. MOST is the secretariat to the Council and the Council is often chaired by the minister of MOST sitting in for the President.
- In 1982, the Korea Technology Development Corporation was founded as a venture capital organization to stimulate the development of technology-based firms.
- In 1982, the second long-term Electronics Industry Development Plan was adopted (1983-1991), along with the MOST four-year semiconductor and computer R & D plan (1983-1986).
- Throughout the period since the late 1970s, private industry research institutes have been founded at an accelerated pace, numbering over four-hundred by late 1987.

A parallel major initiative pursued by the government of Korea to promote high technology industries has been in the area of manpower development. Although the South Koreans have a historic cultural commitment to education and training, the pace and direction of economic progress outstripped the supply of qualified manpower. The transition from labor-intensive industry toward more skill- and technology-intensive industry has presented a major challenge to the education system. Indeed, government expenditures on education have become a major share of the budget, over twenty percent in 1985 (some 3.5 percent of GNP, see Table 3). However, government expenditures represent only about thirty percent of the total expenditures on education; the remainder is borne by the private sector.

Table 3

GOVERNMENT EXPENDITURES ON EDUCATION,  
1940-1985

Year	Central Government Expenditures on Education (in million won)		Ratio of Central Government Expenditures on Education	
	Current Price	1970 Price	To Government Budget	To GNP (%)
1948	2	n.a.	8.0	n.a.
1951	15	n.a.	2.5	n.a.
1954	575	7,668	4.0	0.9
1955	2,633	—	9.4	2.3
1960	6,381	29,272	15.2	2.6
1965	15,331	31,260	16.2	1.9
1970	78,476	78,476	17.5	2.9
1975	227,916	96,185	14.3	2.3
1980	1,099,159	173,667	18.9	3.2
1985	2,492,308	303,575	20.3	3.5

Source: Ministry of Education. Lee, 1988, p. 46.

The number of schools and vocational training centers has grown dramatically. Indeed, vocational training was seen as so critical during the industrialization drive that in 1976 the 1966 Vocational Training Law was amended to impose compulsory training on business enterprises with two-hundred or more workers. Firms could provide this by setting up in-house vocational training programs, or they could finance training of their employees at vocational schools. Scientists and engineers were seen as so critical to future growth that university programs and graduate schools received special attention early in the 1970s. KAIS, as noted above, represented a turning point in the domestic provision of graduate education in science and engineering, but it was still only one component of a much larger strategy to provide the brainpower needed to fulfill long-term economic planning goals.

The main point to be made by this listing of institutions and legislation is that science and technology promotion is seen as an integral part of the development process. The legal and institutional framework provided a basis for supporting both broad-based technical advance and specifically targeted industries, such as electronics. Available statistics suggest that government policy has had a significant impact over time on national investment in science and technology (see Table 4).

Table 4

TRENDS OF S/T INVESTMENT AND R & D EXPENSES

Year	1965	1970	1975	1980	1983	1984	1985
(In billion won, current)							
S/T investment	2.1	12.8	62.0	317.0	728.2	957.7	1,286.2
Gov. vs. Private	90:10	—	—	68:32	38:62	32:68	28:72
% of GNP	0.26	0.47	0.61	0.86	1.23	1.44	1.77
R&D expenses	2.1	10.5	42.7	211.7	621.7	833.9	1,155.2
Gov. vs. Private	90:10	71:9	67:33	52:48	27:73	21:79	19:81
% of GNP	0.26	0.38	0.42	0.57	1.06	1.26	1.59

Source: Ministry of Science and Technology. Lee, 1988, p. 37.

## 2. Local Market Protection<sup>16</sup>

Protection of the local market until local producers mature has been a major policy of Korea's industrialization. Market protection has been implemented through import licensing restrictions combined with strong buy-national policies and high tariffs. For example, the Electronics Machinery Industry Bureau of the Ministry of Trade and Industry had to approve imports of computers and software, while the Electronics Industry Association of Korea had to approve semiconductors and electronic communication equipment. The approval depended upon certifying need and a lack of domestic supply. Priority was also given to foreign suppliers who had been cooperative in transferring technology to Korea in the past.

Since the early 1980s, most of the import licensing restrictions have been eliminated and some tariff reductions have occurred. Buy-national policies remain important. The success of these policies can be seen in the growth of industry and the stimulation of foreign producers to invest in South Korea or provide technology transfer agreements. Tariffs remain a substantial barrier by industrial country standards.

A major revision of the foreign investment rules occurred in July, 1984: approvals switched from a positive to a negative list system, approval procedures were streamlined, and restrictions were reduced. Many areas were liberalized. Still, key products remained protected.

16. Besides some of the sources noted above, the next three subsections draw from A. MODY, RECENT EVOLUTION OF MICRO-ELECTRONICS IN KOREA AND TAIWAN: AN INSTITUTIONAL APPROACH TO COMPARATIVE ADVANTAGE (1986) (manuscript published by AT&T Bell Laboratories) and A. Patton, An Analysis of Industrial Targeting Tools Used in Korea's Electronics Industry (July 16, 1985) (staff paper of the Office of the Pacific Basin, U.S. Dep't of Com.).

In the electronics industry, the 1984 negative list included mobile telephone systems, portable radio communication equipment, radio station communication equipment, optical fibers, and transformers. Special approval to invest in Korea in an area on the restricted list could be acquired, but the conditions usually required substantial technology transfer, local control, and high use of domestically produced imports.

### 3. *Tax Policy*

Historically, tax incentives have been important industrial policy instruments. In 1982, the Korean government eliminated many of the industry-specific tax incentives. Tax incentives remain available to strategic industries, however. As of 1986, companies could choose between tax credits from three to five percent of the invested amount or accelerated depreciation of up to one-hundred percent of the normal depreciation allowances. This choice was only available to the electronics and industrial machinery industries. The remaining targeted industries were only eligible for the accelerated depreciation benefits. Other tax incentives (including income tax exemptions and accelerated depreciation) are granted on investments made by eligible small and medium-sized firms in any high technology field.

### 4. *Credit Policy*

Credit management has long been the principal industrial policy mechanism used by the South Korean government. Demand for funds has always exceeded supply available at official interest rates. Targeted industries have not only received preferential access but, often, preferential interest rates. High-debt, high-growth corporations are particularly sensitive to credit availability, and thus the government has had strong leverage on their behavior. Until very recently, the banking system was under virtually full government control and credit provided both the carrot and the stick to direct large corporations. Strategic industries have had access to a variety of different sources of funds besides preferential bank lending. For example, industry also could draw on the Korean Development Investment Company, the Technology Development Fund, and the National Investment Fund for preferential financing.

The Korean Development Investment Company, established in 1982, was Korea's first venture capital firm and was founded to finance high technology businesses and small and medium-sized firms engaged in research and development work.

The Technology Development Fund, under the control of the Min-

istry of Science and Technology, is financed by the Korean Development Bank, the Medium Industrial Bank, and the Korean Technical Development Corporation. In 1983, the fund had U.S. \$214.3 million available for loans. These funds are used for long-term preferential loans to eligible firms planning to commercialize newly developed high technology products or for procuring equipment for research labs. Firms obligated to pay technical service fees for the construction of industrial facilities or seeking foreign technology transfers also qualify for Fund loans. The Fund provides eight- to ten-year loans with a grace period of two to three years. In 1983, loans were being extended at an interest rate of ten percent.

One of the oldest industrial policy funds is the National Investment Fund, established in 1974 to extend preferential loans to Korea's strategic manufacturing industries. In the early 1980s, NIF funds were being provided to heavy, chemical, electronic, and electric power industries through intermediaries such as the Korean Development Bank and Import-Export Bank of Korea. The NIF provides long-term loans payable over ten years after an initial two- to three-year grace period (at an interest rate of ten percent in 1983). The NIF was being phased out throughout the 1980s.

### *B. Looking to the Future*

The government has played an extensive role in guiding, pushing, cajoling, and otherwise helping pave the way toward industrial development. Heavy and detailed intervention into economic activity has given way to policies of a more general character, although the government remains highly involved in major decisions. The long-term planning process remains an important tool of economic management. The various plans serve as major guides to detailed policymaking and to the investment plans of firms.

Several recent planning initiatives have had special implications for the industrial structure and for trade. One is the project conducted by the Korea Development Institute in 1984 called "Year 2000." This was a major effort conducted with the cooperation and participation of many government agencies and all major research institutes. In 1986, KAIST and MOST completed a companion study on Long-Term Perspectives for Science and Technology that builds on the Year 2000 project and feeds into the sixth five-year plan (1986-1991). Together these plans have developed a framework of overall policy.

A view that permeates Korean long-term planning is that technology is rapidly becoming the most important factor in social and economic development. This is interpreted to imply an inevitable change

in the international economic order that South Korea will want to be a part of. Emerging facets of this new order imply that:

- Technology will join labor and capital as a fundamental basis of economic competition for the foreseeable future;
- Competition in higher technology, due to the high risks and large investments required, will create an oligopolistic market that includes a relatively small group of industrialized producer nations;
- Automation technology applied to existing industries will almost inevitably shift comparative advantage in industries that are now labor-intensive back to the industrial countries;
- Economic progress in Korea will only be maintained through a rapid acceleration of technological progress. It is in this context that Korea's drive to build a large-scale technological base in selected industries must be seen.

Korea has set itself the goal of achieving industrial country status by the year 2000. Current plans aim for a ranking of fifteenth in terms of gross national product, tenth in terms of trade volume, and in some aggregate sense, a comparable ranking in industrial technology. Policy planners in conjunction with academics, industry leaders, and others have identified five major areas of concentration: 1) "Microelectronics, information and telecommunication technologies, for an early realization of the so-called information society." 2) "Industrial key technologies such as design, systems engineering, and automation, for increasing value added and productivity of industrial promotion." 3) "Specialty chemicals, new materials and genetic engineering, for providing necessary support of industrial structure adjustment." 4) "Energy and resource technologies for the stable growth of the economy and industry." 5) "Public welfare technologies such as environmental conservation and public health care for improvement of public welfare."<sup>17</sup>

Individual initiatives in the five priority areas are to be selected according to a variety of criteria including, among others,

- Economic return and growth potential,
- Probability of success,
- Indispensability relative to national security and socioeconomic stability,
- Industrial and technological linkage effects, and

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17. These quotations are from, and the following overview is based upon, a summary of Korea's plans provided in Lee, *supra* note 14.

- Future contribution to public welfare and new industrial possibilities.

The "Long-Term Perspective for Science and Technology Development to Year 2000" also recommends a basic policy strategy and possible policy instruments to achieve a variety of goals in the areas of manpower, investment, and a national R & D system: a technological information system, financial and tax support mechanisms, the generation of markets for new technology products, technological intensification of small businesses, formation of R & D estates, stimulating a technology-oriented social culture, as well as promoting international development and cooperation in science and technology.

In the investment policy area, plans call for research and development investment to expand from about two percent of GNP in 1986, to three percent of GNP in the 1990s, to five percent of GNP in 2001. Roughly forty percent of this investment would be allocated from government, and sixty percent from the private sector, of which some twenty percent of the total would be basic research. Besides noting that current inducement policies for research and development are inadequate, the plan lacks specificity regarding the detailed instruments for achieving these goals.

Great concern is expressed about avoiding the waste of duplicative and overlapping investments and this concern is one reason for the high priority given to establishing a research and development network system that divides tasks among public and private research groups in some sort of efficient manner. Little information exists about how this system and its cross-links are to be used.

The structure, as presented, mirrors that which has emerged in the industrial countries. Industrial firms and their laboratories are to focus on industrial technologies and their commercialization. Public institutes should emphasize mission-oriented applied research on national projects involving high risk, great externalities, and long gestation periods. Universities should be primarily responsible for basic research and manpower development, while also cooperating with public sector institutes on industrial research. In the long term, part of this network would be Daeduc Science Town clones in various parts of the country. This is seen as a means of enhancing the network among scientists and engineers around the country as well as of helping to balance the extremely uneven regional growth of South Korea.

The concern to avoid duplication and overlap, combined with the drive to accelerate economic development to the maximum extent possible, logically led to an interest in building a nationwide network designed to collect, manage, and distribute information. The Korea

Institute for International Economics and Technology leads this effort, which is intended to be integrated into a much more comprehensive national computer network. Implementation of the nationwide computer network is one of the policy issues currently simmering between the U.S. and South Korea because of potential exclusionary aspects of its implementation. However this potential dispute is resolved, the Koreans see the information network as a building block in their national research and development system and, thus, critical to the nation's future.

South Korea clearly learned a lesson from the Japanese experience regarding the importance of stimulating the domestic market for products the government wished to promote. Historically, making a market has almost always implied protection from foreign producers, among other items. With foreign pressure for liberalization, explicit protection will become more difficult, but protectionist strategies will continue to be used. The main market protection policy identified and discussed in the plan was the use of public procurement. Public procurement is viewed as a way to reduce market uncertainties and to impose quantity and quality specifications on domestic firms.

The underdeveloped nature of Korea's small and medium-sized firms is a strong policy concern. The perceived success of small and medium-sized companies in the United States, and the remarkable dynamism of small and medium-sized companies in Taiwan, seem to underlie the Korean planners' focus on "economies of variety" as well as "economies of scale." The notion is that the economic structure of the future is likely to be biased in favor of the former. The plan voices a special concern that a wide variety of support measures in finance, tax, information, and public procurement will be required to promote small and medium-scaled industries in an era of rapid technological advance.

#### IV. ASSESSMENT AND CONCLUSIONS

These rather lengthy reviews of economic development strategy and policy provide useful insight into the process of trade policy formulation, the specific instruments used, and likely future changes.

Both countries have treated economic development as a central national goal — necessary both for the preservation of their own national security and as a key base for government legitimacy. The intensity with which economic growth is viewed as an overriding national imperative has declined somewhat over time, as success has brought other goals and concerns to the forefront. Nonetheless, growth remains a key priority against which all other objectives will be weighed.

Taiwan and South Korea are market economies that have been guided with considerable government intervention. The extent of intervention has changed in form and generally declined over time. South Korea has used and continues to rely upon more detailed and specific policy formulas than Taiwan. The great contrast in industrial structure helps explain the different policy approaches. It would have been extraordinarily difficult for Taiwan to provide detailed direction to its thousands of small firms, while the highly concentrated industrial structure of South Korea makes detailed guidance much easier and, indeed, a deliberate policy goal.

Economic and trade policy in both countries is of such importance that it has been controlled at the highest levels of government and has become increasingly reliant upon technocrats and technocratic approaches. Slowly, over time, more interests have begun to have an influence on decisions. Most recently, the trend towards political liberalization has made economic and trade policy formulation far more complex, creating potentially more explosive issues with the two countries' respective trading partners.

Their relatively small size, lack of resources, and market orientation led both countries to terminate the import substitution strategy early in their development and to turn to a focus on competitiveness in foreign markets as a primary objective in industrial development strategy. The goal was not simply to export, but to develop firms that could compete on their own without government support. A wide array of incentives, subsidies, and protectionist barriers has been used over time to stimulate firms in industries deemed strategic. The list of policies looks very similar to those employed by other countries.

The main difference has been that domestic distortions have been kept to a minimum (with exceptions). Essentially, exporting firms were usually not given large subsidies beyond that required to make their input costs more or less equal to international prices; or, at least they were not given subsidies for very long. They were, however, sheltered in the domestic market by protectionist barriers. Further, the government often "made the market" for priority goods — through procurement, local content requirements on foreign investors, and a variety of other techniques.

Because of size differences, Taiwan has had to rely on a stronger export orientation and less domestic protection than larger South Korea. Taiwan has also tended to reduce protection and relax investment constraints more rapidly than South Korea.

In both countries, the bureaucracy has had wide discretion in interpreting the complex rules of trade policy and at times seems to be

formulating trade policy. This flexibility is at once a traditional part of their respective legal systems and a deliberate strategy to permit detailed intervention if conditions warrant. However, this discretion sometimes leads to a situation in which trade policy pronouncements are implemented slowly, or sometimes not at all. This problem has been more pronounced in South Korea.

Despite important similarities, the basic approach to industrial development differs significantly. South Korean policy favors large projects, risk-taking, and technological leapfrogging. In the process, Korea has developed some major world-class firms, with a weak and thin support base of small and medium-sized firms, and limited flexibility. Taiwan's approach has been much more cautious. Growth with stability is the goal. Moreover, Taiwan has focused on creating a more diversified and flexible economic base than South Korea. However, average firm size is small, limiting Taiwan's ability to move into higher technology and capital-intensive production.

Trade policy increasingly reflects these industrial policy challenges. In different ways, both countries are seeking to localize production. In Taiwan, the goal is to expand the scale of that production, while in Korea the goal is to develop more small and medium-sized local supplier firms.

As each looks to the future, modernization remains a key priority in both countries. Trade policy will be used to support this drive to modernize, but the range of flexibility is limited. Their economies have become so complex that detailed intervention has become inconsistent with high growth, especially in South Korea. Moreover, international agreements and foreign pressures provide political and legal constraints.

Both countries have identified industries required to pull their economies into the future while maintaining strong international competitiveness. The intended result is that these industries will both replace imports and provide for export growth. Besides high technology, both nations, in differing degrees, have come to recognize the need for a modern service sector. Taiwan, in particular, has begun to use liberalization (of domestic *and* international barriers) to move service industries forward. Foreign direct investment is seen as increasingly critical for accelerating modernization in the services sector in both countries.

Both South Korea and Taiwan see trade diversification as an economic development goal. Excessive concentration on the U.S. as a market and on Japan as a supplier results in serious vulnerability.

As their economies have developed, constituencies in both coun-

tries have come to see that protection of intellectual property rights is critical to future growth industries. Thus, internal forces will dovetail with external pressures on this issue. Similarly, domestic pressures for the liberalization, privatization, and modernization of internal financial markets are reinforcing foreign pressures for financial reform.

Finally, as both countries liberalize their international trade regimes, the issue of internal market disruption due to rapid import growth, foreign subsidies, and unfair trade practices is becoming a more important topic of the policy debate.