

International Comparisons of Processes and Policies for Developing Heavy and Chemical Industries

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**International Comparisons of Processes and Policies for Developing
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Foreword

Korea's success in eradicating poverty and developing its economy through industrialization provides a valuable lesson to many developing countries. One of the best illustrations of how this process unfolded can be found in heavy and chemical industries (HCI), an area that marked a major turning point in the economic structure's gradual move forward from light industry to ICT and other advanced technology. Given that similar policies in other developing countries ended as often in failure as in success, however, an international comparison is needed if the factors are to be properly understood.

This study compares Korea's HCI process and policies with those of four other countries that attempted an HCI push over the similar period: Taiwan, the Philippines, Brazil, and Algeria. These countries were chosen not only because they offered the most representative examples of HCI drives for their respective continents, but also because of the stark contrasts in their methods, policies, and performance. By comparing different countries' approaches to HCI development, it may be possible to uncover new perspectives in assessing the approach of any single country.

This kind of country-by-country comparison is especially crucial because the process is still ongoing. First, by reexamining and objectively reevaluating Korea's HCI push, it may be possible to identify numerous implications for present and future industrial policy planning, as well as a design process that is based on past experience and reflection. Second, the need and demand for industrial collaboration with developing countries has risen

sharply as Korea has gone from being an aid recipient nation to an aid donor. In order for Korea to accurately share its industrial development process and policies with emerging nations, the right methods and patterns for the requesting nation must be sought through an examination of past successes in HCI development and the responsible factors. Third, a comparison of the five countries may provide invaluable basic data and lessons for any developing countries that are implementing or considering their own HCI drive in the present or future.

Because this study is based on the research of top experts in the five countries who have personally witnessed their respective nation's individual HCI drives, it is certain to provide a basic store of information that is both vivid and reliable. The authors wish to express their deepest gratitude to Dr. Cha Moon-joong of the Korea Development Institute; Ministry of Trade, Industry and Energy department director Kim Young-hwan; and Drs. Jang Seok-in and Nam Jang-keun of KIET, who were all unfailingly generous with their advice and support during the writing process.

It is my sincere hope that this report will prove to be beneficial to those in government, industry, and academics, as well as those with an interest in the industrial policy of Korea and developing countries and the sharing of Korea's industrial development experience. I should also note that the content of the report represents the opinions of the authors who took part in the research, and should not be taken as the official position of the institute.

December 2013
DoHoon Kim
President, KIET

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Synopsis

Chapter 1. Introduction

This study attempts a comparative analysis of the heavy and chemical industries (HCI) policy and development process in five countries — Korea, Taiwan, the Philippines, Brazil, and Algeria — with a focus on their implications. In particular, it looks at the similarities and differences in the background of their HCI drives, the implementation processes, the policies, and their results.

Industrial policy is not an area where experiments can be replicated. However, a cross-sectional comparison may at least help in objectively assessing any one country's industrial policy in a situation where experimental replication is not a viable option. An examination can offer an invaluable resource in planning and designing a direction for future industrial policy for countries that have succeeded in HCI, as well as those that have been unsuccessful.

Chapter 2. The Process and Policy of Korea's HCI Drive

Concrete implementation of Korea's HCI drive came as part of the third and fourth five-year economic development plans (in 1972~76 and 1977~81, respectively). The government provided active support over this period through selective industrial policy, pouring a total of US\$9.6 billion into six strategic industries. The country selected six industries for its third five-year plan (1972~76): steel, nonferrous metals, machinery (including cars), ships, electronics, and chemicals. The aim was to take HCI beyond the level of import substitution, using its growth as an export driver to achieve an advanced industrial structure and nurture the domestic defense industry.

Korea's HCI came as part of a government-led strategy known as the "Big Push", but the primary investors came from private enterprise, and large corporations in particular. The HCI Promotion Committee was officially in charge of the push; this committee was responsible for overall HCI planning, as well as planning for individual industries, sites, support programs, and assessment. It was technically under the Prime Minister, but the President, along with economic officials, corporate representatives, scientists, and technicians, provided supervision through attending meetings to discuss HCI plans.

In terms of the production factor's policy, Korea introduced tax incentives and a system of "unlimited finance distribution" at low interest rates for private enterprise to invest in HCI. In addition to its efforts to incentivize investment, Korea also focused on acquiring human capital and developing technology. Industrial

complexes were developed for different industries in an effort to boost forward/backward linkage and synergy.

The focus of Korea's trade policy was on expanding the export promotion system, with incentives likewise geared to increasing exports. For example, a 50% corporate tax exemption was granted for export income, and duties were exempted for imported facilities materials needed to boost HCI international competitiveness. At the same time, other measures were focused on protecting the domestic market. In 1978, the effective rate of protection was 71% for HCI, compared to -2% for the light industry.

The Korean HCI push did come with its share of opportunity costs — from the concentration of economic resources and the imbalance in economic growth. However, from a long-term perspective, it was an ongoing effort to contend with the comparative advantage conditions of the 1970s (specifically, the labor-intensive light industry) and to establish a new comparative advantage in more capital- and technology-intensive, high value-added industries.

Chapter 3. The Process and Policy of Taiwan's HCI Drive

Taiwan launched its HCI drive with its Ten Major Construction Projects in 1973 and a six-year development plan initiated in 1976. The construction projects were part of a program of domestic demand promotion and upstream import substitution in response to the recession in the wake of the first oil crisis in 1973 and the country's 1971 departure from the UN; industry areas included

steel, petrochemicals, and shipbuilding. The country's approach to nurturing HCI changed considerably in the 1980s. When the second oil crisis in 1979 sent petroleum prices soaring, the country responded by limiting the expansion of energy-intensive HCI facilities to the level needed to meet domestic demand, and adopting a new strategy of fostering high-growth industries like machinery and electronics, which were less energy-intensive and more dependent on technology.

The Taiwanese government played an active role in HCI investment during the Ten Major Construction Projects period, using public enterprises in steel, petrochemicals, and shipbuilding. The aim was to make up for the companies of lack of capital and technological capabilities by having the public corporations socialize the investment risk. But, even as it directed investment, the decision-making process was on the technical, market-oriented side. Policies and incentives were more conservative and less focused than those in Korea. In the 1980s, when Taiwan began developing technology-intensive industries such as machinery and electronics, private enterprise led the way in investment, while the government's role was more about forming a suitable environment than participating in the market.

In terms of the government's role in acquiring production factors, the central government and public enterprises arranged the investment funds for the Ten Major Construction Projects, since they were the parties directing investment. The country had a current account surplus at the time, providing a relatively strong capital base; sixty percent of funding for the project came from domestic capital. During the technology-intensive industrial

development period of the 1980s, the Export-Import Bank of ROC was set up to provide long-term, low-interest-rate loans to private enterprise. Taiwan also established its own R&D support system during its second import substitution period in the 1970s. During the 1980s push to develop technology-intensive industries, it built Hsinchu Science Park and beefed up the role of ITRI to promote R&D in the machinery and electronics industries.

In terms of trade policy, Taiwan adopted protectionist trade measures for its HCI import substitution push in the 1970s, including increased duties and an import approval system. During the technology-intensive HCI development period of the early 1980s, energy-intensive industries were restricted to the facilities necessary to meet domestic demand. Import tax exemptions on machinery, equipment, and other intermediate goods were granted along with investment tax incentives for export industries, in order to boost the international competitiveness of technology-intensive areas like machinery and electronics.

In summary, while Taiwan did focus on HCI for roughly a decade, its policies were relatively less intensive. However, the government's proactive role in its development should not be overlooked.

Chapter 4. The Process and Policy of the Philippine's HCI Drive

The Philippines began its HCI drive in the 1970s. The Investment Incentive Act, enacted in 1967 to end an economic recession,

included both the HCI and light industries. But as the 1970s progressed, it was the HCI industries — copper refining, paper, chemicals, and synthetic fiber materials — that chiefly benefited from the act. By incentivizing the use of capital instead of labor in the production process, the law was ultimately more beneficial to capital-intensive industries. The Progressive Manufacturing Program of 1973 was implemented as part of a drive to develop cars and other HCI, but rent-seeking by the ruling Marcos clique prevented it from achieving its intended goal of backward integration in manufacturing and high value-added industries.

Private enterprise and foreign direct investment companies were the chief investors in the Philippine HCI drive, with the government providing active support. Laws on foreign investment were relaxed during the export-led industrialization period of the 1970s in order to draw in export-oriented FDI. It has been argued, however, that the country became overly-dependent on foreign investment companies during this period. For example, an unsuccessful effort was made to develop the automobile industry by incentivizing finished car makers through the provision of FDI to invest in parts.

In terms of acquiring production factors, the Investment Incentive Act of 1967 offered two main types of incentives: “preferred” and “pioneer”. The “preferred” category (for industries without the ability to meet domestic demand or achieve potential export scale) included accelerated depreciation, tax exemptions for capital goods imports, and tax incentives for the purchase of domestic capital equipment. The “pioneer” category (for industries introducing new products or processes to the country)

offered the same incentives, plus additional exemptions on all domestic taxes (except corporate taxes) and permission to have 100% equity owned by foreign investment companies. However, the country had no human resources or R&D policy to speak of.

In terms of trade policy, the Philippines set up an incentive system to promote exports with the enactment of the Export Incentive Act during its export-led industrialization period in the 1970s. However, the system was also protectionist in nature: the Progressive Manufacturing Program was structured in such a way as to encourage companies receiving support to use domestic rather than imported intermediate goods.

In summary, the HCI drive in the Philippines failed due to a combination of macroeconomic instability, market liberalism, flawed policy incentives, over-dependence on FDI, and a lack of patriotism from the leaders directing industrialization.

Chapter 5. The Process and Policy of Brazil's HCI Drive

Brazil's first attempt at HCI came in the late 1950s in response to a current account crisis, a program that was articulated in the Target Plan of 1956 to 1961. From 1961 to 1967, economic policy was focused on macroeconomic stability amid persistent political and economic upheaval; industrial policy was low on the list of priorities. After this came the so-called "Miracle" of 1967 until 1973, when the economy began to boom and the importance of industrial policy once again came into sharp relief. The NPD I (1972~74) was drafted; it was eventually followed by the NPD II

(1975~79), which responded to the first petroleum crisis with a more rigorous import substitution strategy. Industrial policy became an important element of general economic management.

The Target Plan steered investment to HCI industries through a three-pronged approach involving domestic and foreign private enterprises and state-run enterprises. The government spearheaded infrastructure investment, while taking steps on its own (through state enterprises) to foster industries where private investment was less practicable. The NPD II included some of the same areas as the TP — energy and transport — while adding further investment in state-run enterprises in areas of infrastructure such as communications, distribution, urbanization, and sanitation. Public enterprises also assumed an increasingly important role in the production of basic and intermediate goods. Meanwhile, private enterprise continued to take the lead in capital goods production.

In terms of government policy to acquire production factors, the Target Plan offered long-term, low-interest loans to strategic industries through the BNDE. Real interest rates were negative for most of this period, and the BNDE provided guarantees on international borrowing. A multiple exchange rate system also contributed greatly to attracting FDI during this time. Additional measures introduced with the NPD II included accelerated depreciation and domestic tax exemptions on domestic purchasing. However, Brazil's public policy focused solely on increasing production abilities while neglecting human capital and R&D.

In terms of trade policy, the Target Plan included strongly

protectionist measures designed to promote import substitution in HCI. This import substitution-oriented protectionism only intensified with the NPD II. During this period, non-tariff barriers were generally preferred over tariff protections.

In summary, the Brazilian HCI drive failed because of excessive and opaque protectionist barriers, a lack of temporary legislation, and barriers to the adoption of inputs and new technologies.

Chapter 6. The Process and Policy of Algeria's HCI Drive

In Algeria, HCI was seen as a way of laying the groundwork for post-independence economic self-sufficiency through industrialization. It came as part of a more general program of improving productivity across the economy: key upstream industries were being developed to direct growth in their respective areas, while integrated industries were developed and applied in all economic areas.

State enterprises were entirely in charge of directing investment; indeed, these enterprises held monopolies in the different industries. During the HCI industrialization period, the private sector accounted for just 2% of all industry investment. The reason the state and its enterprises took the reins on investment was because all investment funding had to come from the state, which held a complete monopoly on petroleum resources.

Algeria suffered from many of the characteristic problems of

socialist industrialization: total dependence on state enterprises, monopolistic industrial structure, and incentives for quantitative expansion over efficiency. The combination of an investment distribution pattern that produced imbalances between industries, the lack of entrepreneurial groups to operate modern industrial businesses, and absence of the necessary policy capabilities in the government and public sector resulted in a triple crisis for the Algerian industrialization strategy: inefficient and over-leveraged public enterprise, mounting external debt, and increased government liabilities.

Attempts were made in the 1980s to reform state enterprises through corporate partitioning and decentralization and settle their debts. These were only formal changes, however, without any fundamental difference in corporate management or government policy. Improving external economic conditions in the wake of the second oil crisis allowed the basic development strategy to hang on temporarily, but when oil prices began falling in the 1980s, the national economy reached a systemic crisis that brought political and economic turmoil.

Algeria's experience with an HCI drive is an excellent lesson to other resource-rich countries hoping to achieve industrial diversification through large investments directed by the state and state enterprises. Countries hoping to avoid the "resource trap" would do well to heed it. It also illustrates the narrow and difficult path to successful industrialization for resource-rich nations. Another lesson is that while government intervention is necessary to check the negative effects of resource boom and mitigate market failures, it also greatly increases the costs of

industrialization failures. Perhaps the most crucial step in achieving industrialization in a resource-rich country is to find a model for private sector-government collaboration that is suited to the country's circumstances, where each side makes up for the other's weaknesses.

Chapter 7. Comparison and Assessment of HCI Policies and Their Implementation

1. Final Appraisal

Korea's HCI drive was a "Big Push" strategy with large investments, primarily from private enterprise (especially large corporations), that were shored up by comprehensive and proactive government support in the 1970s. It was an export-led growth strategy that hinged on both incentives and disincentives. Some difficulties were encountered in the early 1980s as over-investment issues led to rationalization. The aim of investment adjustments was to improve international competitiveness by cutting back on over-equipment and affecting production specialization. But following the 1986 enactment of the Industrial Development Act, which brought a move away from industry-selective policy to a more function-based approach, Korea was able to succeed with its HCI push through a judicious use of increased autonomy of private enterprise, a shift toward innovation-led industrial development, and external openness policies. In particular, the so-called "three lows" (low value of the Korean won, low oil prices, low interest

rates) of the mid-1980s and the rise of China during the 2000s contributed greatly to the success of Korea's HCI. Its push certainly did come with its share of opportunity costs — from the concentration of economic resources and the imbalance in economic growth — but from a long-term perspective, it was an ongoing effort to contend with the comparative advantage conditions of the 1970s (specifically, labor-intensive light industry) and to establish a new comparative advantage in more capital- and technology-intensive, high value-added industries.

Taiwan invested large sums in HCI (petrochemicals, steel, shipbuilding) in order to nurture basic materials industries as a way of stimulating domestic demand and achieving backward integration with previously developed downstream areas during the recessive conditions of the 1970s. Because private enterprise lacked investment capabilities, the government sought to socialize the risk through public enterprises. This early approach is seen today as successful, in that it paved the way for the active investment of private enterprise that occurred during the liberalization period from 1980 onward. The government was involved in the Taiwanese HCI drive through public enterprise, but it was not a “Big Push” strategy, as the decision making was more market-oriented and less comprehensive than in Korea. Taiwan also sought a path for sustained growth by shifting the focus of its HCI structure to technology-intensive areas like machinery and electronics, in response to the rising energy prices in the wake of the second oil crisis in the 1980s.

The Philippines followed a similar path to other developing countries: import substitution-oriented-industrial development in

the 1960s, an export-led strategy in the 1970s. Its HCI production base and innovation levels, however, remain quite meager. Its industrial development strategies have lacked consistency, transforming drastically in response to current account crisis conditions and political changes. The Progressive Manufacturing Program of the 1970s, the 11 major industry development strategy of the early 1980s, and the technology-intensive industrial development strategy of 1998 were all thwarted by political upheavals, including the rent-seeking practices of the ruling Marcos clique. Another problem was the government's lack of commitment to HCI development policy. In the case of shipbuilding, the interests of the shipping industry were prioritized over those of ship manufacturing; the attempt to develop the automobile industry foundered due to a reliance on the benevolence of FDI companies and a lack of commitment to nurturing the local parts industry. The country also lacked any real policies for establishing human capital and developing technology. Chapter 4 identifies macroeconomic instability, market liberalism, absence/irrationality of incentive systems, over-dependence on FDI, and a lack of patriotism from the leaders directing industrialization as causes of the Philippine HCI push's failure.

Brazil also failed to develop most of its HCI target industries into industries with international competitiveness today. Its HCI policy lacked incentives for improving productivity and competitiveness, while excessive and ongoing protectionism led companies to satisfy themselves with the domestic market and abandon efforts at technological innovation. Public policy was

focused solely on increasing production capabilities and neglected development of human capital and technology. These factors explain how the country's shipping industry could go from second in the world to nonexistent during the free market period of the 1990s. Chapter 5 identifies excessive and opaque protectionist barriers, a lack of temporary legislation, and barriers in the adoption of inputs and new technologies as reasons for the failure of Brazil's HCI push.

After achieving independence in 1962, Algeria attempted a state-driven industrialization push along socialist lines. By 1980, it was faced with a triple crisis — with its corporations, national finances, and foreign debt — which led to a systemic crisis in the later part of the decade. The outcome of the Algerian strategy can be explained by a combination of factors: the socialist, state- or state enterprise-centered methods, an over-reliance on petroleum resources (characteristic of many resource-rich nations), and a lack of industrialization experience (characteristic of many developing nations). The role of the oil rent deserves particular attention, as it provided the source of investment funds and enabled the development strategy to continue for as long as it did. Algeria's experience with an HCI drive is an excellent lesson to other resource-rich countries hoping to achieve industrial diversification through large investments directed by the state and state enterprises. Countries hoping to avoid the “resource trap” would do well to heed it.

2. Implications for Industrial Policy in Developing Countries

This study holds a number of implications for developing countries hoping to implement their own HCI drives. First, the government needs to be committed and consistent in its HCI policy. Second, the incentive system needs to be fair and rational. Third, investment planning must be tailored to each country's stage of industrial development. The optimal approach for a country's industrial development may be to have the development of backward sector, such as the HCI, lag behind or proceed in tandem with the downstream development such as the light industry. Fourth, resource channeling and economies of scale are crucially important in the early stages of HCI industrialization. However, one common factor between Korea and Taiwan was the shift to an innovation-driven development pattern after an investment base had been established through resource channeling. Fifth, trade protection measures need to be temporary and predictable. Sixth, HCI methods need to be focused as much on acquiring human capital and stronger technology as they are on expanding production through capital acquisition. In summary, HCI development, and industrial development in general, requires a long-term plan and long-term practice to make the most of current and potential comparative advantages.

Chapter 1

Introduction¹⁾

In the 1970s, Korea channeled large resources into developing private sector-driven heavy and chemical industries (HCI), with active support from the central government. While those industries did experience some difficulties due to overinvestment in the early 1980s and early 1990s, the period from the mid-1980s onward generally saw them rising to become some of the most important export industries existing today, thanks to increased private sector autonomy, a shift in focus to innovation-driven industrial development, and the judicious use of economic openness policy.

This study compares Korea's HCI policy and implementation with those of other countries that pursued the similar approach over a similar period, namely Taiwan, the Philippines, Brazil, and Algeria. An international comparison may offer very important implications for the course of Korea's industrial policy, as well for

1) Written by Dr. Young Seok Oh (KIET, Korea).

the development of similar policies in developing countries that wish to establish their own industries, and for Korea's sharing its development experience and policy approach with those developing countries. This section outlines the background, goals, and importance of the study.

Why was HCI selected for comparison? Industry typically follows a characteristic pattern of evolution. Countries start with labor-intensive light industry, which gives way to capital-intensive HCI and, eventually, to technology-intensive high-tech industries. Most developing countries have sought to develop HCI either after or in conjunction with the development of light industry. But HCI is a difficult area for many developing countries to successfully implement, considering its demands for vast volumes of capital, relatively skilled human capital, and advanced technology. It also requires different forms of government policy support. In that sense, it is inevitable that developing countries would primarily be interested in learning about HCI when they request information about the industrial development experiences from other countries that have succeeded with it.

What is the value of comparing different countries' HCI policies and experiences? Industrial policy is not an area where experiments can be replicated. Korea's HCI development came with considerable trial and error and substantial opportunity costs. Any objective appraisal is complicated by the fact that evaluations of Korea's HCI necessarily vary according to the focus and perspective of the evaluator. This is why it is necessary to compare the policies, implementation processes, and results for countries that attempted HCI development over a similar period.

While each of them started from different circumstances, a cross-sectional comparison may at least help in objectively assessing any one country's industrial policy in a situation where experimental replication is not possible.

Why were Taiwan, the Philippines, Brazil, and Algeria selected for comparison? In addition to being perhaps the best examples of countries attempting an HCI strategy in their respective regions, these four countries vary starkly in their policy design, method of implementation, and results achieved. In contrast with the Korean case, Taiwan's government participated directly in the HCI drive through public enterprise, yet the country managed a faster catchup than Korea in terms of per capita GDP (with the US). In the Philippines, industrial development strategy and policy were more or less improvised in response to current account deficits and more general economic conditions, an approach that was usually influenced strongly by domestic political conditions and changes in them. Brazil, which attempted a protectionist HCI drive leveraging its vast domestic market, had a higher per capita GDP than Korea at one point, but began losing ground in the mid-1980s. Algeria leveraged its petroleum regions to formulate a strategy for a socialist HCI push centered on public enterprise, only to experience macroeconomic and systemic failure due to corporate inefficiency and the unsuitability of its industrial policy. A comparison of the different HCI approaches in various countries may provide a new perspective on evaluating a single country's methodology. Specifically, it may shed new light on the importance of aspects that have generally been taken for granted.

What contemporary relevance do studies of past HCI policy hold? The research for the individual countries examined in this study was performed by the countries' top local experts, people who bore witness to the implementation process. The aim in comparing the studies here is not specifically to highlight their invaluable significance in academic terms. Rather, it is to address a number of strong ongoing concerns. First among them is the need to reexamine and objectively reconsider Korea's approach to HCI by way of international comparison; the data may provide much in the way of implications for developing and designing future industrial policy. In other words, conception and formulation of future approaches should be informed by reflection on past experience. Second, the need and demand for Korean industrial collaboration with developing countries has increased substantially as the country has gone from being a recipient of aid to a donor nation. If Korea's industrial development experience and policies are to be shared accurately, it is first necessary to examine the factors that determined the success or failure of other countries' HCI policies to identify the right methods and patterns for the countries requesting assistance today. Third, a comparison of the five countries' HCI approaches may provide a pool of invaluable lessons and basic data for developing countries that may adopt an HCI strategy in the future.

What is the goal of this study? By comparing the background, implementation process, policy design, and results for five countries (Korea, Taiwan, the Philippines, Brazil, and Algeria), this study attempts to identify and illuminate similarities and differences. In so doing so, it seeks to provide basic data and

implications for Korea's present and future industrial policy, ideas of industrial collaboration with developing countries, and a course of HCI policy for present and future developing countries.

What distinguishes this study from previous research?

First, it can potentially offer an invaluable academic resource as a vivid, credible analysis based on research from some of the top scholars in the different countries analyzed. This research has the benefit of being informed by the researchers' own experience witnessing the HCI policy implementation. Second, little research to date has attempted an objective assessment of Korea's HCI policies, their implementation, and their performance in comparison with the approaches adopted in major developing countries. By generalizing the factors that account for Korea's HCI success — as well as their drawbacks — such an analytical approach can contribute to both a basic understanding of industrial advancement-oriented policy in itself and a new understanding and implications for sharing Korea's experience with developing nations. Third, this study is distinct from previous research in extending the international comparison of HCI policies beyond the level of generalities, offering concrete analysis of the factors behind different countries' HCI strategies, the specific policies, their implementation, and their outcomes.

How is the study organized? Chapters II through VI present analyzes of the HCI policies and implementation processes for Korea, Taiwan, the Philippines, Brazil, and Algeria. In particular, they focus on the economic and political factors behind the countries' HCI drives, the actual methods of implementation (the industries and selection standards, the specific companies, the

organizations and agencies behind the implementation, industrialization patterns), the specific policy measures adopted by national governments, and the outcomes of the different drives. Chapter VII synthesizes the findings to illuminate the factors behind the policies' success or failure and offer implications for industrial policy in developing countries.

Chapter 2

The Process and Policy of Korea's HCI Drive²⁾

1. Introduction

In this chapter, we intend to depict the development path of Korea's current major industries which boast for their competitiveness and market share in the world market these days. The chapter will try to find out the reason why they were selected as targeted industries, how they were assisted by the government, the reason why they encountered severe setbacks, how they overcame those setbacks and again how they were helped by the government in the process of overcoming difficulties.

In the first place, we will look into the development policy packages for so-called heavy and chemical industries at the beginning of 1970s. Even though this part will focus on the government's various policy assistances such as tax incentives, financial assistances and establishment of industrial complexes, a

2) Written by Dr. DoHoon Kim (President of KIET, Korea).

special attention will be paid to the list of targeted industries, “how and why” they were selected at that period and who (which businesses) responded to the government’s call for participation. By doing so, we hope to find out some underlining factors of Korea’s initial success of launching these capital intensive industries which went against their comparative advantage edge, which will in part explain differences in the initial development path between Korea and other developing countries who launched similar industries in a similar period.

In the second place, we will examine the ups and downs of these industries in the later stage, paying attention to other related industries which emerged during this period as well. The government’s continuous follow-up assistances in this process, responding to the need of these industries, will be one of the main subjects of our examination. In fact, the Korean government not only had provided a variety of policy incentives at the initial launching policy packages as above-mentioned but also developed continuously new sets of policy assistances, emphasizing in one time importing foreign technologies in other times developing their own technologies and exploring foreign markets etc. A special attention will be paid in this part to the major setbacks of these industries starting from the end of 1970s. In fact, many companies in these industries encountered managerial and financial difficulties. These setbacks were mainly due to the second oil shock and the recession of the world economy at the aftermath of the oil shock, as the success of many Korean industries were heavily dependent on export of their products to the world markets. However, we can easily find out

the internal reason of these setbacks. In fact, being too much encouraged by their continuous success with their first-tier industries and again second-tier industries, too many companies participated in the small (in the sense of niche markets reserved to Korean industries) and retracting markets with too much investment. The phenomenon of so called “over-competition” between Korean companies emerged seriously.

In the third and last place, we will investigate the restructuring program launched by the Korean government during the 1980s with the purpose of resolving the above-mentioned problem, over-competition. Our close attention will be paid to the reaction of private companies which for the first time encountered dissuasive government policies differently from traditionally promotional assistance policies. In fact, with their strong ownership, most private companies were strongly reluctant to the government's intervention in this time. One should look into in detail the negotiation process of business exchange between industrial groups, or chaebols, and the process of reaching to the government business partnership again. Another important aspect of this restructuring program will be covered in this examination. That is the criteria to select concerned industries and companies to dissolve or to concede to others. We will try to find out the policy means, incentives and dis-incentives, which were employed by the government in order to persuade those private companies.

As, differently from other developing countries, Korea managed to make these industries not only get through these difficulties but also get world level competitiveness in the later

stage, we intend to follow up the process of Korean industries' overcoming difficulties and getting back their competitiveness. Of course, the upcoming event in the international market in the middle of 1980s, so called "three lows" — low oil prices, low international interest rates and low dollar (or strong yen) certainly helped Korean industries to overcome these difficulties. However, we will again try to look into Korean industries' effort to increase their competitiveness, investing in technology development and exploring new markets, and the government's follow-up policy scheme to assist these industries in their effort.

2. Background of HCI Drive in 1970s

Departing from its initial policy stance for industrial development in the 1960s, described as export promotion policy and regarded as "industry-neutral" in the sense that the government had not explicitly selected industries to support, the Korean government set out a veritable industrial targeting policy, the HCI drive in the early 1970s. In fact, the president at that time, Park Chung Hee, pronounced "the Declaration of industrialization of heavy and chemical industries" in March 1973 by the occasion of a new-year address to Parliament.

When this policy was announced, there were not unanimous welcomes even though the necessity of this kind of industrial policy for industrial diversification and/or upgrading of industrial structure had been sporadically raised by business representatives. On the contrary the Korean government was faced with the disapproval from the World Bank and severe critics from many

international experts. Even in the domestic arena as well, many economists argued that Korea's comparative advantage still remained in labor intensive industries. We can find three major reasons for this "seemingly adventurous" political commitment of the Korean government at that time.

Three major reasons for the HCI drive are as followings.

First reason is a political necessity. To avoid the absolute dependency on the US assistance in national defense against North Korea, Korea felt the necessity to establish basic defense industries such as machinery. In fact, in the early 1970s, military tension rose sharply between two Koreas.

Second reason is an economic necessity. To avoid the absolute dependency on the import, especially import from Japan in the supply of intermediate goods for exporting and domestic industries, Korea wanted to develop its own intermediate goods producing industries such as petrochemicals, steel etc.

Third reason is a strong policy will. Being encouraged with the early success in the 1960s with export drive policy, Korea wanted to diversify exporting sources from light industries to HCIs.

3. Selected Industries and Driving Forces

(1) What were criteria for selecting targeted industries?

The exact selection process of specific HCI industries to develop, so — called targeted industries, was not clearly known. The final selection was seemingly made by a close consultation between the President Park and his aide O Won Chul, even though we can

draw out some criteria for selection as described below.

Considering the above-mentioned three major reasons to embark on the HCI drive, we can classify selected targeted industries roughly in three categories as follows. First, industries selected by a defense motivation such as machinery (other than automobile), non-ferrous metals. Second, industries selected by an economic motivation such as petrochemicals (materials demanded by existing textile industries), and steel (materials demanded by existing industries such as electronic appliances, automobile and shipbuilding). Third, industries selected to expand existing embryonic industries such as shipbuilding, electric machines, and machinery (automobile).

The Korean government applied technical feasibility studies, when they were to select targeted specific industries, whether the sector was appropriate given Korea's stage of overall economic development and how those selected industries would contribute to particular strategic military and economic goals. For this purpose, in general, the following four criteria were applied.

First, the contribution to military purposes was very straightforward, each sector had to meet specific military demand. For example, petrochemicals and nonferrous metals were related to the demand for ammunition and other explosives, shipbuilding docks could be used as repair facilities of the US Navy, and machinery responded to the demand for rifles, cannons and tanks.

Second, scale economies were an important criterion for getting approval from the government. Even though there was much lower level of domestic demand in many sectors, the

government wanted to put in place large production facilities sufficient for benefiting from the economy of scale.

Third, technical feasibilities were also important criteria. The government wanted to check whether Korea had the technical skills to absorb transferred technologies from foreign partners and/or technologies embedded in newly constructed plants.

Fourth, the availability of finance was another crucial element for selection of sectors. Sometimes, difficulty in finding foreign financing had been the main cause of delay of specific investment projects in some industries.

(2) Who made the decision of the HCI drive and who took investment initiatives?

It is known that the decision to launch the HCI drive was made by the President Park himself with the help of a key industrial specialist at the Ministry of Commerce and Industry, O Won Chul, even without direct consultation with some key ministers such as the ministers of EPB and MCI at that time. However, the basic necessity of developing HCIs had been largely shared by key economic ministers and leading businessmen even before the 1973 declaration of HCI development, because this idea had been raised and discussed in important regular meetings in which the President, key economic ministers and leading businessmen had attended such as Monthly Meetings on Current Economic Development and Monthly Export Promotion Meetings. In fact, before announcing their intention to launch the HCI drive officially in 1973, the Korean government sent government

officials to several advanced countries such as US, Japan and Germany to look into successful development cases. Furthermore, some basic infrastructure (hard and soft) for HCI development had been developed since far before the 1973 declaration. For example, the Changwon Industrial Estate which was conceived as the place in which a new machinery complex would be built started to be developed in 1971. Many development act for specific heavy and chemical industries were adopted at the end of 1960s (in 1967, Machinery Promotion Act and Shipbuilding Promotion Act, in 1969, Electronics Promotion Act, in 1970, Petrochemical Development Act and Steel Development Act and in 1971, Non-ferrous Metal Industry Act).

Even though this initial action (the 1973 Declaration) and the general framework of the HCI drive were made by the government, each individual investment project was initiated by private companies, of course, under the consent of and with heavy assistance by the government. At that time already in Korea, some industrial groups were formed as a result of the success of export businesses so that they were eager to diversify their businesses especially in areas related to their successful businesses which were in general light industries and some assembly lines in electronics and automobile. Those promising areas were in effect heavy and petrochemical industries which were regarded as industries producing intermediate products for their light businesses or securing new markets. Therefore these industrial groups responded rather hastily and competitively to the government plan for the HCI drive. The Heavy and Chemical Industry Promotion Committee (see below) scrutinized these

individual investment projects attentively if they had acquired minimum requirements in the areas such as financing plans including their seed money level and foreign capital borrowing, technology transfer plans from foreign partners and plant construction plans. The Committee supervised the whole process of initial build-up of each individual investment projects regularly and made crucial decision to give further government level assistance to those projects if necessary and to resolve any bottlenecks to those projects.

(3) The HCI drive supervising body

The government established a special administrative body for forming and reviewing specific proposals, selecting specific companies and solving eventual obstacles and problems. This body, named as “Heavy and Chemical Industry Promotion Committee” and led by O Won Chul, played the key role to pursue the HCI drive policy and to supervise and monitor the actual progress of the investment projects under the HCI drive.

The ‘Heavy and Chemical Industry Promotion Committee’ was established at the Prime Minister’s Office, and was presided by the President himself even though the prime minister was named as chair of the Committee. The committee was participated by related ministers, related business leaders and eminent engineers and scientists, and was convened 18 times during 1973~74 (almost monthly meetings).

The major functions of the committee was as followings ; establishing of the general plan for HCI development, locational

plans for HCI industries, sectorial plans, support programs and evaluating of the development of above plans and programs.

4. Accumulation of Production Factors and Role of Government

(1) Where to procure key production factors such as capital and technology?

Differently from export-oriented light industries which relied only on abundance of “unskilled” labor forces, newly targeted heavy and chemical industries needed a new set of crucial production factors. They included large capital (for building up factory complexes and procuring machines and equipment), relatively high production technology (for running factories and controlling product qualities) and skilled engineers. At that time, Korea was well short of all these key production factors.

Therefore the private companies who wanted to take part in the HCI drive had to procure these factors from abroad. Firstly they went abroad with their investment plan to borrow foreign capital from any sources sometimes inducing direct participation of foreign partner companies in their businesses (ex: petrochemical) sometimes borrowing money from international commercial banks (ex: shipbuilding). As these private companies were small and unknown to these foreign investors at that time, in many cases the Korean government had to play the role of guaranteeing the projects.

The new production technologies came from foreign partner

companies in general from US and Japan. Sometimes Korean engineers were sent to their partner foreign companies in advance during the investment process, sometimes they learned necessary technologies during factory construction process. Sometimes Korean companies invited foreign engineers in action during weekends or in retirement by paying high fees in order to facilitate technology transfer. In rare cases, they were able to recruit Korean native engineers who got their education or experiences in these foreign advanced countries.

The technology transfer took place between high level engineers. However, these new HCIs needed low level engineers as well. These low level engineers were fostered by engineering high schools which were newly established by the government.

FDI had been an important vehicle for technological development in establishing the chemical industry and the electrical and non electrical machinery industries. FDI had also contributed to technological development in the basic metals sector. Licensing had been an important source of technology transfer in much the same industries as FDI — chemicals, basic metals, and machinery. In the chemical industry, extensive reliance on FDI was inevitable to establish and expand production, primarily due to the reluctance of the technology suppliers to transfer technology via other modes. But in other industries where technology was also proprietary, Korean companies had managed to initiate, and in most cases to operate successfully a variety of high technology industrial activities by means of licensing and turnkey arrangements. Formal transfer of disembodied technologies had played a minor part in technological

Table 2-1. How to Procure Key Production Factors

	Financing Source (or foreign investors)	Technology Providers	Main Korean Companies
Petrochemical	Gulf, Dow Chemical, Skelly (US)	Gulf, Dow Chemical, Skelly (US)	Several
Steel	Japan's Economic Cooperation Fund and commercial loan from Japanese Export Import Bank	NKK (Nihon Kohan) and Nippon Steel Corporation	POSCO
Shipbuilding	commercial loan from Barclays (UK) and ship order from a Greek shipping company		Hyundai Heavy Industry
Non-ferrous (Aluminum)	commercial loan from Japan		Korea Aluminum Company
Automobile	Nissan (joint venture)	Nissan	Saenara Automobile
Electronics	started by assembly lines	Several Japanese companies	Gold Star (LG)

Source : made by author from various literatures.

development. In technologically sophisticated sectors, however, technological development involved greater reliance on R&D as well as licensing as a way of acquiring technology.

(2) How to form human capital for the HCI drive

Newly targeted industries, HCIs, demanded a new kind of human capital, skilled workers and high level engineers, differently from light industries which had relied on only unskilled workers. The Korean government issued a long-term plan for procuring and breeding this specific human capital in 1971 for the decade of 1970s.

First of all, high level engineers needed in a relatively small numbers were provided by overseas sources (graduates from foreign colleges) and domestic universities. The Korean government and Korean companies in the HCI industries tried hard to recruit Korean scientists and engineers who had got their education in advanced countries and had been working there by giving them high salaries and other fringe benefits. Moreover, the government enlarged engineering faculties by increasing student numbers in areas such as machinery, electronics and chemistry. In fact, during 1970s, the faculty of chemical engineering was regarded amongst high school graduates as the number 1 target, because the petrochemical industry was selected as a targeted industry. In addition to that, the government created a special graduate school aimed at forming very high level scientists and engineers, the Korea Advanced Institute for Science and Technology in 1971.

Aside from high-level engineers at the college level, the Korean government decided to facilitate the supply of low level engineers who were to be formed at the high school level.

Korean government designated "specialized engineering high schools". During 1973~79, 19 schools were selected as "specialized high schools for machinery industry" and received heavy financial assistance from the government for equipping necessary materials and equipment. During 1976~79, so called "exemplary engineering high schools" (11 in total) were selected for providing skilled workers for overseas construction industries. At the last academic year, candidate students received on the job training for 6 months before joining those companies after their graduation. During

1978~79, so called “specialized engineering high schools” (12 in total) were additionally selected for meeting specific demand for specific skilled workers from other HCI companies, as those HCI companies started to request their specific necessity for human capital (ex: electronics, chemistry, construction, steel, railroad and military related industries etc.).

Korean government also established “public job training centers”. The centers targeted at the population of graduates from elementary schools and beyond. The training period was from 3 months to 3 years. For example, the Central Job Training Center (1968) targeted at the graduates from middle schools received 1 year job training in casting and molding, wooden pattern, welding, pressing and electronic repairing. The Center formed teachers in these fields as well. And the “internationally collaborated training centers” was established with advanced countries, starting from Korea-German Public Training Center in Busan (1970). Trainees got the chance to receive job training classes in Germany (other collaborative countries: Japan, Belgium and USA).

(3) Major roles played by the government

Aside from the role of selecting targeted industries, the government played a key role in developing HCI industries. The government provided direct and indirect assistances including public loans to HCI industries, and established governing rules and a managing body for the HCI drive.

The intervention which mattered most and had the greatest

impact on industrial incentives and structure was the allocation of credit. To finance the accelerated development of HCI industries, the government relied heavily on its control of the entire credit system and provided targeted industries with preferential access to credit at substantially subsidized rates.

By source, policy loans could be classified into those financed by the government, either directly or through Bank of Korea rediscounting on the National Investment Fund (NIF) and those funded by banks. While it is impossible to assess the full role of policy loans in the credit system, lending by the NIF and deposit-money banks provided good insight into how directed credits were used to underpin industrial objectives. The NIF, established in 1974, lent as much as two thirds of its portfolio to HCI projects. Whereas the NIF was the most visible and most clearly directed financial support for specific industries, it only constituted between 3.0~4.5 percent of total domestic credit during this period. Therefore, its real impact on credit allocation stemmed from its “announcement effect” on bank lending practices. It was estimated that one third of bank lending went into policy loans. Targeted industries received favored access to other bank lending as well, as compared to traditional industries producing either for the domestic market or for export.

The share of credit allocated to the three strategic industries such as petrochemicals, basic metals and fabricated metal products and equipment almost doubled from one third of total deposit-money bank loans in 1973~74 to about 60 percent in 1975~77. Supported by policy loans, fixed capital formation expanded sharply, but its contribution was primarily capacity

building in the heavy-chemical industry. For example, nearly all of the investments projected by the Fourth Five-Year Plan (1977~81) in the heavy-chemical industry were completed by 1979, while the investments planned in other industries were less than half completed. The HCI industries not only had better access to capital, but also enjoyed much lower borrowing costs. The high interest rate policy of the late 1960s was discontinued in 1972 and a lower interest ceiling was introduced. Real bank interest rates were negative throughout the 1970s and created severe excess demand for bank credit. The differential between bank rates and those charged in the curb market represented a substantial discount for industries eligible for credit from the government-

Table 2-2. Interest Rates for Policy Loans

Unit : %

	Discount Rate for Commercial Bills	Interest Rates for Policy Loans			Consumer Price Growth Rate
		Discount Rate for Export L/C	Machinery Promotion Fund	National Investment Fund	
1973. 5	15.5	7.0	10.	-	3.2
1974. 11	15.5	9.0	12.0	9.0	24.3
1974. 12	15.5	9.0	12.0	12.0	24.3
1975. 4	15.5	7.0	12.0	12.0	25.2
1976. 8	17.0	8.0	13.0	14.0	15.3
1977. 7	15.0~18.0	8.0	13.0	14.0	10.1
1978. 6	18.5	9.0	15.0	16.0	14.5
1980. 1	24.5	15.0	21.0	22.0	28.7

Source : KDI, Basic Objectives of Industrial Policy and Proposal for Changes in its Incentive System, Dec. 1982.

Note : The numbers in consumer price growth rate indicate the annual increase rate of CPI for the corresponding years.

controlled banks.

The HCI drive was supported by a broad range of policy measures. A new Tax Exemption and Reduction Control Law (1975) gave five-year tax holidays, investment tax credits, and accelerated depreciation to designated industries. Other industries faced higher taxes. Other government assistances can be summarized as follows.

Firstly, as for providing many direct assistances, Korean government established industrial complexes in well-suited locations (mostly sea shore areas and near big cities except Changwon). The government also provided tax holidays, tariff exemptions for imported equipment and materials, and rapid depreciation, and protected domestic markets against import competition

Secondly, as for providing indirect favorable environment, Korea government provided skilled work forces with training and education (engineering schools and professional training centers), assisted technological development by establishing many public technological think tanks and facilitating technology imports, and provided overseas market information through KOTRA and general trading companies.

Thirdly, as for establishing rules and a managing body, Korean government adopted laws for promoting specific industries, and established a special administrative body for conducting the HCI drive.

As a result, we can find lopsided proportion of government supports that were given to HCI industries during this period. As of 1978, three typical examples can be shown as follows: Firstly,

amongst policy loans to manufacturing sectors, HCI industries took 93%. Secondly, Average reduction rates of corporate income taxes was 40% for HCI whereas the rates was 8% for light industries. Thirdly, effective protection rates (from import competition) was 71% for HCI whereas the rates was -2% for light industries.

5. Restructuring Program and Transformation to New Industrial Policy in 1980s

The 1980s can be regarded as the period during which the Korean government tried to cure adverse effects caused by the strong industrial promotion policies which had been implemented since 1960s. The government applied another set of industrial policies which were again targeted at HCI industries, industrial restructuring and industrial rationalization under the name of “investment coordination in heavy & chemical industries”. The progress of political democratization that came just in time certainly played a role in raising this issue for the Korean society, in the sense that the previous HCI drive policies were regarded as having given too much preferential treatments to manufacturing sectors in general, to HCI industries more specifically and to leading large industrial groups, Chaebeols. The firms involved were large and highly leveraged, with their loans representing a significant share of commercial bank assets.

New policy programs related to industrial development are as followings: restructuring program in selected HCI industries, rationalization program for structurally depressed sectors, from

direct support for selected industries to indirect assistance for general industries, introduction of competition policy.

(1) Why restructuring?

Korean industries, especially HCI industries, which had overcome the first oil shock during early 1970s, started to suffer from the adverse effect of the second oil shock. After the second oil shock, several industries, including shipbuilding, shipping, and overseas construction, suffered severely from declining orders, overcapacity, and financial distress. This was from both sides of supply and demand. In the supply side, Korean heavy and chemical industries were hit by the sharp hike of energy prices. In the demand side, they suffered from plummeting world demand for their products. The government had to intervene to bail out many troubled firms, because the situation was partly due to its promotion policies in the past, and since major bankruptcies could bring about grave repercussions in labor and financial markets.

There were domestic factors for this crisis also due to “over-investment” and “over-competition” problem. Korean companies, in the form of industrial groups or Chaebeols, encouraged by the success of early participants, competitively flocked into successful businesses competitively, which in the end resulted in excessive supply capacity for decreasing world demand in several industries. In fact, “distortive resource allocation” in favor of targeted industries accelerated this phenomenon. These booming sectors were eligible to much favored bank credit during the HCI

Table 2-3. Over-investments by Sector

Sector	Contents of Over-investments	Period
Steel	- hot coil plate, thick plate, bar, special steel	since 1992
Petrochemicals	- over capacity by entering in the market by Hyundai & Samsung	since 1990
Automobile	- competitive increase of production facilities by incumbents (Hyundai, Daewoo, Kia)	since 1985
	- entering in the market by Samsung	
Semiconductor	- competitive increase of production facilities by incumbents (Hyundai, Samsung, LG)	since 1995
Aircraft	- 4 small companies short of economy of scale	since 1990
Railroad Equip.	- over-capacity	since 1995
Electricity Production Equip.	- over-capacity caused by entering in the market by Hyundai & Samsung	since 1996
Ship Engines	- new entrance by Samsung	since 1995

Source : ByungHo Lee, Market and Government for Enhancing Industrial Competitiveness, Korea Institute for Industrial Economics and Trade (KIET), 2000.

drive period, which encouraged other industrial groups outside of the initial participants to ask for new bank loans — under the favored credit conditions as well — and resulted in chronic expansion of money supply during this drive period. The Korean economy experienced much higher inflation than other advanced countries at that time. This inflationary trend with the combination of steep wage surge due to the shortage of skilled labor forces, in turn, reduced Korea's competitiveness in HCI products.

(2) Change of policy stances

In addition to the decreasing demand in the world market and

unfavorable domestic macroeconomic circumstances, the sudden change of policy stances from the end of 1970s aggravated the difficulty of the HCI industries. Actually, the President Park, the powerful and persevering supporter of HCI industries was assassinated by his political aide at the end of 1979. The new government, led by another military general, changed their basic economic policy from an expansionary stance to a stabilizing one. A macroeconomic specialist who played the role of new government's master mind in terms of economic policies prioritized economic stability to economic growth faced with the inflationary pressure coming from the second oil shock and the expansionary trend in the domestic economy at that time.

First, the financial liberalization, characterized with privatization of state owned banks, stopped distortive allocation of bank credit in favor of HCI industries. Second, the new government realigned other industrial incentive system towards industrial neutrality including tax reform, which meant less direct supportive measures to HCI industries. No more preferential policy loans, if any, were allocated to these industries. Third, the new government wanted to promote competition across-the-board between industries, amongst the inside of industries and between companies even with foreign companies. This resulted in sudden reduction of protective tariff level for these industries.

(3) Restructuring program

Faced with the crisis in several HCI industries, the Korean government was forced to change its policy stances for industrial

development from targeting policy to indirect support and restructuring. This change was also due to the loss of the main driver and supporter of the HCI drive, the President Park in 1979. However one should consider that the policy change was mainly due to the worsening international market conditions and internal excessive capacity problem in some industries.

Restructuring program involved mergers and capacity reduction, as well as general support to commercial banks. But the restructuring programs were criticized for excluding involved financial intermediaries in designing the programs, for being largely firm-specific rather than industry-specific, for their inconsistency across cases, and for their failure to clearly define the extent of government commitment.

Interim military government intervened in selected seven

Table 2-4. Concerned HCI Industries and Restructuring Program

Concerned Industry	Restructuring Program
Electricity Generating Equipment	3 private companies to 1 semi-public company
Construction Equipment	More than 3 companies to 3 companies
Automobile	3 companies to be specialized in passenger cars, bus, and truck
Electricity Equipment	2 companies to be absorbed by 1 company, another company to be specialized in other area
Diesel Motors	3 private companies to be specialized in different areas
Telecom Exchange System	2 companies to be specialized in different areas
Copper Refining	2 private companies to 1 private company

Source : The Committee for the Sixty-Year History of the Korean Economy, History of Industrial Development, edited by DoHoon Kim, 2010.

industries to cull out less competitive companies at the profit of most viable company(ies) in those industries twice in 1980, while keeping existing assistance mechanism such as financial and fiscal assistances and further decreasing interest rates for surviving companies in order to facilitate restructuring process.

(4) Who carried out the restructuring program

The new military government in power established a “National Emergency Committee (NEC)” under the martial law to apply new political and economic policy changes and this NEC was in charge of the restructuring program as well. The NEC was consisted with military personnel and selected policy specialists including government officials and academics. However, the top decision for restructuring program was already made from the commanding generals and their master mind. Therefore, companies under question were forced to follow the orders made by the NEC, even though they showed resistance at the beginning.

(5) Rationalization program for depressed industries

After having undertaken the first restructuring program in 1980, the Korean government had to apply another similar policy to rationalize one of the most depressed sectors, shipping in 1983. The government designated the shipping sector as an industry to be rationalized (IBR). The government had to reduce 66 companies in the sector to 17 companies. According to the Tax

Exemption and Reduction Control Law, when designated as an IBR, buying companies were able to benefit from tax exemption for that M&A and further financial support. The government designated the overseas construction sector as an additional IBR afterwards.

(6) Supportive measures for restructured industries

As the industries which were designated as over-invested industries under the HCI restructuring program and as depressed industries under rationalization programs had suffered from structural difficulties such as diminishing world demand and declining competitiveness, and were newly faced with sudden abolition of traditional incentive mechanism, the Korean government gave out temporary supportive measures. The government allowed a relief loan to companies who had to merge other companies under difficulty, applied reduced interest rates and exempted (or reduced) taxes on M&A.

(7) Assessment of the restructuring program

The policy program under the name of “investment coordination in heavy & chemical industries” initiated by the government in the early 1980s can be regarded as an effort to minimize adverse side effects of the policy for promoting heavy & chemical industries in the 1970s. In terms of mid-and-long-term, however, the program also aimed for enhancing the competitiveness of Korean manufacturing industries. Despite this investment coordination

program, production activities in heavy & chemical industries remained in depression until mid-1980s in general, but the exports of heavy & chemical industries began to regain their growth pace in large scale experiencing so-called “three low golden chances” that appeared since the Plaza Agreement in September 1985. This “three low phenomenon” can be positively evaluated in the sense that they resulted in the recovery of capacity utilization operation ratio and profitability of these industries.

On the other hand, in spite of the positive evaluation as above, the program of “investment coordination in heavy & chemical industries” brought forth several adverse side effects such as accelerating concentration of economic power in favor of large industrial groups by benefiting large-sized enterprises which were only capable of operating M&A for large enterprises in difficulties, deepening monopolistic/oligopolistic market structure by hampering new entrance into the related markets and consequently granting monopolized position to specific enterprises, etc. Especially, it might be assessed as another unreasonable example of government involvement in addition to the very development program of heavy & chemical industries in the 1970s which had been already very interventionist measures, considering that treatment of excessive and disposed facilities in concerned areas remained problematic due to the absence of follow-up actions, and that the project having been carried out in a manner to adversely affect the market mechanism which was indispensable for smooth industrial restructuring, and that reasonable standards in the process of selecting business categories and companies in question by the program of investment coordination.

(8) Towards a neutral industrial policy

Besides those temporary relief measures, the government set out a new series of incentive measures in order to assist industries (usually manufacturing industries including HCIs) which were suffering from declining international competitiveness. However, this time, these incentives were established under the principle of industrial neutrality. Therefore, financial and fiscal incentives (under the form of tax reduction or tariff exemption) were established not for specific industries but for specific functions such as R&D, employment and import of high tech machines and equipment and raw materials for export purposes. To do this, the government abolished all the promotion and development acts for specific industries to adopt a new law “Industrial Development Act” in 1986.

Before the adoption of the new law, the government introduced a new industry coordinating mechanism, entitled as “Council for Industrial Policy (CIP)” in 1981 in order to realign industrial assistance system and coordinate government policies for industrial promotion. The CIP had the following vocations: to rearrange tax incentive system such as domestic taxes and tariff reduction, to decide new measures for controlling foreign trade, to scrutinize the management plan of industry promotion funds and the Industrial Development Bank, to investigate large public projects and private projects which include a large government assistance.

Despite the general thrust toward neutrality, the government continued to take an active role in restructuring of distressed

industries, support for the development of technology, and promotion of competition. An active role in these functional areas could be regarded as consistent with the liberalization efforts, at least to the extent that it could be rigorously justified on the basis of market imperfections.

In these restructuring operations, the government bypassed competitive solutions. Reluctance to permit market forces to guide adjustment appeared inconsistent with the policy emphasis on liberalization. However, it can be argued that there were justifications for some interventions in the Korean context. Financial distress was so widespread that it had threatened the viability of commercial banks as a group. Failure of major commercial banks would have undermined confidence on Korean finance with serious repercussions for access to foreign capital. Korean banks had little experience in dealing with financially distressed firms. Non-financial firms could not be counted on to finance mergers or buyouts of other troubled firms, since they were highly leveraged. The government also believed that letting firms fend for themselves would have increased private perceptions of investment risk and undermined its ability to implement policies in the future, since the investment programs that generated the financial distress had been encouraged by past government policy.

Despite the possible validity of these justifications the restructuring operations still had serious side-effects of moral hazard problems. The government interventions reduced incentives for positive private adjustment programs and encouraged firms to wait for public rescue. Distressed companies

could postpone adjustment until a rescue, hoping that their share in the final merger or cartel would be an improvement over scaling down or private merger proposals. These considerations were especially relevant to rescue attempts structured along the Japanese model which tended to distribute cartel gains roughly in proportion with pre-cartel market shares.

6. Assessment of the HCI Drive Policy

(1) Achievements

1) Advancing the industrial structure of South Korea

The industrial policy of promoting heavy & chemical industries brought forth many positive outcomes in the Korean economy in spite of many hardships at the beginning. First of all, we can see a big surge of value added and employment level in these industries during 1970s. During 1970s, Korea's manufacturing sector in general showed a big surge in value added and employment. Among these manufacturing industries, HCI industries increased their value added and employment figures more sharply than traditional light industries.

In terms of export performances, while in the early 1970s the products issued from labor-intensive light industries occupied 80% of Korea's total manufacturing exports, in the early 1980s products made by heavy & chemical industries acquired equal importance to those made by light industries. One cannot deny that, since then, heavy & chemical industries such as steel, petrochemicals,

Table 2-5. Rapid Growth in Value-Added and Employment

(percentage change)

	Total Manufacturing	Heavy and Chemical	Light
Value Added			
1966~70	21	23.2	17.8
1970~73	20.2	32.2	19.2
1973~75	13.8	25	11.5
1975~78	20	31.2	15.7
1978~80	4.8	3.6	5.2
1980~83	8	12.8	6.4
Employment			
1966~70	8.8	11.8	8.2
1970~73	9.6	15.5	8.2
1973~75	15.6	18	15.1
1975~78	8.4	13.5	7
1978~80	-1	2.5	-1.8
1980~83	2.7	8.3	0.6

Source : Stern, J.J, J. Kim, D.H. Perkins and J. Yoo, Industrialization and the State: The Korean Heavy and Chemical Industry Drive, Harvard Institute for International Development and Korea Development Institute, 1995.

Table 2-6. Export Jump in HCI Industries

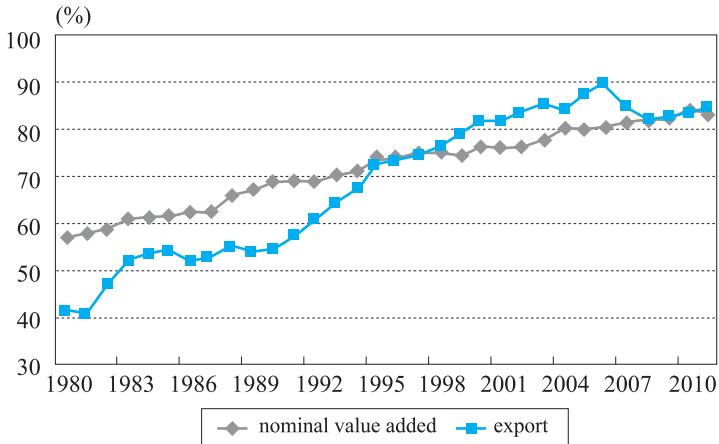
Unit : %

	1971	1976	1981
Primary Products	13.9	12.2	10.4
Light Industries	72.1	57.9	45.6
Heavy and Chemicals	14.2	29.8	44

Source : made by author from Korea's trade data.

automobile, shipbuilding, machinery and electric industries have so far played key roles in backing up the Korean economy as a whole.

Figure 2-1. Proportion of Heavy and Chemical Industries of Korean Manufacturing



Source : Global Insight.

The outcomes of industrialization through the heavy and chemical industries can be assessed differently, depending on the mid and long-term implications, in terms of the effectiveness of the systemic incentives it provided, the consistency and sustainability of the policy, and how it shaped the changing economic circumstances afterwards. Between the late 1980s and the onset of the global financial crisis in 2009, manufacturing in South Korea remained steadily focused on the heavy and chemical industries. The increasing contribution of these industries to the nation's value added and exports also meant that the Korean industrial structure evolved in line with the heavy and chemical industries.

2) Transformation from a labor-abundant country to a capital-abundant country

South Korea, once a country of factory boys and girls struggling toward development through cheap labor, is now one of the wealthiest and most capital-rich countries in the world.

According to the Heckscher-Ohlin-Vanek-Leamer (HOVL) model³⁾, the greatest advantage held by South Korea until 1990 was its cheap labor, but it has since thrived on the capital it accumulated since 1995. In other words, whereas South Korea boasted strength in labor-intensive industries and goods, around 1995, it began to gain greater comparative advantage over capital-intensive industries and goods.

This transformation of comparative advantage that came about in the early 1990s was a result of a decades-long journey. Having started to promote industrialization in the 1970s through the heavy and chemical industries, South Korea had to readjust the structure of state investment in the early 1980s due to an oversupply problem. With the passage of the Industrial Development Act in 1986, Korean policy shifted its focus to innovation and private sector-led industrialization amid sweeping

3) The multi-production factor HOVL model helps us determine the comparative advantage of a given economy by measuring the proportion of production factors for net exports against production factors for domestic demand. The larger the ratio of a production factor in this model, the greater the comparative advantage that a given economy holds in producing goods or services that use the production factor intensively. Conversely, the smaller the ratio of a production factor in this model, the lesser the comparative advantage that a given economy holds in producing goods or services that use the production factor intensively.

political and economic liberalization. In the early 1990s, in particular, the private sector was liberalized and finally allowed to make massive investment, particularly in the heavy and chemical industries. South Korea's transition to a capital-rich country in the early 1990s, in other words, came about as a result of a number of significant preceding changes, including the concentration and accumulation of investment in the 1970s; the rationalization of production and enhancement of industrial competitiveness through investment readjustment in the early 1980s; the growth of private-sector innovation and autonomy since the mid-1980s; and the permission given the private sector to make investment in the 1990s.

Table 2-7. Portion of the Production Factor used for Net Export to the Production Factor used for Domestic Demand

	1990		1995		1998	
	Proportion	Rank	Proportion	Rank	Proportion	Rank
Labor	-0.0166	2	-0.0185	3	0.0364	3
Professional Technical Management	-0.0118	3	-0.0181	4	0.0299	7
Office Work/Service	-0.0095	1	-0.0128	2	0.0361	5
Agriculture/Fishery	-0.0596	7	-0.0636	9	-0.0511	9
Production/Manufacturing	-0.0196	5	-0.02	7	0.0524	2
Manual Labor			-0.0192	6	0.0267	8
Capital	-0.0196	3	-0.0178	2	0.0422	2
Physical Assets	-0.0197	6	-0.0182	5	0.0415	4
Information Assets	-0.0147	4	-0.0068	1	0.0587	1
Service	-0.0099	1 2	-0.0169	1 3	0.0457	1 3
Natural Resources	-0.0676	4 8	-0.0611	4 8	0.0321	4 6

Source : Yeong-seob Shim and Yeong-seok Oh (2003), Analysis of the Competitiveness of Korean Industries, KIET.

3) Heavy and chemical industries' leadership in the world market today

South Korea is now one of the five largest manufacturers in the heavy and chemical industries in the world. In 2012, it was the second-largest shipbuilder (occupying 32.9 percent of the world market), the fifth-largest automaker (with 8.7 percent of the world market), and also the fifth-largest producer of petrochemicals (taking up 5.2 percent of the world market). Between 1990 and 2012, South Korea's leadership in the world market declined only in the textile industry, while the country managed to elevate its profile in vehicle manufacturing, shipbuilding, machinery, steel production, and petrochemicals until the mid-2000s.

Table 2-8. Share of South Korea's Heavy and Chemical Industries in the World Market

Unit : %

	1990	1995	2000	2005	2010	2012
Shipbuilding	21.8(2)	26.2(2)	39.1(1)	38.0(1)	32.9(2)	32.9(2)
Automobiles	2.7(10)	5.0(5)	5.3(5)	5.5(5)	7.7(5)	8.7(5)
Machinery	0.9(18)	1.6(14)	1.9(11)	2.5(10)	3.0(9)	3.4(8)
Steel	3.0(7)	4.9(6)	5.1(6)	4.3(5)	4.2(6)	4.6(6)
Petrochemicals	1.8(14)	5.0(5)	5.2(4)	4.9(5)	5.5(5)	5.2(5)
Textiles	6.6(3)	5.6(3)	5.0(4)	2.7(6)	2.1(8)	2.0(8)
Semiconductors	3.1(3)	10.4(3)	7.4(3)	10.5(3)	14.1(3)	14.6(3)

Source : DoHoon Kim (2013), "Structural Changes in Industries and Creative Economy", KIET (for internal use only).

Note : 1) As far as world market shares are concerned, shipbuilding tops the list (measured in terms of the number of ships built), followed by automobiles and semiconductors (in terms of revenue), machinery and textiles (in terms of exports), steel (in terms of quantity of output), and petrochemicals (in terms of the capacity to produce ethylene).

2) The numbers in parentheses indicate South Korea's rank in the world.

(2) The opportunity cost of industrialization through the heavy and chemical industries

1) Direct cost

The South Korean government made huge direct investments in industrialization through the heavy and chemical industries in the 1970s. This trend of major state investment continued even with the rationalization of Korea's industrial structure in the early 1980s. According to the World Bank (1993), this direct involvement of the Korean government has had a significant strain on the Korean economy as a whole. For example, the Korean government spent up to five percent of its entire budget

Table 2-9. Details of the Cost of State Intervention

Item	Cost
Financial Support from Government	- 5 percent of entire budget, 1973 to 1979
Tax Benefits	- KRW 82 billion, or 3 percent of total revenue in 1977, lost
Policy Financing	- 45 percent of total credit in Korea, 1977
Tacit Interest Rate Benefits	- KRW 75 billion (1.4% of GNP), 1977 - 3% of GNP, including opportunity costs of other industries
Non-performing Loans	- Amounted to 10% of total assets of commercial banks, 1986 to 1987
Rationalization of 78 Companies, 1985 to 1988	- Machinery, shipbuilding, overseas construction, shipping, etc. - KRW 1 trillion of principal settled (1% of GNP, 1985) - Payability of financial institutions deteriorated due to additional support, etc.

Source : World Bank (1993).

on the heavy and chemical industries between 1973 and 1979. Policy financing provided in 1977 amounted to 45 percent of total credit in Korea. Taking into account the tacit interest rate benefits and the opportunity costs of other industries, the direct cost of the industrialization program amounted to three percent of the gross national product (GNP).

2) Concentration of wealth and prevalence of monopoly/oligopoly

The South Korean program of industrialization through the heavy and chemical industries also gave birth to the oligopolistic conglomerates known as chaebol, in which wealth and power have become concentrated. The proportion of monopolistic/oligopolistic markets in South Korea grew from 69.5 percent in 1966 to 74.9 percent in 1983. The resource-concentration strategy favoring large companies in the 1970s and the rationalization of investment and production in the early 1980s have decisively skewed the South Korean economy in favor of conglomerates.

Table 2-10. Changes in the Manufacturing Market

Unit : %

	1966	1974	1981	1983	1985	1987	1990
Monopoly/Oligopoly	69.5	72.1	73.9	74.8	69.9	64.8	63.7
Competition	30.5	27.9	26.1	25.2	30.1	35.2	36.3

Source : KDI (1995), The Last Half a Century of Korean Economy.

Note : These figures are based on the values of goods released into either the monopolistic/oligopolistic market or the competitive market. The distinction between the two types of market is based on whether or not the three top producers in each market (CR3) together occupy more than 50 percent of the market share (The dividing point, however, was 60 percent in the cases of 1966 and 1974).

3) Other side effects of Korea's HCI drive

As a matter of fact, one cannot deny as well that the development of heavy & chemical industries had a number of unexpected side effects. First, as most policy supports and assistances, given by the government, were so concentrated on heavy & chemical industries and related manufacturing sectors, this policy brought forth the relative stagnation of primary industries such as agriculture, fisheries, etc. and consequently resulted in so-called “unbalanced growth of the Korean economy” and “development discrepancy between urban and rural areas” as the population of farming and fishing villages suddenly moved to urban areas. There were also macroeconomic side effects such as continuous trend of high inflation because of high investment and lingering trade deficit due to rapid increase of imports of capital goods and intermediate goods.

7. Conclusion

(1) Success factors of Korea's HCI drive

The first reason why Korea succeeded in HCI drive was political commitment at the highest level. The fact that the President regularly presided over the HCI Promotion Committee meetings, even though the prime minister was official chairman of the Committee, shows the political will of the Korean government at that time. In fact, the committee meetings were convened practically once in a month during the first two early year of the

HCI drive. This political commitment of the President mobilized the whole government especially related ministries and the central bank to provide appropriate support to HCI industries and to solve any problems which were encountered by HCI industries. The second reason why Korea succeeded in HCI drive was good “sequencing” effect. Existence of protected domestic markets, even if insufficient for securing economies of scale, provided initial demand for the products of some industries such as petrochemicals and steel. Amongst HCI industries, some industries such as machinery and non-ferrous metals, in general politically motivated, showed relative development retard, because they did not have sufficient domestic market for their products at the early stage of the HCI drive. In some other developing countries which launched their version of HCI drive in a similar period as Korea, for example Algeria and Argentina, the policy priority was laid upon import substitution and they tended to neglect the importance of securing initial domestic markets with inter-industry linkage.

The third reason why Korea succeeded in HCI drive was private ownership with public support. Aside from the steel industry, the Korean government allowed private companies to invest in these industries, even though securing monopoly position at the beginning. These private companies, keen for profit and continuing business, actively invested in further technological development in products and production process (differently from many cases in other developing countries which relied on public companies).

The fourth reason why Korea succeeded in HCI drive was

relatively favorable international environment. At least at the beginning of Korea's HCI drive, the world market grew relatively fast and provided sufficient demand for these industries. Easy access to Japanese technology was also an important factor for Korea's success in HCI industries.

(2) Final assessment

The industrialization of South Korea through the heavy and chemical industries was implemented through a "big push" strategy. With comprehensive and active support from the government, private sector players, especially conglomerates, were able to make major investments in the heavy and chemical industries. The South Korean government, in other words, provided an export-oriented growth strategy with appropriate penalties and incentives. Yet the government had to streamline its investment and production in the early 1980s in order to discourage inefficiency and enhance the competitiveness of Korean industries. The introduction of the Industrial Development Act in 1986, however, effectively expanded the autonomy of the private sector and prompted the conversion to an innovation-led and trade-oriented economy at an opportune moment. In particular, the low value of the Korean won, the low oil price, the low interest rate in the mid-1980s, and the increasing economic activity of China in the new millennium have allowed the Korean heavy and chemical industries to flourish.

This particular strategy of industrialization has had some significant repercussions, especially in terms of the concentration

of wealth and the imbalance of economic growth. Nevertheless, it also paid off in terms of the Korean government's drive to secure comparative advantage over capital and technology-intensive industries with high value added when it had nothing but cheap labor back in the 1970s.

South Korea effectively transformed itself in the early 1990s from a labor-abundant country into a capital-abundant country. In 2012, the country was the world's second-largest shipbuilder, with a market share of 32.9 percent; fifth-largest automaker, with a market share of 8.7 percent; and third-largest producer of semiconductors, with a market share of 14.6 percent.

Chapter 3

The Process and Policy of Taiwan's HCI Drive⁴⁾

1. Background of Second Import Substitution

After the Chinese Civil War ended in 1949, the economic development in Taiwan began from the agriculture. But in the implementation of the first four-year economic development plan between 1953 and 1956, Taiwan's government started to precede a systematical industrial construction, as we called the first import substitution in 1960s. Taiwan was in the period of light industry export expansion where the government used the policy tools as tariffs, foreign exchange and interest rate, and the development of a law named "The investment reward ordinance", to cultivate vigorously livelihood industries and to lead the change of Taiwan's industrial structure into secondary industry. However, the labor-intensive export industries established in this time was affected by the significant changes of various factors at home and

4) Written by Mr. CHEN Tsung Yun (ITRI, Taiwan).

abroad, forcing the government to change its economics and industrial policy direction.

(1) International reasons

Taiwan depends deeply on international trade, so its economy is easily affected by external reasons. The first oil shock broke out in 1973 because of the 4th Middle East War, while OPEC announced the suspension of oil exports to retaliate Israel and Western countries. This event resulted a dramatic increase of oil price, and affected Taiwan deeply because of its high out-dependence degree. The overall economic performance such as the GDP growth rate or the consumer price index had large fluctuations.

In addition to the oil crisis and the global recession, Taiwan declared the withdrawal from the United Nations in 1971 and was isolated in international relations, which resulted the lack of investment confidence, pulled down the market purchase will and reduced largely the exportation quantity. That's why the solution must be made by Taiwanese government to improve the industrial structure in response to such challenges.

(2) Internal reasons

Besides the international reasons, Taiwan's economic development was also encountered a bottleneck at home in 1970s. The main problem was that the government did not pay attention to the infrastructure at the same time when light industry development

progressed, it made that large-scale construction quality was quite backward and did not meet the needs of following industrial development. Fortunately, after the end of 1950s, Taiwan's rapid economic development driven by the expansion of exports had gradually accumulated funds and improved technical level in the country. So the improvement of infrastructure became possible.

At the meantime, the demand on raw materials and intermediate components from domestic light and durable consumer goods industries increased significantly and was sufficient to support the establishment of the economies of scale compliance for raw materials industry, for reducing the entire dependence on imports and the foreign exchange consuming. Therefore, the Taiwan's government decided to promote the second import substitution, taking the "adjust economic structure, promote economic upgrading" strategy and began to encourage the heavy and chemical industries development to change the import dependence situation of the needed industrial upstream raw materials for the production in response to internal economic growth, which is the origin of later "Ten major constructions". Interestingly, the funding source of "Ten major constructions" was 40% of foreign loans and 60% of domestic funds, which mainly came from years account surplus accumulation, this can be seen that the government finances were very sound at that time.⁵⁾

The Ten major construction projects and the development of heavy and chemical industries were actually the result of a

5) Yu Tsung-Hsien, Wang Gin-Lee, *A visible hand: the governmental role in the economic development process*, Linkingbooks: Taipei, 2003, p. 83.

political direction change. Before Taiwan was suffered by a series of diplomatic setback, the Kuomintang regime under volitional control of Chiang Kai-shek put a lot of financial and material resources and energy on the political motive of “retake the Mainland”, and did not take into account the social and livelihood construction in Taiwan. Until the international situation changed, “retake the Mainland” had become gradually impossible, the Taiwan’s government finally realized that Taiwan is home, and domestic building is hope for the future, so it began to emphasis on the infrastructure and industry construction.

After the industrialization in the 1950s, Taiwan’s economic growth momentum began to have a great part from secondary industry. But for the reason of the changes in domestic and international environment and in response to the oil crisis, the Taiwan’s government started the six-year economic development plan in 1976. In these six years, 48% of investments went to infrastructure, and 52% went to heavy and chemical industry development, establishing the capital-intensive industry in Taiwan.

On the whole, because of the domestic and international situation changed, Taiwanese government in the second import substitution period thus began to build infrastructure with effort. It not only would like to expand domestic demand through taking a major public investment, but also to create sufficient upstream raw material supply for downstream products, in order to improve the overall industrial structure and reduce foreign dependence on raw materials and equipment. So the reason why Taiwan began to push the heavy and chemical industries is to achieve the purpose of import substitution. But it must be said,

the purpose of import substitution is always to increase export without doubt.

2. Selected Industries and Participating Firms

(1) Pull-up by infrastructure construction

The Ten major constructions projects driven by the President Chiang Ching-Kuo in 1973 was the most important measure in response to the oil crisis. This policy completely changed Taiwan's industrial structure, so that heavy and chemical industries in Taiwan had laid a solid foundation and became the key reason why Taiwan could recover quickly later. The government used the public construction as tool to make up the gap produced by the export decline and consumption reduction in oil crisis. A total investment amount about 5 billion US dollars was spent during the construction and it helped a lot on economic growth and industry upgrade. In the Ten major constructions, the item related to heavy and chemical industries were:

- Shipbuilding (China Shipbuilding Corporation Kaohsiung plant): Located in Lin-Hei industrial area in Kaohsiung city, it was the first major construction project completed. The establishment of this plant shouldered a multiple mission of supporting shipping, trade, defense and associate industries development.
- Steel mills (China Steel Corporation): In order to prevent the deep dependence on foreign steel products and solve the

problem of accuracy due to different sources in the past, then decided to build a consistent operating steel factory and set up Chinese Steel Corporation. The factory is located in the border of the Second harbor of Port of Kaohsiung to save the shipping and transportation costs through the direct loading and unloading of import raw material at the pier.

- Petrochemical industry (China Petroleum Corporation Kaohsiung plant): The establishment of this plant could help the development of plastics, synthetic rubber, synthetic fibers and chemical products industries by increasing their export competitiveness.

In the “Ten major constructions assessment report” published by the Council for Economic Planning and Development in 1979, it pointed out that this construction policy contributed many for economic recovery, economic growth, employment opportunities and price stability. The following table shows the contribution on

Table 3-1. Contribution of Ten Major Constructions

	Ten Major Constructions Investment Ratio	Economic Growth Rate Achieved	Economic Growth Rate achieved by Construction
1973	4.5	11.9	0.6
1974	4.5	0.6	0.03
1975	19.3	2.4	0.5
1976	19.6	11.5	2.6
1977	13.1	8.5	1.3
1978	8.1	12.8	1.2

Source : Hsueh Hua-Yuan, Taiwan Trade History, 2008.

investment and economic growth in Taiwan.

After Ten major constructions, the Taiwan's government promoted the twelve construction projects in 1980 to 1985 to further complement the infrastructure required for the development of heavy and chemical industries; furthermore in 1984 Premier Yu Kuo-hwa promoted Fourteen major construction projects. Although these two projects had less emphasis on heavy and chemical industries, but there were still some items associated with, including: the second stage of the first phase of construction and the third expansion phase of China Steel Corporation, an important oil and energy projects (development of oil and gas energy). The government's effort on the basis establishment of heavy and chemical industries through large-scale infrastructure construction can be clearly identified in this period.

(2) Reasons of the selection

The industrial production in Taiwan in 1960s is a labor-intense process, which was called "shallow-dish" type development. The character of this type is that the industrial structure basis is not deepened and solid enough so that the industry will be affected easily by external changes. To enhance the production level and upgrade the value-added, the "backward linkage" industrial development becomes necessary at this time⁶⁾, which means the establishment of the upstream industry to integrate the existing

6) Yu Tsung-Hsien, Wang Gin-Lee, *A visible hand: the governmental role in the economic development process*, Linkingbooks: Taipei, 2003, p. 92.

downstream industry.

According to the economic situation in Taiwan, the petrochemical industry and steel industry was the most acceptable to the market. In fact, the heavy and chemical industries had already begun to develop before 1970s by learning the production skill in slow speed and create a downstream system in private sectors. So when the country faced the difficulties, the government's solution choice did not come from nowhere, but just took the upstream industry to fit the current industrial structure in order to maximize the value-added. In this reason, the industry items promoted in HCI at that time, such as petrochemical industry, steel and iron industry, shipbuilding, machinery, were already in private sectors with a considerable development degree on the downstream industrial system, and the government promoted these industries for the reason of the creation of the national upstream raw material supply chain.

On the other hand, in the early stage of industrial development, there is no experience on how to guide the development by policy instruments for Taiwan, so the government will choose the mature industries developed in advanced countries to have feasible targets and clear evolution model to follow. It makes decision-making easier.⁷⁾ The choice of heavy and chemical industries was in this case of recommendation and benchmarking from the United States.

In decision-making, in the reign of President Chiang Ching-

7) Chu Wan-Wen, The effects of Taiwan's industry policy: a preliminary evaluation, *Radical Quarterly in Social Studies*, No. 42, 2001, p. 99.

Kuo, we call that this was a “soft authoritarian period” in Taiwan. Even though the decision-making power was concentrated on him, because the KMT was an outside comer, the relation between politics and enterprises was not close, and Mr. Chiang pretended no particular competence in economic affairs. So the decision-making on economic policy was oriented mainly on the market situation but not on the political target achievement. Also, because of the complex characters of heavy and chemical industries, such as special nature of the product, capital-intense and large production system, it made that President Chiang relied heavily on the economic bureaucracy’s advices.⁸⁾ This political culture made that the seats of technique officers and state-owned enterprises operators of heavy and chemical industries mixed with each other in this period and formed a complicate politics and economic relationship inside the heavy and chemical industries. So Taiwan’s government did combine market-based adjustment and the opinions of bureaucracy for the selective promotion of certain sectors.

(3) Participating firms: State-owned enterprises

For the participating firms, the Taiwan’s government wanted originally to encourage private enterprises to invest in promoting heavy and chemical industries, but it was changed to public management model for certain factors. There were China

8) Stephen Haggard, *Pathway from the Periphery: The politics of growth in the newly industrializing countries*, Cornell University Press: Ithaca and London, 1990, p. 140.

Petroleum Corporation for petrochemical industry, China Steel Corporation for iron and steel industry, China Shipbuilding Corporation for shipbuilding industry, and the automobile industry was planned by China Steel Corporation. This public management model did have partly political considerations, but mainly because the private capital was too small to take the risk of investing in such capital-intensive industry at that time. In addition to the higher technology barriers for entry, the investment will of the private capital was not high enough. It made the government had to access directly to heavy and chemical industries as a market participant. In manufacturing production, the ratio from public sector was from the percentage of 14.08% in 1973, rose to 19.45% in 1974, and 22.73% in 1980. The development of heavy and chemical industries during this period result a continuous increase of the proportion of manufacturing production from state-owned enterprises.

In Taiwan, this model of risk socialization by public investment was an effective method to promote these industries. Although the private capital did not have intention in initial, but when the major projects had been proved to be feasible, the private willingness of investment turned stronger significantly. A large number of private capitals began to enter into the heavy and chemical industries in the 1990s, it proved that this model has certain effects.

On the other hand, it also shows that the state-owned enterprise is not necessarily a form of uncompetitive company. Although many of them are complained by the lack of efficiency, the example of China Steel Corporation is considered internationally competitive. But when economic patterns transits

towards market economy and the power of private sector rise, the open of these state-owned enterprises becomes inevitable.

(4) Role of foreign capital

Taiwan's postwar economic construction was actually quite dependent on U.S. aid, and this situation was also apparent in the development of heavy and chemical industries. The American influence was particularly evident in the petrochemical industry. As the following table, the upstream technology and equipment, and also the capital of development of Taiwan's petrochemical industry came mostly from the United States, leading to an extreme dependence on the U.S. Even the direction of focus on the development of the petrochemical industry was also the opinion suggested by USAID's technical consultants.⁹⁾ Because of such needs, U.S. manufacturers often required restrictions of new plant establishment in order to monopolize the market.

About the introduction of foreign technology, Taiwan's automobile industry must be mentioned. This industry began also to import production technology from abroad in this period, mainly from Ford and French Peugeot, in an attempt to develop the production capabilities besides the assemblage. However, Taiwan's auto industry does not as successful as in South Korea. The main reason is that the domestic market is too small, but there are more than a dozen manufacturers in producing a variety

9) Chu Wan-Wen, Demonstration effects and industrial policy: the birth of Taiwan's petrochemical industry, *Radical Quarterly in Social Studies*, No. 27, 1997, p. 104.

Table 3-2. Products and Technology Sources of Taiwan's Petrochemical Plants

Completion Date	Petrochemical Plant	Products	Technology Source
May-68	First Naphtha Cracking Plant	Ethylene, propylene, butadiene	U.S. Lummus
Sep-75	Second Naphtha Cracking Plant	Ethylene, propylene, butadiene	U.S. Stone&Webster
Nov-76	Third Naphtha Cracking Plant	Ethylene, propylene, butadiene	U.S. Stone&Webster
Jul-73	Ethan Cracking Plant	Ethylene	U.S. Lummus
Feb-80	Xylene Separation Plant	Paraxylene, O-xylene	U.S. UOP
Apr-71	First Aromatics Extraction Plant	Benzene, Toluene, Xylene	U.S. UOP
Mar-76	Second Aromatics Extraction Plant	Benzene, Toluene, Xylene	U.S. UOP
Jul-77	Third Aromatics Extraction Plant	Benzene, Toluene, Xylene	U.S. UOP

Source : Tsai Wei-Hsien, *The Political-Economic Analysis about the Development of Taiwan's Petrochemical Industry*, 1997.

of models, which does not meet the economy of scale. It leads that Taiwan's automobile industry hard to develop and has been lower than international production level for a long time.

From the above two examples about petrochemical industry and the automobile industry, we can see the importance of foreign technology and capital introduction for the development of heavy and chemical industries, but this is not the decisive factor about success or failure. It depends in the end on if the implementation of investment projects is in the correct direction, and if the efficiency is good enough. The failure of Taiwan's

automobile industry lies in the wrong execution direction, causing irreparable disadvantage.

3. Government Incentives

As the main industrial response to the crisis, in addition to the aforementioned pulling up by infrastructure, there were various forms of protection and subsidies for Taiwan's heavy and chemical industries. But the different policy instruments had been used according to the difference of industry characters.

(1) Tariffs and trade barriers

For some infant industries, the protection by trade barriers is necessary. In the iron and steel industry, for example, the government involved positively and the state-owned enterprise China Steel Corporation dominated the market from 1975 to 1983. The protection measures taken were:

- Prohibit the expansion and application of steel factory in order to avoid waste and overproduction of steel products in 1978.
- Raise gradually the tariffs from 11.38% in 1979 to 16% in 1982.
- For protecting against competition from foreign steel products, the government gives the right to import endorsement for 26 products which can be manufactured by CSC in 1980.¹⁰⁾

In 1983, Taiwan's steel product exports exceeded imports for the first time, it represented that Taiwan's iron and steel industry had reached a considerable scale and technical standards at this stage of development. So the government released officially the investment ban after setting up the standards about the production scale, product quality, pollution and energy efficiency standards. At this point, we could see that protective measures in the iron and steel industry were relatively successful.

Another infant industry protected by the government is the automobile industry. This industry is considered as a national industry for the dual objective of the economic development and national security. In order to avoid foreign competition, the government gave high protection, the measures included: full or partial control of the imports, high tariffs (increase from 65% in 1965 to 75% in 1971), factories install restrictions, homemade rate and using domestic automobiles on governmental and business vehicles. However, these protective measures had failed to exert effects because of the lack of large domestic production as mentioned above.

(2) Tax incentives: Investment reward ordinance

The "Investment reward ordinance" entered into effect in 1960 used mainly the taxation measures to induce private investment. Its legislative intent was to exclude the legal restrictions that

10) Chu Wan-Wen, The effects of Taiwan's industry policy: a preliminary evaluation, *Radical Quarterly in Social Studies*, No. 42, 2001, p. 81.

Table 3-3. Industry Items of Investment Reward

	1961	1969	1973	1979	1986	1990
Food	9	8	16	9	9	9
Wood	2	3	2	0	0	0
Papermaking	15	15	8	4	5	1
Rubber	3	5	6	1	2	0
Chemical	53	47	40	81	95	84
Non-metallic Mineral Products	6	9	11	9	6	5
Basic Metal Manufacturing	15	16	15	23	13	12
Machinery Manufacturing	13	17	16	20	57	54
Electrical Equipment Manufacturing	14	26	18	15	52	51
Electronics			11	55	122	98
Transportation	2	3	6	17	34	34
Ceramics	5	3	4	4	3	2
Spinning	5	5	3	4	3	5
Construction Material	0	2	1	1	3	2
Movie	0	0	0	0	4	4
Others	8	17	11	11	10	9
Total	150	176	173	259	418	370

Source : Yu Tsung-Hsien, Wang Gin-Lee, A visible hand: the governmental role in the economic development process, 2003.

impede investment, and to widen the tax-free scales. But the reward was not including all production items. The following table shows the items including in the ordinance.

For helping the development, the government added some heavy and chemical industry items into the ordinance in the 1970s to give them various concessions. Besides that, considering the

long payback period of heavy and chemical industries, the government gave an alternative concession of “accelerated depreciation” in addition to the origin “five-year tax-free” to the vendors. Furthermore, the government added the incentive measures for energy conservation, resource development and pollution prevention, such as depreciation acceleration of machinery and equipment within two years, and that the exemption period of foreign resources exploration and development could be deferred, etc. The reward for the research and development activities began from this moment as well.¹¹⁾

(3) Localization

The supply of industrial land is also a key factor for industrial development. Therefore, the Industrial Development Bureau was established in 1970 to take charge the measurement, investigation and development of industrial land usage. It meant that the planning of industrial land usage changed from negative attitude to positive development by government.

On the other hand, the government set up three petrochemical industrial centers in Toufen (Miaoli), Renwu and Linyuan (Kaohsiung) for the cluster effects in the decade from 1970 to 1980.

11) Huang Ren-Te, Hu Bei-Ti, Tax incentives and industrial development in Taiwan, Linkingbooks: Taipei, 2006, p. 40.

4. Evaluation

Before the early 1960s, the agriculture plays a dominant role in Taiwan's industrial structure, but after a series of industrialization efforts until mid-1980s, secondary industry gradually replaces this status. As can be seen in the below table, from 1965 to 1985, the proportion of value production from industry in Taiwan's GDP rises from 29.7% to 44.8%, at the same time the agricultural output drops from 23.4% to 5.4%.

As for the exports, the following table shows the exports proportion of industrial products rises from 46% to 93.8% from 1965 to 1985, and the exports proportion of agricultural products and processed agricultural products goes down from 54% to 6.2%.

Table 3-4. Industrial Proportion in Taiwan's GDP

Unit : %

	Total	Agriculture	Industry	Services
1952	100	32.1	19.5	48.4
1965	100	23.4	29.7	46.9
1970	100	13.1	38.9	48
1981	100	7.1	42.9	50
1986	100	5.4	44.8	49.8
1987	100	5.2	44.5	50.3
1990	100	4	38.4	57.6
2000	100	2	29.1	68.9
2006	100	1.6	26.8	71.4
2007	100	1.5	27.8	70.7
2008	100	1.7	25	73.3

Source : Council for Economic Planning and Development, Taiwan Statistical Data Book 2009.

Table 3-5. Exports Proportion of Different Products

Unit : %

	Total	Agricultural Products	Processed Agricultural Products	Industrial Products
1952	100	22.1	69.8	8.1
1965	100	23.6	30.4	46
1970	100	8.6	12.8	78.6
1980	100	3.6	5.6	90.8
1986	100	1.6	4.5	93.5
1987	100	1.3	4.8	93.9
1990	100	0.7	3.8	95.5
2000	100	0.2	1.2	98.6
2006	100	0.2	0.8	99
2007	100	0.2	0.8	99
2008	100	0.2	0.8	98.9

Source : Council for Economic Planning and Development, Taiwan Statistical Data Book 2009.

Table 3-6. Employment Proportion of Different Sectors

Unit : %

	Total	Agriculture	Industry	Services
1952	100	56.1	16.9	27
1965	100	46.5	22.3	31.3
1970	100	36.7	27.9	35.3
1980	100	19.5	42.5	38
1986	100	17	41.6	41
1987	100	15.3	42.8	42
1990	100	12.8	40.8	46.3
2000	100	7.8	37.2	55
2006	100	5.5	36.6	57.9
2007	100	5.3	36.8	57.9
2008	100	5.1	36.8	58

Source : Council for Economic Planning and Development, Taiwan Statistical Data Book 2009.

As for the employment, the ratio of industrial employment population rises from 22.3% to 41.4% from 1965 to 1985, and the agricultural employment ratio falls from 46.5% to 17.5%. Especially after, the proportion of industrial production in 1986, as well the proportion of industrial employment between 1975 and 1985, not only far more than agriculture, but also more than service industry.

Although the proportion of industry production decreases slowly from the second half of 1980s, but the production proportion of heavy and chemical industry begins to surpass light

Table 3-7. Structure Change of Light and Heavy Industry

	Proportion			Production % of Heavy and Technology Intense Industry	Exports % of Heavy and Technology Intense Industry	Products Exports % Technology Intense Products
	Manu-Facturing	Light	Heavy and Chemical			
1986	100	51.52	48.48	59.65	54.9	
1987	100	49.65	50.35	60.94	57.2	24.2
1988	100	47.17	52.83	63.92	61.3	28.8
1989	100	45.4	54.6	64.6	62.5	29.5
1990	100	44.06	55.94	65.28	64.3	34
1991	100	43.02	56.98	66.69	64.8	–
1992	100	40.72	59.28	67.05	68.2	31.1
1993	100	38.14	61.86	68.68	69.2	38.3
1994	100	36.45	63.55	70.32	69.7	56.5
1995	100	33.63	66.37	73.26	69.9	46.7

Source : Yu Tsung-Hsien, Problems and solutions of Taiwan's economic development, 1998.

Note : The heavy and technology-intensive industries include chemical materials, chemical products, rubber and plastic products, basic metals, metal products, machinery, electrical and electrical industry, transportation, precision instrument and equipment industry.

industry inside the manufacturing. As the below table shows, the proportion in 1986, light industry is 51.52% and the heavy and chemical industry is 48.48%; but in 1995, the proportion changes to 33.63% and 66.37%. The same situation can also be found in

Table 3-8. Structure of Net Production in Taiwan's Manufacturing

Items	Year			
	1971	1981	1991	2001
Food	10.07	5.29	7.44	4.88
Tobacco	2.76	1.72	0.27	0.14
Textile	20.09	17.54	5.79	4.21
Apparel and Clothing	2.76	3.63	3.67	0.88
Leather, Fur and Products	0.38	0.76	1.46	0.33
Wood and Bamboo Products	4.32	3.11	1.43	0.23
Furniture and Fixtures			1.36	0.43
Pulp, Paper and Paper Products			2.13	1.68
Printing and Related Utilities	3.29	1.95	1.4	1.22
Chemical Materials	5.43	8.39	6.94	10.40
Chemical Products	3.32	1.95	2.23	2.26
Petroleum and Coal Products	5.35	5.66	3.26	4.61
Rubber Products	1.73	1.62	1.49	0.76
Plastic Products	7.69	5.15	6.67	3.61
Non-metallic Mineral Products	3.97	3.43	3.55	2.51
Basic Metal	6.2	4.2	7.68	9.78
Metallic Products	1.06	1.42	6.60	4.37
Machinery Equipment	4.20	3.17	5.10	4.12
Electrical & Electronic Equipment	11.78	19.61	19.71	37.16
Transportation	4.30	6.92	6.81	4.24
Precision Instruments	0.08	0.64	1.25	0.80
Others	1.22	3.00	3.76	1.41

Source : Huang Ren-Te, Hu Bei-Ti, Tax incentives and industrial development in Taiwan, 2006.

exports, the proportion of heavy and chemical industry exports increase from 59.65% in 1986 to 73.26% in 1995. All these represent a huge structural modification in Taiwan.

As for the implementation effectiveness of the policy, the following table shows the evolution of manufacturing value production structure. We can observe that the focus reward items in the 1960s such as food and textile, they become indeed the main industry in 1970 but gradually decline in the 1980s. On the other hand, the focus reward items since 1970 like iron and steel, petrochemical, electrical machine and electronics industries, because the policy continues to provide support, so that these industries has maintained a strong status in the manufacturing.

5. Difficulties and Obstacles in the Development Process

(1) Impact again from international environment

In the previous period of second import substitution, Taiwan survived from the first oil crisis through the major infrastructure constructions and the development of heavy and chemical industries to improve the industrial structure and expand the employment opportunities. But the rapid environmental change, caused by a series of events in 1980s, had brought another shock for Taiwan's economy.

Facing to the first oil crisis, the Taiwanese government took a low energy price policy to avoid the negative effect on industry and the international oil price was not fully reflected on the national price. The government undertook the oil price rise

pressure by sacrificing the income from tax and surplus of state-owned enterprises in order to get a lower inflation and higher export competitiveness. But this policy reduced also the energy savings generated by the price effect.¹²⁾ Thus, when the second oil crisis broke out in 1979, the oil prices which rose twice fully revealed this problem of high energy cost in Taiwan's industry, reduced greatly the export competitiveness and result a serious economic recession just like before. Coupled with diplomatic relations end with the United States in 1979, the investment confidence was once again shocked and the national economy faced another crisis.

Because the problem came from energy prices, the heavy and chemical industries developed in previous stage such as petrochemical, iron and steel, shipbuilding, heavy machinery and other high energy-intensive industries were considered no longer suitable to develop in Taiwan. Therefore the government decided to define them as domestic-oriented industries and set the development goals to supply simple the domestic needs. The government encouraged as well the overseas investment and cooperation with foreigners to set up factories of the heavy and chemical industries, without expanding production capacity inside the country including the measures like stopping the existing furnaces, postponed expansion projects of CSC, and cancel the expand projects of CPC's fifth Naphtha Cracking Plant.

12) Yu Tsung-Hsien, Wang Gin-Lee, *A visible hand: the governmental role in the economic development process*, Linkingbooks: Taipei, 2003, p. 94.

(2) Turn to the strategic industries development in the 1980s

After rethinking the direction of industrial development, the Taiwan's government proposed the "Economic Construction Decade Project" in 1979 and decided to change the direction of industrial development to "accelerate economic upgrading, and actively develop strategic industries". The government emphasized that industrial development should be consistent with the conditions of "two large, two high and two low", as large industry related effect, large market development potential, high technology intensity, high value-added, low pollution, low energy intensity. The industries who conformed these conditions would be identified as strategic, such as mechanical and electronic industries, and would be given the funding and counseling supports in technology, management and market.

The most representative measure was the establishment of Hsinchu Science Park in 1980. This cluster was managed directly by the National Science Council to providing electronic and information industry a development space. The government set it to resolve land problem and to provide administrative services to help manufacturers. It also provided the investment tax incentives such as five-year tax-free, importation tax exemption of personal use machinery and equipment, raw materials and semi-finished products, and so on.

At the meantime, the government strengthened the "Industrial Technology Research Institute (ITRI)" by the establishment of the laboratories of electronics, industrial materials and machinery industry, and promoted the establishment of civil society

“Information Industry Institute (III)”. Through the establishment of R&D units, it helped the development of the basic necessities for the strategic industries like integrated circuits, new materials and automatic equipment. After multi-effort of government, there was still 6.2% on economic growth rate in 1981.

The other measures to encourage the development of strategic industries were the establishment of “The Export-Import Bank of the Republic of China” to provide long-term low interest rate loans and to participate to the venture capital, and the amendment of “Investment reward ordinance” to double the retained earnings as well as giving 10-15% of the investment tax credit to technology-intensive and major export industries.¹³⁾

(3) Liberalization and privatization since 1986

Besides the attack of the second oil crisis, another challenge was the wave of liberalization. On the external side, The United States began to push the liberalization in the 1980s and required other countries to open their markets, especially the East Asian countries. In 1985, the Plaza Accord had been reached and the main resolution was a comprehensive international exchange rate adjustment. After the Japanese Yen appreciated sharply, the NT dollar faced as well a strong appreciation pressure. NT dollar appreciated about 40% in the year of 1986.¹⁴⁾

13) Yu Tsung-Hsien, Wang Gin-Lee, *A visible hand: the governmental role in the economic development process*, Linkingbooks: Taipei, 2003, p. 95.

14) Chu Wan-Wen, *The petrochemical industry in Taiwan's post-liberalization economy*, *Radical Quarterly in Social Studies*, No. 44, 2001, p. 19.

The appreciation of NT dollar brought a deep impact to the original export industries. It made the export of labor-intensive downstream industries facing recession and the production line had to move abroad, as in Southeast Asia and the Mainland China, in order to reduce production costs and develop new markets. Plus, the technology-intensive upstream industries, because of the downstream relocation and government policies changes, must begin to face directly the foreign market, supplying to Taiwanese manufacturers and conducting overseas investments at same time.

For example, in the petrochemical industry, the upstream industries led by government changed the role. When a large number of downstream industries went abroad and the market of the Mainland China became the major export market of Taiwan, the products of heavy and chemical industries began to shift toward more capital-intensive, at the meantime the upstream also began to increase the direct exports to foreign countries for releasing the production capacities accumulated.

In addition to currency, the United States also required the elimination of trade barriers and the abolition of subsidies violating the principle of fair trade to balance the trade situation with Taiwan. This reflected mainly on the reduction of tariffs and non-tariff barriers. As mentioned earlier, the Taiwan government has set several protection measures as high tariffs and numbers of imports restrict conditions to certain industries. During this period, these measures were eliminated quickly. The following table lists the import goods situation related to heavy and chemical industries in the case of trade liberalization. It can be seen that the

Table 3-9. Import Situation Related to Heavy and Chemical Industries in Trade Liberalization

Items	1984		1997	
	Import Restrictions %	Import Examinations %	Import Restrictions %	Import Examinations %
Chemical Products	3	96.9	3.5	2.6
Plastic Products	0.5	99.8	0.5	0.8
Textile	0	100	0	0.1
Non-metallic Mine	0	57.1	0	0
Basic Metal	1.1	98.9	0.1	0.1
Machinery	1.2	91.9	0.1	0.1
Transportation	0.9	99.1	0	19.3
Precision Instruments	0.2	98.9	0	0.1

Source : Yu Tsung-Hsien, Wang Gin-Lee, A visible hand: the governmental role in the economic development process, 2003.

ratio of import restrictions and examinations are rapidly reduced.

Internally, Taiwanese society became richer and the ability and willingness of participation in the field of economics and politics increased, challenging the government long-standing monopoly status. The state-owned enterprises and their dominant heavy and chemical industries were no doubt affected especially the petrochemical industry and the iron and steel industry. Confronting these pressures, the Taiwan's government began to promote large-scale economic liberalization measures. On the macroeconomics, the controls of foreign exchange and capital flows were reduced significantly, including the interest rates liberalization gave the permission to commercial banks on

deciding interest rates in order to increase competitiveness; the foreign exchange liberalization relaxed the magnitude of foreign exchange; the capital movement liberalization opened the possibility of foreign investment to trade the stocks and do other investments, as well as the domestic funds could invest abroad.

The liberalization on heavy and chemical industries reflected on the market opening and deregulation, which meant that the government abolished the control policy by state-owned enterprises and entered to the privatization stage.

First, the change showed on the national petrochemical industrial policy. In the early 1970s, the application from private operators to establish the naphtha cracking plant (the sixth Naphtha cracking plant of Formosa Petrochemical Corporation) already existed, but it was not possible to do so. Then in 1990, this request was approved by the government. In addition, the government abolished the petrochemical industry trade control measures in 1986, and approved the possible opening of private gas stations in 1987.¹⁵⁾

The iron and steel industry led also by the government, in the previous stage, had many limitations of market competition. In 1983, the government re-opened the investment applications for establishment or expansion of steelmaking facilities, allowing operators to have a greater degree of freedom on adjustment of the production structure and scale. At this point, the use of import endorsement by China Steel Corporation became more gentle and

15) Chu Wan-Wen, Import-substitution and Export-led growth: a study of Taiwan's petrochemical industry, *Radical Quarterly in Social Studies*, No. 18, 1995, p. 49.

withdrawal this authorization in 1987. Furthermore, the government has gradually reduced import tariffs on steel products since 1985. The iron and steel industry has returned to the free market system. The main character of iron and steel industry at this time was the fast development of private factories, result that the production of CSC slowed down and the production of private sector increased significantly.

Observing these two decades of Taiwan's economic

Table 3-10. Industrial Policy Change in Taiwan

Item	Before the 1980s	After the 1980s
Tariffs Trade Barriers Factories Limitation Self-production Percentage	High protection	Liberalization and lower the protection for industry
Tax incentives	For target industries	General and functional
Technology Development	Developed by government and transfer to private sector	Encourage the R&D activities in private sector
Industrial Area	Developed by government	Developed by private sector
Public Constructions	Offered by government	Planned by government, constructed and running by private sector
State-owned Enterprises	Establish the state-owned enterprises for helping industrial development	Privatization
Industrial Development Items and Directions	introduced by government	introduced by private sector and helped by government
Industrial Environment Bilding	Solutions for target industries	Improve the whole environment

Source : made by author.

development process, it is a development process of a shift from planned economy to market economy, and the heavy and chemical industry is an interesting example. The below table shows, before the 1980s, the government led the decision of economic development plan and key industries, including the Ten Major Constructions which emphasized on heavy and chemical industries, and later transfer to the high-tech industry. Until the liberalization, a transition to a market economy and the privatization of state-owned enterprises and public constructions had gradually expanded. The role of government changed from leading development to environment building, and the companies have to learn how to improve their quality in order to enhance competitiveness.

6. Conclusion

Since the domestic market is small, Taiwan's economy has long been dependent on foreign trade and was quite vulnerable to external environmental factors. The focus on heavy and chemical industries in the 1970s by the government was in response to adverse external factors. At that time, the development of heavy and chemical industries by the major constructions and policy incentives reduced not only the dependence on imports, but also sustained the market confidence by expanding public investment. The effect was proved quite good afterwards. But there is one thing to mention here. Although Taiwan's economic development has been once dominated by the government, but the situation is quite different with the experiences in South Korea. The industrial

policy and incentives presented by Taiwan's government are more conservative, and there is no so-called "big push". This difference is not only because Taiwan's economy scale is small and dependent on foreign trade, and the measures too drastic will cause irreparable harm, but also the economic issues in Taiwan have less political consideration and the decision-making is more technique and market-oriented. So compared to South Korea, we said that Taiwan's economic policy is less centralized.¹⁶⁾

As for the heavy and chemical industries, because there were already a lot of downstream industries in Taiwan's society, the choice of upstream heavy and chemical industries would have the most import substitution effect. That is the reason why the government chose to focus on them. Many documents say that the government set the heavy and chemical industries development policy with a well-done planning. This is not totally fault, but in fact the government makes a judgment based on actual market conditions to select the most advantageous way and changes its role by time without a definite schedule.

On this point of view, we may be able to say that the process of Taiwan's heavy chemical industry development policy design and implementation is not as comprehensive as in South Korea. This method has both advantages and inconveniences. Especially in some difficult industries, a close communication and coordination is necessary between industry and government on

16) Stephen Haggard, *Pathway from the Periphery: The politics of growth in the newly industrializing countries*, Cornell University Press: Ithaca and London, 1990, p. 138-141.

the target setting, the practices design, the actual process, for allowing the effective operation of a large development project. The South Korea does a better job on this point through the combination of government and the large chaebol, while Taiwan's system is comparatively more loosely.

But the active role played by the Taiwan's government in promoting the development of heavy and chemical industries cannot be denied. When the government decided to develop upstream industries and faced the unwillingness of private capital to access, it had to lead it by the state-owned enterprises. When the degree of capitalist development is still low and the size of individual enterprises is small as well, it is impossible for private companies to raise a large amount in capital market without the help from nation. In such development stage, the "free market" cannot support the capital-intensive and large-scale investment projects which are indispensable for the development of heavy and chemical industries.

Although there are only few years that the Taiwan's government really focused on the development of heavy and chemical industries, but the laid foundation is still helpful for the subsequent mechanical and electronic industries, change the industrial structure quickly from labor-intensive to capital and technology-intensive, and also lay the basis for the emergence of Taiwan miracle.

However, the Taiwan government's policy for the heavy and chemical industries has almost completely disappeared since then. Because of the domestic environmental consciousness, the development space of these industries began to shrink. In such

situation, the vendors have to choose to move to Mainland China. But at the same time this kind of decision is also limited by the “be patient” policy, the whole living conditions are quite severe in Taiwan.

All these expose the contradictory ideas of Taiwan government for heavy and chemical industries. As these industries, especially the petrochemical industry and the iron and steel industry, have many downstream related industries in Taiwan, it would cause large damage economic growth if we limit it hastily. But because of environmental protection pressures, we must restrict these high-polluting industries. The Taiwan's government fell in this contradictory situation and let this issue idles for several years without any specific conclusions.

It is not possible to abandon completely the development of heavy and chemical industries in Taiwan. The solution that the government should think about is how to achieve a balance between the economic development and environmental protection. All the measures including pollution norms, strict inspection, restructuring counsel, increase the value-added are the possible methods to let the heavy and chemical industries to keep staying. After all, these industries have high political implications. The development of heavy and chemical industries in Taiwan is now facing a turning point, it needs the cooperation between government and industry to exert the real policy effect in the market and to allow the upgrading Taiwan's heavy and chemical industries, for that they will be able to serve as the driving engine of economic growth in Taiwan in the future.

Chapter 4

The Process and Policy of Phillipine's HCI Drive¹⁷⁾

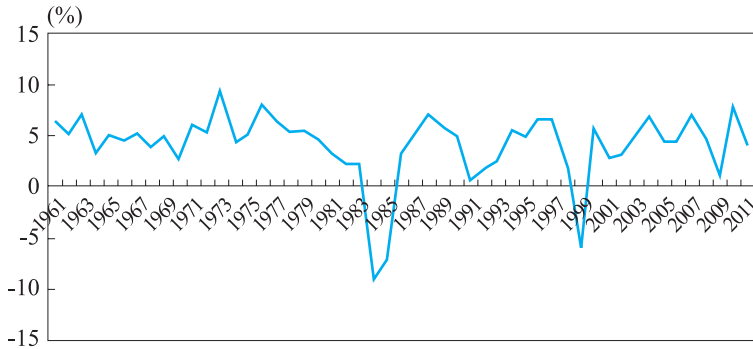
1. Industrial Development Policy

Historically, the shifts and turns in trade and industrial policies in the Philippines had been dictated by the state of the country's financial position. Many economic policies, as a result, grew out of responses to crisis; as such they were not deliberate attempts to promote development goals.

Figure 4-1 outlines the cycles of boom and bust that the Philippines underwent in the last five decades. Shifts in policy regimes and beginnings of new industrial programs are precipitated by economic downturn and followed by upswing. Thus, the shift from import substitution to export-oriented industrialization in 1970 was preceded by slow growth in the second half of the 1960s and followed by high growth in the early

¹⁷⁾ Written by Professor Ma Joy V. Abrenica (Univ. of the Phillipines Diliman, Phillipine).

Figure 4-1. Real Growth Rate of Philippine Gross National Income, 1960-2011



years of the decade. The launching of Major Industrial Projects in 1980 was in part designed to arrest the economic decline since 1978. Sharp economic dips in 1984 (-9.2%) and 1999 (-6.1%), caused by domestic political crisis and Asian financial crisis, respectively, prompted radical changes in economic policies. Such crisis-triggered changes in economic policies contrast with more deliberate policy shifts in other economies.

(1) Period of import controls: The 1950s

In the Philippines, the industrialization drive began in 1949, four years since independence, when controls on imports and foreign exchange were imposed ad hoc as a response to severe balance of payments (BOP) crisis. All importations had to be licensed by an Import Control Board that classified commodities by degree of essentiality. The most stringent controls were imposed on “nonessential” consumer goods, namely luxuries and consumer

durables; the least controls were applied to essential consumer goods, e.g., pharmaceuticals, and essential producer goods, such as machinery, fertilizer, and fuels and lubricants.¹⁸⁾

Although the trade policy regime during this period was initiated to curb consumption and address external payments problem, it had the unintended effect of starting off an industrialization drive. The import controls soon became the platform for the production of domestic substitutes for imported “nonessential commodities” to which most of the controls were directed. In particular, domestic production of nonessential consumer goods flourished since they were shielded from competition by the quantitative restrictions on imports, while imports of raw materials, intermediate and capital goods required for their domestic production were kept open. The trade policy provided an immediate boost to the economy: average annual GDP growth during 1949~53 was 8.6%, while manufacturing value-added increased at 15.8% annually during the first half of the 1950s. Yet a more significant consequence of the policy was the formation of a constituency for industrialization in a still predominantly agricultural economy. Such group, largely dependent on import protection, turned out to be a powerful force behind import restrictions that persisted until the 1980s.

It is important to note that the government during this period was constrained in its use of policies to advance domestic economic interests. The Philippines had an agreement with the

18) The foreign exchange controls required all exporters to surrender their foreign exchange earnings to the Central Bank.

United States, called the Bell Trade Act (also known as the Philippine Trade Act), which limited the government's ability to impose tariffs, among others, in exchange of war reparation payments. The Bell Trade Act ensured the continuation of US control over the Philippine economy under a post-colonial setting. A system of preferential tariffs for US trade to the Philippines was established; Philippine peso was pegged to the US dollar; unfettered repatriation of incomes to the US was guaranteed; and a "parity" clause granted US citizens the same rights as Filipinos in the use of minerals, forests and other natural resources. Since 70% of Philippine trade was then with the US, it was significant that the Philippine government was bound by the agreement to seek US concurrence on its tariff schedule and to implement such schedule on US trade gradually. In 1955, however, the Bell Trade Act was superseded by the Laurel-Langley Agreement which removed US control in the determination of peso exchange rate with the US dollar, turned parity privileges reciprocal, extended quotas on sugar and other Philippine exports to the US, and provided for application of tariffs on Philippine goods exported to the US.¹⁹⁾ The Philippines, in turn, was also allowed to progressively apply tariffs on US goods imported to the Philippines.

By the late 1950s, the investment opportunities for consumer goods production were exhausted because of the limited size of the domestic market. Despite controls of foreign exchange use, the country's reserves dwindled because of the import dependency of the new industries that emerged as a result of

19) The Laurel-Langley agreement expired in 1975.

import controls. A three-year period of decontrol ensued: the peso was allowed to devalue to the US dollar and all import licensing requirements were removed. These measures were not intended to diminish protection to domestic industries; rather they were responses to the growing lobby of agricultural-based traditional elites in the legislative body and the need to reform a graft-ridden import control system.

(2) Import substitution industrialization

The conscious decision to build an industrial base through import-substitution strategy came rather belatedly in the late 1950s and was prompted by another imminent external payments crisis. Because of corruption in the import licensing system, high tariffs were imposed in lieu of quantitative import restrictions. A “cascading” tariff structure (i.e., decreasing with value-added) was designed to support import substitution in so called “priority” industries, namely: consumer durable industries such as automotive and so called “white goods” (refrigerators, washing machines, air-conditioners and the like), textile, wheat flour, pulp and paper, cement, ceramics, sheet and plate glass, petroleum refining, leather tanning, and food manufacturing. These industries also received priority allocation of foreign exchange. In addition, several laws were enacted granting fiscal incentives to priority industries which included exemptions from domestic taxes and customs duties, especially on imported capital equipment and parts; tax deductions; and tax credits. The overall incentive structure attracted FDIs.

The policies during this period purported to support light manufacturing since heavy manufacturing were considered unviable given the size of the domestic market and scarce supply of local capital. But the combined policies had adverse effects on resource allocation. It discouraged backward integration as imported raw materials were cheap. It also created bias for the use of capital instead of labor in production since imports of capital were duty-free. Moreover, it dampened the incentive to export because of the protection of the domestic market.

But during the decade that followed, the 1960s, no new industries emerged; economic growth was slow; manufacturing activities were stunted; excess capacity was accumulated; prices rose while real wages fell. In 1966, a financial facility for distressed firms had to be set up at Development Bank of the Philippines, a government bank. The government had to intervene more actively in allocating resources to favored industries. These measures turned out inadequate. Thus, to arrest the economic decline and revive a flagging industrial sector, a comprehensive set of incentives was legislated, known as the Industrial Incentives Act of 1967 (Republic Act 5186).

The Investment Incentives Act (IIA) rationalized the granting of fiscal incentives. Before this law, the incentives were handed out quite indiscriminately, i.e., they were an open-ended encouragement for investments in industrial sector. IIA distinguished two types of priority investments: “preferred”, where existing capacity was considered less than could be supported by domestic and potential export markets; and “pioneer”, or those that introduce new products or processes to the Philippines.

Preferred investments were entitled to accelerated depreciation, tax exemption on imported capital equipment, and tax credits on the purchase of domestic capital equipment. On the other hand, pioneer investments were eligible to exemptions from internal revenue taxes except corporate income tax, in addition to the set of incentives accorded to preferred investments. A further incentive was given to pioneer industries in that they could be wholly foreign-owned, whereas a maximum of 40% foreign ownership was imposed on firms registered in preferred industries. The law also granted tax credits to exporters, equivalent to the amount of import taxes they have paid on their inputs. This was meant to bring down the exporters' cost of inputs to world market prices.

An important offshoot of IIA was the establishment of the Board of Investments (BOI), an agency attached to the Ministry of Trade and Industry (currently Department of Trade and Industry, DTI). BOI remains tasked, to this date, to draw up an Investment Priorities Plan (IPP) which identifies the priority sectors, process applications and administer the incentives. In the 1970s, the BOI was allowed to bar investments in sectors that it identified "overcrowded". Thus, the availability of incentives to a particular sector depended on BOI's assessment of whether the industry capacity was sufficient to support the domestic market and likely export potential. Once such capacity was reached, an industry was declared "overcrowded" and hence removed from IPP. About 30 industries, including cement and textiles, were designated overcrowded, which meant that not only were the incentives for these sectors withdrawn, but also that no new investments or

expansion of existing capacity could be allowed in these industries without BOI approval.²⁰⁾

BOI-registered firms were entitled to a set of incentives that had the effect of subsidizing the use of capital in production. These included: (i) tax exemption on imported capital equipment within 7 years from the date of the firm's registration; (ii) tax credits on domestic capital equipment equivalent to 100% of customs duties and compensating tax that would have been paid on imports of such item; (iii) accelerated depreciation allowances; (iv) tax deduction of expansion reinvestment, equivalent to 25% to 50% for non-pioneer projects and 50% to 100% for pioneer projects; and (v) preferential access to low interest government credit. Since no equivalent incentives were accorded for using labor, these incentives were reckoned to have created a bias for the use of capital instead of labor in production. Consequently, industrial production grew without proportionate change in employment.

(3) Export-oriented industrialization

At the beginning of the 1970s, the country was again on a verge of another BOP crisis. Import substitution stimulated manufacturing activities but the boom was short-lived. The strategy created capital-intensive and import dependent industries that had limited

20) Clearly, the intervention of the BOI is designed to protect local capital against foreign competition. In current setting, investments are no longer regulated based on the industry's prevailing capacity.

value-added and were heavy users of foreign exchange. The protection afforded to a few import-substituting industries inadvertently created policy discrimination against agriculture and exports. It was important to remove the growth obstacles on exports to fuel up a faltering economy and generate foreign exchange. Thus, export promotion became the focus of the new industrial and trade policies and programs. The 1973-74 energy crisis underscored even more the need to build up foreign exchange reserves and hence the imperative of promoting exports. The peso was floated and rules on foreign investments were relaxed to encourage export-oriented FDI.

The ultimate expression of the country's seriousness to shift regimes — from import substitution to export promotion — was the passage of a law providing for comprehensive support to export activities, known as the Export Incentives Act of 1970 (Republic Act 6135). This and the IIA, were two important incentives laws that subsequently defined the country's industrial policy until the 1980s.

To be sure, some incentives in the IIA were directed to encourage export production, such as tax credit on duties paid on imported materials and supplies and double deduction of shipping costs and promotional expenses for exports, which applied to export activities not only of IPP-registered firms but also of nontraditional export producers. Yet there was a need for more explicit and comprehensive support government support to exports, hence the Export Incentives Act (EIA).

The aim of EIA was not only to jumpstart export activities in general, but also to diversify exports by encouraging nontraditional

manufactured exports in particular. The incentives package consisted of: tax and duty-free importation of capital equipment; duty drawbacks on imported intermediate goods; tax credits for taxes paid on domestic capital equipment, raw material and semi-manufactured products used in production for export²¹⁾; anti-dumping protection; protection from government competition; reduced income tax; exemption from export tax²²⁾; post-operative tariff protection; loss carry-over; tax deduction for expansion reinvestment and market development expenses; and infrastructure subsidy for regional development.²³⁾ Entitled to this array of incentives were firms exporting at least half of their outputs and the products were listed in the Export Priorities Plan (EPP) prepared by the BOI, export traders and service exporters.

In keeping with infrastructure support to exporters and FDI liberalization, industrial parks and export processing zones (EPZs) were established. The incentives given to EPZ locators increased significantly over the years such that in the late 1990s, the World Bank suggested that Philippines' package was "the most generous and flexible set of incentives available anywhere."²⁴⁾ A clearing

21) This was meant to nullify the capital-cheapening effects of incentives under IIA.

22) The export tax was first imposed in 1970 as a stabilization tax or a levy to windfall gains made by exporters as a result of the currency devaluation in the same year. The plan was for this tax measure to be temporary — gradually decreasing from 10% to 0% by 1974. Yet in July 1973, the tax was made permanent on some traditional exports such as mineral, wood, coconut and sugar. In addition, a premium duty (20 to 30%) was imposed on coconut products and sugar.

23) Subsequent laws during the Martial law period, 1972~77, amended the EIA and IIA. Some of the amendments liberalized the original incentives under these two laws; others removed or restricted the implementation of such incentives.

24) World Bank (1997), p. 79.

house for bulk trading and financing, the Philippine International Trading Corporation, was also set up. Philippine trade houses were opened in key cities in US and Europe, and the commercial attache corps was expanded.²⁵⁾

Just as important as EIA to export growth during this period was the floating of the Philippine peso in February 1970, leading to a 64% de facto devaluation.²⁶⁾ From 1971 to 1976, the peso depreciated at an average annual rate of 3%.²⁷⁾ Yet the windfall gains from depreciation were partially offset by the imposition of ad valorem tax, ranging from 4 to 10%. Additional tax was also levied on gains realized from increases in export prices due to world commodity price boom during this period.

The devaluation, combined with EIA, induced the growth of nontraditional manufactured exports, specifically, clothing, footwear, furniture, chemical products and travel goods. Their growth was largely induced by EIA that exempted industrial exports from export taxes and granted additional tax credits on export sales and excise taxes on intermediate inputs.

(4) Industrial deepening

Apart from the shift in industrial strategy, the 1970s also witnessed the beginnings of HCI in the Philippines as part of industrial deepening. Since the pressure on foreign exchange reserves had

25) Bautista and Power (1979), p. 19.

26) This was from 3.9 pesos to 6.4 pesos to a US dollar.

27) Bautista and Powers (1979), p. 19.

not been eased by export promotion, policymakers turned to developing industrial intermediates and subsequently, capital goods industries. Among the largest recipients of BOI incentives during the 1970s, as a result, were copper smelting and refining, pulp and paper, chemical and chemical products, and synthetic textile fibers.²⁸⁾

Following a strategy of industrial deepening, the Progressive Manufacturing Program (PMP) was initially adopted for automobiles in 1973 and later extended to trucks, motorcycles and consumer electronics. PMP was designed to force participants to use locally manufactured intermediates by progressively reducing their allocation of foreign exchange for imports. In return, the participating firms received protection from foreign competition and new domestic entrants. The success of PMP would have addressed the problems of high import dependency and limited value-added of the manufacturing industries. There was enough interest in the programs, particularly among foreign manufacturers, such that in all programs, the number of applying firms exceeded the number of participants that policymakers envisaged for the size of the domestic market. In such situation, the participants could have been competitively selected and immediately replaced when they fail to deliver. But cronyism and rent seeking took hold of the selection of participants and program implementation. Close associates of Marcos (Philippine president, 1965~86) cornered most of the business opportunities created by PMP and other industrial deepening programs, causing

28) Dohner and Intal (1989), p. 445.

these programs to miss on their goals of creating backward linkages and raising the value-added of the manufacturing sector.

In 1979, a second energy crisis struck the global economy. The domestic crisis spawned by such crisis drove the government to take another radical policy turn. The economy was deep in foreign debt and in recession. It had to embark on a medium-term structural adjustment program upon the prodding of its creditors. One of the objectives of the adjustment program was to correct the structural inefficiencies fostered by a system of protection and overvalued currency. Thus, the adjustment program involved reforming tariffs, lowering import barriers, realigning indirect taxes, removing biases against certain sectors, particularly agriculture, and rationalizing the industrial incentives system. A phased annual adjustment in tariffs brought down the

Table 4-1. Effective Rates of Protection in Philippine Industry

	1965	1974	1985
All sectors	48	36	28
Exports	-19	4	12
Nonexportables			
Import Competing	59	37	35
Import Noncompeting	83	148	67
Agriculture and Primary	10	9	3
Manufacturing	51	44	36
Capital Goods	16	18	25
Intermediate Goods	27	23	33
Inputs for Construction	55	16	31
Consumer Goods	70	77	42

Source : Compiled by Dohner and Intal (1989, p. 441) from various studies.

rates from an average nominal of 43 percent in 1980 to 28 percent after five years. Quantitative import restrictions were lifted, and investment incentives were redesigned to be more performance-oriented and neutral to factor choice. The changes in the structure of protection brought about the tariff reform are evident below.

On the side, an aggressive industrialization strategy was being planned. Eleven major industrial programs (MIPs) were scheduled to be established during the first half of 1980s. Table 2 lists the programs that were expected to spur the growth of supporting manufacturing activities. Their locations across the country were chosen strategically so as to disperse economic activities and generate rural employment. The funds for these programs were expected to come from external loans, foreign equity and suppliers' credits.

Before any of these big ticket projects could take off, the country plunged into another economic and political crisis, triggered by the assassination of a leading opposition leader in 1983. The copper smelter-refinery, coco-chemical manufacturing project and phosphatic fertilizer project were completed, became operational in 1985, but had to be aborted. The other projects did not even hit the ground, as massive capital flight and severe foreign exchange crisis ensued. The industrialization programs had to take a backseat to stabilize the economy and reduce the deficits in the balance of payments and government budget.

Table 4-2. The Eleven Major Industrial Projects

Project	Description	Site	Implementing Agency
Copper Smelter	Establishment of a copper smelting and refining facility designed to process locally manufactured copper concentrates into	Isabel, Leyte	Philippine Associated Smelting and Refining Corp.
Phosphatic Fertilizer	Project to utilize the sulfuric acid output of the copper smelter project, and produce ammonium sulfate, NP/NPK, MAP, and DAP	Isabel, Leyte	Philippine Phosphate Fertilizer Corp.
Aluminum Smelter	Establishment of facilities to produce foundry ingots, slabs and extrusion billets	Phividec Industrial Estate, Misamis Oriental	National Development Co.
Integrated Steel mill	Establishment of an integrated steel works by expanding the Iligan Steel Works	Iligan, Northern Mindanao	National Steel Corp.
Alcogas Program	Intended to reduce the country's dependence on imported crude oil by displacing 20% of the projected demand for gasoline	Nationwide	Philippine National Alcohol Commission; Philippine National Oil Company; Ministry of Energy
Heavy Engineering Industries	Development of the country's capabilities in fabricating equipment and machineries required by industrial plants	Bataan	Commission on Heavy Engineering Industries
Integrated Pulp and Paper	Expansion of existing PICOP plant from 450 TPD to 900 TPD pulp capacity	Bislig, Surigao del Sur	-
Petrochemical Complex	Establishment of two downstream petrochemical plants and an upstream naphtha cracker plant	Limay, Bataan	Philippine National Oil Company
Diesel Engine Manufacturing	Manufacturing of low- and high-range horsepower diesel engine	Dasmariñas, Cavite (LR), Metro Manila (HR)	
Cement Industry Expansion	It has 3 components: conversion to coal-fired plants; rehabilitation of existing cement plants; increase annual production to 1 million ton per plant	various	Philippine Cement Industry Authority
Coconut Industry Rationalization (Fatty Alcohol)	Establishment of a coco-chemical plant to produce coco-fatty alcohol (to replace imported petrochemical as feedstocks for soaps and detergents)	Rosario, Cavite	United Coconut Planters Bank

Source : Five-Year Philippine Development Plan, 1983~87, pp. 66-67.

(5) Market liberalization

By the 1990s, the new leadership showed greater commitment to economic liberalism as manifested by continuous tariff reforms, privatization of public monopolies in energy and transportation, and liberalization and deregulation of telecommunications, banking and power sectors. More than three-fifths of its tariff lines have now MFN rates at 0% to 5%, and only 5 percent of tariff lines have MFN rates at 20% and above. There are few vestiges of protectionist system, however. Sugar and rice sectors still enjoy 65% and 50% duties, respectively. About 150 "sensitive" agricultural products still have tariff quotas. Duties at 20% to 30% are levied on automobiles and parts, chemical wastes, made-up textile articles and high value crops. But locally manufactured intermediate goods are covered by only 5 to 15% rates of duty, while the rest of imports, such as crude oil, petroleum products, inputs to manufactured goods and those not locally produced are levied 3% and below.

After the aborted MIPs, subsequent political leaderships shun any public discussion of industrial development plan. But in June 1998, the Industry Development Council, composed of public and private sector representatives and chaired by the DTI, announced a new industrial plan. The new plan was to focus on technology and skills upgrading, as opposed to conservation of foreign exchange reserves and employment generation in the previous plans. Sixteen industries were selected based on actual or latent competitiveness, industry size and potential jobs impact. These included copper products, decorative crafts (basketwoods,

ceramics, holiday decor, jewelry), electronics, fertilizer, footwear and leather goods, fresh fruits, furniture, garments and textile, industrial tree plantation including rubber products, iron and steel including metal products, marine products, motor vehicles and components, oleochemical, petrochemical, processed food and carrageenan. As the plan was conceived at the tail-end of the Ramos presidency, it was not implemented as subsequent political administrations brushed it aside.

The development programs on automotive, shipbuilding and steel industries remarkably trace the foregoing shifts and turns in policy regimes. They prospered with protection and foundered with market liberalization. Curiously, all three programs were conceived at around the same period, i.e., in the late 1960s and faded in the background during the 1990s. The next section reviews the roller-coaster development of the automotive industry.

2. The Automotive Industry Program

In 1969, when the Philippine economy was evidently ahead its Asian neighbors, the plan to localize automotive production was conceived. The Philippines then had 12 car assemblers producing 29 models and 16 truck assemblers in a market that consumed 17,000 passenger cars and 10,000 commercial vehicles annually. Most parts and components, except for tires and other rubber parts, were imported. Consequently, there was tight competition among assemblers, not only for a niche in the market but also for foreign currency allocation. Four car assemblers controlled 75% of

industry's output. But even with high market concentration, the leading firms did not find it viable to get pass the assembly stage since the domestic market was too small and fragmented.

(1) The progressive car manufacturing program, 1973~86

The design of the Progressive Car Manufacturing Program (PCMP) was completed in 1971, but it took another two years to launch the program. It was the first automotive development program by an Asian LDC. Other Asian countries, such as South Korea, Taiwan, Malaysia and Thailand patterned their development programs after the PCMP.

Similar programs were put in place for motorcycles in 1974, dubbed as Progressive Motorcycle Manufacturing Program (PMMP), and for commercial vehicles in 1977, called Progressive Truck Manufacturing Program (PTMP). The thrusts of these programs were to: (i) save on foreign exchange by producing local components; (ii) promote local manufacturing activity and facilitate transfer of technology especially to small and medium-sized firms; and (iii) generate new manufactured exports. These objectives were to be met through localization of parts production and rationalization of the sector, i.e., limiting the number of assemblers.

The PCMP was limited to the production of passenger vehicles with four cylinder engine, and engine displacement 2,000cc. and below. Only program participants were permitted to import CKD units. Five firms were admitted to the program, although the initial intent was to have only two. These were: (i) Delta Motors

Corp. (Toyota); (ii) Ford Philippines; (iii) Yutivo-Francisco Motors Corp. (General Motors); (iv) DMG Inc., (Volkswagen); and (v) Chrysler Philippines (later renamed Canlubang Automotive Resources Corp. or CARCO). The participants were required to raise the ratio of domestically manufactured to imported components and to earn their foreign exchange through exports. The Board of Investment (BOI) imposed a minimum local content ratio of 15% in the first year; 25% in the second year; and 35% in the third year.

To meet the local content targets, the BOI encouraged participants to manufacture parts with high value-added. Thus, Delta Motors manufactured engine blocks, coil springs and springs; Ford Philippines, body stamping and soft trims; Yutivo-Francisco, transmissions; and Chrysler Philippines, transmissions, soft trims and wiring harness. Since the participants were also required to earn their foreign exchange, Delta exported engines to Japan; Ford Philippines, body panels to Southeast Asia; Yutivo-Francisco, transmissions to Australia and Southeast Asia; DMG, seat pads and various components to Germany; and Chrysler Philippines, transmissions to Japan and Southeast Asia.

The emphasis on generating foreign exchange is evident on the formula used in computing local content, i.e.,

$$\text{Local content ratio} = \frac{\text{F.O.B. import price of local parts} + \text{forex earnings on exports}}{\text{F.O.B. export cost of CBU}}$$

From this definition, there were two ways to raise local content:

by increasing the proportion of domestically manufactured components; and by raising export earnings. Assemblers preferred the latter because as more local parts are integrated, the price of the assembled unit increases. It was estimated that increasing local content from 50% to 60% would raise the price of a completed vehicle by 23.5% and further adjustments in local content up to 65% would result in a 32.4% price increase. On the other hand, it was easier to satisfy the local content requirement through export earnings since credits can be earned even for non-automotive exports.

By 1978, sales of passenger cars, AUVs and commercial vehicles reached 70,000 units.

There were then about 220 local parts manufacturers. But the more important targets of the program were being missed out.

Foremost, the local content level until 1978 was below 30 percent; it should have reached 35% two years earlier based on the program's target. Moreover, most of the parts that were included in domestic content were those produced by the assemblers. This suggests that there was limited manufacturing activity outside the assembly sector. In fact, the failure rate among independent parts manufacturers was high due to small production runs and weak technical and financial support from the assemblers. The assemblers were expected to invest in local parts manufacturers by cultivating the kind of subcontracting relationships found in the Japanese automotive industry, but it did not happen. Nor did the PCMP ease the pressure on the country's foreign exchange reserves. This omission was crucial because of the recurring BOP problems of the economy. In fact, imports rose

faster than exports because of the high import content of locally manufactured parts. And since local content credits were given to exports of non-automotive components, there was essentially no pressure on parts manufacturers to raise the value-added of major components.

(2) Why the PCMP faltered

Faulty design and weak implementation were the main pitfalls of the PCMP. It is worthwhile to review these lapses as these also put into context the subsequent changes in the program.

First, the government erred in emphasizing the production of major functional parts (engine blocks, axles and transmission) despite the underdeveloped state of the ancillary sector. The rationale behind encouraging their production was to facilitate greater transfer of technology from assemblers to parts producers, and to generate larger export revenues. But the rigorous technical specifications in manufacturing major components compelled the assemblers to integrate vertically, i.e., to produce the parts themselves, since there were no subcontractors who can meet the product standards. The outcome would have been different if the localization efforts started with simple parts and those with high replacement rates such as brake linings and fan belts, or those parts that were easy to standardize such as radiator, brake drums, auto seats and pick-up truck engines (Doner 1987). These parts are relatively labor-intensive and may be efficiently produced at low volumes.

Second, foreign assemblers used transfer pricing to discourage

local production of parts. One factor accounting for the high price of automotive was the assembler's pricing scheme of reducing the price of the imported CKD by less than the import cost of the parts excluded from the package. A locally manufactured part integrated in the assembled vehicle was assigned a "deletion allowance" — the value to be deducted from the price of the CKD package. The basis for the deletion allowance was the marginal production cost of the parent company, excluding profits. As such, the allowance was set below the price of the component if imported separately and not as part of the CKD package. As an example, the import price of a crankshaft was US\$55.30, but the price of the CKD package would be reduced only by US\$7.32 (13% of import price) when this was taken out of the package. The deletion allowance ranged from 7% (for ring gear) to 71% (for axles, radiator) of the actual importation cost. Thus, as more parts were locally sourced, the transfer pricing scheme raised the prices of locally assembled vehicle (Ken 1977).

Third, the pressure on assemblers to support local parts producers was weakened by BOI's failure to enforce the local content requirement strictly. Several factors accounted for this. One was insufficient technical expertise and manpower in BOI to monitor compliance. Another was the formula used in calculating local content which allowed assemblers to claim local content credit for exports of non-automotive products. Arguably, the policy of crediting non-automotive exports towards local content avoided the higher efficiency cost that would have been incurred if local parts for which the country did not have comparative advantage were produced instead. But the efficiency losses

should be weighed against the dynamic gains from learning by doing that was expected if domestic content were properly enforced. Specifically, the rationale for requiring domestic production is to compel local manufacturers develop their capacity to produce goods which they would not have produced under *laissez-faire*. Moreover, those non-automotive products would have been exported anyway independent of the local content credit. Therefore, the program cannot claim to generate positive externalities through such arrangement.

The ineffective enforcement of local content requirement might have also reflected the government's unstated priority to use the program as a platform for attracting investments, than for developing the local parts sector. But the enforcement of local content was critical to the effectiveness of the program as a tool for industrialization. The cost penalty of meeting the content requirement would have forced assemblers to limit the brands and frequency of model changes. If there were no such penalty, assemblers would have just introduced many brands and models that cater to different consumers' taste. In addition, too many brands and models fragmented the market and therefore defeated the purpose of limiting entry into the assembly sector. It also deprived local parts manufacturers of the scale needed for technological learning and efficient production.

Another factor considered critical to the program's success was the development of subcontracting arrangements between assemblers and local parts manufacturers. This happened only in a very limited scale. Instead of harnessing the capacity of local parts producers, many assemblers chose to manufacture the parts

themselves or bring in their home affiliates, thus there was little technological spillovers from foreign assemblers to local parts producers.

When the economy slumped in 1979, the automotive industry went into shamble. The crisis exposed the weaknesses of the sector, in particular its import dependence and weak linkages to the domestic markets. Delta went bankrupt. Ford, GM and DMG had to close their production plants. Only two assemblers survived. Pilipinas Nissan Inc. (PNI) took over the slot of DMG, while Philippine Automotive Manufacturing Corp. (PAMCOR) obtained CARCO's license to assemble Mitsubishi vehicles. But even with only two of them in the market, they were hardly viable amidst economic slump and foreign exchange crisis. Thus, when the importation of parts was again restricted in 1986, the two remaining assemblers left the market.

(3) The motor vehicle development program

In December 1987, the government revived local automotive production by launching the Motor Vehicle Development Program (MVDP) to replace PCMP. The new program was like the old, where separate rules governed passenger cars, commercial vehicles and motorcycles. The Car Development Program (CDP) under MVDP covered the assembly of medium-sized passenger cars (1,200 to 2,800cc.) only, but this was later expanded to include small and large cars. The Commercial Vehicle Development Program (CVDP) covered production of Asian Utility Vehicles (AUVs) and light and heavy commercial vehicles

up to 18,000kgs. GVW. But the new program was described as parts-oriented, whereas the old program was viewed as assembly-oriented.

The main thrust of MVDP was the development of a parts manufacturing sector as opposed to employment and foreign exchange generation under PCMP. MVDP's success was to be measured by export earnings from automotive parts that was targeted to reach US\$2.6 billion in year 2000, and by domestic value added in parts which must reach 35% in 2000.

Since the thrusts of MVDP were different, there were changes in the design of the program. First, the calculation of local content was revised to promote parts manufacturing and de-emphasize foreign exchange generation. Thus, local content was defined by:

$$\text{Local content} = \text{Sum of (Points} \times \text{Local Content of Component)} \\ + 15\% \text{ Assembly Allowance}$$

where "points" referred to the ratio of CKD price of individual part or component to the CKD full-pack price; "local content of component" was the selling price of each component less imported materials, depreciation of imported equipment and other foreign costs; and the assembly allowance represented costs on other local materials and supplies used in the assembly. A maximum of 15 percent cost penalty was allowed on local parts, which meant that the selling price of the local component used in the computation may be at most 15 percent higher than the landed cost of the part taken out of the imported CKD package.

The local content targets were as follow:

	1988	1989	1990
Passenger Cars	32.36%	36.56%	40.00%
Commercial Vehicles			
Category I	43.10%	51.21%	54.86%
Category II	35.82	41.69	44.42
Category III	16.83	20.33	21.9
Category IV-A	16.5	19.91	21.44
Category IV-B	17.08	20.64	22.24
Category IV-C	10.69	12.65	13.53
Category IV-D	10.87	12.87	13.77

Considering that these rates included a 15% assembly allowance, the target local content ratios were quite modest. But assemblers were required to invest in parts manufacturing over a period of three years. The cumulative amount of investment must be at least 9 percent of the net local content requirement under the program. They were also obliged to source their foreign exchange requirements from exports of automotive parts, although credits for non-automotive parts were allowed until 1993. In particular, the foreign exchange requirements were 50% for CDP participants and 25% for CVDP participants. Foreign exchange credits for non-automotive parts were to be phased out within a six-year period based on the following schedule:

	Foreign Exchange Credit (%)	
	Automotive	Non-automotive
1988	encouraged	100
1989	20	80
1990	40	60
1991	60	40
1992	80	20
1993	100	0

By year 2000, the participants were expected to have attained foreign exchange self-sufficiency. Meanwhile, only participants were allowed to import CKD units, while importation of CBU units were banned.

Cognizant that the development of local capability is an incremental and cumulative process, the program limited the number of assemblers and models, and regulated the frequency of model change. Participants in CDP were initially limited to three — Toyota Philippines, Nissan Motors Pilipinas Inc. (NMPI) and PAMCOR (Mitsubishi). Each assembler was allowed to have three basic models and two variants for each basic model. The basic models and variants had to be retained for a minimum period of five years. These measures were intended to give time to local parts manufacturers develop their skills and capability. The thinking behind the policy was that local manufacturers could handle the basic automotive technology but their limited technical and financial resources prevented them from coping with frequent changes in design.

In the original timetable, the MVDP was set to end in 1998 by which time the local industry was expected to be ready for competition. Yet not long after the program had started, the design and priorities were changed by a series of policy adjustments.

(4) Policy flip-flops

In January 1990, the CDP was opened to assemblers of cars with engine displacement of less than 1,200cc., purportedly to bring

down car prices since the original participants had concentrated in the manufacture of middle and high-priced cars. A price ceiling on the retail price of the People's Car was set — initially at P175,000 (about half the average price of a medium-sized car). Later, the price cap was raised to P300,000 because of inflationary pressure exerted by adjustments in exchange rate, taxes and wages. Seven assemblers were admitted to the People's Car category: Columbian Autocar Corp. (Kia Pride); PAMCOR (Mitsubishi Colt); NMPI (Nissan March); Asian Carmakers (Daihatsu Charade); Honda Mitsubishi (Honda Civic); Tranfarm & Co. Inc. (Gurgel model of Brazil); and Itacar Pilipinas (FIAT Uno). Each participant was allowed one basic model and two variants thereof. In turn, the participants were required to generate 50 percent of their foreign exchange requirements by exporting automotive and non-automotive products. They are also required to achieve local content ratio of 35 percent in 1991, 40 percent in 1992 and 51 percent in 1993.

Although the introduction of the People's Car category encouraged the production of cheaper and smaller vehicles, it was used as a springboard by other assemblers to enter the market for medium-sized cars for which demand is less sensitive to price change. People's car assemblers were eligible to enter the main category, i.e., cars with engine displacement of 1,200 to 2,800cc. after one year stint. Thus, five of the seven original participants to the People's Car category gained entry into the main category. This resulted in the proliferation of more brands and makes of vehicles than there were during the PCMP period.

A public transportation shortage in Metro Manila and its

suburbs in 1990 pressured the government to liberalize the importation of commercial vehicles. Specifically, the government allowed tax deferment on imported CKD buses. Major bus operators were permitted to import and assemble CKD units subject to the 40% local content requirement. Importation of second-hand engines was also liberalized. These short-gap measures spawned the assembly of commercial vehicles outside of CVDP. Moreover, the CVDP participants had to compete against imports of used buses from China and Japan that flooded the market.

In December 1992, a third category was added to the CDP for the assembly of luxury cars, or those with engine displacement greater than 2,190cc. This category opened the market to European automakers, namely: Volvo (Scandinavian Motors) and Mercedes Benz (Commercial Motor Corp). Unlike the other two categories (People's car and Main Car — 1,200cc. to 2,800cc.), luxury car assemblers were not bound by the local content rules, but were required to bring in investments of US\$8 million for parts and components manufacturing. In addition, they had to generate 100 percent of their foreign exchange requirements through exports of automotive parts and components. To make this policy consistent with those that apply to People's Car and main car assemblers, the foreign exchange requirement in these two categories was adjusted so that it would reach 75% in 1995 and 100% in 1998.

In May 1993, import restrictions on brand-new luxury car with engine displacement of 2,190cc. or greater for gasoline-fed, or of 3,100cc. or greater for diesel-fed, were relaxed. The basic models

allowed for each assembler in the main car category was increased from three to four.

A year later, the CDP was amended to accommodate the automotive assembly projects under the ASEAN Industrial Joint Venture (AIJV), specifically the entry of Malaysia's Perusahaan Otomobil Nasional Berhad or Proton (through a partnership with the Autocorp Group).

Even more radical changes were introduced in 1995. In July, a new tariff reform code (E.O. 264) was passed, reducing the tariff on CKDs from 10% to 3%, while increasing the tariff on CBUs from 30% to 40%. This raised the tariff differential enjoyed by the assemblers from 20% to 37%.

The assemblers lobbied for the additional 17-percent tariff differential, citing the cost penalties that stemmed from local content and foreign exchange requirements and obligation to invest in automotive parts manufacturing. In October, all quantitative restrictions on importation of brand new vehicles were removed and replaced by tariffs.

A 3% tariff rate on CKDs created a bias against local parts production because the tariffs on raw material inputs for automotive parts range from 10% to 30%. The rationale given for the change in tariff structure was that it was meant to push the domestic parts industry to become efficient. Ironically, tariffs of up to 30 percent had been retained for parts that had already gained foothold in the export market such as radiators, silencers, exhaust pipes, fuel tanks, brakes and clutch pedals, steering wheels and wiring harness.

Clearly, the structure of protection favored the assemblers at

the expense of parts manufacturers, which was clearly incompatible with the original thrust of the program to promote parts production. Two months after the tariff adjustment, the government brought the assemblers and parts manufacturers together into an agreement that encouraged the former to obtain at least 40% of their parts requirements locally. But since compliance to the agreement was voluntary, it did not provide relief to parts producers.

(5) Prelude to liberalization

The original timetable of MVDP provided for market liberalization by 1998, and deregulation by 2000. Market liberalization meant lifting all quantitative restrictions and other impositions on car and commercial vehicle importation, including local content and foreign exchange self-sufficiency requirements. But in March 1996, two years ahead of the target date, a new set of program guidelines was introduced, removing many of the market restrictions.

Among them was the relaxation of entry into the program. A prospective assembler could seek accreditation for as long as the investment requirements were met. All import restrictions on brand-new CBU cars, motorcycles and LCVs with seating capacity of less than 10 passengers were removed. Limits on the number of models and variants for each assembler and the required five-year period of maintaining the models were lifted. Price ceilings on all vehicles except People's Car were rescinded. Before this change, local assemblers had to observe a maximum retail price

imposed on each car model. Assemblers were no longer required to adjust their local content progressively. However, to qualify or remain in the program, assemblers had to maintain a local content ratio of at least 40% for passenger cars, and 13.8% to 54.8% for commercial vehicles (depending on the category). The mandatory deletion list was scrapped. Those that reached a local content of at least 50% in cars and 55% in commercial vehicles were awarded foreign exchange credits as incentive. The foreign exchange requirements were substantially scaled down, but credits could be given only to automotive parts. Thus the export credits required from assemblers of luxury cars was lowered from 100% to 75%; for People's Cars, from 50% to 5%; and for medium-sized cars, from 50% to 45%.

In the face of stiff competition, assemblers introduced more models and brands to stimulate demand. Some of the models were imported as CBUs since it was not economical to set up an assembly line for each new model introduced in the market. For example, 7 of the 15 models that Toyota sold were imported as CBUs. One-fifth of industry sales consisted of CBUs.

One may argue that the pressure of competition would have nudged assemblers to source more parts locally in order to bring down costs. But that would have been the case if the locally manufactured parts could match imports in quality and price. Unless the technology of the ancillary industry is upgraded, many small and medium-sized parts manufacturers would have difficulty coping to this environment.

3. Shipbuilding Industry

After booking a significant increase in vessel orders recently, the Philippines has become the fourth largest shipbuilder in the world, behind China, South Korea and Japan, as its market share in the world orderbook increased from 0.4% in 2005 to 2.1% in 2010.²⁹⁾ Ironically, this rise occurred nearly three decades after the government abandoned its shipbuilding program. Like Vietnam, India and a few other developing countries, the Philippine was propelled into global shipbuilding when Korean, Japanese and European yards started investing in facilities in developing countries to counterbalance the weight of China's labor cost advantage.

It is equally paradoxical that the Philippines and Korea launched their shipbuilding programs at about the same time in the early 1970s when the former had a slight technological lead over the latter. And now much of the increase in orders that the Philippines received came about because the Korean shipbuilder Hanjin Heavy Industries allocated more of the orders that it received to its Subic yard in the Philippines than to its Busan yard in Korea.³⁰⁾ Hanjin's business strategy reflects its attempt to maintain a competitive position in a post-growth stage. South Korea attained global leadership in shipbuilding in the 1990s and only recently ceded that position to China. The Philippines, on

29) Mickeviciene (2011), p. 204.

30) Since 2011, Hanjin H.I. has suspended the operations of its domestic shipyards but kept those of Subic yard (Nomura, 2013).

the other hand, has only recently emerged as a new player. Why the Philippines had fallen far behind its contemporaries is yet again instructive of how it spoiled its early lead and opportunities to industrialize.

Shipbuilding is traditionally classified as an assembly industry whose processes can be divided into two parts: steelwork, i.e., prefabrication, assembly and erection of steel structure of the ship; and outfitting, i.e., the installation of systems, equipment and fittings into the ship. Most of these processes lend themselves to automation but few shipyards in the world have seen the need to automate at the highest degree possible because of “one-of-a-type production” and availability of a large supply of labor.³¹⁾

That shipbuilding had always been accorded the highest priority in government support of industry is not surprising. This owes largely to the Philippine geography — the second largest archipelago in the world — where 85 percent of person and commodity movement depend on sea transport. In addition, the country's location, at the crossroads of Asian trade, makes it an ideal hub for ship repair. The Philippines was thus expected to nurture an indigenous shipbuilding industry because of these natural advantages.

In the second half of the 1960s, 15 industrial development projects were identified strategic and worthy of full fiscal support. The government was poised to accord to these projects not only tax and tariff incentives but also financial support in the form of equity, long-term loan or sovereign guarantee on foreign loan.

31) Mickeviciene (2011), p. 213.

Shipbuilding was among these priority projects. Initially fiscal support was extended to the government-owned National Shipping and Shipyards Corporation so it could expand its shipbuilding capacity in the 1,700 gross tons (GT) class, ostensibly to relieve the shortage of passenger and cargo vessels being experienced at that time.³²⁾ But the problem turned out more complex than envisaged and required an integrated approach.

Despite the presence of government and private shipyards, domestic shipbuilding was a fledgling industry until the early 1970s. These shipyards were producing mostly tugboats, liquid cargo vessels, barges and fishing vessels. Domestic shipping companies would have served a ready market for locally built ships, especially because the country's fleet at that time consisted mostly of post-war U.S. surplus military vessels and ageing Japanese vessels that needed to be replaced. More than 60 percent of the ships were over 30 years old. The demand for ship repair was high but the facilities were capable of servicing a mere 30 percent of the fleet's total tonnage and only vessels up to 10,000 GT. As a result, larger vessels had to be drydocked in other countries. And yet obsolescence was only one problem; another was fleet efficiency and its impact on the costs of inter-island shipping. Too many small vessels were navigating the same route, whereas many routes were either unserved or underserved.

At the inception of their respective industrial programs, Philippine shipbuilders faced the same constraints as their Korean counterparts. Neither one had previous experience in shipbuilding

32) Four-Year Economic Program for the Philippine Fiscal Years 1967-70, p. 42.

construction as much as Japanese shipbuilders had accumulated before World War II. Philippine shipping owners preferred foreign-built second-hand vessels over locally constructed ones, just as Korean shipping companies were buying Japanese-built used vessels because the financing and delivery terms were better. Moreover, whereas imported vessels were exempted from Customs duties, imported raw materials for ship construction were not. A tension between the shipping and shipbuilding sectors was inevitable if either one was promoted without the other, hence an integrated program had to be crafted for the two sectors.³³⁾

In 1974, a 10-year Maritime Industry Development Program (MIDP) was launched to address the concerns of the shipping and shipbuilding sectors concurrently. The thrust of the intervention in the shipping sector was the rationalization of its operations through: (i) allocation of trade routes to shipping companies; (ii) regulation of the number, type, tonnage and sailing frequency of vessels plying the identified trade routes; (iii) control over the proliferation of small shipping companies; and (iv) gradual phasing out of obsolete and uneconomical vessels in major trade routes. On the other hand, shipbuilding was to be promoted by: (i) standardizing the design of vessels; (ii) localizing shipbuilding of inter-island vessels; (iii) providing credit to ship buyers; and (iv) fostering joint ventures between local and foreign

33) The imminent conflict of interest between shipping companies and shipbuilders was avoided in the case of Japan as Japanese shipping companies were more patronizing of Japanese-built ships (Shin and Cincantell, 2009, p. 184). Indeed it is argued that one reason Japan was able to seize global leadership of the shipbuilding industry from Britain in the 1950s was that it coordinated well the State shipping and shipbuilding program (Mickeviciene, 2011, p. 203).

shipbuilders to accelerate the development of domestic shipyards. To implement the Program, the Maritime Industry Authority (MARINA) was created and given broad powers to develop both shipping and shipbuilding.

The first set of incentives to shipbuilders was applied in 1975, consisting of exemption from import duties and taxes on raw materials, parts and machineries that were not locally produced in sufficient quantity and acceptable quality; accelerated depreciation allowance for industrial plant and equipment; and exemption from contractor's percentage tax. The most important provision, however, was the declassification of shipyard as public utility, which shielded it from cap on foreign ownership and other restrictions applied to public utilities.³⁴⁾ This facilitated the eventual entry of foreign-owned yards. All Philippine-owned and registered vessels were required to undertake repairs and drydocking only with MARINA-registered yards.³⁵⁾ Shipbuilding and ship repair were also included in the list of preferred investment areas of the Board of Investments, entitling investors to a range of tax and tariff incentives including income tax holiday and net operating loss carry-over (NOLCO).

These incentives boosted the industry. Registered shipbuilding and repair facilities grew twice as many within a three-year span from 1975.³⁶⁾ Two out of five registered vessels during 1976-77

34) Presidential Decree No. 666, titled "Providing for Incentives to the Shipbuilding and Ship Repair Industry", promulgated on 5 March 1975.

35) Presidential Decree No. 1221, titled "Requiring all Philippine-owned/and or registered vessels to undertake repairs and drydocking with MARINA-registered ship repair yards", promulgated on 17 October 1977.

were locally constructed. Besides penetrating the domestic market for inter-island vessels, the shipbuilding industry made some inroads in the export market for vessels less than 1,000 deadweight tons (DWT), such as conventional inter-island vessels, medium-sized tugboats, barges and fishing boats. But the good run on exports was short-lived since the market for small vessels was very competitive.

Here lies the crucial difference between the Philippine and Korean shipbuilding programs. In the former, there was limited support for technical upgrading of productive capacity, hence local shipbuilders remained behind their foreign competitors in productivity and product quality. As a result, the initial success in the export market was difficult to sustain.

Korea, in contrast, dramatically transformed its capability from the production of small coastal ships to the construction of large ocean-going vessels, including large bulk carriers and oil tankers. To succeed in export in the 1970s when the global market was suffering from excess production capacity, Hyundai Heavy Industry (HHI) persevered in acquiring technologies from European shipbuilders. According to Amsden (1989), HHI obtained dockyard designs from a Scottish naval architecture firm (A&P Appledore), ship designs from a Scottish shipbuilding firm (Scottlithgow), and production know-how from a Japanese shipbuilder (Kawasaki). It also employed experienced European shipbuilders in the company for 3 years. These efforts put HHI in

36) In 1975, there were 46 registered shipbuilding and repair facilities, with combined capacity of 90,090GT; in 1978, the registration list grew to 116 with total capacity of 190,080GT.

a position to take advantage of increased demand for large vessels by global shipping companies when seaborne trade between Asia and the U.S. expanded with the growth in the Chinese economy. No local shipbuilder made similar investments in technology as HHI. The absence of technological upgrading in the Philippine industry explains why the changes spurred by the program were limited and temporal.

It did not help that the local shipbuilders could not turn to the domestic market which continued to be inundated by imported secondhand vessels (mostly from Japan) that cost about a third of the price of locally built units. Pushed by a strong lobby from local shipbuilders, MARINA regulated the importation of vessels by imposing age and size criteria. In a series of directives in 1978, the agency banned the importation of vessels older than a specified age or below a certain tonnage. But the import restrictions were ineffective to curb the entry of foreign vessels since the maximum age limit of the vessel was set too high, while the minimum size limit was pegged too low. Concretely, the maximum age limit of 15 years still allowed the entry of foreign vessels that could no longer be registered in their home countries, hence were sold locally at a huge discount. Similarly, the minimum size limit of 250GT was not enough protection to local shipbuilders who were already producing vessels more than twice this size.

Although the intent of the MIDP was to give equal promotion to shipping and shipbuilding, the former received more in practice. For one, the financing schemes for the acquisition of imported vessels were more readily available than for locally

constructed vessels. The Philippine National Lines Leasing Co. (PNLLC) was specifically set up to guarantee the foreign loans contracted by local shipping companies to acquire foreign-built vessels. Second, given the tight foreign exchange regulation prevailing at that time, an assured supply of dollar allocation was arguably more important than duties exemption. Shipping companies were given priority dollar allocation on their importation of vessels; no such allocation was afforded to local shipbuilders importing their raw material requirements.

Subsequently in 1978, the Development Bank of the Philippines (DBP) and the National Development Council (NDC) offered soft loans (at 12% interest with 20 years term) that could cover up to 80 percent of the purchase price of locally built ships. But the scheme attracted few borrowers. One explanation given was that imported secondhand vessels were still cheaper than locally-built units despite the financing terms. Another was that the owners of shipping companies, reputed to be close allies of the Marcoses, made a lucrative business out of the acquisition of foreign ships. Using funds borrowed from government-owned banks or loan guarantees of PNLLC, they inflated the contract price by as much as 20 percent and pocketed the difference.

Opportunities for technological upgrading were either squandered or lost in corruption. The Philippine Dockyard Corporation (PDC), the largest shipbuilder during that period, obtained the contract from NDC to construct five prototype ships of 3,000DWT class. It did not deliver any design. The standardization of shipping design was expected to reduce construction time (by as much as 25 percent), and afford economies of scale to shipyards

and the ancillary sectors. It could have facilitated learning and lowered construction costs. The PDC also cornered the government R&D funds for developing local capacity to build vessels of at least 65,000DWT class. In the end, however, PDC produced a 6,000DWT class at a cost 60 percent higher than if the vessel were constructed in Western Europe.

It is not unreasonable to suspect that the technological development of the shipbuilding industry was deliberately undermined to justify the continuous importation of vessels, which as noted above, was a source of rake-offs for the Marcos cronies. The PDC was then controlled by the Bataan Shipyard and Engineering Corp. (BASECO), where the Romualdezes (Marcos' brother-in-law) held substantial stakes, while also invested in the shipping industry.

When the government withdrew all forms of support to shipbuilders in 1985, it argued that the incentives afforded to the industry compromised the development of the shipping sector. This contention of course contradicted the rationale of the MIDP which found congruence in the development of shipping and shipbuilding sectors. In any case, since 85 percent of shipbuilding cost was accounted for by imported raw materials, the suspension of tax and duties exemption was sufficient to decimate the industry and reduce it to a boat industry fabricating tugboats, barges and fishing vessels. Ship repair activities however continued even in the absence of government support. They were sustained by foreign capital — Japanese and Singaporean multinationals — which had stakes respectively in the two biggest shipyards, Philippine Shipyard and Engineering Co. (PHILSECO,

formerly BASECO), and Keppel Shipyard Philippines Inc. (in Subic). But the Philippines had already fallen far behind Singapore in terms of technology and equipment in ship repair.

In the 1990s, the Philippine government renewed its interests in developing the shipbuilding industry, with the vision of making the country a maritime hub in the Asia-Pacific Region. As part of the “Pole Vaulting Strategy”, shipbuilding and ship repair were again included in the IPP, which meant that the tax and duties exemptions in the 1970s were restored. This attracted the entry of Tsuneishi Holdings Corp. of Japan in 1997. Significantly, Tsuneishi partnered with the Aboitiz Group, one of the three families that controlled the shipping industry in the Philippines. Tsuneishi shipyard in Cebu was the first to construct bulk carriers in the country.

Cognizant that global shipbuilders, particularly Japanese and Korean, are moving their investments overseas, the Philippine Congress passed the “domestic Shipping Development Act of 2004³⁷⁾” to make permanent the investment incentives in the shipping and shipbuilding sectors in order to attract more foreign ship yards in the country. The government prepared yet another comprehensive development plan for shipbuilding and ship repair in 2007. Hanjin Shipyard of Korea, one of the world’s largest shipbuilder, responded and developed a second shipyard in Subic.³⁸⁾

And yet it is worth noting that the current incentives granted to

37) Also known as Republic Act No. 9295.

38) The first shipyard in Subic was developed by Keppen.

shipbuilders, consisting of value-added tax exemption, accelerated asset depreciation, net operating loss carry-over and progressive restriction on vessel importation³⁹⁾, are far less aggressive than those offered by other developing countries. Elsewhere, financial assistance to shipbuilders are large and comes in different forms such as investment aid, loans and payment guarantees, direct loans to buyers of locally built ships, and mandatory requirement to order ships at domestic yards, among others.⁴⁰⁾

A division of labor between foreign- and Filipino-owned shipyards has somewhat evolved recently. Foreign-owned yards (Hanjin, Keppel and Tsuneishi) are constructing bulk carriers, ostensibly for export, while Filipino-owned yards (Colorado, Herma and Gensan) are building passenger cargo vessels, potentially for the domestic market. Apart from this, the current conditions in the industry are akin to those in the 1970s. Despite foreign capital and technology, productivity in the Philippine shipyards is still generally lower than in the foreign yards, i.e., it takes longer to build and repair vessels locally. As a result, domestic ship owners still prefer vessels constructed in foreign shipyards because of lower cost and shorter delivery time.

4. The Steel Industry

Early architects of the Philippine industrialization program must have believed that the fate of shipbuilding and steel sectors were

39) This is initially set at 500GT.

40) Mickeviciene (2011), p. 214.

intertwined.⁴¹⁾ The steel industry was envisaged to be the catalyst for a number of sectors including shipbuilding, which is why the integration of the country's steel industry was set in motion ahead of the MIDP and other industrial programs. Yet the forces that foiled the growth of the shipbuilding program and those that prevented the steel industry from spearheading industrialization were different and unrelated. In retrospect, one program could have gotten ahead without the other. Still the success in both could have created a virtuous cycle of industrial growth as it did for Japan and Korea.

To be clear, the iron and steel industry embraces a chain of activities starting with the transformation of raw materials (such as iron ore and coke) into primary steel products (namely ingots, slabs, blooms and billets), manufacturing of intermediate steel (hot-rolled coils, plates, cold-rolled coils, bars and rods), and production of finished steel (e.g., G.I. sheets, tin plates and wires). An integrated steel mill performs the entire gamut of these processes, from smelting of iron ores to manufacturing of end-user steel. Before the integrated steel development program and until now, the local production chain is discontinuous, so that various steel products at different stages are imported. For

41) This is reflected in the fact that a single government corporation, the National Shipyards and Steel Corporation (NASSCO), was created to undertake public investments in dockyards and integrated steel mill. In the late 1950s, however, it was proposed that NASSCO be divided into two separate entities to be known as the National Steel Corporation (NSC) and National Shipping and Shipyards Corporation. The split did not happen until 1974. But the proposal was probably triggered by the recognition that the shipbuilding and steel programs could be pursued separately.

example, blooms and billets are locally produced, but ingots and slabs are sourced abroad. Some finished steel products are manufactured locally (e.g., small structural shapes, bars and wires) but intermediate steel such as coils, plates and wire rods are imported. A domestic iron and steel industry therefore exists, but it is not integrated.

The plan to integrate the iron and steel industry dated back in the 1950s and must have been motivated by at least two factors. An integrated facility would allow the Philippines to supply the steel requirements in the Asian region since only Japan had an integrated steel industry at that time. It could also provide the link between manufacturing and mining, particularly iron mines, and lead to the development of iron ore, coal and refractory industries in the country.

In 1955, the National Shipyards and Steel Corporation (NASSCO), a government entity, was tasked to establish and operate a pig iron smelting plant to jumpstart the backward integration of the industry.⁴²⁾ It was also authorized in 1957 to borrow US \$62.3 million from the US Eximbank to finance the importation of plant machinery and equipment. At the onset, the integration was envisioned as a public monopoly undertaking. A law was passed⁴³⁾ prohibiting other entities from setting up a pig iron smelting plant until NASSCO achieved commercial operations. Yet on the prodding of the US Eximbank, the

42) NASSCO was created in 1951, nearly two decades ahead of the Korean Pohang Iron and Steel Corporation (POSCO).

43) Republic Act 1396.

Philippine government had to turn over the management of NASSCO and its 49 percent equity interest therein to a private entity. This was apparently to shield the project from the bureaucratic inefficiencies that troubled past government initiatives.⁴⁴⁾

In 1959, the Jacintos who were then operating a steel mill in Iligan, won the bid to partner with NASSCO. The joint venture was incorporated as Iligan Integrated Steel Mill Inc. (IISMI) and received a package of incentives that included import controls over competing products, foreign exchange allocation, 10-year holiday from taxes, levies and fees, and importation priority for their raw material requirements. In 1962, the government sold out to the Jacintos, turning the integration project into a fully private undertaking. Still the government, recognizing the sizable financial resources required by the project and the long gestation period before investments could be recouped, committed to provide full backing for the project.⁴⁵⁾

These changes in equity structure delayed IISMI's integration plan. The US \$62.3 million loan from Eximbank would have been sufficient to set up a fully integrated steel mill in 1957. But by 1963, the loan was just sufficient for a cold- and hot-rolling mill. An understanding was reached between the Jacintos, the Philippine government (under the Macapagal administration) and Eximbank that the blast furnace would be constructed at a later time with funding from the DBP and two other government

44) There were allegations, however, that the loan condition was a result of the lobby of US steel manufacturers.

45) Valencia (1993), p. 4.

financial institutions.⁴⁶⁾

After the construction of the cold- and hot-rolling mills in 1969, the Jacintos requested for additional US \$70 million to finance the blast furnace. But the Marcos administration refused to honor the commitment of its predecessor to provide full financial backing for the project. The global oil price shock in the early 1970s, followed by a sharp peso devaluation, interest rate hike and scarcity of foreign exchange, made it difficult for the Jacintos and other industrialists (whose loans were also guaranteed by the government) to meet their debt obligations. DBP bailed out the industrialists closely allied with the Marcoses, but foreclosed the assets of IISMI. In 1974, the National Steel Corporation which spun off from NASSCO, took over IISMI.

There were conflicting accounts on the real sources of financial troubles of the Jacintos. One study attributed the problem to mismanagement and diversion of funds from IISMI to the other business interests of the family.⁴⁷⁾

Another view ascribed the problem to the government renegeing on its commitment to provide protection from imports and domestic competition. Indeed, another domestic steel company (Elizalde Steel Rolling Mills) was allowed to put up a cold-rolling mill at about the same time as IISMI. The withdrawal of investment incentives to IISMI may be contrasted to the steady and massive government support received by the six largest steel producers in Japan during the 1950s. The Japanese government

46) Ibid.

47) UP Business Research Foundation (1973).

provided steel producers full support including subsidies on raw materials, import ban on foreign steel, low interest and flexible loan terms, and various tax incentives.

Following NSC's takeover of IISMI, the primary capacity of the plant expanded nearly seven-fold as NSC acquired the facilities of other local steel companies that were under financial distress.⁴⁸⁾ Eventually, NSC enjoyed near monopoly position for almost two decades from 1978 to 1992; it became the country's leading producer of billets, the only tinsplate producer, and dominant producer of flat-rolled steel. However its market vulnerabilities were laid bare by the trade reform that began in the 1980s which brought down the tariffs of most steel products to 3% and allowed easy entry of imports from Taiwan and South Korea.

A key difference between the Pohang Iron and Steel Company (POSCO) of South Korea and NSC is that the former used its period of monopoly to acquire new technologies and facilities from different sources (mostly Japan and Europe) on automation, large-scale blast furnaces, continuous casting equipment and mini-mill technology, among others (Enos and Park 1988). To be sure, the NSC had two phases of expansion projects between 1983 and 1992 which resulted in the computerization of its system and acquisition of high convection furnaces, but the scale and depth of its technological upgrading do not compare to that of POSCO's. Moreover, POSCO invested heavily in research and development

48) For example, NSC acquired the cold rolling facilities of Elizalde Steel in 1978 and its tinning lines in 1981, the billet making facilities of the Philippine Blooming Mills, Inc. in 1984, and cold rolling equipment of Visayan Integrated Steel (VISCO) in 1985.

by setting up the Pohang University of Science and Technology (POSTECH) in 1986 and the Research Institute of Industrial Science and Technology (RIST) in 1987. There was no similar initiative from NSC. In fact, NSC's business in tinsheets quickly disappeared with the entry of imports from South Korea because it failed to recognize that the market demand has already shifted from electrolytic tin plate sheet (which it was producing) to coil.

The recent initiatives of the Philippine government to put integration of the steel industry back on track have met limited success. In 1991, to raise interests in the NSC that was then the object of privatization, the Congress passed a legislation that reinstated the incentives accorded to investors in primary and intermediate steel production during the 1960s and 1970s, and added some more. Among the new incentives stipulated in the Philippine Iron and Steel Industry Act⁴⁹⁾ are: (i) allowing steel producers to directly generate or co-generate their own power; (ii) including steel projects among those eligible for ODA financing; and (iii) preferred use of locally manufactured steel products in government construction projects. In 1993, then President Ramos called on private businesses to take lead in the integration program. Only one, Philsteel Group, responded with actual investments in midstream and downstream sectors.⁵⁰⁾

Such cold reception from the business sector may be a sign of

49) Republic Act No. 7103, promulgated 8 August 1991.

50) Although the iron and steel industry is included in the 2012 IPP list, it has been delisted and reenlisted several times since 2000. In most cases, an industry is included in the IPP because of the strong display of interests by foreign and domestic investors.

continuing mistrust on the Philippine government's resolve to pursue an industrialization program based on its past policy flip-flopping and vacillation. But it could also reflect the international division of labor in steel production that has emerged since the late 1980s. It appears that steel producers from Japan, South Korea and Taiwan are interested in investing in developing countries only in the rolling sector (such as cold rolling and surface treatment) — not in the integrated steel production. These investors are inclined to import primary steel from their home countries, and to keep the high value-added processes there.⁵¹⁾ If this reading is accurate then it would do well to rethink the strategy of propelling industrialization through the integration of the steel industry at this stage of globalization.⁵²⁾

5. Evaluation of Philippine Industrial Program

The Philippines abandoned industrial planning since the 1990s on expectation that pursuit of macroeconomic stability, opening of markets to greater competition, efficient mobilization of savings and investments to finance infrastructure, and freeing up of markets from shackles of poor regulation will lead to economic growth and industrial development subsequently. This is not to

51) Sato (2009), p. 29.

52) A potential exception to this trend is the recent entry of China-based TKC Steel Corp in the Philippines. In 2010, the company announced that it plans to commission blast furnace in order to produce steel billets from locally sourced iron ore. Current reports, however, indicate that the company is still manufacturing billets from scrap metal. TKC is currently using the facility of IISMI for its production.

imply that recent administrations have been any less concerned about industrial development than their predecessors. Indeed, the present Philippine Development Plan (PDP) for 2011~2016 recognizes the need for a globally-competitive and innovative industrial sector to promote inclusive growth. Yet instead of “picking winners”, the PDP lays out a more general plan to improve the business environment, raise productivity and safeguard consumer welfare. The PDP describes the strategy as follow⁵³⁾ :

Business competitiveness will be enhanced by improving governance, strengthening economic zones, and strengthening national brand identity/awareness. To increase productivity and efficiency, government shall focus interventions on key priority areas, provide firm level support to MSMEs, increase market access, expand industry cluster development and intensify the culture of competitiveness. Proactive measures to empower consumers, promote competition and enforce trade regulations shall also be pursued.

Without specifics, the PDP commits to pursue growth in the medium term on the following key areas: tourism, business process outsourcing, electronics, mining, housing, agribusiness/ forest-based industries, logistics, shipbuilding, infrastructure, other high-potential industries such as homestyle products (i.e., furniture and furnishings, holiday decor, houseware and ceramics, woodcraft, giftware excluding toys, shellcraft and basketwork),

53) National Economic Development Authority (2011), The Philippine Development Plan 2011~2016, Chapter 3, p. 2.

wearables (jewelry), motor vehicle parts and components, garments, and construction and related materials.

The foregoing list of so called “key areas”, containing many common sectors with the past lists for targeted intervention, is evidence of lack of structural transformation in the Philippine economy. After over six decades of industrialization, the focus of intervention is still generally on labor-intensive, low-technology sectors. This is because the industrial sector has barely grown during the period. Table 4-3 shows that from 1970 to 2010, the contribution of industrial sector to GDP in 2010 is almost stagnant, from 31.5% to 32.6%, while that of manufacturing sector has declined from 24.5% to 21.4%. On the other hand, the contribution of services increased dramatically from 38.6% to 55.1%.⁵⁴⁾

Table 4-3. Share of Sectors in GDP

Unit : current prices, in percent

	1970	1980	1990	2000	2010
Agriculture	29.9	25.8	21.9	16.5	12.3
Industry	31.5	38.5	34.5	30.9	32.6
Manufacturing	24.5	25.5	25	22.1	21.4
Services	38.6	35.7	43.6	52.6	55.1

Source : Philippine Statistical Yearbook, various years.

54) In developed economies, the share of services sector in national output and employment naturally increases during post-industrialization as the country's comparative advantage evolves. But in a developing country that has yet to attain industrial maturity, the increasing share services sector is due to a faltering industry and manufacturing sector, which Fabella and Fabella (2012) aptly describe as a development progenia (premature ageing).

Table 4-4. Share of Sectors in Employment

Unit : %

	1970	1980	1990	2000	2010
Agriculture	52.1	51.3	44.8	38.6	33.5
Industry	16.1	15.1	15.6	15.8	14.8
Services	30.9	33.5	39.2	46.3	51.7

Source : Philippine Statistical Yearbook, various years.

The weakness of the industrial sector is manifested in its inability to absorb a growing labor force. Thus the share of industry in employment, shown in Table 4-4, has even declined from 16.1% to 14.8% during the period. Consequently, the services sector acts as employer of last resort, absorbing the increases in work force as well as those moving out of agriculture.

Another source of weakness of the industrial sector is its “hollowness”, i.e., the sector is dualistic, comprising of small and large enterprises, with practically no medium-sized firms. The linkages between the small and large firms are also very weak. This lack of backward linkages undermines the competitiveness of large firms, while small ones are unable to compete against imports.

Such lack of competitiveness is mirrored in the structure of exports. Since the 1980s, exports have been concentrated on electronics and garments, as can be gleaned from Table 4-5. Traditional commodity exports, such as coconut and copper, have still significant shares in total exports because there are no new commodities on which the Philippines has acquired competitiveness. In fact, it has lost its export lead in several agricultural and labor-intensive products such as sugar, fish,

Table 4-5. Major Export Commodities

Unit : million US dollars

	1986	1991	1996	2001	2006	2011
Electronics	900	2,293	9,988	22,411	29,673	23,796
Garments	700	1,861	2,423	2,403	941	1,448
Coconut	430	447	730	525	757	1,784
Sugar	76	136	140	32	98	390
Copper	267	396	349	266	1,315	1,465
Gold	112	65	55	31	50	214
Banana	128	158	237	297	405	471
Others	1,991	2,830	6,621	5,348	13,287	18,504
Total Exports	4,604	8,186	20,543	31,313	46,526	48,072

Source : BSP for all except 1986 figures which were taken from the Medium Term Philippine Development Plan 1987-92.

clothing accessories and footwear.

Technological development has been stunted as well, and yet this is not because of lack of opportunities for technology accumulation. FDIs have been particularly attracted in the electronics industry, for example, but they have not created backward linkages that would have facilitated technological diffusion from FDI to domestic economy. Instead, because local suppliers lack technological sophistication, foreign assemblers brought into the country their network of suppliers from their home country. The influx of foreign producers of parts and components deprived local firms of learning and experience that would have been gained from directly supplying foreign assemblers.

It is hardly surprising that given the lack of structural transformation and technological development, much of the woes

of the industrial sector in the past decades, particularly of HCI, remain. In the iron and steel industry, local production of hot-rolled and cold-rolled coil sheets, tin plates and wire rods have stopped because of fierce competition from imports. As a result, the downward industry, specifically tool and die, has been at a competitive disadvantage against imported dies and molds because of high cost of imported raw materials and lack of equipment. The Philippines has copper smelting facilities and is able to extract copper ores, but all the mined ores are exported, while the smelting facilities import all of its ore requirements in the absence of copper rod facility. In manufacturing wiring harness, one of the country's top export product products, all copper rod requirements are imported. The absence of a pulp mill has also made the pulp and paper industry uncompetitive. Finally, the manufacture of automotive parts still lacks the economies of scale as more than half of the vehicles sold in the domestic market are assembled elsewhere.

6. Lessons Learned

By way of unraveling the Philippine enigma, it is worthwhile reflecting on what the Philippines had done and missed that made it different from countries successful in their industrialization bid. Korea presents a useful benchmark to understand the Philippine experience for a number of reasons. The Philippines and Korea embarked on building an industrial base almost at the same time during the 1960s and 1970s; selected a common set of industries to nurture; followed nearly identical development

blueprints for selected strategic sectors; and utilized the same set of policy instruments to channel resources to targeted groups. But Korea was clearly successful in its industrial transition, while the Philippines was not. What made the difference?

The most obvious difference is the consistency, coherence and credibility in the implementation of the industrial programs. The Philippine case studies in automotive, steel and shipbuilding industries demonstrate the kind of inconsistencies and lapses that overturned the goals of the program. For example, the Philippines failed to manage the apparent contradiction in the interests of the shipping and shipbuilding sectors, inadvertently favoring the former over the latter by allowing relatively liberal entry of cheap imported secondhand vessels, offering more financing schemes for the acquisition of imported vessels than of locally constructed ones, and neglecting the ancillary sector. Likewise, the automotive program failed because of the neglect of small and medium-sized parts manufacturers, while assemblers were subjected to weak regulations on local content and limitations on brands and models. As a result, the expectation that the cost penalty of localization would compel foreign assemblers to develop local parts production did not materialize. The program became a disappointment because it did not instigate the technological transfers and knowledge spillovers expected from foreign investments. On the other hand, the integration of the steel industry did not succeed because the government flip-flopped in allowing the private sector take the lead and wavered in its commitment to back them up against external shocks. In contrast, the Korean chaebol did not have to be concerned about policy

inconsistencies and reversals of their government. They were given preferential access to domestic credit and external funds, and were bailed out when threatened by global downturns and financial crisis.

Since the government can intervene in the market only selectively, certain groups or individuals are inevitably favored by such intervention. But here again Korea and the Philippines differ on the amount of discretion that the government exercised to foster favored firms and industries. The basis for and manner of dispensing government “favors” spell the difference on whether those favored turn into purveyors of growth or drag to economic development. In Korea, there were sufficient limits and objective criteria applied in the government’s exercise of discretion to ensure that no individual firm or group was unfairly favored at the expense of another. The government made the chaebol compete for protection by channeling credit, foreign exchange and other opportunities to best performing firms (often measured in terms of export performance). In the Philippines, rewards were based less on performance than on political patronage. There was less incentive among Marcos cronies to strive for efficiency, not only because they chose to concentrate on nontraded and heavily protected sectors, but also because they can easily evade rules. For example, close allies (allegedly the Silverios) were able to evade local content rules.⁵⁵⁾ Thus, the business empires of the cronies flourished more by expropriating rents that are created by uneven application of rules than by generating profits as a return

55) Dohner and Intal (1989), p. 472.

for superior performance.

Where performance rather than patronage is the basis for receiving protection and preferential access to resources, the capacity of the bureaucracy to monitor and maintain systematic records of performance is essential for consistent and credible application of rules. The Korean government was lauded for reliable monitoring and record-keeping system that proved valuable not only in implementing industrial programs, but also in designing macroeconomic stabilization packages.⁵⁶⁾ Such capacity was sorely lacking in the Philippine bureaucracy. As shown in the automotive industry case, the weaknesses in BOI's monitoring of compliance to local content requirement undermined the program's credibility as a platform for industrialization.⁵⁷⁾

Another major difference is the constituency for industrialization in the two countries; they were fewer in the Philippines than in Korea. Industrial policies were perceived to be championed in the Philippines by US-trained technocrats who enjoyed the confidence of international lending agencies but had no political base. And even if they were also in the bureaucracy, they had to constantly compete against landed elites, import-substituting industrialists, cronies and lobby groups in influencing the President who ultimately decides. The concentration of economic wealth in a few families left out a much smaller base advocating for industrial reforms. Most of the Marcos cronies found it

56) Collins and Park (1989).

57) A more telling case of this weakness was the overstatement of the country's reserves that was unfortunately discovered when the country declared moratorium on debt repayments in 1983.

convenient to extract rents from traditional export commodities (e.g., sugar, banana and coconut) and nontraded sectors such as communications, finance, construction, transportation, electricity generation and distribution services. Few among the cronies were interested in developing the manufacturing base. In contrast, the Korean economy had a more egalitarian distribution of income at the onset, which helped in developing domestic demand for local manufactures, as well as a support base for industrial changes.⁵⁸⁾

The economic decision-making process was much more complex and long-winded in the Philippines even under an authoritarian rule since it was still politically expedient to weigh and balance the competing interests of the different elite groups. As a result, many economic decisions, involving changes in trade and industrial policies, were made at the brink of a crisis (usually related to balance of payments). These decisions were often ad hoc, rather than purposive attempts to promote industrialization. Korean policies and programs, on the other hand, reflected more homogeneity in decision-making, thus they tend to be more consistent with the country's chosen development path. Moreover, since the chaebol grew their wealth out of special privileges received from the state, they were more pliant to the policy designs of the government. Absent constant wrangling between landed elites and industrial barons, it was more feasible to push for a comprehensive development strategy and to switch paradigms (between import substitution and export promotion)

58) Immediately after liberation, Japanese-owned lands in Korea were either redistributed or sold, and land reform was earnestly pursued. Concentration of land ownership (and economic wealth) declined dramatically as a result.

when the conditions warrant.

Yet perhaps the most critical component in the Korean success was the profound understanding of the government that active intervention is necessary to achieve technological development. The obvious but often neglected reality by many developing economies, including the Philippines, is that technology does not transfer automatically as a result of opening up to foreign trade and capital flows. The Korean government had a wide array of policies geared towards stimulating market demand for technology, increasing S&T supply, and creating effective linkages between demand for and supply of technology.⁵⁹⁾ And the chaebol had been efficient in utilizing the periods of protection to advance their technologies. The Philippines, by contrast, did not even have a cogent set of technology policies to speak of.⁶⁰⁾ Not surprisingly, those afforded protection found no exigency to build their technological base. Thus, they were easily crashed by the weight of competition when the trade protection was removed.

In the end, the real issue is not the aptness of state intervention in the market to pursue development objectives, or of choosing sectors to promote. Indeed industrial development requires both. The real challenge is designing and implementing comprehensive, coherent, credible and long-term programs that would not only harness the country's existing potentials, but more importantly create new ones.

59) Kim and Dahlman (1992).

60) Abrenica and Tecson (2003).

Chapter 5

The Process and Policy of Brazil's HCI Drive⁶¹⁾

1. Introduction

Like many other countries, Brazil adopted a pro-active industrial policy during much of its recent history. Although it was able to shift the structure of its economy in favor of certain industries, most of the time it failed to develop industries that were internationally competitive.

This being the case, in addition to identifying and describing the policies adopted by the Brazilian government over time, this article will attempt to provide an understanding of the reasons for this policy failure in terms of international competitiveness. In this regard, it proved to be helpful to compare Brazil with countries in similar circumstances that, unlike Brazil, have been successful. Accordingly, we chose to contrast Brazil with South Korea.

Particular emphasis will be given to the period that begins

61) Written by Dr. Mauricio Canedo Pinheiro (FGV, Brazil).

with the Target Plan, the first organized and articulated industrial policy planning experience in Brazil, and ends with the II NDP, when this experience resumed. This is the period when Brazil began to venture beyond the consumer goods industries, seeking to encourage the development of more capital-intensive heavy and chemical industries. Hereafter this is referred to as the HCI drive.

Specifically, we intend to show how flaws in the design and implementation of incentives in industrial policy, the failure to pay sufficient attention to human capital formation, the lack of care in dealing with innovation and the inability to make adjustments while the process of industrialization was underway, were responsible for the differences in results in the experiences of Brazil and South Korea with respect to industrial policy.

2. The First Brazilian HCI Drive: The Target Plan

(1) The HCI drive: Why?

Although the first attempts at industrial development policies date back to the 1920s, only in the beginning of the 1930s a systematic concern about this issue by the Brazilian government begins to emerge. But it was not until after the end of World War II that this concern was transformed into a more articulated and conscious industrial policy.

In fact, the efforts for analysis and planning began a few years earlier. In the Eurico Gaspar Dutra (1946~51) administration the SALTE Plan was designed. It did not include a strategy for

industrialization, but prepared an analysis of need for infrastructure, which ultimately became one of the bottlenecks for Brazil's industrial development. Further, although it never got beyond the paper stage, the SALTE Plan resulted in the creation of the National Bank for Economic Development (BNDE) in 1952, during the second administration of Getulio Vargas (1951~54).⁶²⁾ The government planning and analysis effort continued with the Joint Brazil-United States (Joint Commission), and later with the Joint ECLAC-BNDE Group (GMCB).⁶³⁾

The results were used in the preparation of a program for the promotion of industry, coordinated by the staff of the presidency, which once again was not put into practice. However, the efforts for analysis and institutional mobilization culminated in the definition of the Target Plan, put into practice during the administration of Juscelino Kubitschek (1956~61) [Suzigan (1996)].

Brazil had already been through an initial process of import substitution, which eventually generated a poorly integrated process of industrialization focused mainly on consumer durables. There were huge bottlenecks, especially in energy and transportation, but also with respect to intermediary industrial inputs. The efforts at analysis mentioned above had identified the need for significant investments in infrastructure, and the

62) Not until 1982 did the Bank assume its present name: National Bank for Economic and Social Development (BNDES).

63) The Joint Commission was formed under the Ministry of Finance and composed of experts from US and Brazil. It was the result of negotiations between Brazil and the United States that began in 1950, to finance a program of modernization of the infrastructure sectors of the Brazilian economy. ECLAC refers to the Economic Commission for Latin America.

development (or expansion) in domestic productive capacity in certain basic industries. The main economic reason for justifying the HCI drive was external vulnerability.

However, this was not the only option. Nor even the most obvious. The Brazilian economy was already showing signs of crisis. By the 1950s, inflation exceeded 25% per year, there was a severe fiscal imbalance and external strangulation was imminent. At the same time, most countries in Latin America were opting for contractionist adjustment. Even Brazil was already thinking about solutions in this direction during the second Vargas administration (1951~54) and the abbreviated government Cafe Filho (1954~55) [Vianna (1990) and Pinho Neto (1990)].⁶⁴

From a political point of view, a broad consensus had formed and there was a base of support for HCI drive, as opposed to the economic stabilization alternative. For the Brazilian industrialists, maintenance of expansionist policies and the promotion of domestic production of selected inputs was an attractive solution. Added to this, the philosophy of Brazilian developmentalist economic thought — with an emphasis on state planning to promote industrialization — that originated with from ECLAC was widely held by many technical experts. In addition, several other organized sectors of the public were mobilized in favor of the HCI drive, under the banner of economic nationalism. There were national aspirations to have Brazil participate in industrial sectors that are more often associated with mature economies [Rabelo

64) Vice President Cafe Filho assumed the Presidency after the suicide of Getulio Vargas, originally elected for a term of five years between 1951 and 1955.

(2003)].

In other words, the HCI drive was not only motivated by economic necessity, but also as the result of a strong political will of the government that was validated by various sectors of the Brazilian public. For this reason, the Target Plan went beyond a simple response to the need to correct external imbalances generated by the previous process of import substitution. In fact, it encouraged the development of capital goods sectors producing capital goods that tended to generate additional pressure on imports [Lessa (1975)].

Not coincidentally, President Juscelino Kubitschek (1956~61) was elected with a government program whose motto was to advance “Fifty Years in Five”, and put the Target Plan, an ambitious program of investment in infrastructure and promoting the domestic industry into operation.

(2) The role of government

In addition to identifying the sectors that would be the targets of industrial policy, the government took an active role in the HCI drive. The policies used by the government can be grouped into three broad categories: (i) selective protection of the domestic market, (ii) attraction of foreign capital, (iii) directing credit (both public and private). As a result, as with the analysis, many of the necessary policy tools were already available prior to the decision to promote these sectors.

1) Selective protection of the domestic market

In 1949, under President Eurico Gaspar Dutra (1946~51), a system of import licensing was implemented. Only imports of essential consumer goods were allowed and then only when similar goods were not available on the domestic market.⁶⁵⁾ An overvalued exchange rate also made the import of capital goods relatively cheaper, which helped to foster investment in new industrial sectors, funded by the significant increase of credit by public banks, especially by the Bank of Brazil [Vianna (1990)].⁶⁶⁾

However, exchange rate appreciation eroded the competitive position of Brazil's main export products. Thus, in 1953, during the second Getulio Vargas administration (1951~54) there was a period of currency reform. This resulted in Superintendence of Currency and Credit (SUMOC) Instruction 70, which created a system of multiple exchange rates.⁶⁷⁾

In the Target Plan a multiple exchange rates system was used for a more systematic development of selected sectors. Higher priority was given to the imports of essential raw materials, some

65) It is the Similar Nacional Law sanctioned in the late nineteenth century, but its use was intensified in 1949. For more details see Baer (1996). It should be noted that initially import controls were adopted to overcome the shortage of foreign currency reserves. Gradually, as the effects in terms of promotion of domestic industry were perceived, it turned into an instrument of industrial policy.

66) The Bank of Brazil is a public commercial bank. At that time it was responsible for more than 40% of private banking and was the main financial agent of the government.

67) At that time Brazil had no central bank (it not created until 1964), and its functions were divided between the SUMOC, the Ministry of Finance and the Bank of Brazil.

types of equipment (especially capital goods associated with the shipbuilding and automobile sectors) and goods that could not count on a reliable domestic supply, which enjoyed a relatively more favorable exchange rate. At the same time, the sectors selected for development were protected from international competition by an undervalued exchange rate.

Import tariffs were also significantly increased, and rates reached 150% in some cases. Furthermore, Brazil increased and tightened the examinations of “similarities”: the industries that proved to be able to meet domestic demand were protected from foreign competition. Minimum domestic content requirements also became common [Orenstein & Sochaczewski (1990)].

2) Attracting foreign capital

Another important policy tool was SUMOC Instruction 113 enacted in 1955, during the Cafe Filho administration (1954~55), that allowed the discretionary issue of licenses to import equipment without hedging the exchange rate. With declining revenues from coffee exports and increasing external strangulation, this was one of the solutions to modernize the domestic industry without pressuring the balance of payments. In addition, this measure also was designed to attract the foreign capital investment needed to sustain growth in Brazil. Basically, imported equipment was recorded on corporate balance sheets as an investment under a free exchange rate, while the profit remittances were made at a preferential exchange rate. Exchange rate differentials made these investments more attractive [Caputo & Melo (2009)].

3) Directed credit

Finally, the government played an important role in directing credit to selected sectors. In this respect, the creation of the BNDE in 1952 had a preponderant role. Initially BNDE loans were funded through compulsory loans from income tax receipts and were used to finance infrastructure investments. With the advent of the Target Plan, its activities were redirected to making long-term loans to domestic companies, at low rates of interest, extended grace and amortization periods, and covered a significant percentage of the project [Lessa (1975)].⁶⁸⁾

In addition, the BNDE was important in underwriting projects by assuming co-responsibility for the settlement of foreign debts and loans, obtained from foreign companies that were willing to invest in the sectors that were included in the Target Plan.

4) Summary

In summary, the Target Plan was based on a three-point nexus formed by government, private domestic and private foreign capital. The government, in addition to assuming responsibility for investments in infrastructure, also increased its direct activities in certain industries through state enterprises. Private domestic capital was attracted to sectors selected by the BNDE for in direct credit and surety for international financing, as well as those in

68) Given the high rates of inflation, real interest rates of these loans often became negative.

the domestic market that were protected through exchange policy and import controls. Private foreign capital also benefited from the protection mechanisms in the domestic market, and also by a more foreign investment friendly policy, under SUMOC Instruction 113.⁶⁹⁾

(3) Selected industries and participating companies

1) Selection criteria

One of the fundamental elements of the Target Plan was the selection of the industries to be promoted, with the definition of production targets for each. It should be noted that the goals were often to be taken as indicative and often described in terms of sectors rather than specific companies. Moreover, there was no kind of punishment in case of the failure to comply with the goals.

Accordingly, the selection of the majority of the sectors was based on the principal bottlenecks in the Brazilian economy, as identified by the US-Brazil Joint Commission and the ECLAC-BNDE Commission. In other words, the Target Plan was primarily focused on investment in infrastructure (energy and transportation) and substitution of imports in some sectors that produced intermediate inputs (chemicals, steel, heavy machinery and electrical equipment).

For this reason, investment planning was largely done to ensure the Brazil's self-sufficiency with respect to these inputs in

69) Although they were less important, tax reductions and exemptions were also used.

order to mitigate the external constraints that Brazil was facing. The targets were selected based on studies that estimated the trend of domestic demand for each input in subsequent years. From the existing domestic supply, the increase in production needed to meet this demand was calculated (and revised as the plan was being put into practice). Included in this group, among others, are the steel, aluminum and chlorine-soda industries, petroleum refining, pulp and paper and cement.

However, as noted above, the Target Plan also included sectors producing capital goods, which unlike those promoted to mitigate external constraints, tended to add to the pressure on imports. The shipbuilding and automobile industries certainly fit that description.⁷⁰⁾

As for the participating companies, the option was the use of state-owned enterprises in sectors where private sector interest was lacking. In other sectors, both private domestic and foreign capital were encouraged to participate in the investment effort.

The private projects were selected by sector executive groups that evaluated their feasibility, and passed through the filters of the BNDE and SUMOC, to make sure that the projects were compatible with other projects in the sector, and capable of attracting international financing and having foreign exchange earnings capacity (this governance process will be explored in

70) The decision to develop the automotive industry is in part a result of the option to prioritize investments in road infrastructure in the Target Plan. Something similar can be said with regard to shipbuilding and investment in modernization and expansion of the Brazilian ports. As less attention was given to the railroads, the same occurred with the industry rail transport technology.

more detail below).

The following are some sectors that were identified under the Target Plan that are further analyzed with respect to the selected companies and funding sources.

2) Steel

In the steel industry the option was mostly for companies with state control. Brazil already had some capacity in the sector, mainly due to the start up of operations of the National Steel Company (CSN) in 1946. The construction of the plant was the result of diplomatic agreement signed in 1942 between Brazil and the United States, which included a loan, key to enabling the creation of CSN (and also of Companhia Vale do Rio Doce — Vale). The Target Plan caused installed capacity to increase and the costs were paid from its own resources, capital increases and loans from the Eximbank.

In addition to expanding the capacity of smaller steel companies — Belgo Mineira, Aliperti, Acesita, Lanari and Barra Mansa — two new large companies were developed: Cosipa and Usiminas, both with state control. Cosipa used public funding (BNDE, the federal government and the state government of Sao Paulo) as well as private funding, from Europe (with the approval of the BNDE). Usiminas also had international funding (from Japan, endorsed by the BNDE), as well as domestic capital from BNDE loans and capital subscription by the federal government, the state government of Minas Gerais and private shareholders. For the industry as a whole, approximately 40% of total

investment originated from abroad [Dias (1993)].

3) Aluminum

Brazilian production of aluminum was started in 1951, controlled by two groups: Electrochemical Brazilian (Elquisa), owned by the Canadian Alcan and Brazilian Aluminum Company (CBA), national private company. The production did not reach the installed capacity, due to shortfalls in electric power supply. Accordingly, the Target Plan envisaged investments in hydroelectric power to overcome this problem, as well as investments in the expansion of production capacity of these two companies. The BNDE was involved in the financing the expansion of CBA, directly financing the investments and giving its approval for a foreign loan. For the industry as a whole, BNDE was directly responsible for 20% of the funds, with the remainder divided between companies assets (18%), private domestic sources of funding (32%) and foreign financing (31%).

4) Chlorine – Soda

In the chlorine-soda industry the majority of options were for state-owned enterprises. The Target Plan provided them with funding from the BNDE, achieving a substantial increase in production capacity at the state-owned Companhia Nacional de Alkalis (CNA), then the nation's largest provider of caustic soda and soda ash (sodium carbonate). Some smaller projects involving private national capital were also provided with federal funding.

Most funds originated with the BNDE and the endorsements by the bank for foreign loans for CNA. The CNA also embodied French capital and technology [Pereira (2010)].

5) Petroleum refining and related industries

In this sector the option for state companies was even stronger. In 1953, during the second Vargas Administration (1951~54), a state monopoly in refining (and production) of oil was established and Petrobras was created. The Target Plan forecast an increase in the refining capacity of the state-owned company, as well as the start of an oil prospecting program.

In related industries, although there was not a state monopoly defined by law, the option was also to use Petrobras. For example, it was deemed the company's responsibility to build a synthetic rubber plant and another for fertilizers.

6) The automotive industry

In the automotive industry, the first choice was to use private capital. In this case, foreign capital was predominant in the production of motor vehicles, while Brazilian companies, often associated with companies from other countries, were more important in the production of auto parts.

The sector was the largest beneficiary of SUMOC Instruction 113, receiving approximately US \$ 190 million in foreign direct investment between 1955 and 1964. Of this total, the majority came from the US (48.2%) or from Germany (28.7%). As an

example, General Motors invested around US \$ 25 million, Ford approximately US \$ 22.5 million and Volkswagen US \$ 14.3 million [Caputo & Melo (2009)]. The BNDE played a very small role in financing these investments.

The Target Plan not only called for an increase in the production of motor vehicles, but also imposed domestic content requirements. These requirements helped several companies to develop a national metalworking industry, specifically in the auto parts sector. Between 1946 and 1960 the number of companies producing parts in Brazil increased from 30 to 1,300 [Colistete (2010)].

While companies from other countries established subsidiaries in Brazil, the presence of domestic companies was remarkable. Many of them associated themselves with foreign firms to import, assimilate and adapt technology. Examples of this strategy are Metal Leve, which gained technical assistance from the German company Mahle in the production of pistons and piston pins, Cofap, which entered into several partnership agreements with German (Boge and Mahle) and American companies (Perfect Circle, Monroe and Thompson) for the production of piston rings, shock absorbers and cylinder parts, and Cobrasma, who joined the North American Rockwell Spring for the production of truck axles and differentials [Dias (1993), Colistete (2010)].

BNDE funding was much more important in the case of auto parts than in the production and motor vehicles. The development bank participated either through direct financing or through the support for foreign borrowing for several projects, including for the Cobrasma and producers of electrical parts,

forgings, cast iron parts, engine blocks and parts made of malleable iron.

7) The shipbuilding industry

In the shipbuilding industry, in the majority of cases, funding came largely from private capital. Several small Brazilian shipyards were upgraded and production capacity was increased. This was especially true for the CCN Maua shipyard, which obtained major funding from the BNDE.

In addition, two large shipyards linked to international groups were installed. The first — Ishibras — was linked to Japanese shipbuilders Ishikawajima and received funding as well as equipment from the head office and funding from the BNDE. The other — Verolme — was a subsidiary of the Dutch group Verolme United Shipyards [Dias (1993), Geipot (1999)].

8) Where to find key production factors?

Table 5-1 summarizes the information, indicating the sources of funding, technology and principal companies in some of the sectors in the Target Plan.

Table 5-1. Target Plan - Where to Look for Key Production Factors

Industry	Sources of Funding	Sources of Technology	Leading Companies
Steel	BNDE and foreign capital (U.S.-Eximbank - for CSN, European and Japanese Cosipa for Usiminas)	United States and Japan	CSN*, Usiminas* and Cosipa*
Chlorine-Soda	BNDE, and foreign (French) capital	France	CNA*
Aluminum	BNDE private domestic and foreign capital		CBA**, Elquisa***
Oil Refining and Related Industries	Government budget and BNDE		Petrobras*
Automotive	BNDE and foreign capital, mainly through Instruction 113 of SUMOC	United States and Germany	Ford***, GM***, Volkswagen*** and Mercedes Benz*** in vehicle production and several Brazilian companies in auto parts manufacturing (Romii**, Cofap**, MetalLeve**)
Naval	BNDE and foreign capital (Japan for Ishibrás and the Netherlands for Verolme)	Japan and the Netherlands	Ishibrás***, Verolme*** and CCN Mauá**

Source : The author with data taken from various authors. More details throughout the text.

Note : * company with state control, ** private domestic capital, *** private foreign capital or subsidiary of a foreign company.

(4) Governance

As mentioned previously, while the Target Plan implied an increase in direct public sector participation in the economy, the government was also given the important role of inducing private sector activities (domestic and foreign). Thus, it became necessary to create a framework of governance to harmonize activities

within the government and coordinate them with the efforts of the private sector.

To do so, the Council for Development, connected directly to the Office of the President, was created. Initially its role was to be the overall coordinating agency and formulator of policies associated with the Target Plan. However, it was not successful in doing so, and limited itself to monitoring the implementation of actions and verifying their results.

While it did not function well as a coordinator of the Target Plan, the Development Council gave rise to several special administrative entities, one for each sector covered by industrial policy. These were collegial bodies that coordinated the efforts of the government agencies responsible for handling different policy instruments. Among these were the Executive Group of the Automotive Industry (GEIA), the Executive Group of Shipbuilding Industry (GEICON), Executive Group of Agricultural Machinery (GEIMAR) and Executive Group of Heavy Mechanical Industry (GEIMAPE).⁷¹⁾

Given its composition, the proposals of the executive groups were not very difficult to meet, and it functioned as a coordinating body of the various agencies of government and acted to remove any bureaucratic obstacles to achieving the goals set for each sector [Lessa (1975)].

Another important coordinating body was the BNDE. As a practically mandatory checkpoint for government programs, it

71) While some groups have enjoyed much autonomy and extensive duration (GEIA and GEICON, for example), others existed only briefly.

assumed, albeit informally, the function of a center for analysis of the Target Plan. The BNDE played an important role in the alignment and organization of programs and decisions taken in isolation at the sector level, a function that initially fell to the Development Council [Dias (1993)]. SUMOC had similar role, but limited to assuring the compatibility between the availability of foreign currency and the authorizations granted by CACEX to import at favorable exchange rates [Lessa (1975)].⁷²⁾

Finally, for the exclusive goals of the public sector, the biggest challenge was to overcome the administrative rigidity and the Brazilian budgetary process, which made the funding of projects that required large investments for long periods of time more difficult. The solution was to use state-owned enterprises and independent agencies, which enjoyed greater operational freedom, combined with funds from sources that were not subject to budget restrictions. In this case, since the funds were insufficient and it was necessary to complement them with outside funding, it fell to BNDE to act as the overall coordinator of the actions associated with the goals of the public sector as it did with the private sector.

(5) Human capital and R&D: The forgotten elements of the target plan

Despite the arrival of skilled foreign workers (Europeans, mostly)

72) CACEX was the agency responsible for the licensing of exports and imports. Also worked in the financing of Brazilian foreign trade.

to Brazil, the supply of skilled labor was quite scarce at the start of the Target Plan [Thoumi & Teitel (1986)].

But in contrast with the South Korean experience, little attention was devoted to human capital formation. In 1951 the National Campaign for the Improvement of Higher Education was created, in order to ensure the supply of skilled personnel in sufficient quantity and quality to guarantee the development of Brazil.⁷³⁾ Although in the early years it encouraged the hiring of foreign teachers and granted scholarships for Brazilian students to study abroad, its activities were very discreet under the Target Plan.

Coincidentally, planned investments in education accounted for only 2.8% of the total Target Plan, and basically were used for vocational education programs and the establishment of the Federal University of Brasilia (UNB).⁷⁴⁾ In later years investment in higher education and professional training increased, but nothing to compare with the South Korean effort to recruit and train engineers demanded by sectors subject of industrial policy and the promotion of professional training centers [Kim (2013)].

Moreover, during the Target Plan and in the following years, basic education was relegated to the background. This explains why the average levels of education of the population, which was already lower than most developing countries, stagnated

73) It is currently called Coordination of Improvement of Higher Education Personnel (Capes).

74) The creation of UNB was a necessity derived from the construction of the new capital, and not a strategy to meet the demand for human capital in the sectors that were targeted in the Target Plan.

throughout the 1970s (more details on this topic in section 5).

The same can be said with regard to research and development. In 1951 the National Research Council (CNPq) was created, which at the time centralized the coordination of national policy for science and technology.⁷⁵⁾ But the BNDE only opened a specific financing line for innovation and technology, the Fund for Scientific and Technical Development (FUNTEC), in 1964 and not until 1965 was a government agency established specifically for the innovation promotion, the Research and Projects Financing Agency (FINEP). But even after these initiatives, the government's actions remained focused, with rare exceptions, on increasing production capacity, with little attention and less mobilization of funding for actions to promote innovation, research and development [Suzigan (1996)].

(6) Political turbulence and a temporary change in course

The years that followed the government of Juscelino Kubitschek (1956~61) were politically turbulent. The elected president, Janio Quadros resigned seven months after taking office. Vice President Joao Goulart assumed the Presidency 1961, but was deposed by a military coup in 1964.

Economic disequilibrium was also exacerbated with accelerating inflation, deficits in the balance of payments and fiscal deterioration. Because of this, more emphasis was placed

75) Not until 1971 did it assume its current name: National Council for Scientific and Technological Development.

on policy reforms and macroeconomic adjustments. During the government of Joao Goulart (1961~64) the Three-Year Plan was put into practice, which had little success in correcting the imbalances of the Brazilian economy. After the military coup, in the Castelo Branco government (1964~67) the Government Economic Action Program (PAEG) was launched, which among other things, reduced government spending (but not investment), improved the tax collection system, restricted credit, depressed wages and fixed utility rates (which were lagged for inflation). The PAEG also made several reforms that modernized and strengthened domestic credit [Baer (1996)]. It was not a genuinely orthodox stabilization plan, but an attempt to keep the Brazilian economy growing without letting inflation accelerate as well. Industrial policy, similar to that of the Target Plan, was relegated to less important status.

In the following years protection for the domestic market was also reduced, amore lenient test of similarity was applied, exchange rates were unified (and depreciated) and nominal tariffs on imports were reduced. In addition, the tax bias against exports was gradually removed, replaced by a growing number of incentives for this activity, such as tax exemptions, subsidized credit to exporters and duty drawbacks [Balassa (1979), Cardoso (1980)]. In fact, export subsidies were concentrated in manufacturing industries and some minerals, and were attempts to offset the high cost of intermediate inputs (protection had decreased, but still remained high).

3. The NDP II: Deepening the Import Substitution Model

After a few years of relative stagnation, the Brazilian economy once again began to experience high growth rates, a result of the accumulation of production capacity and reforms of previous years. This is the period known as the Brazilian Miracle (1967~73), when the economy grew at rates of over 10% per year for six consecutive years.

Gradually, industrial policy agenda regained importance. In 1972, the government of Emilio Garrastazu Medici (1969~74), put into practice the I National Development Plan — NDP I, with three-year horizon (1972~74). It was the first experience with the new HCI drive. As a response to the first oil shock, in the government of Ernesto Geisel (1974~79), industrial policy finally returned to a prominent place in the menu of economic policies with the II National Development Plan — NDP II (1975~79).

Compared to Target Plan, the NDP II expanded policy of import substitution. Other sectors producing intermediate inputs were included as targets of industrial policy (petrochemicals, for example), along with advanced technology industries (telecommunications, aircraft, armaments, nuclear and computer). Import substitution policies were also extended to imports of capital goods, which in the Target Plan were primarily for vehicles and transport equipment.

The protection system was expanded and deepened. The tools of tariff protection were being abandoned (despite maintaining high rates) in favor of using increasingly intense bureaucratic and discretionary mechanisms of non-tariff protection: examination of

similarity indices, minimum domestic content requirements, preference margins for domestic firms in procurement of capital goods, and others. In other words, the opening that occurred after the Target Plan was reversed and the Brazilian economy became closed to imports. For capital goods, in addition to the tools noted above, the policy of import substitution also drew upon measures such as accelerated depreciation allowances for equipment and national tax exemptions on the purchase of domestically manufactured equipment [Carneiro (1990)].

Targeting mechanisms were focused on subsidized credit for investment in priority sectors (BNDE) and the promotion and export financing (CACEX). Added to this there was a policy of mini-devaluations of the domestic currency.

With respect to infrastructure investment, state-owned enterprises continued to play a major role. In addition to energy and transportation (the focus of the Target Plan), investments in communications, storage, urbanization and sanitation were also targeted by the government. Also the importance of state enterprises in sectors producing intermediate inputs increased. The private sector continued to dominate the production of capital goods.

In education, emphasis was placed on the expansion of higher education (but with little investment in elementary or primary education). At the same time a national system of scientific and technological development was established. However, when compared with the emphasis on production capacity, again little attention was paid to innovation.

With the crises of the late 1970s and early 1980s, protectionism

was again intensified and export subsidies were scaled up to enable improvements in the trade balance. Among the protectionist policies of that era, special mention should be made of the Computer Law, enacted in 1984, which created a protected market for domestic manufacturers of computers and other electronic products.

With the worsening of inflation and macroeconomic imbalances, public investments in education and infrastructure were reduced, but the autarchies in the Brazilian economic environment were maintained.

Since the 1990s, there has been a marked shift towards a more open economy, a reduction in the role of government as an entrepreneur through privatization and the control of inflation with the implementation of the Real Plan in 1994. But although several elements of industrial policy remained from previous years, its importance diminished considerably [Guimaraes (1996)].

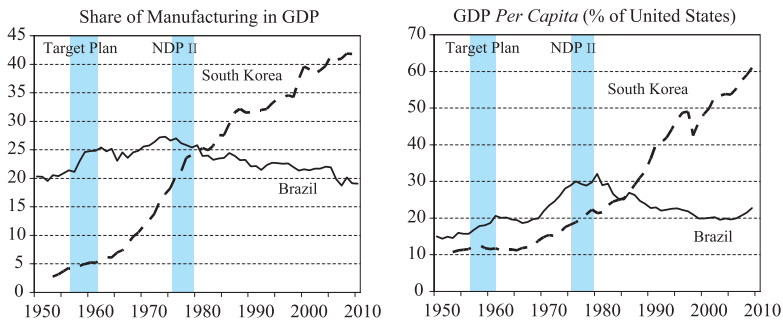
4. Evaluation of the HCI Drive

(1) Overview

Overall, the share of manufacturing industry in Brazilian GDP increased, with some ups and downs, until the beginning of the 1970s (see Figure 5-1). However, the NDP II, and the spread of import substitution policy that followed, was not able to sustain this growth. Instead, after the first oil shock a declining trend can be perceived that extends to the present day.⁷⁶⁾

However, structural change is not an end in itself (or at least

Figure 5-1. Share of Manufacturing Industry in GDP and GDP Per Capita



Source : Timmer & De Vries (2009) for share of manufacturing in GDP and Heston *et al.* (2011) for GDP per capita (in PPP).

should not be), but is a tool to achieve economic development. The per capita income of Brazil as a percentage of US per capita income increased until the end of the 1980s, and then began a cycle of decline that continued until the beginning of the XXI century (see Figure 5-1).

In both cases, the comparison with South Korea makes the difference in performance between the two countries quite clear.

(2) Value added, employment and production

The HCI drive resulted in accelerated growth of the manufacturing

76) In fact, depending on how the share of GDP is computed (constant or current prices), the share of manufacturing industry in the Brazilian GDP has different behavior. We chose to use data from Timmer & De Vries (2009), calculated at constant prices and GDP converted to US dollars (PPP), as a comparison with South Korea with current price data in domestic currency, participation continues to increase until the mid-eighties of last century, when it finally starts to decrease.

industry, at a rate greater than that of the economy as a whole. This trend continued until the mid 1970s (see Table 5-2), and is consistent with their increased share of GDP in the same period (see Figure 5-1).

Table 5-3 shows in more detail the evolution within the manufacturing industry from 1950 to 1985.⁷⁷⁾ Note that the heavy and chemical industries increased in importance in terms of value added and employment. In 1950, before the Target Plan, these industries accounted for only 24.7% of value added and 25.8% of industrial employment. By 1960, these percentages reached 47.4%

Table 5-2. Annual Growth Rate of GDP and Manufacturing Industry

	GDP (%)	Manufacturing Industry (%)
1950~1954	6.30	8.40
1955~1959	8.00	10.30
1960~1964	5.70	6.80
1965~1969	6.50	6.70
1970~1974	11.10	12.40
1975~1979	6.40	6.20
1980~1984	1.50	-0.50
1985~1989	4.40	3.90
1990~1994	1.20	0.50
1995~1999	2.00	0.10
2000~2004	3.00	3.80
2005~2009	3.60	0.30

Source : IBGE.

77) After this year, there was a change in methodology that makes comparison difficult. In any event, in 1985 the process of structural transformation of the industry had already cooled.

Table 5-3. Share in Manufacturing (HCI and Light Industries)

	HCI (%)	Light Industries (%)
Value Added		
1950	24.70	75.30
1960	47.40	52.60
1970	52.90	47.10
1975	57.50	42.50
1980	59.70	40.30
1985	61.80	38.20
Employment		
1950	25.80	74.20
1960	39.00	61.00
1970	43.10	56.90
1975	46.50	53.50
1980	46.80	53.20
1985	47.40	52.60

Source : IBGE.

and 39.0% respectively, and continued to increase until 1985, the last year for which data are available.

(3) Structure of exports and trade

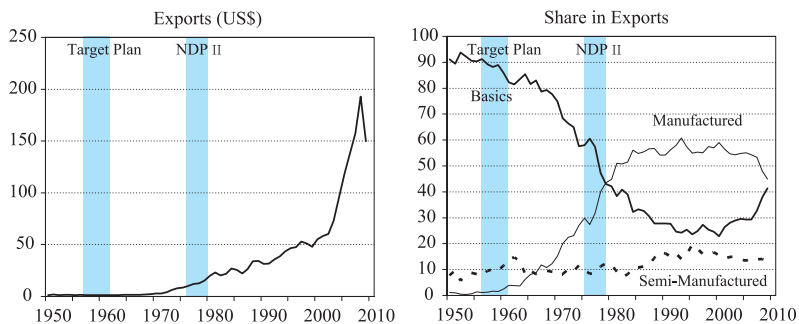
Note that not until the end of the 1960s, or more than ten years after the start of the Target Plan, did Brazilian exports begin to increase (see Figure 5-2). As noted above, this is a result of removing the bias against exports and policies of subsidies for this activity that were practiced at the time.

Unfortunately specifically with regard to the insertion of heavy

and chemical industries in exports, it was not possible to construct a series dating from 1950 that reflects this change. The most that could be done is to separate industries into basic (agriculture and mining), semi-manufacturing (some light industries) and manufacturing industries (HCI, but also including some light industries). That is, the manufacturing segment includes the heavy and chemical industries but also some light industries. This clearly shows the effect of the HCI drive to increase the share of manufactures in exports, as well as a reduction of the share of basic commodities. This trend continued until 1985. More recently, basic industries have again increased their export share, due to the increase in international demand for soybeans and iron ore, products in which Brazil is a major global producer (see Figure 5-2).

Within manufacturing, it is possible to identify the behavior of the most important products (see Table 5-4). This confirms the increased importance of the sectors affected by industrial policy in

Figure 5-2. Exports from Brazil



Source : Secex.

Table 5-4. Share of Selected Products in Brazilian Exports

Unit : %

	Metallurgy	Chemicals	Pulp and Paper	Transport Equipment	Machinery and Equipment	Total
1950~1954	0.10	0.30	0.00	0.00	0.00	0.40
1955~1959	0.00	0.30	0.00	0.10	0.20	0.70
1960~1964	0.20	0.40	0.00	0.70	0.60	2.00
1965~1969	5.10	1.30	0.20	0.40	1.80	8.80
1970~1974	3.90	1.80	0.80	1.50	3.80	11.80
1975~1979	4.10	2.10	1.10	5.10	7.40	19.70
1980~1984	10.80	4.60	2.60	7.30	8.10	33.40
1985~1989	14.30	6.10	3.20	8.40	9.80	41.80
1990~1994	17.00	6.50	4.10	8.30	11.50	47.40
1995~1999	12.50	7.20	4.50	9.90	11.90	46.00
2000~2004	10.40	6.60	3.80	13.10	12.40	46.20
2005~2009	9.90	6.60	3.00	12.80	10.00	42.20

Source : Secex.

the Target Plan and the NDP II. It also confirms that exports did not show an increase until the late 1960s.

The increase in exports, however, does not mean that the Brazilian HCI drive was focused outward. Rather, it is a process of autarchic industrialization, geared to the domestic market. This is illustrated by the fact that the degree of openness (the ratio of imports plus exports to GDP) declined in the years after Target Plan and has changed little since the NDP II (see Table 5-5). Only recently has the degree of openness of the Brazilian economy increased, although it is still very low. This observation reflects the fact that even after the HCI drive, the profile of the Brazilian economy has changed little.

Table 5-5. Brazil - Patterns of Trade and Degree of Openness

Unit : %

	Exports (% GDP)	Imports (% GDP)	Degree of Openness	Share in World Trade
1950~1954	10.30	9.00	19.30	2.10
1955~1959	9.60	8.10	17.60	1.40
1960~1964	6.80	6.40	13.20	1.00
1965~1969	6.00	4.80	10.80	0.90
1970~1974	6.70	7.70	14.40	1.00
1975~1979	6.60	7.80	14.50	1.00
1980~1984	10.10	8.20	18.30	1.20
1985~1989	9.90	5.20	15.10	1.20
1990~1994	8.10	5.40	13.50	1.00
1995~1999	6.40	7.00	13.40	0.90
2000~2004	11.80	9.30	21.00	1.00
2005~2009	11.80	8.80	20.60	1.20

Source : Secex.

(4) Collateral effects

The development of heavy and chemical industries led to a number of side effects. The first was an acceleration of inflation, especially after the Brazilian Miracle, reaching levels of more than 1000% per year in the late 1980s and early 1990s. There were also problems with recurring external bottlenecks due to the need to import of machinery and equipment.

This also called attention to increasing regional disparities. The development strategy concentrated investments in the South and Southeast, relegating other regions, especially the Northeast, to the sidelines. Although some regional policies were adopted

(such as creation of regional development agencies), they had little impact in mitigating regional imbalances.

Finally, the HCI drive did little to change the unequal distribution of income in Brazil, which was reinforced by the neglect of primary school education (more details in the next section).

5. What Went Wrong?

(1) Classification of public policy

For purposes of organization of ideas, public policy will be classified according to two dimensions, as to type — provision of public goods or market intervention — and transversality — vertical (limited to few sectors) and horizontal (for broader sectoral range) (see Figure 5-3). Examples of horizontal policies in the provision of public goods include quality basic education, ensuring property rights and a reduction in business bureaucracy. Creating engineering schools, for example, involves the provision of public goods, but is vertical in nature — it meets the needs of certain sectors (electronics, for example) but not others (agriculture). Here the distinction between sectors and activities is helpful. Activities are actions that potentially cut across various sectors and activities that are not normally carried out at the company level (innovation, for example). In turn, in the lower right quadrant are included policies that distort relative prices of specific sectors (trade protection and subsidies for certain sectors, for example). Finally, there are market interventions that are designed to affect certain

Figure 5-3. Classifications of Public Policy

		Transversality	
		Horizontal	Vertical
Type of Policy	Provision of Public Goods		Light Industrial Policy
	Market Interventions	Light Industrial Policy	Heavy Industrial Policy

Source : Adapted from Pagés (2010).

activities (subsidies for research and development, subsidies for job training, subsidies for investment in capital, for example) and not specific sectors (lower left quadrant).

That said, industrial policy is defined as actions to change the production structure of the economy in order to increase production and improve the technological capacity in certain sectors. In other words, industrial policy is defined to be selective; it is associated with vertical policies, but may also include horizontal measures of market intervention (the gray areas in Figure 5-3). Moreover, within what is defined as industrial policy, some authors make a distinction between mild or neutral industrial policy (upper right quadrant, associated with the provision of public goods, and the lower left quadrant, related to changes in relative prices of activities, in particular research and development) and heavy industry policy (right lower quadrant, associated with interventions that distort relative prices of sectors) [Harrison & Rodriguez-Clare (2010)].

(2) Poorly designed heavy industry policy

Comparing the experiences of industrial policy in Brazil and South Korea, it is clear that, in broad terms, both countries have made a number of policies that are similar in essence. In this case, the question is: given the similarities, what explains the difference in performance between countries? In this regard, although the same tools of industrial policy were used, some key differences with respect to the implementation of these policies can be identified.

First, there are marked differences with respect to the incentives for productivity increases. In South Korea, companies and sectors that were targets of industrial policy were exposed to mechanisms that combined both incentives and punishments. Some kind of target was always set, usually associated with exports, which if not achieved entailed a penalty or withdrawal of benefits. Moreover, the government gave credible signals that protection would be reduced over a given period of time. Both mechanisms lead to significant gains in productivity that were needed to be successful in meeting export targets and to prepare itself against the withdrawal of protection in the domestic market [Lee (1997)].

In Brazil, by contrast, the domestic market remained isolated from international competition for a long period of time and no indications that lower levels of protection might be forthcoming were issued by the authorities. Thus, although it managed to diversify its economy, Brazil failed to achieve international competitiveness in most of the sectors covered by industrial

policy. Again, this is a predictable result in economic theory: excessively protected sectors tend to develop using outdated or obsolete technologies, and are therefore unable to achieve a competitive position in the international market.

Another notable difference relates to how imports of intermediate inputs and absorption of technologies from other countries were treated. Again, in the example of South Korea, the focus of industrial policy continued to be on achieving international competitiveness in selected sectors. If by making changes in the domestic economy with regard to the directions of the inputs could make it possible to achieve this goal so much the better. If not, no barriers to the import of inputs were imposed. On the contrary often the importation of certain inputs received incentives.

This approach is in direct contrast with the Brazilian experience. Early in the process of import substitution, imports of capital goods and intermediate inputs were eased. However, industrial policy has been gradually moving towards an increasingly closed but growing economy, with a growing disincentive to import intermediate inputs in favor of domestically produced goods, with the latter highly protected.

The negative effect of this kind of policy becomes more important in the light of evidence that importing inputs, especially of capital goods, is an important channel through which firms in developing countries acquire and absorb technology. The importance of this aspect in the development of East Asian countries has been emphasized by several authors [Pack (2001)], in particular for the South Korean case [Rodrik (1995)].

Indeed, from the end of the 1970s, Brazil's industrial policy has been characterized by a number of barriers to adoption of new technologies, unlike the East Asian countries which created mechanisms to facilitate this activity. The Computer Law is one of the best examples in this regard. Evidence indicates that it implied a price and/or performance lag of at least three years in computers produced (and used) in Brazil in relation to international standard, and generated welfare losses on the order of 20% of domestic spending on this kind of equipment [Luzio & Greenstein (1995)].

Thus, excessive and indefinite protection, besides hampering the process of absorption of technology, also reduced the incentives for investment in research and development and innovation. Again, as regards the provision of incentives for innovation, Brazilian domestic industry should have gradually been exposed to international competition [Miyagiwa & Ohno (1999)]. Empirical evidence confirms this view, indicating that one of the main drivers of investment in innovation is the competitive pressure exerted by competitors, be they domestic or foreign [Aghion and Griffith (2005)].

(3) Little attention was paid to light industrial policy

Another aspect that illustrates the differences in the experiences of industrial policy in Brazil and South Korea are the differences in emphasis on light industrial policies. Even when heavy industrial policies were dominant, South Korea devoted special attention to enabling companies to innovate and provide human capital

formation. In Brazil these elements of industrial policy, with few exceptions, were neglected.

To illustrate this point, it may prove helpful to contrast the experiences of Brazil and South Korea with respect to the development and promotion of the shipbuilding industry. Although the role of heavy industrial policy was important in South Korea, the government also encouraged investment in R&D through the use of grants, tax incentives and direct investment, as with the creation of the Korean Institute of Technology. Initially the focus was on the assimilation of leading edge technology, mainly through joint venture agreements between foreign and South Korean shipyards, in which there was a tacit requirement for technology transfer. Gradually South Korean companies became able to develop their own technologies, evolving into the most highly developed shipbuilding industry innovation cluster in the world [Bain & Company et alli (2009)].

In the Brazilian case, policies to develop the sector were based in large plans for the shipbuilding industry with ambitious targets for the nationalization index for parts and components. Imports were authorized on a case by case basis and often favored vendors that lacked the appropriate scale and experience, paying higher prices than in the international market as a result. Bureaucratic delays in the approval of imports of inputs led to delays in construction schedules, further increasing the cost of production of ships.

The technological dimension was completely overlooked and programs or goals for the systematic technological development or increases in productivity were never established. The total lack

of exposure to international market competition further added to the disincentives for investment in research and development and increases in production efficiency by domestic shipyards. The result is that, after having been the second largest shipbuilding industry in the world, Brazil's naval construction industry virtually disappeared during the 1980s, when the resources to fund protectionist policies waned.

It is also useful to mention briefly two cases of successful Brazilian HCI drive in terms of international competitiveness. Not coincidentally they were exceptions to the general neglect of human capital formation and innovation capacity building. The first example is the Brazilian aircraft manufacturer Embraer, founded in 1969, whose development received technical support from the Aerospace Technical Center (CTA).⁷⁸⁾ The CTA is an institution founded in the 1950s, as the result of collaboration with the Massachusetts Institute of Technology (MIT). They were responsible for the education and training of the labor force and the development of the technology and expertise for the domestic production of aircrafts [Forjaz (2005)].

The other example is Petrobras, which in 1963 established the Cenpes, its R&D and basic engineering center. It was through Cenpes that the company was able to assimilate the technology needed to make offshore oil production viable in Brazil, and later become a major global player in the development of technology for ultra-deep water drilling [Dantas & Bell (2009)].

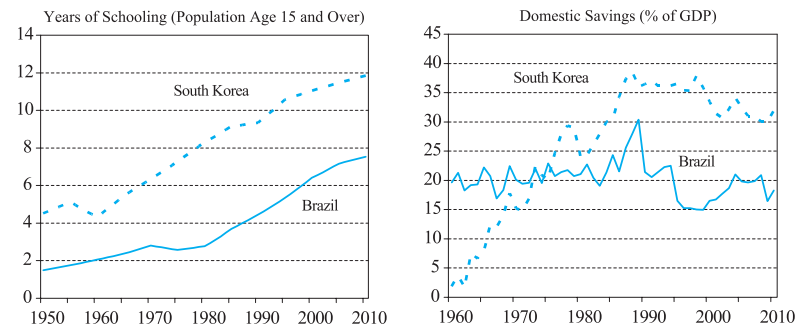
78) Today it is called the Aerospace Technical Center.

(4) Beyond industrial policy

Besides differences in industrial policy, is it possible to point to other differences in policy between the two countries? The answer would appear to be yes. South Korea launched industrial policies, but also other policies that had a positive effect on growth, particularly horizontal policies. It lies beyond the scope of this paper to address this issue in detail. But by way of illustration, it is worth commenting briefly on some of the differences between the experiences of Brazil and South Korea.

The difference in emphasis with respect to investment in human capital is important. In 1950, the average educational level of South Koreans was already well above that of Brazilians and continued to grow significantly (see Figure 5-4). Brazil, in turn, in addition to starting from a lower level of education, had relatively small growth rates (remaining almost stagnant during the 1970s).⁷⁹⁾ Accordingly, there is evidence that approximately two

Figure 5-4. Education and Domestic Savings



Source : Barro and Lee (2010) for education and World Bank (2011) for domestic savings.

thirds of the difference in per capita income between Brazil and South Korea today is due to Brazil's lower educational levels [Canedo-Pinheiro et alli (2007)].

It should be noted that the positive effects of industrial policy are greater when the stock of human capital is higher. For example, there is evidence that the externalities associated with foreign direct investment and import of inputs — for example, the ability to assimilate technology — are only manifest when human capital has reached sufficiently high levels [Pack (2001)].

Also notable is the difference between the two countries with regard to investment in infrastructure. While Brazil invested heavily in infrastructure in the early years of the HCI drive, the government, mainly responsible for these investments, lost its ability to do so after the NDP II. By way of illustration, the Brazilian infrastructure deficit explains about 35% of the difference in the growth rate in comparison with South Korea in the 1980s and 1990s [Calderon & Serven (2004b)]. Additionally, there is evidence that if Brazil had the stock of infrastructure that South Korea has, income inequality would be approximately 15% lower [Calderon & Serven (2004a)].

Another difference relates to the macroeconomic environment. The South Korean HCI drive generated some macroeconomic imbalances. However, they were nothing comparable to the

79) And the issue of the quality of education is not even mentioned, in which Brazil is at a level well below that of South Korea, given the poor ratings on Brazilian international proficiency tests. In 2009, the latest edition of the PISA exam, Brazil ranked 53rd in reading, 57th in math and 53rd in science, out of a total of 65 countries. By comparison, South Korea came in 2nd place in reading, 4th and 6th in mathematics in science.

Brazilian experience with hyperinflation or the lack of austerity in the conduct of fiscal policy in Brazil.

Finally, another important factor that helps countries to change their levels of income, to catch up the developed countries, is the creation of incentives for capital accumulation. While South Korea has made a considerable effort to increase saving, in Brazil the levels of domestic savings have remained at a level similar to countries such as the United States, which is already in the dynamic of long-term balanced growth, over the past forty years (see Figure 5-4).

6. Some Final Thoughts

Brazil and South Korea have both had experiences with industrial policy. In fact, most countries have experienced some type of industrial policy. Some managed to grow steadily and today are developed countries, such as South Korea, but most of them were not able to achieve the desired results, such as Brazil.

The difference between success and failure lies in how they created incentives for companies and sectors covered by industrial policy. Excessive indefinite protection, the lack of sunset clauses, barriers to imports of inputs and to the adoption of new technologies — typical of the Brazilian experience — seem to be a recipe for failure. South Korea, by avoiding these mistakes, managed to change the structure of its economy and grow steadily.

In addition, certain horizontal policies are necessary conditions in order to attain higher levels of income. In fact, it is not known if country can succeed without, for example, satisfactory

provisions for infrastructure, significant investments in human capital and an appropriate macroeconomic environment.

In summary, the success of South Korea seems to be a combination of horizontal policies (investments in education, infrastructure and innovation), light industrial policies (investment in the training of engineers) and well designed heavy industrial policies (protection and directed credit to certain sectors, but with the gradual reduction of support and increased exposure to international competition).

Accordingly, after a brief period in which industrial policy was relegated to the background, it has gradually regained importance among public policies in Brazil. In the XXI century, successive industrial policy plans have been announced — The Industrial, Technological and Foreign Trade Policy (PITCE) in 2003, the Productive Development Policy (PDP) in 2008 and Brazil Master Plan (PBM) in 2011.

Progress has been made in encouraging innovation, but the emphasis on heavy industrial policies has grown. The role of the BNDES is being increased. The importance of local content requirement policies and of using the purchasing power of the government to stimulate the domestic industry has grown. The same can be said about the creation of the so called national champions (through mergers encouraged by the BNDES or by state pension funds) and policies to provide exemptions for some sectors have been created [Canedo-Pinheiro (2011)]. Broadly speaking, it follows the same guidelines as the Target Plan and NDP II policies for autarchic growth. We have learned from the results of those policies. We must also learn from the mistakes.

Chapter 6

The Process and Policy of Algeria's HCI Drive⁸⁰⁾

1. Introduction

(1) Context of analysis

Algeria is an oil producing country situated in North Africa. It could not be further from South Korea either geographically or culturally. Although it is a relatively populous country, compared to other countries in the Middle East and North Africa, with a population of 35 million, the country depends on crude oil and natural gas for over 95 percent of all its exports. Like its neighboring oil producing countries, Algeria has an economic structure that is fundamentally different from that of South Korea. Since gaining independence from France in 1962, the Algerian government has adopted a socialist system with a planned economy and a process of industrialization predominantly shaped

80) Written by Dr. Kye Hwan Kim (KIET, Korea).

by the state — owned enterprises.

Like with South Korea, it is difficult to compare Algeria with Taiwan, the Philippines, or even Brazil. One may thus ask why it is necessary for Koreans to analyze and understand Algerian society, culture, politics, or economy.

Even while granting these ideological, political, historical, and cultural differences, we may still meaningfully attempt to understand the commonalities found in examples of the successes and failures of industrialization policies, especially in the heavy and chemical industries, in developing countries around the world. Such an analysis may hold significant benefits and implications for resource rich developing countries that are intent on diversifying their industrial structures.

(2) Periods of analysis

Since decolonization from France in 1962, the history of the Algerian economy can be divided into a few periods for ease of analysis. The Algerian state launched its first industrial program in the late 1960s. Planned economy, officially introduced for the first time in Algeria in 1967, would become a perennial feature of the Algerian government's industrialization policy. The period between the nationalization of the oil industry in the late 1960s — a decision made in hopes of securing the necessary funds for industrialization — and the oil shock of the mid 1970s featured massive investments made by the Algerian state and nationalized enterprises in the industrialization of their economy. The year 1979 marks the peak of this heavy handed approach to

industrialization. Although attempts at partial reform began to be made in the 1980s, particularly addressing the distorted structure that had consolidated itself throughout the preceding decade, the main framework of state — led industrialization remained intact. The oil crisis of 1986, however, pushed the Algerian model of heavy and chemical industry — centered industrialization to the brink, compelling fundamental reform.

Thus, in Algeria, the decade between the late 1980s and the late 1990s was a period marked by a comprehensive system crisis, engulfing all parts of Algerian society, including economic, political, and social aspects.

For the purposes of our analysis, we will divide the contemporary economic history of Algeria into the following periods. The first period, lasting from the beginning of independence to 1987 or 1988, was a period in which the Algerian state worked hard to consolidate its planned economy⁸¹⁾, especially by fostering the heavy and chemical industries. The second period, between 1987 or 1988 and 1991, saw limited attempts at a transition to a market economy and political liberalization. These attempts at reform, however, abruptly ground to a halt due to the escalating political and social crisis in 1992 and 1993. The period from 1993 to 1999 is chiefly remembered as a period of structural readjustment implemented as a result of debt

81) The Algerian government produced the following plans for economic development: the Three Year Plan, 1967~69; the First Four Year Plan, 1970~73; the Second Four Year Plan, 1974~77, which was followed by a break from 1978 to 1979; then the First Five Year Plan, 1980~84; and the Second Five Year Plan, 1985~89, which came to an abrupt end almost immediately after being released.

negotiations with the International Monetary Fund (IMF). This period, however, failed to usher in an effective market system capable of replacing the collapsing planned economy. Beginning in 1999, however, the political and social crisis began to subside amid rising oil prices worldwide, which has significantly improved the macroeconomic prospects of Algeria and allowed Algerians to seek new approaches to development. Thus the period from the late of 1960s to the end of the 1980s is the focus of this analysis.

The main subject of the analysis in this study is the Algerian policy of fostering the heavy and chemical industries, which was introduced as the main feature of the new planned economy in 1967 and flourished until the mid 1980s, prior to the arrival of the oil shock. However, the incomplete yet significant attempts, made between 1988 and 1998 amid the unfolding systemic crisis, to make a transition to a market economy also merit attention. In particular, the introduction of the structural readjustment programs in 1994, imposed by the IMF, marks a major turning point in contemporary Algerian history and economy.⁸²⁾

2. Background of Heavy and Chemical Industrialization

(1) Political and social background

After finally achieving independence from France in 1962, the National Liberation Front (FLN) of Algeria naturally adopted a socialist system aspiring toward political and economic

82) Dahmani (1999).

egalitarianism. However, the nascent country lacked skilled entrepreneurs, administrators, and bureaucrats to fill the vacancies left by the French withdrawal.⁸³⁾

On September 20, 1962, President Ahmed Ben Bella declared Algeria to be a “people’s democratic republic based on socialism”, thus making official the plan for the collectivization of mass production facilities.

One of the most pressing concerns of the Algerian government in the post independence years was achieving emancipation from the economic domination of the French. Prior to decolonization, Algeria had been a backwater supporter of production in France, heavily dependent upon investments from the French state. The first several years of the new Algerian government were thus dedicated to finding a model of development that would ensure the smooth transfer of Algerian resources back to the Algerian people and also cement the country’s independence economically. While industrialization was naturally expected of such a development program, heated debates arose between the liberals and the socialists regarding the specific nature of the program.⁸⁴⁾

A critical turning point came when the Charte d’Alger was adopted in 1964, consolidating the socialist backbone of Algeria’s industrialization policy. The charter explicitly dismissed the capitalist direction, reflecting the socialist ethos of the era that saw capitalism as treating workers and laborers as mere commodities, accompanying periodical crises, and culminating in imperialism.

83) K. Bouhou (2009), p. 323.

84) A. Chignier (2009), p. 13.

The charter thus officially endorsed the socialist direction, calling for the nationalization and autonomous management of all means of production.⁸⁵⁾ The industrialization of Algeria, in other words, was to be planned out by the state, and foreign investments were always to be viewed with caution. The charter also evinced a major change in attitude toward the private sector. The Private Sector Investment Act of 1966, while acknowledging the significance of such a sector, also subjected all planned private sector investments to the scrutiny of the state, which also held the authority to take over private sector enterprises as it saw fit. The Algerian state also had the power to block private investment in industries it regarded as “strategic” to the country’s development.⁸⁶⁾

(2) Economic background

Before the Algerian state began to invest in national industrialization, the Algerian economy, led by the heavy and chemical industries, consisted mainly of three sectors: namely, the autonomously managed sector, the public sector, and the private sector. As of 1963, about 500 companies remained in the first of these three sectors. These were mostly small businesses concentrated in the construction, food and beverage, wood, and metal industries. Autonomous management was nominal; these businesses were subjected to direct and indirect control from the government in almost all aspects of management, and were

85) A. Chignier (2009), p. 13.

86) A. Chignier (2009), pp. 13-14.

eventually absorbed into nationalized and public enterprises.

Private companies in this period largely meant small family businesses without the core features of a modern industrial economy. The few sizable ones that held out were eventually nationalized.

In the meantime, the public sector was born and began to flourish as the core sector of industrialization, with new companies being organized and existing companies (including those with foreign held equity) being nationalized. State enterprises newly founded in this period include Sonatrach in the oil industry (founded in 1963), SNS in the steel industry (founded in 1964), SNTA in the tobacco and matchstick industry (founded in 1963), and SOMEA in the machinery industry (founded in 1965). These state enterprises held monopolies in their respective industries.⁸⁷⁾

3. Determining and Fostering Strategic Industries

(1) Determining which strategic industries to foster

1) Theoretical grounds for the allocation of investment across industries

Three leading theorists exerted decisive influence on Algeria's strategy of industrialization: Francois Perroux, with his *effets d'entraînement*, Albert Hirschman with his linkage effects, and G.

87) A. Chignier (2009), p. 14.

D. de Bernis, with his *industries industrialisantes*.⁸⁸⁾

According to Perroux, economic development does not occur across all industries at the same pace. There are certain “core industries” that provide the momentum for economic growth. It is the growth of these industries that has a ripple effect on other related industries and leads them to grow. Around these core industries form the “poles of growth”, so to speak. The state therefore should focus on identifying and fostering these core industries and the “poles of growth”. Here, Perroux’s *effets d’entrainement* bears a meaning similar to that of Hirschman’s “linkage effects”. A backward linkage refers to a case in which the growth of an industry leads to the growth of another as the demand for input to the first industry grows. A forward linkage, on the other hand, refers to a case in which an industry grows by producing the input that is required by another industry. Strategies for industrialization, according to Perroux and Hirschman, ought to prioritize identifying and fostering industries that have this kind of significant influence on other industries.

De Bernis formulated the concept of *industries industrialisantes* to articulate the proper direction in which an industrial strategy ought to proceed. The role of these industries is to prompt the development of the basic and systemic grounds for industrialization

88) I am not arguing that these theorists’ ideas were the sole or even decisive factors in the industrialization of Algeria. Ideas work in diverse, unpredictable, and indirect ways on economic policies. Innumerable distortions and transformations are involved in the process of translating a theorist’s concepts into actual policy outcomes. These concepts and theories are discussed here mainly for the purpose of providing a framework through which to understand the general trajectory of Algeria’s industrialization.

and production. These industries involve manufacturing and providing machinery, for the economy as a whole, that are crucial to enhancing the productivity of labor overall. These industries, in other words, involve producing and distributing goods that improve the productivity of an economy in general. De Bernis also uses the concept of *effets d'intégrateur* to explain the correlation among these industries. Industries with great *effets d'intégrateur* produce industrial goods such as motors, turbines, machines tools, manufacturing equipment, fertilizers, and the like.⁸⁹⁾

There were undoubtedly other important structural factors shaping the Algerian economy during this period, including the challenging circumstances it faced and its comparative advantages. However, one should not underestimate the role that these ideas played in the formulation of the country's early development strategy, given how pervasive they were at the time.

The emphasis on the heavy industries appeared first in the Tripoli Program of 1962. Representative of these industries are oil and steel production. The program declared, "The real and long term development of the country is linked to the establishment of basic industries necessary for the needs of modern agriculture. In this regard, Algeria offers great possibilities for oil and steel industries".⁹⁰⁾

Outlining the economic development strategy of Algeria for the subsequent decade, the Tripoli Program aimed to help Algeria

89) A. Chignier (2009), p. 18.

90) Ministère de l'information, Programme de Tripoli, Dossiers documentaires, No. 24, Alger, January 1976, p. 49, as quoted in Chignier (2009), p. 67.

achieve technological self sufficiency so that it could become capable of independently developing and producing the industrial goods and machinery it needed. Basic industries, including steel and petrochemicals, were given top priority in this regard.⁹¹⁾ The examples that inspired this plan included not only the Soviet system but also the relatively small economies of Austria and Spain.

The theory of industrialization advanced by de Bernis and others differed from the balanced growth theory, and the so called “Asia model”, which promoted industrialization by increasing exports. Moreover, it also diverged from the import substitution strategy that prioritized the production of consumer goods.⁹²⁾

What is a “basic industry?” While de Bernis does not provide a clear definition, the Charte defines basic industries as industries playing a strategic role in ensuring the economic independence of the country, industries including metal working, machinery production, electric and electronic goods production, shipbuilding, petrochemicals, and basic chemicals.

Although the Charte designates a number of industries as basic, steel and petrochemicals ended up claiming top priority in the allocation of the state’s investments. Steel was considered important because it was capable of leading the growth of other industries that required steel, such as agriculture, metalworking, machinery, and construction and engineering. Therefore, the steel

91) A. Chignier (2009), p. 68.

92) A. Chignier (2009), p. 68.

mill in El Hadjar quickly established itself as the symbol of industrialization.⁹³⁾

In summary, Algeria pursued an industrialization strategy that envisioned economic development in a step by step manner, starting with the growth of basic industries first. The strategy sought to develop the basic conditions for the advancement of the fertilizer, energy, cement, and other such key industries and pursued the modernization of traditional industries, such as agriculture, by first fostering the steel and petrochemicals industries. In doing so, the Algerian state sought to achieve two goals: achieving economic independence and satisfying the basic needs of the people.

According to the conventional model of industrialization, however, the growth of equipment and machinery production is crucial to translate the progress of the basic industries to the progress of other manufacturing industries. Equipment and machinery play a pivotal role in the overall production system.

The Algerian strategy, however, did not pursue the production of goods beyond steel and building materials. Although the plan called for support of the steel, metal, energy, and electronics industries, it did not allocate investment to the manufacturing of machinery other than that required for farming or construction. Absent a specific investment and production plan, machines and equipment had to be imported from overseas.

93) A. Chignier (2009), p. 68.

2) Specifying investment priorities

Industrial investment can be divided into two main types: investment to boost exports and investment to raise domestic demand and consumption. Export oriented industries in Algeria include facilities such as the natural gas liquefaction plants in Arzew and Skikda and steel processing plants. On the other hand, basic industries aiming to boost and sustain domestic demand are made up of a much wider range of goods and services, including the production of raw and intermediate materials necessary to produce finished goods. These materials include fertilizers, tractors, farming equipment, irrigation pipes, and other such materials for agriculture; cement, flat glass panels, steel rebar, tubes, and paints for construction and housing; trucks, passenger vehicles, and gas stations for transportation; fresh and processed food ingredients, textiles, apparel, televisions, refrigerators, paper, and a host of other goods for general consumption, and so on. These are products of basic industries that support the manufacturing of finished goods. The Algerian government, in other words, had an ambitious plan to substitute a comprehensive range of previously imported goods and services, including intermediate goods, capital goods, and even cutting edge information and communication technologies.⁹⁴⁾

94) Abdelkader Sid Ahmed (2001), p. 4.

(2) Criteria for investment allocation

In Algeria, officially a socialist republic, the government and the public sector played the exclusive role of attracting and accumulating capital. During the period of industrialization, led by steel and oil production, the private sector accounted for only two percent of all industrial investment. However, the private sector produced as much as 35 percent of all goods produced in Algeria during the same period⁹⁵⁾, indicating that production was highly dependent on nationalized enterprises and their massive investment programs. This development strategy, underpinned by state-led investment, has since led to the monopolization of resources by the public sector, and the concomitant contraction of the private sector.

There were a number of other factors, aside from socialism, that intensified the Algerian economy's dependency on nationalized enterprises. One is the general rise in oil prices worldwide after the establishment of the Organization of Petroleum Exporting Countries (OPEC), which enhanced the Algerian government's focus on the already nationalized oil industry. The historical dearth of private companies and businesses capable of providing adequate investment has also played a role.

As in other socialist economies, size and scale were crucial in the Algerian corporate environment. Nationalized enterprises continued to grow larger and more influential, not only in the basic and heavy industries but in other industries as well,

95) S. Goumerziane (1994), p. 68.

including textiles and precision machinery. This is one of the main characteristics associated with state-directed development.

4. Basic Strategy for Fostering the Heavy and Chemical Industries

(1) Strategy

1) Import substitution industrialization (ISI)

Dependency theory, a macroeconomic trend that swept across the developing world in the 1960s, had a major impact on the evolution of Algeria's development strategy, steering it toward import substitution. According to dependency theory, the international economy is asymmetrically divided between the center (advanced economies) and the periphery (developing countries). The unequal terms of trade between the center and the periphery are causes of halted development in peripheral countries. This theory thus postulates that independence from the center is necessary for the periphery to find and secure the investment necessary for its industrialization. It ultimately culminates in the ISI strategy.

A noteworthy aspect of ISI, as it unfolded in Algeria, was that the strategy aimed to produce domestic substitutes for the entire range of products, including not only the materials and equipment needed for domestic industries but also agricultural, construction, and consumer goods. However, the implementation of this strategy served only to deepen Algeria's dependency on a

wide range of goods, including materials for production and consumer goods as well as production technologies. In other words, Algeria's ISI strategy failed because it held an unrealistic view of the domestic market and demand.

2) State-led accumulation of capital

The state and its nationalized enterprises played exclusive roles in the industrialization of Algeria. State-led industrialization necessarily meant a system of planned economy underscored by major state-directed investment programs. Starting with the country's first three year plan, which was implemented between 1967 and 1969, the early period includes two more subsequent four year economic development plans that centered on investments by the state to foster the heavy and chemical industries.

The amount of state investment grew at an explosive pace. Whereas 800 million dinars a year was invested, on average, under the first three year plan, that figure reached 14 billion dinars a year by the time of the second four year plan, 1974 to 1978, in the aftermath of the oil shock. In other words, the average yearly investment increased 17.5 times in less than a decade.⁹⁶⁾

96) The figures here do not reflect inflation, and the rate of increase will certainly drop should these figures be converted to reflect real prices. Some estimate that the Algerian state's investment in industry during the decade between 1967 and 1978 amounts to USD 45 billion in total (cf. Clement Henry (2009), "Between the Shocks: 'White Elephant' Industrialization in Algeria, Viewpoints", p. 49).

Table 6-1. Distribution of State Investment by Industry, 1967~78

Unit : DZD 1 million

	1967~1969		1970~1973		1974~1978		1967~1978	
	Planned	Actual	Planned	Actual	Planned	Actual	Total (actual)	%
Basic Industries (1)	2,200	2,580	5,200	7,520	21,900	40,250	50,350	71.15
Manufacturing (2)	500	370	1,200	1,320	4,000	9,030	10,720	15.45
Mining and Energy	400	440	1,400	2,180	2,600	6,670	9,290	13.40
Total	3,100	2,390	7,800	11,020	28,500	55,950	69,360	100

Source : A. Brahim A. (1992), "Stratégies de développement pour l'Algérie", Economica, Paris, as quoted in Chignier, 2009, p. 19.

Note : 1) Basic industries do not include oil excavation (confirmation required).

2) Manufacturing encompasses transformative industries.

This increase in investment was evident not only in absolute numbers but also in the proportion of Algeria's gross domestic product that it occupied. In the late 1970s, in particular, the state's investment hovered around 50 percent of its GDP, which was one of the highest rates in the world at that time. By 1980, the yearly amount of fixed capital investment had grown to more than 20 times what it had been in 1967.

The dramatic rise in state investment is manifest in the amount of investment made in excess of the plans. The actual investments made surpassed the planned investment amounts by great margins during the two four year plans. The discrepancy is attributable more to a tendency of wasteful management than to a failure to predict the demand for investment.⁹⁷⁾

The idiosyncratic pattern of state investments made during this

period become more apparent when one takes into account a longer span of Algeria's contemporary history. Between 1967 and 1973, when the Algerian state sought to consolidate its model of industrialization, major socioeconomic changes swept across the country, including nationalization, the organization of large conglomerates, the central management of companies, the introduction of a planned economy and development policy, and an agricultural revolution. The amount of state investment peaked by 1971, as the state officially endorsed its socialist approach to the management of its petrochemical resources and companies.

The soaring price of oil between 1974 and 1979 led state investment to a new high, as Algeria became all the more capable of making such investments thanks to the oil money. With increased borrowing from abroad, state investment grew much more rapidly than the capacity of Algerian companies to absorb it. Along with state investment, the demand for technological support and technology transfer from overseas grew as well.

However, the trend of investment began to take a downward turn in 1979. Moreover, the state investment portfolio began to undergo major changes in 1980. Whereas industries such as oil and steel had previously claimed the highest investment priority, the development of socioeconomic infrastructure (including, but not limited to, monuments, dams, roads, railroads, public health, education, and administration) gained newfound significance.⁹⁸⁾

Even with the downturn, however, those industries claimed

97) A more detailed explanation follows below.

98) A, Chignier (2009), p. 71.

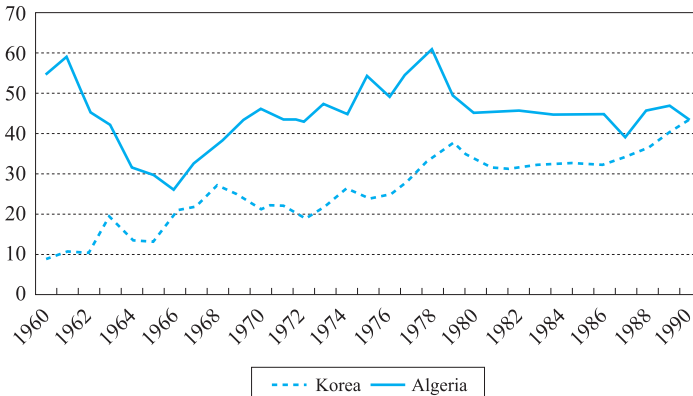
Table 6-2. Upward Trend in State Investments: 1967 to 1989

Unit : DZD 1 billion, as of 1984

	Period	Yearly rate of Increase (%)	Proportion of Overall Investment
Agriculture	1967~89	1.8	
Economic Infrastructure	1967~69	1.14	
	1980~84	11	
Industry	1967~89	522	46%
Oil			21%
Other Industries			24%
State Investment in Industries	1967~69	5.4	
	1978~79	53	
	1980~84	26	

Source : Chignier (2009), p. 72.

Figure 6-1. Investment Rates in the Algerian Economy, 1960-90



Source : Alan Heston, Robert Summers, and Bettina Aten (July 2012), Penn World Table Version 7.1, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania.

Note : Investment share of PPP converted GDP per capita at current prices [cgdp], (%).

well beyond 40 percent of all state investment until the late 1980s. The oil money and foreign loans sustained this state-led accumulation of capital.⁹⁹⁾

3) Execution of investment

The heavy and chemical industries were by far the main stars of Algeria's ambitious industrialization program, as 55 percent of the entire fixed capital investment was concentrated in those industries. In particular, the oil industry claimed more than half of all state investment in industrialization. The second biggest winner was the sector of basic industries. Manufacturing, which relied on the basic industries for equipment and materials and catered to domestic demand, received only nine percent of all state investment.

Under the second four year plan (1974 to 1977), 26.5 percent of the rapidly increasing state investment went to the oil industry, while steel and other industries together claimed 36.2 percent. The period between 1977 and 1980, however, saw state investment in the oil industry increase yet again to 34.9 percent.¹⁰⁰⁾ Seventy percent of the remaining state investment in industrialization was concentrated in the basic industries.¹⁰¹⁾

The Algerian state invested massive amounts of money in the oil industry, as it promised to be the greatest source of capital for

99) Some claim that the yearly average amount of state investment between 1967 and 1989 reached as high as USD 11 billion. See A. Chignier (2009), p. 71.

100) Ahmed (2001), p. 4.

101) A. Chignier (2009), p. 19.

the rest of its industrialization program. Almost 50 percent of all investments in industry (and 25 to 30 percent of all investments made by the state overall) went to the oil industry. The basic industries, in turn, received the majority of the remaining state investment in industry, the two claiming 70 percent or more between 1967 and 1978 (see Table 6-3).¹⁰²⁾

This meant that there was a growing inequality between the basic industries and the rest of the manufacturing sector, and also between industry and agriculture and between industry and the service sector. Agriculture and the service sector received little of the state's attention in comparison to industry. The basic industries, in this sense, formed the upstream industries, while the rest of the manufacturing industries formed the downstream ones. The growing inequality between the two types of industries has its origin in the Algerian state's industrialization policy.

The Algerian state's plan was to invest 34.5 percent of its entire investment budget in the basic, heavy, and chemical industries. Agriculture was also supposed to receive 31.7 percent, which was a considerable portion. The actual amounts of investment made, however, varied dramatically from sector to sector, with the heavy and chemical industries claiming an overwhelming portion of the total investment. Agriculture ended up receiving only 19.5 percent of all investment, while manufacturing as a whole received 75 percent. Although the development plans envisioned a balanced division between industry and agriculture, and also between the heavy and chemical industries and light manufacturing, the reality

102) A. Chignier (2009), p. 19.

Table 6-3. Distribution of State Investment by Economic Sector, 1967~77

	1967~69	1970~73	1974~77	Total	Proportion (%)
Planned investments (Unit : DZD 1 million)					
Agriculture	1,900	9,500	31,600	41,600	31.7
Basic Industries	1,580	7,720	28,460	38,660	34.5
Light Manufacturing	370	1,320	5,070	22,660	20.2
Construction & Public Works				9,000	8.0
Proportion of Planned Investments Actualized (%)					
Agriculture	100	46	28	46	19.5
Manufacturing	12	112	133	120	74.9
Construction & Public Works				60	5.5

Source : Simon Pierre Thiery (2012), p. 3.

was that agriculture and light manufacturing were slighted in favor of the heavy and chemical industries.

5. Challenges in the Heavy and Chemical Industries and Responses

(1) Challenges and the attempts made to overcome them

1) Sustainability and efficiency of investment

The first and foremost problem with Algeria's industrialization program was the gross inefficiency of investments made by the state. While investment inefficiency is a phenomenon commonly associated with planned economy, Algeria's waste was unusually

high, as it was a struggling developing country at the time. Its investment projects usually dragged on for three to four years, generating considerable additional costs. Some estimate that these additional costs amounted to approximately 55 percent of the total investment, which translates, roughly, to USD 18 billion wasted between 1967 and 1978. In the construction & public works alone, additional costs reached 139 percent of the planned investment.¹⁰³⁾

Whereas investment increased by 88 billion dinars between 1967 and 1978, industrial output managed to grow by only 7.8 billion dinars over the same period. The amount of investment per unit of output (the investment coefficient) reached 11.2.¹⁰⁴⁾

Additional costs such as this necessarily bore grave fiscal consequences. Algeria's capital expense associated with industrialization was twice the average of advanced countries, while the cost of hiring a new employee was five times as high as the international average.¹⁰⁵⁾

The source of the problem was not only the inefficiency of investment. Inefficiency was also prominent in the administration responsible for investment. Such inefficiency is analyzed in detail in Janos Kornai's theory of "shortage economy". An industrial facility may be created with the help of a certain amount of investment, yet the mundane difficulties of administration and/or procurement necessarily incur unnecessary purchases or use of

103) S. Goumerziane (1994), p. 73.

104) A. Chignier (2009), p. 20.

105) S. Goumerziane (1994), p. 74.

materials and other facilities, which, in turn, generate more costs. Overemployment or employment of insufficiently skilled workers, lack of knowledge of relevant techniques, and insufficient information on market demand all translate into significant additional costs.

Another factor causing these high additional costs is found in the low facility operating rates. A survey of 130 Algerian companies in 1980 revealed that 25 of those companies had equipment operating rates that ranged from 25 to 60 percent, while 12 had rates at or below 25 percent. The facility operating rate was especially low in the petrochemical sector. The rate barely reached 70 percent in the building materials sector. These rates reached 38 percent and 59 percent, respectively, in the detergent manufacturing industry and the fertilizer industry, indicating significant inefficiency in overall production.

There were multiple factors contributing to these low facility operating rates. These factors went beyond technical and administrative difficulties. A lack of technical knowledge, the absence of linkage between production and surplus, the absence of a correlation between production and wages, and the high dependency on imported raw materials and technology caused Algerian state enterprises to be incapable of absorbing the increasing amounts of state investment. There were also problems with corporate governance. The bureaucratic practice of making major corporate decisions also bred inefficiency.

The decline of efficiency was evident in Algeria's declining index of productivity. The productivity of the Algerian economy on the whole had taken a 10 percent dip since 1966. However,

Table 6-4. Algerian Index of Productivity, 1967~78

	Actual					Potential	
	Employment (1,000 jobs)		Value Added (in DZD 1 million)		Index of Productivity	Value Added	Index of Productivity
	1967	1978	1967	1978			
Agriculture	874	861	5,200	6,700	1.31	6,700	1.31
Industry	117	390	4,300	12,100	0.84	19,500	1.36
Construction & Public Works	71	399	4,600	12,800	0.49	25,600	1.00
Retail, Distribution, Service	374	581	10,200	22,000	1.40	22,000	1.40
Overall	1,436	4,231	20,300	53,600	0.90	73,800	1.31

Sources : S. Thierry (2012); Smail Goumerziane (1994), p. 76.

productivity fluctuated greatly from industry to industry. While the productivity of agriculture and the retail distribution service sector grew by 31 percent and 40 percent, respectively, the productivity of the construction & public works sector plummeted.

The inefficiency in investment and production caused the financial crises of numerous state enterprises, and ultimately the financial and fiscal crisis of the Algerian government. This is a vicious circle of risk inherent in the socialist economy. Add to this the pervasive chronic inefficiency of the state-controlled pricing system, and the result was that companies chronically struggled with deficits, which they sought to overcome by taking out loan after loan from banks. The aggregate amount of deficits of all state enterprises in Algeria increased by 37 times in just six years, from 480 million dinars in 1973 to 15 billion dinars in 1979.¹⁰⁶ In the meantime, the deficit revenue ratio increased from 8 percent

in 1973 to 12 percent in 1978.

Banks became providers of credit lines and short term relief loans rather than long-term financing. Between 1973 and 1979, the amount of loans taken out by state enterprises tripled. The financial statements of these enterprises began to show alarming signs of an imminent economic crash.

In other words, the development strategy that heavily relied on state investment in the public sector invited and compounded the inefficiency of investment and productivity, fatally compromising the financial health of various state enterprises. These enterprises were compelled to seek loans from state-owned banks, which acted merely as credit lines. Without a clear division of roles between the central bank and the financial ministry, the Algerian government finally resorted to issuing more money, which led to rampant inflation.

2) Deepening dependency on imports coupled with sluggish performance of the domestic market

One of the chief aims of the Algerian government in the early 1960s was to build industrial infrastructure that would help the country achieve economic independence from France. One of the key objectives of the ISI strategy at the time was to have domestic industries and businesses producing goods that would replace

106) Sixty percent of the deficits in the steel industry originated from the low facility operating rates, while 10 percent are owed to the inefficient use of materials. The rest reflects overemployment, inefficient investment, and prices being lower than the cost of production.

imports. The success or failure of the ISI strategy, in other words, depended on the growth of a very well integrated domestic economy and market.

The success envisioned by the ISI strategy involved the establishment of a domestic industrial ecosystem that encompassed all areas of manufacturing (from the production of basic and raw materials to the production of finished goods). Unfortunately, this desired outcome failed to materialize — or materialized only to a limited extent — in Algeria.

The structure of the state's investment portfolio was far from capable of achieving such a balanced industrial ecosystem. The basic industries, especially oil, claimed overwhelming portions of state investment, while downstream industries were relatively neglected. The amount of investment in the equipment and materials necessary for light manufacturing hovered around five percent of all state investment.¹⁰⁷⁾ The absence of integration among different industries led Algeria to rely more and more on imports of intermediate materials that it could not produce domestically. This imbalance in the supplies of equipment, capital goods, and consumer goods, began to reach a worrisome state.

Major state investment programs during this period were costly, but proved to be effective in creating jobs. More jobs meant that Algerians had higher income and greater purchasing power. Coupled with explosive population growth, that greater purchasing power led to a sudden rise in the demand for consumer goods.

107) A. Chignier (2009), p. 21.

The difference between the supply of production goods and consumer goods culminated in the rapid growth of imports, significantly exceeding that of exports. The ratio of the output of domestic industries to the domestic demand was halved, from 48 percent in 1967 to 24 percent in 1977.¹⁰⁸⁾

In other words, Algeria failed to realize its dream of creating of an industrial ecosystem that effectively integrated upstream and downstream industries. While the population and the income level continued to grow along with the demand for consumer goods, Algerian industries remained painfully incapable of producing goods of either adequate quality or in adequate quantities. While all socialist economies develop these signs of “shortage economy”, the manifestation of these symptoms in Algeria was magnified.

The early years of Algerian industrialization failed to produce effective working ties between the basic industries and the manufacturing of equipment and between capital goods and the manufacturing of finished and consumer goods. In the absence of such ties, increases in state investment only served to increase imports, even for production itself, thus consolidating the external dependency of the Algerian economy. Some of these results may have been inevitable for an industrializing country like Algeria, but the level of structural imbalance exceeded a critical point. Industries and enterprises receiving large sums of investment from the state spent that money not on purchasing goods from other domestic industries and enterprises but on importing technologies

108) A. Chignier (2009), p. 21.

and raw and intermediate materials from overseas.

The continuation of this development program paradoxically deepened Algeria's dependency on international trade rather than promoting the country's economic self sufficiency. The bilateral relations of dependency with France were now replaced with multilateral relations of dependency with multiple countries. Economic dependency continued to intensify even after the Algerian state nationalized most of its natural resources, including crude oil, and the economic rent from the rising oil prices in the mid and late 1970s significantly improved conditions for economic independence by boosting the country's fiscal status.

External dependency resulting from a misguided industrialization program has fuelled the structural vulnerability of the Algerian economy to external factors. This is evident in the growing imbalance of international payments and the accumulation of foreign debt.

3) Rising structural vulnerability to external factors

Also raising issues for the sustainability of the Algerian development model were the increasing external limits on the Algerian economy associated with growing imports. The increasing oil rent caused Algerian purchasing power and consumption to grow exponentially, by almost 500 percent between 1967 and 1978. Consumption per capita also grew by 170 percent over the same period.¹⁰⁹⁾

109) S. Goumerziane (1994).

Table 6-5. Market Shares of Domestically Produced Goods

Unit : DZD 1 billion, %

	1967	1973	1974	1977
Domestic Production	2.12	5.31	5.58	8.7
Domestic Demand	4.41	13.67	21.08	36.2
Market Share (%)	48	38.8	26.4	24.0

Source : S. Goumerziane (1994).

The demand for intermediate materials and equipment also grew rapidly, by four times and 20 times, respectively. The domestic industries were incapable of satisfying this growing demand, so the volume of imports increased accordingly.

Consequently, Algeria's trade deficit increased astonishingly between 1970 and 1979, while the volume of imports grew by 14 times for equipment, eight times for agricultural produce, and 14 times for other industrial goods between 1967 and 1987. Incomplete import substitution, increases in import-inducing investment, and misguided allocation of state investment to different sectors rendered the Algerian economy extremely vulnerable to external influences, such as the drops in international prices of raw materials.

The Algerian economy was hardest hit by fluctuations in international prices of crude oil. The terms of trade began to take a noticeably different turn, and seemed to favor Algeria greatly in the 1970s (see Table 6-6). The improvements in the terms of trade between 1970 and 1978 led to improvements in the Algerian government's fiscal policy, but also undoubtedly fuelled its drive to promote the heavy and chemical industries that were already dangerously dependent on state investment.

Table 6-6. Changing Terms of Trade of Algeria, 1967~78

	1967~69	1970~73	1974~77	1978	1967~78
Yearly Avg. Rate of Import Price Increase	+6.1	+7.2	+12.8	+5.7	+8.9
Yearly Avg. Rate of Export Price Increase	+1.1	+11.6	+31.8	+5.7	+14.7
Gap (%)	-5.0	+4.4	+19.0	0	+5.8

Source : Ahmed (2001).

As international prices of crude oil began to take a downturn in the 1980s, the terms of trade also began to worsen for Algeria. The price of crude oil, which reached USD 44 per barrel near the end of 1979, plummeted to USD 10 or less in 1984 and 1985. These disadvantages persisted for over 15 years until the prices of raw materials again began to soar worldwide in 2002. Dependent on oil for 97 percent of its exports and 50 percent of government revenue, Algeria was especially hard hit by these drops in oil prices.¹¹⁰⁾

As imports continued to exceed exports and the terms of trade kept deteriorating for Algeria, the country was increasingly compelled to resort to taking out loans and borrowing on the international capital market. This led to an accumulation of foreign debt at a time when the manufacturing and agricultural sectors were already deep in debt. The Algerian government was unable to abandon its development strategy, nor avoid incurring internal and external debt by continuing with the strategy. In the

110) Ahmed (2001), p. 3.

meantime, the Algerian economy faced a mounting risk of collapse, either by implosion due to rampant inflation (the result of issuing more money) or by explosion due to the uncontrollable growth of foreign debt. Of these, foreign debt posed a more grave threat to Algeria's economy, lacking a sophisticated domestic financial market and relying on a state-controlled pricing system.

(2) Attempted reform of the development model and the crisis of the system

1) Attempt at reform within the system in the early 1980s

The demand for a reform of the economic policy began to soar in the late 1970s as people witnessed how over-investment by the state had contributed to the deteriorating economic inequality. The Algerian government began, in 1980, to introduce a series of reformist measures intended to eliminate the chronic causes and factors of inefficiency. Yet these measures only attempted internal reform of the system without fundamentally revisiting the basis of the development strategy. These reforms included the division and decentralization of conglomerates and the debt settlement of state enterprises.

Corporate division and decentralization became the main objectives of reforming state enterprises. Measures applied to these ends sought to increase productivity, enhance the rational use of facilities, improve the efficiency of labor, and minimize costs.

Large, state-owned conglomerates were broken up into small or medium-sized enterprises specializing in one particular

function or a series of related functions. Conglomerates were divided up into different companies that handled either production or distribution exclusively. Justifying this reform was the perception that the root cause of the inefficiency of state-owned conglomerates was their massive sizes and monopolistic status. The Algerian government also enhanced interdepartmental coordination to facilitate the changes in the new companies. However, even through this enhanced coordination, the Algerian state remained deeply involved in corporate management.

Corporate management was also decentralized and moved to areas outside Algiers. This was done in response to a long time demand, and the headquarters of numerous companies were forced to relocate to regions outside Algiers where their production facilities were operating. Such relocation sufficed to satisfy the goal of decentralization, as different parts of Algeria had begun to specialize in the production of different goods since the 1970s, with the majority of production facilities having thus been established in those areas outside Algiers.

As a result of these measures, the number of public enterprises, which stood at 70 or so¹¹¹⁾ in 1980, increased to 375. More specifically, seven conglomerates specializing in agriculture were divided into 23 companies; 17 industrial conglomerates into 126 companies; 12 construction and public works conglomerates into 101 companies; 8 IT conglomerates into 45 companies; and 26 other conglomerates into 80 companies. The newly born

111) The number of vertically integrated corporations monopolistically dominating each industry.

companies were all small to medium in size.¹¹²⁾

Did these corporate reform measures increase the autonomy of companies and regions outside Algiers? One should not take the division and decentralization of state enterprises to mean the decentralization of decision making. Ministries still wielded power with respect to making important decisions, including those concerning investment. The planning authorities also retained tight control over the administration of these newly born companies.

In the meantime, debt settlement was attempted to normalize the management of state enterprises. A total of 61.2 billion dinars (approximately USD 9 billion) was invested over the four year period from 1983 to 1986 to settle the debts of 284 companies. Specifically, 2.3 billion dinars was spent to provide capital for these companies; 22.4 billion dinars to convert operating losses into government debt; and 6.9 billion dinars to convert bank debt to long term debt of the central bank.

Algerian state enterprises obtained the investment they needed from the Ministry of Finance, and their operating funds from banks in the form of loans. Any profits they earned were returned to the Ministry as government revenue. The chronic operating losses of these companies, however, perpetuated the customary practice of compensating for their losses with bank loans. The government would try to overcome the mounting debt either with its own budget or by issuing more money.

112) Steel and chemical companies, however, were not broken up due to the importance of the production techniques and markets involved.

Table 6-7. Performance of State Enterprises in the Heavy Industries

Unit : DZD 1 million

	1984	1985	1985	1986	1987
Gross Revenue	31,100	32,635	34,197	34,258	34,647
Revenue After Domestic Production	19,971	21,538	24,889	24,971	25,814
Exports	547	586	487	803	1,772
Imports	10,582	10,511	8,821	8,484	7,061
Value Added	15,391	16,314	17,364	18,010	18,268
Wage	5,775	7,027	7,503	7,990	8,355
Operating Losses (After Tax)	2,679	3,232	2,050	4,220	..
Employment	138,800	141,150	148,640	146,847	150,902
Revenue Per Employee (DZD)	225,362	224,836	230,507	233,290	229,593
Facility Operating rate (%)	73	69	73	63	69

Source : FMI (1989), Rapport sur l'Algerie.

The series of reform measures attempted in the early 1980s did not amount to actual and fundamental transformation of state enterprises or a substantial decentralization of decision making power. Although these measures helped state enterprises survive for the foreseeable future with debt settlement provided by the Ministry of Finance, the central bank, and other banks¹¹³⁾, such measures were insufficient to turn around the deteriorating status of corporate management. For example, the cumulative sum of operating losses (after tax) of state enterprises in the heavy

113) These institutions provided a total of 34.7 billion dinars in investment to cover the rising costs.

industries increased by a factor of 1.6 between 1984 and 1987 despite the debt settlement. Some estimated that the figure reached as high as USD 18.5 billion (at an exchange rate of USD 1 = DZD 6.75)¹¹⁴⁾

2) Crisis of the system after 1985

Algeria fell into a serious crisis when the international price of oil began to plummet in 1985, from USD 40 per barrel to USD 10 or less. Since the public sector relied heavily on imports for production, it soon found itself incapable of sustaining its production. Criticism of the public sector had raged since the early 1980s, but serious measures for economic reform were articulated only in 1987, and were not implemented until two years later.

The devaluation of the Algerian dinar in the early 1990s made it impossible to revive state enterprises. The franc-dinar exchange rate, which stood at 1:1 in 1988, rapidly increased to 1:6 in the mid 1990s, preventing manufacturers from continuing production because they were no longer able to pay for the equipment and intermediate materials they had been importing from overseas. The equally explosive growth of interest rates also put a heavy burden on debt-ridden companies.

The year 1994 marks the beginning of the structural readjustment program imposed on Algeria by the IMF. From that point, the proceeds from oil exports could be spent only on importing consumer goods. With the liberalization of the

114) A. Dahmani (1999).

consumer goods market, however, domestic producers eventually gave way to large trading companies and retailers. Domestic production of machinery, tractors, trucks, and televisions remained, in name only, while almost no traces of textile or apparel production remained in the country. The steel mill at El Hadjar, the symbol of Algeria's ambitious industrialization program in the 1970s, finally shut down, laying off hundreds of thousands of workers overnight. Even after the Algerian economy began to recover in the new millennium, its industrial output in 2009 was around 40 percent of what it had been in 1984.

6. Achievements of the Algerian Heavy and Chemical Industries

(1) Achievements

Does the crisis of the system mean that Algeria's drive for industrialization through the heavy and chemical industries was a failure? Did the program have no hope of success to begin with? To be sure, the portion of the GDP occupied by industrial output, other than that of the oil industry, increased by only three percentage points from 11 percent in 1970 to 14 percent in 1978. Growth was almost nonexistent when one considers the considerable state investment that went into those industries. Employment rates grew much more rapidly than productivity. The heavy and chemical industries were supposed to be capital intensive, but in Algeria's case, ended up producing more jobs than goods.¹¹⁵⁾

State investment in industry did indeed create jobs at an astonishing pace, increasing the number of employees in related fields from 2.13 million in 1966 to 3.57 million in 1977, by a margin of over 1.4 million in just a decade. In absolute numbers, agriculture created the most jobs, but most of these were temporary or part time. Industry, construction and public works and administration, on the other hand, topped the list of job creating sectors in terms of both absolute numbers and rate of increase. The numbers of jobs in industry and construction and public works increased by 243 percent (or 240,000) and 330 percent (or 230,000), respectively, in a decade. Administration also saw a 116 percent growth (or 210,000) in the number of jobs it created, thanks to state investment.

The influence of massive state investment is evident not only in the industrial structure of the Algerian economy but also in the structure of employment increases during this period.¹¹⁶⁾ The proportion of jobs in the public sector to the total number of jobs across Algeria grew from 48 percent in 1967 to 59 percent in 1978.

Did the Algerian government's job creation policy succeed? The Algerian population increased from 14 million in 1970 to 23 million in 1987. In 1989, however, only 4.26 million of the 5.5 million economically active people were employed. While the

115) While investment in non petrochemical industries increased by 88 billion dinars, output increased only by 7.8 billion dinars. See A. Chignier (2009), p. 20.

116) The number of full time jobs increased by 116,000 on average from year to year during the Algerian government's drive to foster the heavy and chemical industries. Between 1986 and 1990, however, the figure decreases to 80,000 a year on average.

Table 6-8. Job Increases by Industry, 1966~77

Unit : in 1,000 persons, %

	1966	1973	1977	Rate of Increase (1966 → 1977)	Margin of Increase (1966 → 1977)
Total Population	11,820		17,200	45.5	5,380
Economically Active Population	2,450	3,180	3,740	52.7	1,290
Part time Jobs	820	960	975	18.9	155
Full time Jobs	1,310	1,930	2,590	97.7	1,280
Actual Wage	1,060	1,650	2,210	108.5	1,150
Agriculture	1,270	1,480	1,545	21.7	275
Full Time Jobs	450	520	570	26.7	120
Part Time Jobs	820	960	975	18.9	155
Non Agriculture	860	1,410	2,020	134.9	1,160
Industry	100	225	343	243.0	243
Artisanry		40	45	12.5	5
Construction & Public Works	70	190	301	330.0	231
Transportation	50	77	109	118.0	59
Retail	190	195	282	48.4	92
Service	140	180	260	85.7	120
Administration	180	300	390	116.7	210
Students and Others	130	203	290	123.1	160

Source : C. Palloix (1980), p. 69.

unemployment rate gradually declined from 22 percent in 1971 to 17 percent in 1982, the figure still remained alarmingly high, until it peaked again at 20 percent five years later in 1987.

Let us take into account other employment related factors of the era. State enterprises produced 80 to 85 percent of the aggregate output between 1969 and 1978, but the facility operating rate hovered somewhere around 50 percent. In the meantime, the volume of industrial output continued to grow

rapidly over a 15 year period at a double digit yearly rate. Manufacturing (other than oil, energy, and mining) managed to increase its portion of the GDP to 16 percent in the period between 1970 and 1974. Farming and food processing, the steel metals energy complex, and textiles apparel accounted for 27 percent, 22 percent, and 22 percent, respectively, of the GDP.

Nevertheless, from 1967 to 1979, productivity remained stagnant. As a matter of fact, productivity decreased by 15 percentage points across all industries except oil.¹¹⁷⁾ However, it increased dramatically from 85 to 137 between 1979 and 1984, though the productivity of industries on the whole remained lower than that of the entire economy.¹¹⁸⁾

Table 6-9. Indicators of Industrialization, 1963~2005

Unit : %

Key indicator	1963~86	1987~99	2000~2005
Proportion of GDP	12.6	10.8	6.6
Proportion of total value added	74.1	77.6	65.1
Output increase rate	11.2	-2.7	0.0
Proportion of total employment	12.2	10.3	7.4
Proportion of total imports	90.2	86.9	89.0
Proportion of total exports	7.8	4.3	3.0
Fluctuation rate in public sector producer prices		23.8	3.5
Fluctuation rate in private sector producer prices		15.7	0.8

Source : A. Chignier (2009), p. 73.

117) Assuming a productivity score of 100 as of 1969.

118) This part, however, requires careful interpretation, as the figures are based not on international prices but on state controlled domestic prices in Algeria, which tend to divert far from the former.

Taking a look at exports, the manufacturing sector, excluding oil and natural gas, played only a marginal role. Steel products valued at approximately 600 million dinars (USD 120 million) were exported yearly, but imports soon began to exceed exports in the 1980s as domestic demand soared. In the meantime, resources necessary for domestic production (including agricultural produce) accounted for 56 percent of all imports, indicating a grave failure to substitute industrial imports with domestic products.¹¹⁹⁾

(2) Post crisis fate of industry in Algeria

A series of farther reaching reform measures were introduced in and after 1988 with a view to liberalization. Initiating this second wave of reform was a new law expanding the autonomy of state enterprises.¹²⁰⁾

Although new investment funds were launched to help with the management of state enterprises in different industries in the place of central control, the government still retained much of its decision making power over state enterprises. In 1989, another law was passed with the purpose of introducing market mechanisms to enhance the competitiveness of Algerian industries. The terms and conditions of transactions were evened out for public and private enterprises alike, while the barrier of discrimination in

119) A. Chignier (2009), p. 74.

120) These changes bear a similar pattern to those witnessed in the Soviet Union around the same period. In 1987, two years after the dawn of perestroika in 1985, the Soviet Union also expanded the autonomy of its state enterprises.

banking was also brought down. The introduction of the Corporate Insolvency Act put an end to the belief in the permanence of state enterprises.¹²¹⁾

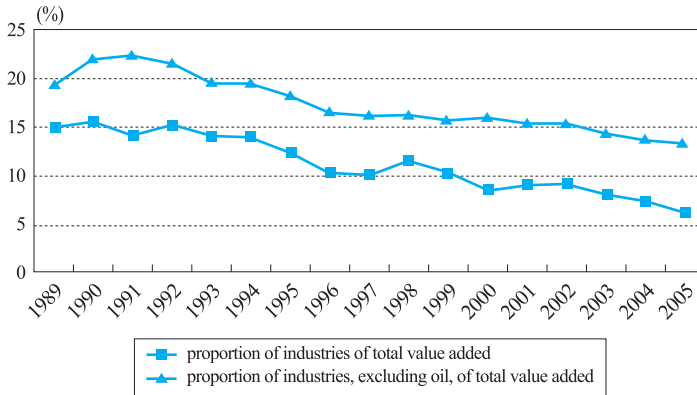
These “market oriented” reform measures, implemented over the three year period between 1988 and 1990, never brought about the intended benefits due to the political and social chaos that engulfed Algeria in 1991. Structural readjustment was also imposed on the country externally (via the IMF) in and after 1994.¹²²⁾ There was hardly any effective industrial policy to speak of between 1992 and 2000, when the political and social conflict in Algeria escalated to a new high. It was impossible for state enterprises, founded and run exclusively with state investment, to quickly secure the level of competitiveness necessary for their survival. Worried about the signs of social implosion resulting from pervasive unemployment, the Algerian government began to support state enterprises again, as soon as its financial prospects improved, in the hopes of creating jobs.¹²³⁾ Such government support, however, did not actually serve to enhance the efficiency and competitiveness of Algerian industries.

121) A. Chignier (2009), p. 81.

122) This whole process also bears much in common with the economic, political, and social disorder that engulfed the Soviet Union in its final days. Although Russia managed to prepare the legal grounds for market economy over a decade since the 1990s with the so called “shock therapy”, the laws for market economy did not result in the efficient, market directed allocation of resources. Algeria suffered from a similar “institutional gap” for about a decade throughout the 1990s, as its fledgling market system had difficulty providing the resources that the state no longer provided.

123) In 1997, the Algerian government settled the debts state enterprises owed to banks.

Figure 6-2. Declining Significance of Industry in Post Crisis Algeria, 1989–2005



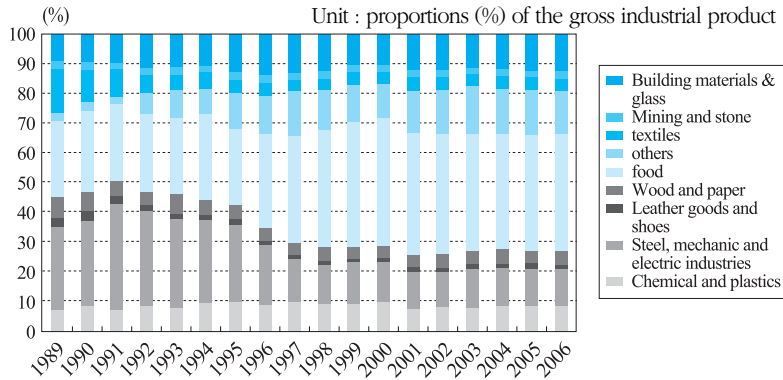
Source : A. Chignier (2009), p. 82.

In the meantime, industry's portion of the GDP declined steadily to 6.3 percent in 2005. Oil has always been the major player in the Algerian economy, but industry seems to have performed better if we exclude oil from the calculations. Yet no one could deny the pattern manifest in the industrial decline in Algeria. Industry's portion of the GDP dropped from 19 percent in 1989 to 13 percent in 2005.

During this period, production fluctuated widely from industry to industry. Designating the general production score of Algerian industries in 1989 as 100, the overall production score declined to 62 in 2004. In particular, the production of light manufacturing — textiles, leather goods, and wood — plummeted to 30 or even below. Building materials, chemicals, and plastics industries, however, managed to maintain more or less the same level of production.

Production in the private sector, however, increased by 40

Figure 6-3. Changing Industrial Structure of Algeria, 1989–2006



Source : A. Chignier (2009), p. 86.

percent over the same period. This means that, while the output of the public sector decreased by 3.1 percent a year, that of the private sector kept growing by 6.5 percent a year.

However, some things need to be considered. First, while the production of private sector manufacturing of building materials increased by a significant margin, the output of the rest of the private sector industries, including agriculture and food, tobacco, and aluminum, remained stagnant. Second, the private sector made up only a small part of the Algerian economy prior to 1989. The private sector was given due attention and support only after the reform measures had been implemented, and no significant increases in output from the private sector have been noted since the late 1990s, except in the building materials sector. Third, the informal sector occupies a large part of the Algerian economy.

In other words, the production of the public sector steadily declined during this period, and no significant progress was made

toward reviving Algerian industries despite the support provided to foster the private sector. Corruption, uncertainty over property rights, and arbitrary intervention by the state still remain characteristic features of the Algerian economy, while the emergence of powerful monopolies in the private sector and the expansion of the informal market continue to obstruct progress in the private sector.

7. Overall Assessment

(1) Diagnostics

Although the Algerian plan for industrialization included metals, machinery, electric and electronic goods, shipbuilding, petrochemicals, and basic chemicals as basic industries to be fostered, it failed to prioritize among these industries properly. In reality, the oil industry became the recipient of an overwhelming majority of government support. Little investment was made in petrochemicals (other than liquefied natural gas) or equipment production.

The steel mill at Constantine managed to produce exports in the early years as it was built to outbalance domestic demand. As domestic demand for its products began to rise due to the increasing need for construction and housing, the situation took a radically different turn. By 1989, the steel industry was capable of satisfying only about 50 percent of domestic demand. Given the debt ratio and production cost of the steel industry today, it can hardly be described as a success. Although 10 percent of the

government budget for industrialization was invested in the steel industry between 1967 and 1989, production cost hovered around USD 3,000 per unit of output, which was double that of the international average. The Algerian steel industry was so rigid that the country was forced to import steel even while many of its production facilities remained idle.

Meanwhile, technical proficiency in metal manufacturing — including the production of home appliances, hygienic goods, and aluminum — remained at the level of handicrafts. These industries also incurred serious operating losses due to the low facility operating rates.

Although it is difficult to determine the portion of state investment that went into equipment production, it is estimated to have claimed six percent of the industrial investment, or 12 percent of industrial investment, excluding oil, in terms of the price level of 1984. The equipment industry was also incapable of satisfying domestic demand, and similarly suffered from low facility operating rates, which stood at around 20 percent in 1982.¹²⁴⁾ Imports for this industry remained consistent.

About 60 percent of the crude oil produced in Algeria was used in the petrochemicals industry, while 20 percent of the natural gas was used for domestic industries and households. The volume of exports from the petrochemicals industry, excluding natural gas, declined steadily from year to year. The exports of refined oil, meanwhile, continued to account for about 20 percent of all oil exports.

124) A. Chignier (2009), p. 76.

Although government support of the oil industry led to the growth of other related industries, including oil refineries, it nonetheless failed to produce the desired level of growth in other industries, especially agriculture and fertilizer production.

As for employment, 2.54 million new jobs were created between 1967 and 1989, 46,000 of which were in industry. The unemployment rate, which rose as high as 23 percent in the late 1960s, dropped to 14 percent in the 1970s, before it peaked again at 23 percent in the 1980s. In addition, 15 to 30 percent of all jobs created were redundant, mainly because employment in Algeria was decided not according to the logic of economics, but the logic of politics and society.¹²⁵⁾

Although the Algerian development strategy did produce noticeable results in terms of the increase in state investment, production facilities, consumption, and employment, it ultimately rendered the Algerian economic structure quite vulnerable to external influences. Proof of this came in the form of the sudden decrease in the price of oil during the mid 1980s that led to the crisis of the system throughout the nation.

(2) Evaluation

1) Marriage of a resource rich rentier economy with a socialist political system

There are two main approaches to understand the nature of the

125) A. Chignier (2009), p. 78.

heavy and chemical industry-centered policy of development that the Algerian government pursued between the late 1960s and the mid 1980s. One focuses on the ideology of socialist nationalism. The other focuses on the resource rich rentier economy. It is crucial to understand both approaches in order to gain a comprehensive picture of how industrialization proceeded in Algeria.¹²⁶⁾

Note that there are elements in the Algerian experience of industrialization, which defy reduction to the socialist model of development. The fact that it was (and still is) a developing country that nonetheless possessed abundant natural resources, affording a rentier economy, amplified the inefficiency inherent in the socialist model to an extreme degree.

Until Algeria officially abandoned socialism in 1988, the state played an overwhelming role in the whole economy. Algeria was a planned economy through and through, heavily dependent on its state enterprises. A massive bureaucratic apparatus came into being to manage nationalized resources and wealth. The bureaucracy, moreover, featured watertight compartmentalization and extreme hierarchy. There was no room for creative initiatives for innovation and progress when the state exerted such tight control over the whole economy.

Another key feature of a developing rentier economy is that it flagrantly lacks skilled entrepreneurs capable of running modern

126) This conceptual mix is how Patrick Conway sums up the process of industrialization in Algeria in the 1970s and 1980s. See Patrick Conway (1988), "Algeria: Windfalls in a socialist economy", in A. Gelb *et al.*, *Oil Windfalls: blessing or curse?*, World Bank.

corporations. The absence of entrepreneurial skills in the private sector, in particular, intensified dependency on the state and inefficiency.

Nevertheless, these criticisms do not mean that a program completely opposite to the one pursued by Algeria would have brought about a better outcome for the country. Experiments with the market model of development in other parts of the world have not necessarily fared better in producing tangible and desired outcomes of industrialization.

In the Algerian case, we must raise two questions. First, did the Algerian state make the right choice in pursuing industrialization against the theory of comparative advantage? Second, if the Algerian state did make the right choice, did it also choose the right means to realize its aim? In other words, did the Algerian state make the right decisions regarding the division of roles between the state and the market, the mode of participation in the international division of labor, the pace of investment, and the prioritization of investment targets?

Figure 6-4 illustrates how the market model of development usually pans out in developing countries. A rentier economy, underpinned by monopolistic control over key natural resources, absorbs the rents on those resources in foreign currencies. Part of the rents is then allocated to the private sector via government purchase programs. Another part of the rents is spent on hiring domestic services in the urban informal sector. This urban informal sector consists of payments to rural communities in return for foodstuffs. Yet the divide between urban and rural sectors remains unbridgeable in rentier economies. As the figure

Of course, the diagram is too simple a representation to explain all the limits on industrialization in rentier economies. Nevertheless, it effectively portrays the economic state of Algeria since the 1990s.¹²⁸⁾

Interventionist policy becomes the inevitable choice to make in order to mitigate or prevent the repercussions of the increase in resource rents, and also to diversify the economic structure. This is particularly the case for developing countries with market failures built into their economies.

Algeria's decision to pursue state-led industrialization in the 1970s was not wrong, at least in its original intent and purpose. As the prevalence of "Dutch disease" attests, it is especially difficult for resource dependent developing countries like Algeria to achieve industrialization solely by virtue of market mechanisms alone.

However, it must be pointed out that the socialist ideology also significantly limited the benefits of market mechanisms that Algeria could have reaped, including certain market incentives, disciplining effects, improvements in efficiency, economy of scale (achieved by participating in the international division of labor), learning effects (especially pertaining to technology transfer), and growth of productivity.

In conclusion, a resource rich country like Algeria, intent on achieving industrialization, should prevent the "curse of resources" from occurring and undermining the non resource sector, especially manufacturing. The importance of this step cannot be

128) This assessment applies to numerous other resource rich developing countries as well.

overemphasized. The state needs to intervene throughout the process of industrialization in order to limit the de-industrializing effect of the abundance of resources, in addition to guarding against the usual market failures.

At the same time, however, the state should also make efforts to enjoy what the market has to offer, in terms of incentives, disciplining effects, economy of scale (achieved by participation in the international market), benefits of the division of labor, learning effects, technology transfer, and other factors contributing to productivity. In order to enjoy all these benefits, the state should increase support for the private sector, boost the initiatives and autonomy of state enterprises, and provide effective incentives.

In summary, the state should acknowledge that the private sector is the proper actor of industrialization and diversification. The state needs to build a consensus on this recognition, even in the early stages when the private sector lacks the capability to assume such leadership. The state should direct its investment — including that for state enterprises — with the goal of fostering the private sector in the long run.¹²⁹⁾

Nevertheless, history teaches us that even interventionist policy borne out of good intent gradually feeds into the stratification of wealth and privileges, and ultimately limits the prospects of reform.

129) What matters most is not who should own titles or claims to resources, but how to promote the competitiveness of a given nation's industries on the world market in the long run.

We may acknowledge the need for state intervention with the goal of minimizing the repercussions of resource rents. This alone, however, does not determine the specific aims of a given country's strategy of industrialization. In reference to South Korea's experience, what limits on the Algerian model of development can we identify?

2) Socialist industrialization dependent solely on state enterprises

Whereas the Algerian socialist approach to industrialization has deepened its dependency on state enterprises and the government, South Korea's strategy, centered also on the heavy and chemical industries, recognized the importance of public/private partnership early on. This difference, however, stems from the fact that the two countries began their journeys toward industrialization with different levels of entrepreneurial capacity.

3) Paradox of comprehensive ISI in disregard of the limits of the domestic market

Algeria focused its attention on the exploitation of natural resources and the processing of basic materials (i.e., basic industries), and in comparison, paid barely any attention to light manufacturing. Interestingly, South Korea took the opposite direction; it focused first on assembly and light manufacturing then proceeded to foster the manufacturing sector at the same time as investing in the production of basic materials and industrial goods.

The nationalization of the oil industry, the increases in international oil prices, and the growing investment in production all made decisive contributions to enabling Algeria to secure the funds necessary for industrialization. The Algerian government then assigned higher priorities to heavy industries, including steel and metals. The ultimate aim of this plan was to establish a well integrated and self sufficient national production system.

However, as the majority of companies continued to rely on imported equipment and materials, the oil industry became the only Algerian export industry. In order for the Algerian economy to survive, industrial imports should have been limited, while the increase in imports of industrial and consumer goods should have been offset by an increase in oil exports.

The problem, however, was that the openness of this system to the outside world necessarily raised the risk of collapse for less competitive industries and made the entire economy even more dependent on the oil industry.¹³⁰⁾ In this situation, rising oil prices worldwide necessarily meant de-industrialization. This is the so called "Dutch disease".

The highest priority in South Korea's industrialization policy was increasing the exports of goods processed or assembled in Korea. The basic industries needed to be fostered only to the extent that they could support this more pressing priority. Facing mounting challenges externally, South Korea sought to enhance the competitiveness of its manufacturing sector by increasing

130) Even without the oil price increases, however, the significance of the oil industry would increase naturally over time as light manufacturing begins to collapse.

exports from the beginning.

By contrast, Algeria focused exclusively on fostering the exploitation of natural resources and the production of basic materials, without paying due attention to light manufacturing and assembly. The reason the Algerian employment rate did not keep up with the pace of increasing state investment is that state investment was concentrated in the capital intensive industries of oil and basic materials, when, in fact, light manufacturing and assembly were the labor intensive options.

How can we explain these differences between South Korea and Algeria notwithstanding both countries' focus on fostering the heavy and chemical industries? The difference originates from the different comparative advantages held by the two countries. Resource rich Algeria naturally focused on exploiting and processing its natural resources. Lacking significant natural resources, South Korea found that it had the advantage of cheap labor, and decided to specialize first in labor intensive manufacturing and assembly.¹³¹⁾

Algeria had an economy that was heavily dependent on imports, not only for the equipment and materials necessary for domestic production, but even for basic foodstuffs, medical supplies and drugs, and other daily essentials. The money for these imports came solely from the government monopolized oil industry. This system was only able to work insofar as the exports

131) Aside from this difference in comparative advantages, strategic and political choices also played a role. South Korea began to push for the heavy and chemical industries as part of a larger plan to foster its defense industry. Algeria, on the other hand, remained focused on achieving economic independence.

of crude oil and natural gas generated enough income. Although Algeria started on its journey of development with the aim of achieving economic independence, it ended up becoming enslaved to the international trade for the importation of agricultural produce and producer and consumer goods as well as the exportation of its oil. The rigidity of the revenue structure and the heavy dependency on imported intermediate and capital goods meant that even the slightest drop in revenue would threaten domestic production and employment.¹³²⁾

This extremely vulnerable economic structure always harbored the risk of implosion and crisis. Algeria's production system simply was not capable of adapting effectively to external influences involving either falls in international oil prices or difficulty receiving credit or loans on the international capital market. The Algerian economy could not easily withstand these external shocks by increasing its exports through regulation of exchange rates.

4) Importance of investment in catching up with technology and productivity

The heavy and chemical industries tend to require massive state investment, not only to set up and run the required facilities but also to assimilate the required technologies and maintain the necessary workforce and organization. Investment is required, in other words, at least for improvement if not for innovation. In

132) Ahmed (2001), p. 4.

recognition of this fact, the South Korean industrial policy underwent a fundamental change in the early 1980s, and afterward, with the goal of shifting from increasing the quantity of exports to improving the efficiency of production. Such a shift was called for by the need to enhance the competitiveness of Korean industries. Exports were necessary, not optional. Korea's industries, other than the labor intensive ones, necessitated developing local technologies and improving the capability for innovation over and beyond adopting technologies from overseas.¹³³⁾

The Korean government thus increased its budget for investment in research and development, and encouraged companies to set up research centers. The Korean heavy and chemical industries began to see dramatic growth in the quantities of its exports thanks to the rationalization of its industries in the early 1980s, continued investment in research and development, and the favorable pricing conditions of the late 1980s.

The Algerian state, on the other hand, saw no comparable efforts to either rationalize its industries or research and develop new technologies after making excessive investment in its heavy and chemical industries in the 1970s.

5) Initial conditions

At the bottom of all these differences lies the question of whether the divergence of the paths taken by the two countries stems

133) By this point in time, the Korean economy was past its Lewisian turning point, and the wages in urban areas began to skyrocket.

from the differences in their initial conditions or the differences in their strategy/policy. To be sure, the early conditions, including the presence of natural resources, of the two countries when they decided to focus on the heavy and chemical industries were fundamentally different. The success or failure of an industrialization strategy depends on whether all its components are consistent with one another, and whether the strategy is relevant to the potential of the given economy.

The Algerian strategy suffered from a number of issues in terms of internal consistency. The imbalance of investment for different sectors, the lack of incentives to enhance efficiency and productivity, and the absence of consistency among different policy components led to failure.

Aside from the different levels of entrepreneurial skills with which the two countries began, one may also hypothesize that there were also noted differences in the level of legislative and policymaking capabilities. South Korea had a competent and merit-based mechanism for selecting its civil servants.¹³⁴⁾ While this bureaucratic difference should not be overplayed, one can reasonably assume that it nonetheless played a role in the different outcomes of industrialization in South Korea and Algeria.

6) Importance of consensus on the direction of development

In order to allow the private sector to play a leading role in a

134) Peter Evans uses the concept of “embedded autonomy” to explain the characteristics of development in Asia. See Peter Evans (1989).

nation's development, it is crucial to build a consensus among the members of the political (and bureaucratic) elite on the general direction and aim of development. Private sector participation is essential to ensure the viability of a nation's industries and economy, notwithstanding political vicissitudes. Exclusive reliance on the state, on the other hand, undermines the long term consistency and stability of the economic policy, as it becomes a matter of arbitrary decision making by whoever happens to occupy key offices of government. Political instability prevents the accumulation of capital, human resources, institutional capability, and other assets necessary for industrialization. Without stable supplies of these soft infrastructures, it is nearly impossible to achieve the desired level of productivity within a given economy.

Algeria fundamentally lacked a strong consensus among the members of its political elite on the direction and key issues of industrialization. Algerian policymakers could not agree on pressing questions such as whether or not to open up their economy to the outside world, what role their state should play in development, and which industries should be prioritized. The socialist ideology also paralyzed their ability to consider questions of economic efficiency, including the issue of participating in the international division of labor and the world market, while promoting industrialization through the heavy and chemical industries.

Chapter 7

Comparison and Assessment of HCI Policies and Their Implementation¹³⁵⁾

1. HCI Comparison: Timing and Background

(1) Changing industrial policy and the nurturing of HCI

This section presents a historical overview of changes in the industrial development process and industrial policy for five countries: Korea, Taiwan, the Philippines, Brazil, and Algeria. In particular, it examines the timing of their respective decisions to focus public policy on HCI.

Korea went through a period of light industry-driven import substitution in the 1950s before experiencing a boom in light industry exports (including textiles) in the 1960s. Its main HCI drive came in the 1970s: then President, Park Chung-hee announced the program at a New Year's press conference in 1973, and specific measures were implemented as part of the

135) Synthesized by Dr. Young Seok Oh (KIET, Korea).

third and fourth five-year economic development plans (1972~76 and 1977~81). The government provided active support over this period through selective industrial policy, pouring a total of US\$9.6 billion into six strategic industries. By the early 1980s, a new period of adjusted HCI investment and “rationalization” was under way. Government-led adjustments came in three stages, between 1979 and 1983, after the issue of the oversupply of equipment was recognized amid the overheated investment of the 1970s and the global recession in the wake of the second oil crisis in 1970. The adjustments were meant to reduce excess facilities and boost competitiveness through production specialization. The 1986 implementation of the Industrial Development Act brought a sea change to industrial policy, as the government-led system of industry-specific support gave way to a function-based approach centering on technology and human capital. Meanwhile, the groundwork for continued HCI growth was being laid out with economic liberalization and openness measures from the mid-1980s into the 1990s, which included greater autonomy for private businesses, innovation-driven industry development, and a higher degree of economic openness.

Taiwan launched its industrial development drive (the “first import substitution program”) in the 1950s during its first four-year economic development plan (1953~56). The following decade, it attempted a new, export-led development strategy focusing on light industry. Its HCI drive, like Korea’s, came during the 1970s. That period is referred to as the “second important substitution period”, highlighted by the announcement of the Ten Major Construction Projects in 1973 and a six-year development plan

initiated in 1976. The construction projects, in particular, were part of a program of domestic demand promotion and upstream import substitution in response to the recession in the wake of the first oil crisis in 1973 and the country's 1971 departure from the UN; industry areas included steel, petrochemicals, and shipbuilding. The country's approach to nurturing HCI changed considerably in the 1980s. When the second oil crisis in 1979 sent petroleum prices soaring, the country responded by limiting the expansion of energy-intensive HCI facilities to the levels needed to meet domestic demand, and adopting a new strategy of fostering high-growth industries like machinery and electronics, which were less energy-intensive and more dependent on technology. From 1986 onward, Taiwan adopted an approach of economic liberalization and market openness. The approach of nurturing HCI through state enterprise was abandoned in favor of privatization and increased private sector corporate investment. HCI policy has virtually disappeared in the years since.

Industrial policy in the Philippines was typically an improvised expedient in response to the current account's critical conditions and political changes — inconsistent and readily abandoned. The 1950s were the “import regulation period”, marked by more or less impromptu restrictions on the importation of “inessential” consumer goods (luxury items, consumer durables) in response to the current account's situation. These measures would lay the groundwork for an industrialization drive that shifted the country from its agricultural roots to the production of the same inessential consumer goods. The 1960s brought a light industry-centered import substitution industry development push, also in

Table 7-1. Country-by-Country Comparison of Industrial Policy Changes and HCI Development Periods

	Korea	Taiwan	Philippines	Brazil	Algeria
1950	Light industry/import substitution	First import substitution period: Light industry	Import regulations: Laying groundwork for industrialization	<i>Earliest HCI development push: Target Plan (1956-61)</i>	Colonial period (agricultural exports)
1960	Light industry/export boom	Light industry/export boom	Light industry-centered import substitution; Investment Incentive Act (1967) provided basis for nurturing capital-intensive industry	Political/macroeconomic instability; decline in industrial policy; opening of market	Independence (1962) followed by adoption of socialist policy; three-year-plan (1967-69)
1970	<i>Nurturing HCI: third and fourth five-year plans (1972-76, 1977-81)</i>	<i>Nurturing HCI (second import substitution period): Ten Major Construction Projects (1973), six-year economic development plan (1976)</i>	<i>Export-led industrialization (Export Incentive Act 1970)</i> <i>HCI drive begins with Progressive Manufacturing Program (1973)</i>	<i>Import substitution HCI drive intensifies with NPD II (1975-79)</i>	<i>Two four-year plans (1970-77); large investment in textile, HCI (steel & metals)</i>
1980	Early 1980s: Oversupply and industry rationalization, 1986: New industrial policy (Industrial Development Act), Late 1980s: Economic liberalization, market openness	<i>HCI structural adjustment: ten-year economic construction project (1979)</i> 1986-: Economic liberalization, privatization of public enterprise	Failure of eleven major industry development projects	Intensifying protectionism	1980-84: first five-year plan (changing priorities, company partitioning, other systemic reforms) Late 1980s: Decline in crude oil prices triggers systemic crisis
1990		Decline in importance of HCI policy	Market liberalization, New industrial development plan (technology-intensive) announced, fails	Transition to open economy, industrial policy declines in importance	Late 1980s: Attempted transition to market economy

response to a current account crisis. The 1967 enactment of the Investment Incentive Act, which incentivized the use of capital over labor in the production process, made a crucial contribution to the development of capital-intensive HCI in the 1970s. The HCI boom entered into full swing, and the development pattern shifted from import substitution to export promotion. In addition to the 1967 IIA, the Export Incentive Act also contributed greatly by offering comprehensive incentives for export activities. Together, the two pieces of legislation shaped the country's industrial policy until the 1980s. Another strategy, the Progressive Manufacturing Program, was put into place in 1973 to nurture other HCI areas such as automobiles and appliances, but the rent-seeking practices of the ruling Ferdinand Marcos clique prevented it from producing tangible results. The early 1980s saw the introduction of an "eleven-industry development program", and another "new industry development" for nurturing technology-intensive industries was in 1998. Both failed to take off – the first because of political upheavals, and the second due to a change in administrations. Meanwhile, industrial policy, and investment incentives in particular, shifted in the 1980s from a factor-specific pattern to one that was more neutral and performance-oriented. The 1990s saw a major increase in economic liberalization and market openness.

Brazil attempted a form of import substitution industrialization from the 1930s to the 1950s, focusing on consumer durables. Its first attempt at HCI came in the late 1950s in response to a current account crisis, a program that was articulated in the Target Plan of 1956 to 1961. From 1961 and 1967, economic policy was focused

on macroeconomic stability amid persistent political and economic upheaval; industrial policy was low on the list of priorities. After this came the so-called “Miracle” which lasted from 1967 until 1973, when the economy boomed and the importance of industrial policy, once again, came into sharp relief. The NPD I (1972~74) was drafted; it was eventually followed by the NPD II (1975~79), which responded to the first petroleum crisis with a more rigorous import substitution strategy. Industrial policy became an important element of general economic management. The economic crisis touched off by the second oil crisis in the late 1970s and early 1980s resulted in greater protectionism, which eventually gave way in the 1990s to a much more open economy, with privatization hence a smaller role for the government. Consequently, the role of industrial policy was sharply curtailed.

In the years after it won independence, Algeria achieved industrial development through a three-pronged approach focusing on public enterprise, self-management sectors, and private enterprise. Although in reality, the public enterprise sector was running the show. During the early 1960s, the country nationalized key industries like petroleum, steel, and machinery in order to better administer them. Its HCI push came in the form of two four-year plans between 1970 and 1977. During this period, the state and state-owned enterprises carried out a massive investment push to industrialize HCI areas such as steel, metals, and machinery. Notable characteristics of the Algerian HCI program were the use of socialist methods following the 1964 adoption of the Algeria Charter, the leading role of state enterprise

with a monopolistic investment in specific industries, and the uniquely imbalanced development pattern that resulted from investment in basic industries like petroleum, steel, and machinery without development in light industry or other downstream areas. A partial reform of the HCI model was attempted with the five-year plan of 1980~84, but it only had the effect of triggering a systemic crisis. Attempts were also made to reform state enterprises through corporate partitioning and decentralization and the settlement of debts, but these were not measures aimed at reviving an “entrepreneurial spirit” in the true sense. Monopolized by public enterprise and focused on price controls, the industrial development strategy produced small-scale inefficiencies in the form of chronic public enterprise deficits. This in turn led to macroeconomic and systemic crisis as deficits mounted with banks, the central government, and current accounts. Between 1988 and 1998, the country adopted a market system; from 1999 to 2011, it underwent another change with a revival of nationalism.

Certain similarities can be identified in the industrial development and HCI implementation periods in Korea, Taiwan, the Philippines, Brazil, and Algeria. First, their HCI drives came mainly in the 1970s. (The exceptions are Brazil, which had its first HCI drive in the late 1950s, and Taiwan, where the strategy was changed from nurturing energy-intensive industries in the 1970s to technology-intensive industries like machinery and electronics in the 1980s.) Second, most of them attempted a light industry-driven development strategy first before adopting an HCI program. (Algeria is the exception, adopting an idiosyncratic

development program of investing in basic upstream industries while neglecting development in downstream light industries.) Third, all of them, after nurturing HCI in the 1970s with government intervention and (at least partially) protectionist policies, subsequently went onto the route of economic liberalization and market openness in the 1980s or 1990s. This suggests that their ability to formulate and implement preliminary strategies and plans for changes in economic policy had a significant impact on the outcome of their respective HCI drives.

(2) Background behind the HCI push

Korea implemented its HCI program in the face of heavy criticism, with many calling the move premature in light of its comparative advantage position at the time. During the 1960s, the light industry export strategy had resulted in increased imports of intermediate and capital goods and an unfavorable balance of trade. By the early 1970s, the combination of protectionist light industry policies in the advanced economies and the hot pursuit of other developing countries was drawing attention to the limits of a strategy based on light industry exports. Politically, the 1968 announcement of the Nixon Doctrine, with its plans for scaling down the U.S. troop presence on the Korean Peninsula, had underscored the need for Korea to develop its domestic defense industry amid an ongoing standoff with North Korea. The HCI program was thus informed both by economic necessity — finding a way to overcome the limits of a light industry export strategy while advancing industry structure by substituting for

intermediate and capital goods imports and promoting exports — and the political necessity of nurturing the local defense industry. It was an export-driven strategy, focusing on exports in its assessments and incentives, but it was also oriented to import substitution to some degree, as it was accompanied by protectionist HCI measures in the 1970s.

Taiwan experienced low investment and economic recession conditions in the early 1970s following its 1971 departure from the UN and the first oil crisis in 1973. Industry infrastructure had fallen behind due to neglect during the light industry export period of the 1960s. The aim of the HCI drive was to promote domestic demand with the Ten Major Construction Projects of 1973, while achieving import substitution and backward integration by developing upstream areas like steel, petrochemicals, and shipbuilding. Integration with backward industries was certainly key, as the country's downstream areas were already substantially developed. But the HCI drive itself was oriented less toward boosting exports than toward substituting for growing imports of intermediate and capital goods as light industry exports boomed. In the 1980s, a new HCI strategy was formulated as a way of developing less energy-intensive, high value-added industries after the second oil crisis sent energy prices skyrocketing. The country had based its policies on low petroleum prices after the first crisis, so the blow from the second crisis was significant. The decision was made to limit facilities' expansions in established energy-intensive HCI areas like steel, petrochemicals, and shipbuilding to the levels needed to meet domestic demand; at the same time, concerted efforts were made to develop high value-added,

technology-intensive industries like machinery and electronics into export drivers.

In the Philippines, the Investment Incentive Act, enacted in 1967 to end an economic recession, included both the HCI and light industries. But as the 1970s progressed, it was HCI industries — copper refining, paper, chemicals, and synthetic fiber materials — that chiefly benefited from the act. By incentivizing the use of capital instead of labor in the production process, the law was ultimately more beneficial to capital-intensive industries. In the face of another current account crisis in the early 1970s, another attempt was made to boost exports (as opposed to substituting for imports) through the Export Incentive Act of 1970. But its effect was to promote light industry exports, which were unhelpful in overcoming the crisis. In response, the government changed its strategy with a push to develop HCI for intermediate and capital goods. The Progressive Manufacturing Program of 1973 was part of a drive to develop cars and other HCI. But rent-seeking by the ruling Marcos clique prevented it from achieving its intended goal of backward integration in manufacturing and high value-added.

The HCI program in Brazil's Target Plan (1956~61) was introduced to address a current account crisis through substitution of imports in intermediate goods. The move had broad-based political support: industry favored expansionist policy and increased domestic production of intermediate inputs, economists were armed with developmentalist economic rationales, and the public backed HCI development in the name of economic nationalism. The HCI push of the later NPD II (1975~79) was also

Table 7-2. HCI Background and Export Promotion/Import Substitution Patterns

Country	Period	HCI Background	Export Promotion/ Import Substitution
Korea	HCI development period (1970s)	<ul style="list-style-type: none"> • Perceived limits of light industry export strategy • Attempt to achieve economies of scale by shifting HCI focus from domestic demand to export promotion • Developing defense industry 	Export-led, partial import substitution development pattern
Taiwan	Second import substitution period (1970s)	<ul style="list-style-type: none"> • Promoting domestic demand through infrastructure, import substitution for upstream basic and raw materials 	Import substitution pattern
	HCI structural shift (1980s)	<ul style="list-style-type: none"> • Second oil crisis prompted shift: limiting energy-intensive HCI to meet domestic needs, developing technology-intensive, high value-added areas (machinery, electronics) 	Domestic demand-focused pattern (established energy-intensive HCI) Export-led pattern (new high value-added industries)
Philippines	HCI Drive (1970s)	<ul style="list-style-type: none"> • Recovering from recession of 1960s import substitution period 	Export-led: Export Incentive Act (1970)
Brazil	Target Plan (1956-61)	<ul style="list-style-type: none"> • Growing HCI imports, current accounts crisis • Expansionism, calls for economic development, nationalism 	Import substitution pattern
	NPD II (1975-79)	<ul style="list-style-type: none"> • Post-“Miracle” (1967-73) awareness of importance of industrial policy • Response to first oil crisis 	Intensifying import substitution pattern
Algeria	First, second four-year plans (1970-77)	<ul style="list-style-type: none"> • Laying groundwork for post-independence economic self-sufficiency through industrialization • Developing rear industries as base for domestic demand 	Autarkic, economic independence-oriented system (integration of related front/rear industries) Revenues for industry and agricultural imports (equipment, inputs, consumer goods) taken from petroleum revenues
	First, five-year plans (1980-84)	<ul style="list-style-type: none"> • Partial reforms to address effects of overinvestment 	Changing priorities (including reduced percentage of HCI investment)

aimed at overcoming a current account crisis and leading an economic recovery in the wake of the first oil crisis.

In Algeria, HCI was seen as a way of laying the groundwork for post-independence economic self-sufficiency through industrialization. It came as part of a more general program of improving productivity across the economy: key upstream industries were being developed to direct growth in their respective areas, while integrated industries were developed and applied in all economic areas. This method ended up giving rise to huge investments directed chiefly toward basic industries. More generally, the Algerian pattern was one in which petroleum exports led to expansions in other industry areas, namely equipment, basic and intermediate inputs, and consumer goods.

The different HCI programs bear a number of similarities and differences. They share a pattern in which initial light industry export development led to increased imports in intermediate and capital goods, and where HCI development was adopted to substitute for those imports and improve the current account's balance. They also came as part of an effort to develop basic raw materials in order to achieve backward integration with previously developed light industry and downstream areas. (The exception is Algeria, which attempted basic industry development without downstream development. As a result, it experienced problems when increased petroleum exports led to a substantial rise in downstream and consumer goods imports, precipitating a current account crisis.) Another similarity is that the need to address imports of intermediate and capital goods led to the active adoption of export-driven development strategies in some

countries, while others focused solely on import substitution. Korea fundamentally focused on making HCI into an export driver; even during the investment adjustment period of the 1980s, its ultimate aim in curtailing the oversupply of equipment and promoting production specialization was to boost export competitiveness. The Philippines likewise adopted an export-driven industry development strategy in the 1970s, while Taiwan's goal in developing its HCI was fundamentally import substitution. Indeed, during the transitional period of the 1980s, it went so far as to restrict energy-intensive HCI to only the levels needed to meet domestic demand. Brazil adopted HCI for import substitution purposes against the backdrop of strong protectionist sentiments and a huge domestic market. These differences in development strategy (import substitution vs. export-driven) may have profoundly affected HCI performance — export performance in particular — by creating differential incentives to improve competitiveness. Finally, the cases of Korea and the Philippines provide an instructive contrast in terms of the importance of a political base. In Korea, the aim of nurturing the domestic defense industry amid an ongoing military standoff with North Korea may have added political traction to the HCI push. In the Philippines, the drive was effectively thwarted by the Marcos clique, which held interests in non-trade sectors and agriculture.

2. HCI Industrialization and Government Policy

(1) Selecting targetted industries and its criteria

Korea selected six industries for its third five-year plan (1972~76): steel, nonferrous metals, machinery (including cars), ships, electronics, and chemicals. Their selection was a continuation of the development strategy in the second five-year plan (1967~71). HCI domestic demand substitution following the enactment of the Industrial Development Act for seven industries had boosted confidence in the area, and the aim was now to take HCI beyond the level of import substitution, using its growth as an export driver to achieve an advanced industrial structure and nurture the domestic defense industry.

In Taiwan, the HCI areas of steel, petrochemicals, and ships were selected for Ten Major Construction Projects during the second important substitution period of the 1970s. HCI was seen as an area where public investment could be used to stimulate domestic demand and replace the “shallow dish” industrial structure that had resulted from a focus on light industry exports. More importantly, it aimed to develop the basic materials industrial as a way of achieving backward integration with downstream areas that had already reached some level of development. During the HCI structural adjustment period of the 1980s, technology-intensive areas like machinery and electronics were chosen for focused investment — part of a response to skyrocketing energy prices in the wake of the second oil crisis. Strategic industries were selected according to a standard of “two

big, two highs, and two lows".¹³⁶⁾

In the Philippines, the Investment Incentive Act of 1967 had the aim of promoting not only HCI, but all industry, including light industry. But it was designed in a way that incentivized the use of capital rather than labor in the production process, which meant that intermediate and capital goods industries were the biggest beneficiaries. The Export Incentive Act on 1970 contributed greatly to increasing light industry exports, but when this failed to resolve problems with the current accounts, the government changed course towards developing intermediate and the capital goods industries. The Progressive Manufacturing Program was introduced in 1973 for the automobile industry; it would later be applied to trucks, motorcycles, and home appliances. The program was designed to promote the use of domestically produced intermediate goods over imports.

For Brazil's Target Plan (1956~61), intermediate goods industries — chemicals, steel, machinery, aluminum, oil refining, paper, and cement — were chosen for development as import substitution areas that had previously been bottlenecks for the national economy. Investment was focused on increasing their self-sufficiency in order to reduce the current account deficit. Cars, ships, and other capital goods industries were chosen for development, but this push would later result in pressure to increase imports. The NPD II (1975~79), a more intensive model

136) The "two bigs" were a big industry linkage effect and big market development potential, the "two highs" were a high level of technology dependence and potential value-added, and the "two lows" were low pollution and low energy dependence.

Table 7-3. Selecting Targetted Industries and Historical Background

Country	Period	Selected Industries	Historical Background
Korea	HCI development period (1970s)	Six industries: steel, nonferrous metals, machinery (incl. cars), ships, electronics, chemicals	Continuation of strategic industry development from second five-year plan (1967~71), Suited to economies of scale from driving exports, Importance for defense industry
Taiwan	Second import substitution period (1970s)	Steel, petrochemicals, ships	Advancing industry from “shallow dish” structure, Suited to serving as industries for backward integration with previously developed downstream areas
	HCI structural adjustment period (1980s)	Machinery, electronics, other technology-intensive industries	High-growth technology-intensive industries with low energy dependence and strong industry linkage effects
Philippines	HCI Drive (1970s)	Investment Incentive Act (1967): intermediate, capital goods	Addressing current accounts deficit
		Progressive Manufacturing Act (1973): cars, trucks, motorcycles, home appliances	Advancing industrial structure
Brazil	Target Plan (1956~61)	Intermediate goods: chemicals, steel, machinery, aluminum, oil refining, paper, cement Capital goods: cars, ships	Substituting for intermediate, capital goods imports to reduce current accounts deficit
	NPD II (1975~79)	Additions to TP strategic industries: Capital goods - petrochemicals, High technology - communications, aircraft, nuclear reactors, computers	Import substitution/ response to first oil crisis
Algeria	First, second four-year plans (1970~77) First five-year plan (1980~84)	Petroleum industry: Drilling, refining, Basic industries: Iron and steel, metals, machinery	Drilling intended to provide investment resources, Forward/backward linked production system established through input supplies to domestic demand industries

of import substitution, had both capital goods industries (including petrochemicals) and high technology industries (communications, aircraft, weapons, nuclear reactors, computers) selected as areas for import substitution development.

In Algeria, basic industries such as steel, metals, and machinery were selected for focused development efforts. The aim was to build a forward/backward production system by supplying basic raw materials for domestic demand industries — that is, the basic industries supplied materials for domestic demand downstream.

(2) Participating companies and the background behind their selection

The participants in Korea's HCI drive were private companies, large corporations in particular, with the government selecting target businesses for concerted policy support. Businesses that had thrived in light industry and assembled appliances in the 1960s were eager to invest in HCI as a way of producing intermediate goods and branching out. A so-called "HCI Promotion Committee" selected recipient businesses after a review of their investment profile — their funding power, foreign funding, and potential to attract investment. Once they received support, businesses introduced capital and technology with government support through collaborative investment with foreign direct investment companies in the advanced economies.

In Taiwan, the government played an active role in HCI investment during the Ten Major Construction Projects period, using public enterprises in steel (the China Steel Corporation),

petrochemicals (the CPC Corporation), and shipbuilding (the Taiwan Shipbuilding Corporation). The aim was to make up for the companies' lack of capital and technological capabilities by having the public corporations socialize the investment risk. Today, the strategy is seen as a success: after state enterprises made early investments, their stocks began looking more reliable, encouraging investment from private businesses. During the post-1986 economic liberalization period, the focus of development strategy began shifting from public to private enterprise amid growing private investment in petrochemicals and steel. Foreign direct investment also played a significant role — the Taiwanese petrochemical industry was especially dependent on the U.S., which was its major supplier of upstream technology, equipment, and investment.

In the Philippines, private enterprise and foreign direct investment companies were the chief HCI investors, with the government providing active support. Laws on foreign investment were relaxed during the export-led industrialization period of the 1970s in order to draw in export-oriented FDI. Symbolic steps in FDI liberalization included the development of industrial complexes and the establishment/expansion of Export Processing Zones. Some have argued, however, that the country became overly dependent on foreign investing companies during this period. For example, an unsuccessful effort was made to develop the automobile industry by incentivizing finished car makers by providing FDI to invest in parts.

Brazil's Target Plan (1956~61) steered investment to HCI industries through a three-pronged approach involving domestic

Table 7-4. Participating Businesses and Historical Background

Country	Period	Public vs. Private Enterprise (incl. Foreign)	Historical Background
Korea	HCI development period (1970s)	Private enterprise-driven <ul style="list-style-type: none"> • Capital, technology from collaborative investment between domestic and foreign companies, • Active government's support 	Government support due to lack of capital and technology acquisition capabilities at private companies
Taiwan	Second import substitution period (1970s)	Initial development through state enterprise investment gave way to privatization, increased private investment in 1980s <ul style="list-style-type: none"> • Capital, technology, advice from U.S. and other advanced economies 	Lack of capital and technology acquisition capabilities at private companies, socializing investment risk through public enterprises
	HCI structural adjustment period (1980s)	Investment primarily from private enterprise	Development in private sector, government support
Philippines	HCI Drive (1970s)	Focus on private enterprise, investing foreign companies	Overdependence on investing foreign companies
Brazil	Target Plan (1956~61)	Three-pronged approach: domestic and foreign private enterprise, state-run enterprise (government)	State-run enterprise (government) intervention in areas where private investment capabilities were lacking
	NPD II (1975~79)	Capital goods: private enterprise Infrastructure: state-run enterprise	Increased role for state-run enterprises in intermediate goods
Algeria	First, second four-year plans (1970~77) First five-year plan (1980~84)	Complete dependence on state-run enterprise	Adoption of socialist policies, All investment funding from state, which held complete monopoly on petroleum resources

and foreign private enterprise and state-run enterprise. Domestic private enterprises were chosen through industry-based working groups, which assessed the companies' investment suitability and submitted them for a BNDE review. The government spearheaded infrastructure investment, while taking steps on its own (through state enterprises) to foster industries where private investment was less practicable. The NPD II (1975~79) included some of the same areas from the TP — energy, transport — while adding further investment in state-run enterprises in areas of infrastructure like communications, distribution, urbanization, and sanitation. Public enterprise also assumed an increasingly important role in the production of basic and intermediate goods. Meanwhile, private enterprise continued to take the lead in capital goods production.

In the Algerian case, state enterprises were entirely in charge of directing investment; indeed, these enterprises held monopolies in the different industries. During the HCI industrialization period, the private sector accounted for just 2% of all industry investment. The reason the state and its enterprises took the reins in investment was because all investment funding had to come from the state, which held a complete monopoly on petroleum resources.

(3) Agencies and organizations in charge

Korea's HCI came as part of a government-led strategy known as the "Big Push", but the primary investors came from private enterprises, and large corporations in particular. The HCI Promotion Committee was officially in charge of the push; this

committee was responsible for overall HCI planning, as well as planning for individual industries, sites, support programs, and assessment. It was technically under the Prime Minister, but the President supervised, with economic officials, corporate representatives, scientists, and technicians attending meetings to discuss HCI plans.

Public enterprises directed investment for Taiwan's Ten Major Construction Projects in 1973, but the decision-making process was on the technical, market-oriented side. The Kuomintang had come over from mainland China and was not close to the business community. President Chiang Ching-Kuo was not well-versed on economic issues, so HCI decisions were made by technology officials collaborating with state enterprise managers. Policies and incentives in Taiwan were more conservative and less focused than those in Korea — this was not a “Big Push”. In the 1980s, when Taiwan began developing technology-intensive industries such as machinery and electronics, private enterprise led the way in investment, while the government's role was more about forming a suitable environment than participating in the market.

The Board of Investment, set up under the Philippines' DTI after the Investment Incentive Act (1967), remains in place to this day, selecting strategic industries and businesses and overseeing incentives.

Early on in Brazil's Target Plan, a Council for Development set up under the president was supposed to serve as a general mediator and developer of related policy measures. It failed to play a very active role, however, with its efforts reduced to

Table 7-5. Agencies and Organizations in Charge

Country	Period	Governance (Government vs. Private Sector)	Organization in Charge
Korea	HCI development period (1970s)	<p>“Big Push”</p> <ul style="list-style-type: none"> • Investment primarily from private enterprise • Government directed overall HCI planning, industry planning, sites, support programs, assessment 	HCI Promotion Committee (President presided over 18 meetings in 1973~74)
Taiwan	Second import substitution period (1970s)	<p>Technical, market-oriented decision-making process</p> <ul style="list-style-type: none"> • Less comprehensive than S. Korean strategy not a “Big Push” 	Collaboration between technology officials and state enterprise
	HCI structural adjustment period (1980s)	Main investment from private enterprise with government support	Collaboration between technology officials and private enterprise
Philippines	HCI Drive (1970s)	Government-led strategic industry, business selection, incentives	Board of Investment under DTI
Brazil	Target Plan (1956~61)	Industry-based public/private sector discussion, coordination	Industry working groups coordinated policy measures, BNDE: Policy program analysis and assessment, investment support
	NPD II (1975~79)	Industry-based public/private sector discussion, coordination	BNDE: Strategic industry investment support, CACEX: Export financing support
Algeria	First, second four-year plans (1970~77) First five-year plan (1980~84)	Complete dependence on state planning, state enterprise, Dominance of top political decision-making bodies, collaboration with planning authorities	Planning authorities, Industry agencies/industry state monopoly businesses

monitoring implementation of the plans and examining the results. The actual HCI industrialization process was handled by industry working groups, whose task was to select private enterprises and judge their investment suitability. The BNDE was in charge of checking the government's programs, playing a pivotal role in TP analysis and loans.

As a socialist state, Algeria was completely dependent on state-run enterprises to steer its HCI industrialization process. The top political decision-makers dominated the decision process, while planning authorities participated in a collaborative role. Government agencies were also set up for the different industries, overseeing state enterprises that were managed along monopolistic lines.

(4) Government policy

1) Accumulation of production factors and policy measures

HCI industrialization is a process that demands vast capital investments, relatively advanced technology, and experienced engineers. It also requires land to serve as industry sites. This section analyzes the policy approaches adopted by the five countries to promote investment and acquire production factors (capital, technology, human capital, and land).

① Investment promotion and capital procurement

Korea introduced tax incentives and a system of “unlimited finance distribution” at low interest rates for private enterprise to

invest in HCI. In particular, it set up a national investment fund to support investment, while channeling 80% of all the Korea Development Bank manufacturing loans between 1973 and 1983 to the area. Real interest rates were negative for most of this period, and the government offered guarantees for international loans. Corporate tax exemptions and other tax incentives were also extended for facility investment.

In Taiwan, the central government and public enterprises arranged the investment funds for the Ten Major Construction Projects, since they were the parties directing investment. The country had a current accounts surplus at the time, providing a relatively strong capital base; sixty percent of funding for the project came from domestic capital. At the same time, the Investment Reward Act (1967), which had been enacted to encourage private investment, was extended to HCI products, resulting in measures such as complete tax exemption for five years and accelerated depreciation. During the technology-intensive industry development period of the 1980s, the Export-Import Bank of ROC was set up to provide long-term, low-interest-rate loans to private enterprise, and the Investment Reward Act was amended to offer tax incentives to technology-intensive industries.

In the Philippines, the Investment Incentive Act of 1967 contributed to developing capital supplies. It had been set up to promote investment in all industries, but it was structured in such a way as to incentivize the use of capital over labor in the production process. The law offered two main types of incentives, “preferred” and “pioneer”. The “preferred” category (for industries

without the ability to meet domestic demand or achieve potential export scale) included accelerated depreciation, tax exemptions for capital goods imports, and tax incentives for the purchase of domestic capital equipment. The “pioneer” category (for industries introducing new products or processes to the country) offered the same incentives, plus additional exemptions on all domestic taxes (except corporate taxes) and permission to have 100% equity owned by foreign investing companies.

The Brazil’s Target Plan (1956~61) offered long-term, low-interest loans to strategic industries through the BNDE. Real interest rates were negative for most of this period, and the BNDE provided guarantees on international borrowing. A multiple exchange rate system also contributed greatly to attracting FDI during this time: capital goods imported by foreign businesses were recognized as investment goods for financial statement purposes, and incentives were offered for foreign firms to choose the best exchange rate when importing capital goods or sending earnings overseas. Additional measures were introduced with the NPD II (1975~79) including accelerated depreciation and domestic tax exemptions on domestic purchasing.

Algeria’s HCI push was a large-scale, state-planned investment program, with the state and state enterprises procuring the investment funding, relying primarily on nationalized petroleum industry zones.

Table 7-6. Government Policy Approaches to Acquiring
Production Factors (1): Investment Promotion and Capital Accumulation

Country	Period	Investment Promotion/Capital Accumulation
Korea	HCI development period (1970s)	“Unlimited financing” at low interest rates Corporate tax, duty exemptions Government guarantees on international borrowing
Taiwan	Second import substitution period (1970s)	Investment Compensation Act: five years tax free, accelerated depreciation Capital from current accounts surplus: domestic capital accounted for 60% of total funding on Ten Construction Projects
	HCI structural adjustment period (1980s)	Export-Import Bank established: long-term, low-interest loans Investment Compensation Act amended: tax incentives for technology-intensive industries
Philippines	HCI Drive (1970s)	Accelerated depreciation, duty exemptions of imported capital goods, tax incentives for domestic capital purchases
Brazil	Target Plan (1956~61)	BNDE: Long-term, low-interest loans, guarantees on international borrowing Attracting foreign investment: multiple exchange rate system, machiner/equipment imports recognized as investment goods
	NPD II (1975~79)	Accelerated depreciation allowed for imported machinery/equipment Domestic tax exemption on domestic machinery/equipment purchases
Algeria	First, second four-year plans (1970~77) First five-year plan (1980~84)	Large-scale state-planned investment program (implemented by state enterprise)

Table 7-7. Government Policy Approaches to Acquiring Production Factors (2): Human Capital, Technology, and Industrial Land

Country	Period	Human Capital	R&D/Innovation	Industrial Land Policy
Korea	HCI development period (1970s)	Highly skilled engineers acquired by attracting overseas technicians, increasing number of engineering colleges, Professional schools established/expanded in different technology areas, Public vocational training institutions founded	Government-led industry technology efforts: Technology Development Promotion Act (1972), 16 government-funded institutes founded	Industrial complexes: maximizing forward/backward linkage, synergy effects for different industries
Taiwan	Second import substitution period (1970s)	N/A	R&D support system, Technology acquired from U.S., other advanced economies	Industry development bureau established (1970): Measuring, inspecting, developing of industrial land
	HCI structural adjustment period (1980s)	N/A	Hsinchu Science Park founded (1980), Machinery, electronics R&D boosted (ITRI functions)	Hsinchu Science Park founded (1980)
Philippines	HCI Drive (1970s)	Lack of necessary human capital, R&D policy		Industrial parks built Export Processing Zones
Brazil	Target Plan (1956~61)	Public policy emphasizing production abilities, neglecting human capital/R&D		N/A
	NPD II (1975~79)	Public policy still emphasizing production abilities, neglecting human capital/R&D		N/A
Algeria	First, second four-year plans (1970~77) First five-year plan (1980~84)	Rapid increase in employment, but without major qualitative changes	Insufficient investment to naturalize imported technology (lack of R&D, innovation investment)	Regional distribution of industry (esp. production facilities), principle of placement in regions where industry linkage has been neglected

② Human capital and technology

In addition to its efforts to incentivize investment, Korea also focused on acquiring human capital and developing technology. To ensure a pool of highly skilled engineers, it worked to attract overseas technicians and expand the number of engineering colleges. Vocational high schools were established for different areas of technology, and public vocational training institutions were founded to focus on training skilled engineers. Sixteen government-funded institutes were established by the Technology Development Promotion Act of 1972, providing a pool of technical resources under government leadership; private enterprises were likewise encouraged to set up their own technology institutes.

Taiwan established its own R&D support system during its second import substitution period in the 1970s. During the 1980s push to develop technology-intensive industries, it built Hsinchu Science Park and beefed up the role of ITRI to promote R&D in the machinery and electronics industries.

In contrast, the Philippines, Brazil, and Algeria all more or less neglected to work at acquiring human capital or improving technology. The Philippines had no human resources or R&D policy to speak of, while Brazil's public policy focused solely on increasing production abilities while neglecting human capital and R&D. Algeria invested little in naturalizing the technology that it imported.

③ Industrial land

HCI development requires large land resources, which in turns

demands industrial land planning. Industrial complex development was a key effort in most of the countries examined.

In Korea, complexes were developed for different industries in an effort to boost forward/backward industry and synergy effects. Taiwan also built industrial parks for petrochemicals, steel, and shipbuilding during its second import substitution period in the 1970s. In 1970, it set up an industry development bureau to oversee measurement, examination, and development of industrial land. During the technology-intensive industry development period of the 1980s, Hsinchu Science Park was built as a way of addressing companies' land issues and offering managing services. The Philippines set up industrial complexes during its 1970s push for export-led industrialization, with a particular focus on Export Processing Zones to draw in export-oriented FDI. Algeria adopted a one-industry, one-region approach in the interests of distribution; the underlying principle neglected the issue of industry linkage.

2) Trade policy

Trade policies for the five countries examined here differed according to the HCI development strategy, i.e., whether it was export-led or import substitution-oriented.

Korea's HCI push was fundamentally export-led, but it did have some import substitution aspects. The focus was on expanding the export promotion system, with incentives likewise geared to increasing exports. For example, a 50% corporate tax exemption was granted for export income, and duties were

exempted for the imported facilities' materials needed to boost HCI international competitiveness. At the same time, other measures were focused on protecting the domestic market. In 1978, the effective rate of protection was 71% for HCI, compared to -2% for the light industry.

Taiwan adopted protectionist trade measures for its HCI import substitution push in the 1970s, including increased duties and an import approval system. In the case of steel, competition was limited by restrictions on facility building and expansion and requirements for the use of domestic parts and materials. During the technology-intensive HCI development period of the early 1980s, energy-intensive industries were restricted to only the facilities necessary to meet domestic demand. Import tax exemptions on machinery, equipment, and other intermediate goods were granted along with investment tax incentives for export industries in order to boost the international competitiveness of technology-intensive areas like machinery and electronics.

During its export-led industrialization period in the 1970s, the Philippines set up an incentive system to promote exports with the enactment of the Export Incentive Act. For instance, companies with exports representing more than 50% of production were granted the right to duty refunds on imported intermediate and capital materials as a way of boosting export competitiveness. At the same time, the move was also protectionist in nature: the Progressive Manufacturing Program was structured in such a way as to encourage companies receiving support to use domestic rather than imported intermediate goods.

Table 7-8. Government Policy Measures: Trade

Country	Period	Trade Policy
Korea	HCI development period (1970s)	Stronger export promotion system: 50% corporate tax reductions on export earnings, tariff exemptions on HCI equipment imports, Protection of domestic market: In 1978, effect rate of protection was 71% for HCI vs. -2% for light industry
Taiwan	Second import substitution period (1970s)	Protectionist measures: tariff hikes, import approval system, Limiting competition: restrictions on facility construction/expansion, requirements to use domestic parts/materials
	HCI structural adjustment period (1980s)	Import tax exemptions on machinery, equipment, and other intermediate goods, Investment tax incentives for export industries
Philippines	HCI Drive (1970s)	Tariff rebates on imported intermediate/capital goods for companies with exports representing more than 50% of production (EIA, 1970)
Brazil	Target Plan (1956~61)	Import approval system (introduced in 1949), High tariffs and “similarities” policy, Multiple exchange rate system: undervalued for domestic production areas, overvalued for areas without domestic production
	NPD II (1975~79)	Stronger protections - Shift from tariff protections to non-tariff barriers
Algeria	First, second four-year plans (1970~77) First five-year plan (1980~84)	State monopoly on trade

Brazil's Target Plan included strongly protectionist measures designed to promote import substitution in HCI: an import approval system, high tariffs, “similarities” policies, and compulsory use of domestic intermediate goods. A typical example of this was

the use of a protectionist multiple exchange rate system. Overvalued rates were used to lower import costs for essential intermediate goods and items that could not be produced domestically, while undervalued rates shielded industries that were under development from international competition. This import substitution-oriented protectionism only intensified with the NPD II. During this period, non-tariff barriers (similarity indexes, minimal domestic product usage requirements, preferential treatment for domestic items when purchasing capital goods) were preferred over tariff protections.

In Algeria, trade was managed monopolistically by the state.

3. Economic Structure Changes in the Post-HCI Era

(1) Macroeconomic changes

1) Per capita GDP catchup

This section examines the “catchup” trend for the five countries in terms of their relative per capita GDP level, where the U.S. standard is taken to represent a value of 100.

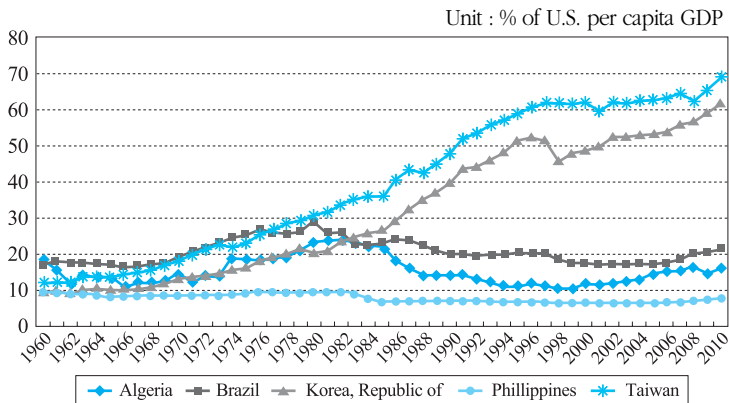
Korea’s catchup relative to U.S. GDP accelerated in the 1970s, when the HCI drive entered into full swing. It dropped off temporarily in the wake of the second oil crisis in 1979 before resuming its acceleration in the early 1980s and on through the period just before the foreign exchange crisis of 1998. This period saw a number of economic changes: a shift toward function-based industrial policy in 1986, as well as transitions to

innovation-led industrial development, external openness, and the so-called “three lows” keynote of the mid-1980s. While the catchup slowed, or even reversed, during the foreign exchange crisis, it subsequently resumed, and has continued throughout recent years.

Taiwan’s trend has been similar. Its catchup phase, which accelerated with the expanded light industry exports of the 1960s and the HCI drive of the 1970s, was sustained through the early 1990s, with only a few exceptions (including the second oil crisis). Since the 1990s, however, it has remained more or less stagnant. Over the same period, the country has moved away from HCI development policy.

The Philippines has had the lowest per capita of the five countries since the 1960s, with almost no catchup taking place through recent years. Indeed, what catching up it had done was actually reversed amid the political and macroeconomic instability

Figure 7-1. Catchup Trends Relative to U.S. GDP



Source : Penn World Table.

of the early 1980s, resulting in a low level that has been sustained ever since. While the country did formulate industrial development plans in the early 1980s and 1990s, both were thwarted by political changes. Market opening has been progressing rapidly since 1990.

Brazil experienced a swift catchup during its “Miracle” years of 1967~73, but the protectionist period of the NPD II (1975~79) saw almost no advancement. Until the early 1980s, Brazil’s per capita GDP was actually higher than Korea’s, but it has been all downhill for the catchup since then. The protectionism only intensified in the 1980s; by the 1990s, industrial policy was being abandoned in favor of economic openness measures.

Algeria experienced a rapid catchup phase between the late 1960s and the early 1980s, the period that saw the implementation drive spearheaded by the socialist government. During this period, per capita GDP remained startlingly similar to Korea’s. Like Brazil, it saw its catchup period come to an end in the early 1980s. During that decade, the combination of inefficient state enterprise and mounting deficits precipitated a macroeconomic and systemic crisis that resulted in massive red ink for banks, the government, and current accounts.

2) The labor productivity catchup

Trends in the rate, level, and changes in the five countries’ catchup with U.S. labor productivity over time are quite similar to those observed above for per capita GDP. The exception is Algeria, which had maintained higher levels of labor productivity than either Korea or Taiwan until the mid- to late 1980s.¹³⁷⁾ Generally,

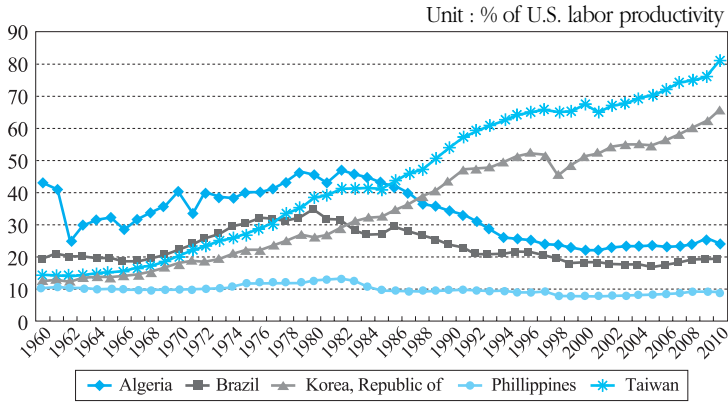
labor productivity has a positive functional relationship to the rate of investment and capital accumulation, human capital accumulation, and technological development.

Algeria actually maintained a higher investment rate than either Korea or Taiwan during the 1970s big HCI push. During its HCI development period, it drew on its petroleum regions to apply 50% of GDP as fixed capital investment, a fact that helps explain the high level of labor productivity. Brazil's investment rate rose throughout the early 1970s before a downward adjustment that has kept levels largely stagnant ever since. Korea saw a steady increase between the 1960s and early 1990s, but its investment rate has also stagnated or even declined since then (Still, its rate has remained higher than any of the other four countries since 1990). Taiwan's investment rate declined during the early 1980s, when energy-intensive HCI industries were restricted to the levels needed to supply domestic demand, while the policy focus shifted to nurturing technology-intensive industries.

As noted before, both Korea and Taiwan committed major efforts to human capital development and technology innovation in addition to their capital acquisition during their respective HCI drives. Both have also continued working to adopt an innovation-led industrial development pattern ever since. In contrast, the Philippines, Brazil, and Algeria neglected human capital acquisition and technology innovation efforts, at least during their HCI development periods. This difference in the locus of their

137) This is thought to be the result of a corresponding high percentage of economically inactive people in the Algerian population.

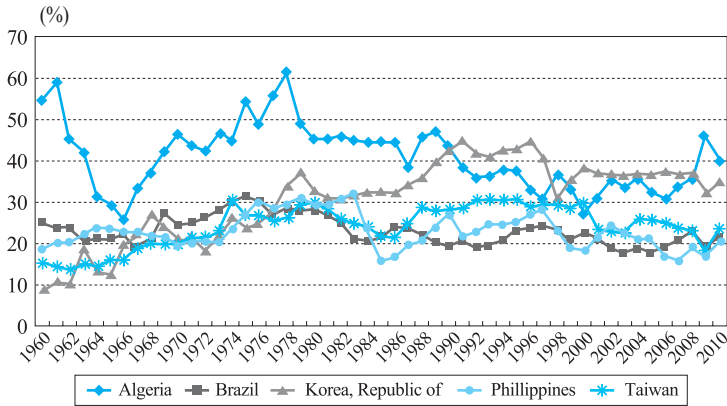
Figure 7-2. Catchup Trends for Labor Productivity Relative to U.S. GDP (U.S.=100)



Source : Penn World Table.

Note : Labor productivity is represented by PPP converted GDP (2005 constant price) per work.

Figure 7-3. Investment Share of PPP-Converted GDP per Capita at Current Prices



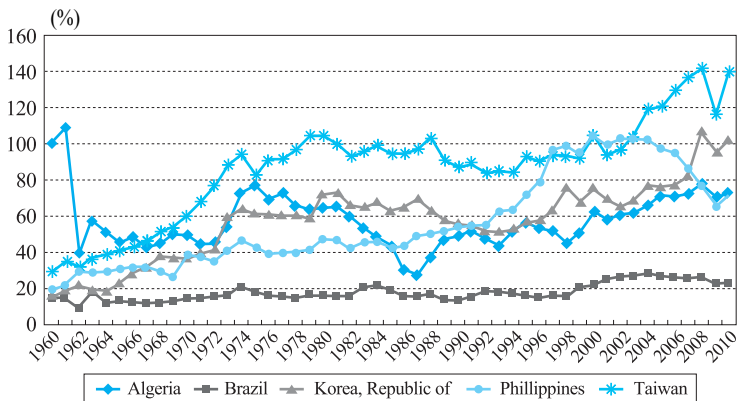
Source : Penn World Table.

efforts may go some way in explaining the changes in the five countries' labor productivity catchup patterns.

3) Economic openness

Korea's dependence on trade rose sharply during the expanded light industry export period of the 1960s and the HCI drive in the 1970s. Taiwan also experienced a rise during its expanded light industry export period of the 1960s and HCI drive in the 1970s. In the Philippines, trade dependence skyrocketed during the export-led industrialization push of the 1970s and the economic liberalization/market openness period of the 1990s. In Algeria, it rose greatly in the period around the first oil crisis, when petroleum prices shot up. Brazil sustained low levels during its import substitution HCI drive, a trend that has continued throughout recent years.

Figure 7-4. Trends in Trade Openness



Source : Penn World Table.

Note : Trade openness is defined as the sum of product and service trade divided by GDP and multiplied by 100.

(2) Changes in industrial structure

1) Changes in manufacturing as a percentage of GDP

In Korea, manufacturing rose as a percentage of GDP during the HCI push, climbing from 19% in 1970 to 25% in 1980.¹³⁸⁾ The percentage continued to go up throughout the 1980s before reaching a peak in the latter part of the decade. It has remained more or less in place since then.

In Taiwan, manufacturing rose from 29.7% of GDP to 38.9% during the light industry export industrialization period of 1965 to 1970. It rose further during the HCI drive of the 1970s, reaching a level of about 43% by 1981. Its peak of 44.8% came in 1986, just after the change in course toward technology-intensive industry.¹³⁹⁾ From that year throughout the 1990s, it entered a sustained decline (see Figure 7-5).

Manufacturing in the Philippines remained more or less static as a percentage of GDP from 1980 until the 1990s, when it began to decline slightly.

In Brazil, manufacturing rose as a percentage of GDP during the Target Plan period of 1956 to 1961, but fell amid the intensified protectionism of the NPD II (1975~79).¹⁴⁰⁾ In terms of long-term trends, it rose from the 1950s until the early 1970s,

138) Bank of Korea.

139) See Chapter 3 for the manufacturing percentage in Taiwan. SOC is included in manufacturing here, which may result in overestimates compared to the levels in Figure 7-5.

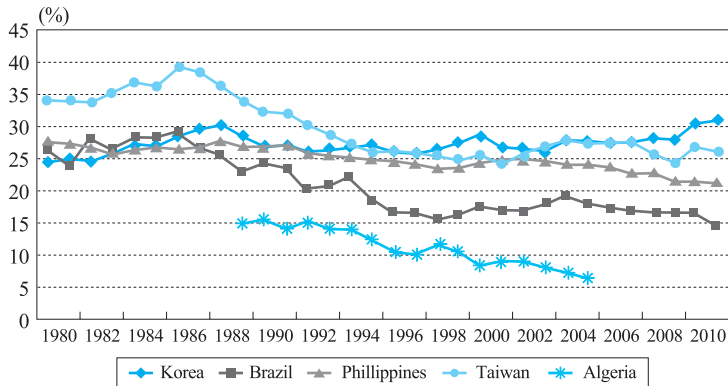
140) See Chapter 5.

reaching a peak of 27~28% in the middle part of the decade before entering a decline that has continued ever since.

Algerian manufacturing rose slightly as a percentage of GDP during the country's HCI drive, climbing from 11% in 1970 to 14% in 1978.¹⁴¹⁾ After that, it entered a sustained decline, reaching just over 6% by the mid-2000s.

Comparison of the manufacturing percentage in the five countries shows Taiwan with the highest level through the early 1980s, with Brazil and the Philippines maintaining a level similar to Korea. While Korea and Taiwan maintained high percentages in the 2000s, the levels in the Philippines and Brazil have remained low.

Figure 7-5. Percentage of Nominal Value-Added for Manufacturing Relative to GDP



Source : Shignier (2009), p. 82, for Algeria, Global Insight for all others.

Note : Represents percentage of manufacturing value-added in nominal GDP; values for Algeria include petroleum as manufacturing.

141) See Chapter 6.

2) HCI as a Percentage of Manufacturing

In Korea, the percentage of HCI value-added among all manufacturing jumped from 36% to 51.4% during the HCI drive from 1970 to 1980. HCI also rose sharply as a percentage of manufacturing exports, climbing from 18.2% in 1970 to 47.6% in 1980.¹⁴²⁾ This suggests a high level of export-led growth in HCI during the decade. The percentage of HCI value-added and exports among manufacturing has continued to climb over the long term since then.

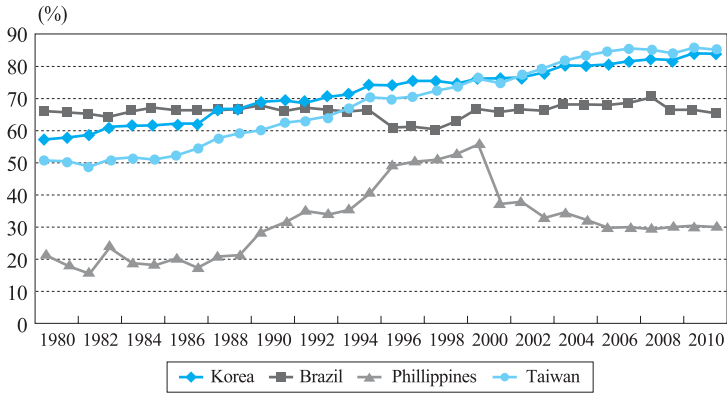
In Taiwan, the percentages of target industries also rose during the HCI development period. Basic chemical products went from 5.4% of manufacturing in 1971 to 8.4% in 1981, while transportation (including ships and cars) rose from 4.3% to 6.9% over the same period. Electronics, one of the main focuses of development efforts, also experienced a sharp rise in the 1980s, jumping from 19.6% of manufacturing in 1981 to 36.2% in 2001.¹⁴³⁾ Since the 1980s, HCI value-added and exports have experienced sustained growth as a percentage of manufacturing in a similar pattern to Korea's.

In the Philippines, HCI's percentage of manufacturing value-added rose between the mid-1980s and around 2000, but has fallen ever since. Its percentage of manufacturing exports, in contrast, has continued to rise. In Brazil, the value-added percentage rose sharply from 24.7% to 47.4% during the period from 1950 to 1961 (which included the Target Plan), but

142) See *Sixty-Year History of the Korean Economy*.

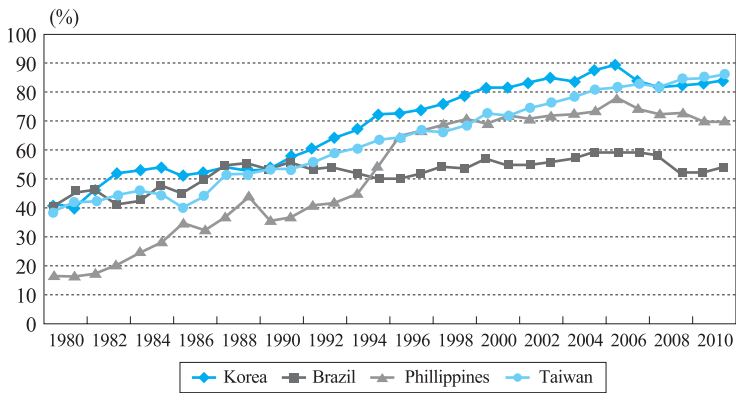
143) See Chapter 3 on Taiwan.

Figure 7-6. HCI as a Percentage of Nominal Manufacturing Value-Added



Source : Global Insight.

Figure 7-7. HCI as a Percentage of Manufacturing Exports



Source : Global Insight.

experienced only a small increase from 57.5% to 59.7% during the period from 1975 to 1980 (which include the NPD II).¹⁴⁴ It has remained more or less in place since the 1980s. A similar trend

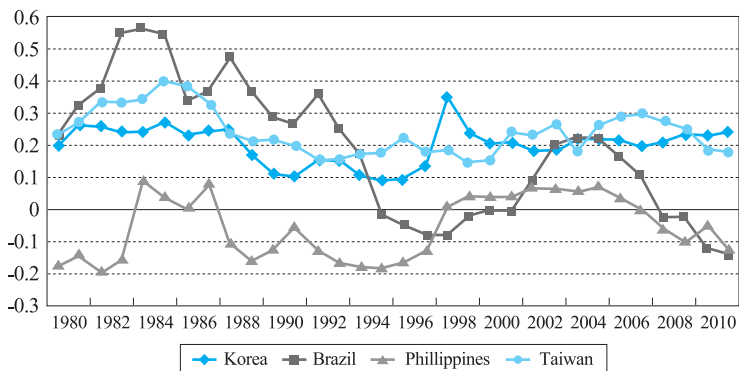
144) See Chapter 5 on Brazil.

was observed for HCI exports as a percentage of manufacturing, which rose in the 1980s but have remained static since then.

3) Changes in manufacturing competitiveness

Figure 7-8 shows manufacturing trade surplus or deficit conditions as a percentage of total manufacturing trade. Manufacturing trade surplus conditions have remained a stable trend in both Korea and Taiwan since 1980, suggesting that their manufacturing competitiveness remains more or less unchanged. Brazil experienced larger trade surpluses relative to total manufacturing trade than either Korea or Taiwan during the period from 1980 to the mid-1990s, but the period since then has been relatively unstable, alternating between deficit and surplus conditions. The Philippines registered small trade surpluses from the mid-1980s until the 2000s, but trade figures have otherwise been negative.

Figure 7-8. Trade Specification Index for Manufacturing
(Measure of Competitiveness)



Source : Global Insight.

$$\text{Note : Trade Specialization Index} = \frac{(\text{export value} - \text{import value})}{(\text{export value} + \text{import value})}$$

4. Final Assessment and Conclusion

(1) Final assessment

As the above trends in per capital GDP catchup show, both Korea and Taiwan have kept in close pursuit since their respective HCI policy drives, while Brazil and Algeria sustained general catchup trends through their drives and into the early 1980s, but only to have the rate decline or reverse since then. The Philippines experienced almost no GDP catchup from the 1960s onwards. HCI policies may result in some immediate outcomes, but their mid- to long-term performance depends on certain factors, namely whether the policies are suited to present comparative advantage and future potential and whether they respond appropriately to subsequent changes in economic conditions.

The expert analyses examined in this paper point to generally successful HCI strategies in Korea and Taiwan, compared to unsuccessful ones in the Philippines, Brazil, and Algeria. Certainly, this sort of “success” or “failure” categorization is relative and prone to hindsight bias. In that sense, the terms “success” and “unsuccessful” are meant to refer to a relative direction in HCI performance. The section that follows briefly interprets the Korean and Taiwanese examples as successful directions and the Philippine, Brazilian, and Algerian examples as unsuccessful direction.

Korea’s HCI drive was a “Big Push” strategy, with large investments, primarily from private enterprise (especially large corporations), that were shored up by comprehensive and

proactive government support in the 1970s. It was an export-led growth strategy that hinged on incentives and disincentives. Some difficulties were encountered in the early 1980s as overinvestment issues led to rationalization. The aim of investment adjustments was to improve international competitiveness by cutting back on overequipment and affecting production specialization. But following the 1986 enactment of the Industrial Development Act, which brought it a move away from industry-selective policy to a more function-based approach, Korea was able to succeed with its HCI push through a judicious use of increased private enterprise autonomy, a shift toward innovation-led industrial development, and external openness policies. In particular, the so-called “three lows” (low value of the Korean won, low oil prices, low interest rates) of the mid-1980s and the rise of China during the 2000s contributed greatly to the success of Korea’s HCI. Its push certainly did come with its share of opportunity costs — from the concentration of economic resources and the imbalance in economic growth — but from a long-term perspective, it was an ongoing effort to contend with the comparative advantage conditions of the 1970s (specifically, labor-intensive light industry) and establish a new comparative advantage in more capital- and technology-intensive, high value-added industries.

Taiwan invested large sums in HCI (petrochemicals, steel, shipbuilding) in order to nurture basic materials industries as a way of stimulating domestic demand and achieving backward integration with previously developed downstream areas during the recession conditions of the 1970s. Because private enterprise

lacked investment capabilities, the government sought to socialize the risk through public enterprise. This early approach is seen today as successful, in that it paved the way for the active private enterprise investment that occurred during the liberalization period from 1980 onward. The government was involved in the Taiwanese HCI drive (through public enterprise), but it was not a “Big Push” strategy, as decision making was more market-oriented and less comprehensive than in Korea. Taiwan also sought a path for sustained growth by shifting the focus of its HCI structure to technology-intensive areas like machinery and electronics in response to the rising energy prices in the wake of the second oil crisis in the 1980s.

The Philippines followed a similar path to other developing countries: import substitution-oriented industry development in the 1960s, an export-led strategy in the 1970s. Its HCI production base and innovation levels, however, remain quite meager. Its industrial development strategies have lacked consistency, transforming drastically in response to current account crisis conditions and political changes. The Progressive Manufacturing Program of the 1970s, the 11 major industry development strategy of the early 1980s, and the technology-intensive industrial development strategy of 1998 were all thwarted by political upheavals, including the rent-seeking practices of the ruling Marcos clique. Another problem was the government’s lack of commitment to HCI development policy. In the case of shipbuilding, the interests of the shipping industry were prioritized over those of ship manufacturing; the attempt to develop the automobile industry foundered due to a reliance on the benevolence of FDI companies

and a lack of commitment to nurturing the local parts industry. The country also lacked any real policies for establishing human capital and developing technology. Chapter 4 identified macroeconomic instability, market liberalism, absence/irrationality of incentive systems, overdependence on FDI, and a lack of patriotism from the leaders directing industrialization as causes of the Philippine HCI push's failure.

Brazil also failed to develop most of its HCI target industries into industries with international competitiveness today. Its HCI policy lacked incentives for improving productivity and competitiveness, while excessive and ongoing protectionism led companies to satisfy themselves with the domestic market and abandon efforts at technological innovation. Public policy was focused solely on increasing production capabilities and neglected development of human capital and technology. These factors explain how the country's shipping industry could go from second in the world to nonexistent during the free market period of the 1990s. Chapter 5 identified excessive and opaque protectionist barriers, a lack of temporary legislation, and barriers in the adoption of inputs and new technologies as reasons for the failure of Brazil's HCI push.

After achieving independence in 1962, Algeria attempted a state-driven industrialization push along socialist lines. By 1980, it was faced with a triple crisis — with its corporations, national finances, and foreign debt — which led to a systemic crisis in the later part of the decade. The outcome of the Algerian strategy can be explained by a combination of factors: the socialist, state- or state enterprise-centered methods, an overreliance on petroleum

resources (characteristic of many resource-rich nations), and a lack of industrialization experience (characteristic of many developing nations). The role of the oil rent deserves particular attention, as it provided the source of investment funds and enabled the development strategy to continue for as long as it did. Algeria's experience with an HCI drive is an excellent lesson to other resource-rich countries hoping to achieve industrial diversification through large investments directed by the state and state enterprises. Countries hoping to avoid the "resource trap" would do well to heed it.

(2) Implications for industrial policy in developing countries

The previous section's analysis of the results of the five countries' HCI programs offers some important implications for developing countries hoping to implement their own HCI drives. This section focuses on the commonalities in their experiences and their implications for industrial policy in developing countries.

First, the government needs to be committed and consistent in its HCI policy. It is a process that demands a political consensus on the need to develop strategic industries, as well as a consistent and flexible approach. During its HCI drive, Korea maintained consistency in the face of critics who argued that the move was ill-suited to comparative advantage conditions. In addition to the economic aim of advancing industrial structure, the political goal of nurturing the domestic defense industry amid the ongoing standoff with North Korea also may have provided a unique driving force in the Korean case. The HCI strategy involved a

comprehensive and long-term investment plan. Even when investments were adjusted in the early 1980s in response to oversupply, consistency in the nurturing of HCI was maintained by making stronger international competitiveness both the goal and the standard. In Taiwan, the government took part directly in the HCI drive through public enterprise investment, thus socializing the investment risk.

The case of the Philippines offers a stern lesson. There, industrial development strategy and policy was extremely inconsistent, often appearing and disappearing spontaneously in response to current accounts crises or political changes. Even cases like the Progressive Manufacturing Program failed to achieve their aims of contributing to manufacturing value-added and backward integration due to the apathy of the Marcos clique, which was more interested in rent-seeking practices involving non-trade sectors. Policy designed showed a lack of commitment to fostering HCI: in the case of shipbuilding, the interests of shipping businesses were prioritized over those of ship makers, while the car industry push failed due to a lack of commitment to cultivating the parts industry.

A second implication is the need for a fair and rational system of incentives. The success or failure of any industrial policy that involves the selection of target industries or businesses depends on these factors. In particular, systems should be designed to encourage productivity and international competitiveness improvements. In Korea, incentives were paired with a system of rewards or punishments according to performance, especially in exports. Beneficiaries that failed to perform had their support

reduced or denied outright. This appears to have encouraged the companies to remain competitive with their performance in order to continue receiving preferential treatment.

Although Brazil set targets for its industries, nothing was done to punish failures to meet them. This, combined with protectionist policies, may be what encouraged many of them to satisfy themselves with the domestic market without working to improve productivity. In the Philippines, compensation was based more on political loyalty than on performance: the Marcos clique in particular thrived on rents from unfair enforcement of the law rather than compensation for outstanding performance.¹⁴⁵⁾

A third implication has to do with the need for investment planning that is tailored to the country's stage of industrial development. Both Korea and Taiwan invested in HCI after first achieving development in light industry (particularly of the export-led variety). In other words, both had established a basic level of domestic demand for the HCI industry, having generating intermediate and capital goods revenues with their light industry export development. This development also meant that private enterprises in HCI areas were already established to some extent.

Brazil and the Philippines also went through an import substitution-oriented or export-led light industry period before nurturing their HCI industries. Although due to other factors, neither achieved satisfactory performance. Algeria offers a particularly stark lesson. Its approach was to invest heavily in basic upstream industries without any development in consumer

145) See Chapter 4 on the Philippines.

goods or other light industry. This tactic may have led to current account crisis, with the lone development of basic industries and rising income levels resulting in a demand for downstream imports in areas such as consumer goods.

In summary, the optimal approach for a country's industrial development stage may be to have development of a backward sector of industry such as HCI lag behind or proceed in tandem with the downstream development of light industry.

A fourth implication involves the importance of resource concentration and economies of scale in the early stages of HCI industrialization. Most of the countries examined in this study offered long-term, low-interest financing and tax/tariff incentives to selected industries and businesses. From the standpoint of a developing country lacking in savings and capital, this may come across as a method that involves concentration of resources. Taiwan's case is particularly instructive: in the early stages of the HCI drive there, the government responded to private enterprise's lack of investment capabilities by participating directly in the market through state enterprise monopolies in order to socialize the investment risk. In Chapter 3, this channeling of resources was observed to be a successful strategy, in that it led to active private sector investment from the 1980s onward, after an investment base and sense of trust had been established. Private sector leadership and foreign capital and technology were also applied for the Taiwanese car industry, but with a small domestic market and more than a dozen businesses participating, economies of scale could not be achieved, and the industry failed to reach internationally competitive levels.

Another common factor in Korea and Taiwan is the shift to an innovation-driven development pattern after an investment base had been established through resource channeling. With its Industrial Development Act in 1986, Korea changed course from industry-specific policy to function-based policy that emphasized innovation, increasing private sector autonomy in the process. Taiwan has also strengthened its market function since 1986 with a move toward expanded private enterprise investment, privatization of public enterprise, and a new paradigm of innovation-driven industrial development.

A fifth implication concerns the importance of temporary and predictable trade protection measures. Developing countries have often used a series of trade protection measures to develop infant industries. Korea and Taiwan went this route during their HCI drives in the 1970s. In the Korean case, at least, market protections were temporary and predictable. Both countries followed a course of implementing and expanding external openness policies from the mid-1980s onward.

The Brazilian example provides something of a lesson in this regard. Excessive and indefinite market protections took away any incentive for companies to innovate and beef up productivity in preparation for a more open market. Indeed, any sudden opening that might expose them to outside competition would be catastrophic. In the Philippines, the steel, shipbuilding, and automobile industries all flourished under protectionism, only to vanish with the open economy of the 1990s.

A sixth implication has to do with the need for HCI methods to be focused as much on acquiring human capital and stronger

technology as they are on expanding production through capital acquisition. Technology is not automatically transferred by trade liberalization or capital inflows. Korea worked from the earliest stages of its HCI drive to not only introduce and absorb technology from the advanced economies, but also build its own government-directed system for acquiring human capital and developing technology. Similarly, Taiwan worked early on to set up an R&D support system.

In contrast, Brazil's public policy was focused only on expanding production capabilities and neglectful of human capital or technology capabilities. In hindsight, this appears to be one of the reasons that it failed to produce industries that are internationally competitive today. The lack of any innovation policies to speak of also appears to have been an important factor in the HCI failures of the Philippines and Algeria.

To sum up, HCI development, and industrial development in general, requires a long-term plan and long-term practice to make the most of current and potential comparative advantage.

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