

Financial System, Corporate Diversification and Technological Catching-up: South-Korea; an imitator to innovator

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Abstract

South-Korea, a front runner among the newly industrializing economies, was a typically underdeveloped agrarian country until the turn of the 1960s. Afterwards within a short period of one generation, it was transformed into a modern industrialized country helped by the rapid growth, which averaged over 8 percent per annum for more than thirty years except during the crisis in the late 1990s, its GDP volume soared from only US \$ 2.1 billion in 1961 to US \$ 1.180 trillion in 2006 in tandem with its exports less than US \$ 1 billion to more than US \$ 325 billion during the same period. Economic literature is replete with research on the Korean strategy which accomplished this miraculous growth but with less consideration to the link between finance and technology. So, this study probes its industrial strategy from a distinct angle of financial system and financial sector policies as an imperative determinant of technological catching-up. This study recognizes that government directed corporate diversification has expanded the product variety of Korea which is the outcome of innovation that in turn crucially depends on knowledge and R&D activity; while these both in turn call for long-term commitment and constant creation of rents. Here credit goes to Korean judicious blend of different financial sector policies to augment indigenous R&D efforts during its industrial voyage through multiple financial and fiscal incentives besides strengthening the education system. Consequently, a vast variety of exportable has provided vast opportunities to learn from international market through exporter-importer interactions of different kinds besides reducing the risk to absorb foreign demand shocks. Unrelated diversification into completely new export sectors and related diversification out of primary into manufactured exports helped to earn more foreign exchange which in turn facilitated to import the advanced technological goods and machines to further strengthen the industrial base of the economy.

In first section a theoretical paradigm has been constructed from literature by discussing the normative aspects of corporate diversification, product variety, demand, innovation, learning and catch-up through exports. Second section tells the Korean tale of corporate diversification and export led technological catching-up. Third section sheds light that how financial sector policies created rents to enhance the entrepreneurship in the economy. Fourth section describes the transformation of Korea from imitator to innovator. Fifth section contains critical analysis of the Korean Industrial strategy. While the last section wraps up some lessons.

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Introduction

South-Korea, a front runner among the newly industrializing economies, was a typically underdeveloped agrarian country until the turn of the 1960s. Afterwards within a short period of one generation, it was transformed into a modern industrialized country helped by the rapid growth, which averaged over 8 percent per annum for more than thirty years except during the crisis in the late 1990s, its GDP volume soared from only US \$ 2.1 billion in 1961 to US \$ 1.180 trillion in 2006 in tandem with its exports less than US \$ 1 billion to more than US \$ 325 billion during the same period. Economic literature is replete with research on the Korean strategy which accomplished this miraculous growth but with less consideration to the link between finance and technology. So, this study probes its industrial strategy from a distinct angle of financial system and financial sector policies as an imperative determinant of technological catching-up.

Schumpeter emphasised² that those who are starting “new things”, or innovating, need to be provided with “profits for above what are necessary in order to introduce the corresponding investment” He argued that entrepreneurial profits (or quasi-rents) may some time be provided by the difficulty of imitating the new technology (or organization), but sometimes would have to be secured through “restraints of trade” like cartel arrangements. The thrust of Schumpeter’s argument is then that entry barriers of one form or another are necessary to provide incentives for innovation because it means doing “new things”. Establishing an industry in a developing country may not involve doing anything “new” from a global point of view, but poses a similar incentive problem, because it still is a “new thing” for that nation³. In order to set up new industries, South-Korea has to import technology along with other indigenous efforts, but making the imported technology work requires a period of learning to assimilate and absorb it which is a costly activity with highly uncertain returns. Thus the state created restraints of trade through tariff protection and provided rents through preferential loans, subsidies and tax exemptions to develop new industries in South-Korea⁴. (For the purpose of this study our focus will remain only on financial incentives) After following the export-led industrialization; the industrial policy of Korea changed emphasis from light industries (LI) to heavy & chemical industries (HCI) in the early 1970s. However, the government continued to use financial and fiscal incentives to promote export-related industries. In the early to mid-1980s, the government switched the direction of industrial policy from direct subsidization of selective industries toward function-oriented support, such as support for R&D activities that can be utilized generally. The transition from LI to HCI and then to IT industries where R&D expenditures are quite important in their development, gave rise to rapid economic growth and resulted in a higher value-added and well diversified corporate structure. While the accumulated non-performing loans of banks as a result of preferential policy loans to promote such industries became one of the causes of the economic crisis in 1997-1998. Therefore, this Korean anti-competitive⁵ approach to technological catching-up calls for a detailed analysis.

² Schumpeter (1943) P. 87-91 and Lundvall (1998) also reiterates that, when the focus is on economic development, successful innovation is more important than efficient allocation.

³ Chang H. J. (1993) P.144

⁴ In 1961 Park extended government control over business by nationalizing the banks and merging the agricultural cooperative movement with the agricultural bank. The government’s direct control over all institutional credit further extended its command over the business community. The Economic Planning Board was created in 1961 which allocated resources, directed the flow of credit, and formulated all of South Korea’s economic plans.

⁵ “The state’s control over technological transfers and foreign direct investments, and the state’s commitment to long-term lending through state-owned banks and various special investment funds have been vital in this respect.” Chang Ha-Joo (1993) P.154

1.1) Corporate Diversification: Why firms diversify their product portfolio?

Variety, a result of innovation and search activities, has gained considerable profession's attention in recent past. Variety and Diversity are interchangeable in lexicon⁶. It is defined as 'the number of actors, activities, and objects necessary to characterise the economic system'. Hence it represents qualitative change in the composition of an economic system⁷. While qualitative change affects all levels of the economy. In the presence of outward-oriented industrial and trade policies variety plays pivotal role to enhance exports of the country. Few empirical studies⁸ confirm that producing highly differentiated export goods gives a competitive advantage which allows selling more products in international market⁹ because man by nature care for variety. Monopolistic competition as a market structure excels over perfect competition because former assumes product differentiation while later lacks it due to the assumption of product homogeneity. Gossen's principle of satiable wants¹⁰ along with two other principles provides a basis for variety growth in demand theory. First, there is the principle of subordination of wants¹¹; second, there is the principle of the growth of wants¹². "These two principles, combined with satiety, provide a microeconomic basis for the saturation of given wants and the increase in the overall number of wants. The two principles combined imply that the marginal utility of adding a new good to the pre-existing pattern of consumption is greater than that of adding an extra unit of a pre-existing good. The two principles are then compatible with utility maximisation¹³". On the other hand foreign exchange, earned through exports, is one of the key determinants of economic growth.

Diversity / variety has emerged as a central topic of research in strategic management. However it occurs prominently as a key variable in numerous fields such as industrial organization economics, financial economics, organization theory and marketing. A review of literature reveals that there is a great deal of variation in the way variety is conceptualized and defined. Gort (1962) defined diversification in terms of the concept of 'heterogeneity of output' based on the number of markets served by that output. To Berry (1975) diversification represents an increase in the number of industries in which firms are active. Hopkins (1985) defined diversification as the extent to which firms operate in different businesses simultaneously. Ansoff's (1957, 1965) notion of variety emphasises the entry of the firms into new markets with new products. Booz, Allen, and Hamilton (1985) defined diversification as a means of spreading the base of the business to achieve improved growth and / or reduce overall risk. Concerning economic performance, major rationale for diversification is economies of scope i.e. given fixed inputs, it can be demonstrated theoretically that producing a greater rather than a smaller variety of products may be cheaper under certain

⁶ Stirling (2004 p. 46) considers that diversity is the principal concept which has three components i) Variety: refers to the number of categories into which the quantity in question can be partitioned. ii) Balance: refers to the pattern in the apportionment of that quantity across the relevant categories (the market share of each option in a portfolio. iii) Disparity: refers to the nature and degree to which the categories themselves are different from each other.

⁷ Saviotti P P (2001)

⁸ Frenken et al (2007), Saviotti, Franken (2008), Hidalgo et al (2007), Michael Funke and Ralf Ruhwedel (2001 and 2001 b)

⁹ Michael Funke and Ralf Ruhwedel (2001)

¹⁰ Georgescu-Roegen (1954), p. 514

¹¹ To Banfield (1844) and to Jevons (1924) . . . the satisfaction of every lower want . . . creates (Banfield)/ . . . merely permits (Jevons) the higher want to manifest itself.

¹² . . . not only does one have to reach satiety before the next one can manifest itself, but it appears that there is always a next want. (ibid., p. 514)

¹³ For detail see Saviotti P P (2001), p. 121-124.

circumstances¹⁴. Most recent attempts at defining variety or diversification have roots in Neo-Schumpeterian Economics¹⁵; a branch of economic literature which deals with dynamic processes causing qualitative transformation of economies basically driven by the introduction of novelties in their various and multifaceted forms. Novelty here means innovation and, in particular, technological innovation.

For the purpose of this study variety is defined as, the degree of differentiation of industrial output of an economic system at higher level of aggregation. In the broader sense variety can be subdivided into two categories. **a) Related variety**; The creation or improvement of similar products which were already being produced in the economic system. **b) Unrelated variety**; The creation of two entirely different innovations (e.g. computers and airplanes) gives rise to unrelated variety. There is considerable evidence that at the level of firm related diversification leads to better results¹⁶. One can expect something similar to apply to higher levels of aggregation; for example national or regional level. If we interpret related variety as the one that countries or regions raise by introducing new products or services similar to those they were previously producing rather than completely unrelated ones, we can expect related variety to be more conducive to economic growth than unrelated variety, especially in the short run¹⁷. Related and unrelated varieties have intrinsically different time scales. Unrelated variety is likely to occur over longer periods than related variety. There are a number of reasons to believe the creation of entirely different sectors to be a slower process than the differentiation of existing ones. Nevertheless both can be the determinants of growth on different time scales, slower for unrelated and faster for related variety. Developing countries are heavily dependent on commodity exports and are therefore vulnerable to external shocks. In order to stabilise export earnings and foster income growth, best strategy is to increase the variety of their export baskets. South-Korea followed the same strategy and government induced the corporate sector to diversify by extending a bouquet of different kind of incentives. While it is considered that diversified firms are prone to misallocate capital to unproductive segments. The more diverse and complex the investment opportunity available, the more pronounced this misallocation is¹⁸. Such misallocation of capital should be associated with a reduction of short-term productivity and a pronounced long-term value discount. On the other hand, a learning-by-doing hypothesis argues that when firms diversify into new lines of business, there is an initial period during which employees learn to use new technologies and/or coordinate with the new businesses; therefore a reduction in short-term productivity should be observed with different perspective¹⁹. This learning-by-doing should not be associated, however, with a value discount since the forward-looking capital market fairly assesses the increase in productivity over time as the learning-by-doing pays off. Therefore, the loss of capital due to the misallocation may be regarded as sunk cost of learning because one also learns by making mistakes. As we have witnessed in the case of South-Korea where, NPLs became one of the main cause to initiate 1997 crisis.

It is generally established that for many countries in North America and Western Europe which developed during the nineteenth century, international trade did serve as an engine of

¹⁴ On economies of scope, see Bailey and Friedlander (1982)

¹⁵ Michael Funke and Ralf Ruhwedel (2001)

¹⁶ Montgomery (1982), Varadarajan & Ramanujam (1989), Montgomey & Hariharan (1991). In this same connection Teece et al (1994) seems to confirm that coherent firms are more likely to survive and to do well than unrelated and incoherent ones.

¹⁷ Saviotti P P (2006), Frenken et al. (2004, 2006) have also obtained exactly the same result for different regions of the Netherlands.

¹⁸ See Scharfstein (1997), Shin and Stulz (1998), and Rajan, Servaes, and Zingales (2000).

¹⁹ See Stockey (1991) and Young (1993).

growth. Trade unleashes several dynamic forces those are conducive to economic growth. Competition surges with the expansion of markets because producers tend to encroach upon each other's markets. This increased competition improves economic efficiency by offering a hard choice to all inefficient producers either to quit the business or become more efficient. Accordingly technical progress through catching-up leads to increased investment, which plays critical role in the exploitation of newly created opportunities. "Hence country's fundamentals namely its endowments of physical and human capital, labour, and natural resources along with the overall quality of its institutions determine relative costs and the patterns of specialization that go with them. Attempts to reshape the production structure beyond the boundaries set by these fundamentals are likely to fail and hamper economic performance"²⁰. It is a stylised fact that ex-ante productivity determines the choice whether to export or not. In other words, firms have to become more productive before they export and causality runs from productivity to exports. Causality in the opposite direction is less clear. One can think of plausible reasons why a presence in export markets might raise productivity after entry, for instance exposure to best practised technology and learning. while studying the determinants of entry and exit from markets, most researchers include measures of international trade in the industry and at the firm level, with the notion that firm death is less likely when the firm is an exporter or in an industry in which exposure to imports is low. Entry and exit then lead to aggregate productivity changes as market shares change. So it follows that there is a direct connection between productivity and exporting²¹. In other words, once a firm has entered export markets, productivity growth may receive a further boost²² because exposure to international market could sharpen incentives to innovate by increasing returns to innovation²³. An other possibility is that export markets are more competitive than domestic markets, forcing firms to reduce X-inefficiency because exporting increases expected profit, which induces entry, pushes up the productivity threshold for survival and drives out the least efficient firms in a Schumpeterian wave of "creative destruction". Clearly this improves average industrial output. Secondly, exporting allows the most productive firms to expand and causes less productive firms to contract. This reallocation effect again acts to raise average industrial output. This model, despite its microeconomic structure, helps us understand the correlation between exports and growth widely observed at the macro level²⁴.

In fact outward looking strategy contains three separate channels of learning. First, interaction with foreign competitors and customers provides information about costs reducing and quality raising new processes, which can be interpreted as learning by exporting. Secondly, exporting allows firms to increase scale. Finally increased competition in foreign markets forces firms to be more efficient and stimulates innovation²⁵.

2.1) Corporate Diversification and Exports led Technological Catching-up in Korea.

The diversified business groups are found in South-Korea like Japan, India, Taiwan, Brazil, Turkey, and other late-industrializing countries. The origin of these diversified corporate groups in Korea is associated with the windfall gains from aid²⁶ during 1953 to 1958 which

²⁰ Rodrik et al (2005)

²¹ F. Sachwal (2002)

²² Clerides et al. (1998)

²³ ibid

²⁴ F. Sachwal and S. Perrin (2002)

²⁵ ibid (2002)

²⁶ The average annual inflow of aid from 1953 through 1958 was US\$ 270 million excluding military assistance, or roughly US\$ 12 per capita per year. At that time this was approximately 15% of the annual gross national product and over 80% of foreign exchange. Cole and Lyman (1971)

provided a basis for the emergence of altogether new entrepreneurial element, less conservative in outlook than Korea's older textiles industry and far more growth oriented than its small scale sector. "During this, period political connections lead to an uneven distribution of spoils"²⁷. According to the Government Audit Report 1961²⁸, the industries to which these enterprises thriving on venality belonged included textiles, paper, housing, mining, fertilizers, flour, alcohol, glass, pottery, livestock, construction, warehousing, and Trade. These subsidised entrepreneurs were generalists, devoted to money making in whatever industry the opportunity arose²⁹. The 1950s had witnessed a decrease in the size of agricultural enterprises along with an increase in the size of industrial enterprises and the tentative groping toward a symbiotic relationship between the state and the progenitors of large diversified business groups (*Chaebol*). The Park administration decided that the central government must play the key role in economic development. The government started to guide private industry through a series of export and production targets utilizing the control of credit, informal means of pressure and persuasion, and traditional monetary and fiscal policies.

In 1961 Park extended government control over business by nationalizing the banks and merging the agricultural cooperative movement with the agricultural bank. The government's direct control over all institutional credit further extended its command over the business community. The Economic Planning Board was created in 1961 and became the nerve centre of Park's plan to promote economic development. It was headed by a deputy prime minister and staffed by bureaucrats known for their high intellectual capability and educational background in business and economics. Beginning in the 1960s, the board allocated resources, directed the flow of credit, and formulated South Korea's economic plans. In the early 1960s, Korea's industrial policy was characterized by import substitution policy emphasizing the production of consumption goods. The Ministry of Commerce and Industry (MCI) regulated imports by using the discretionary import licensing system. To relieve the shortage of foreign exchange and technologies, private companies tried to borrow from abroad; but this was strictly controlled by the government. The Government Debt Guarantee Act promulgated in July 1962, guaranteed the private companies to borrow debts from abroad. The MCI chose fertilizer, PVC, cement, and petroleum refineries as the main industries to develop in the early phase of economic development and constructed industrial estates equipped with the appropriate infrastructure. However in the mid of 1960s, South-Korea embarked on the promotion of export- oriented industries, Export promotion policies began to be pursued in 1964 with the slogan "Export Number One." The government increased the direct subsidy to export and emphasis was placed on exporting products produced by labour intensive Light Industries (LI) such as textiles and clothing, where the Korean economy had a comparative advantage³⁰. While the government established the first integrated steel mill in Korea – Pohang Iron and Steel Company, Ltd. (POSCO), in the late 1960s – which became one of the best-performing steel companies in the world a few decades later. In the mid-1960s, various export promotion measures such as tax deductions and export finance schemes were introduced. In addition to it the government also developed sites for industrial complexes and provided inexpensively to firms entering the complex.

²⁷ Fortunes, therefore, were amassed, the "gravity train" starting with sales of Japanese property at below market prices. Favoured firms, whatever their origins, were allocated hard currency to import scarce materials – grains and fertilizers – that they then resold on the domestic market at monopoly prices. Furthermore they were given loans at subsidized interest rates and were granted tax exemptions. They were also awarded preferential contracts for large scale government project. K.D Kim (1976)

²⁸ The report suggests that total outstanding loans equalled about US\$ 140 million which is about half of the average yearly grant aid in the 1950s.

²⁹ A. H Amsden (1989)

³⁰ L.E Westphal and C.J. Dahlman (1985)

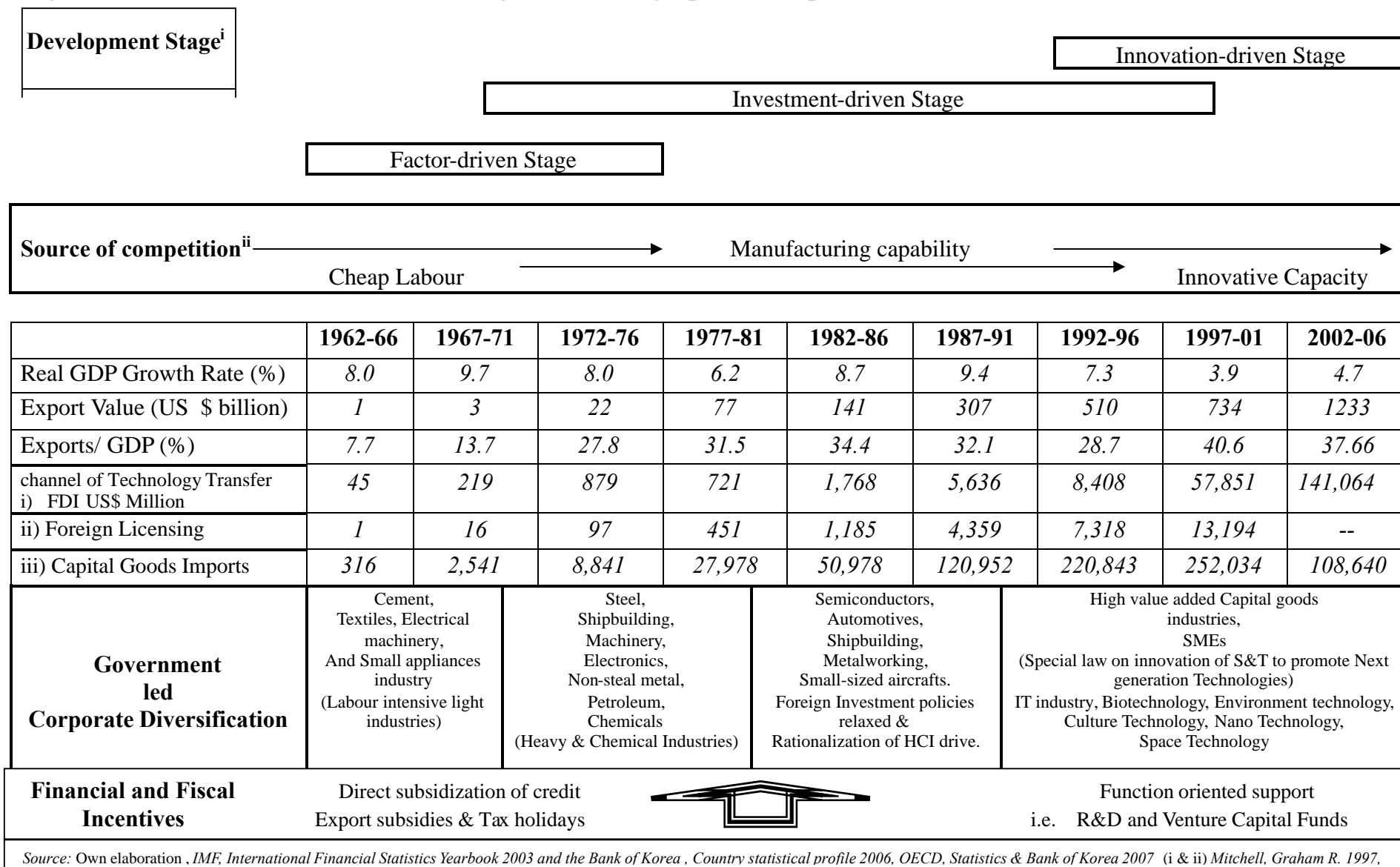
The government also established institutions relating to the promotion of exports – the Korea Trade and Investment Corporation (KOTRA), and the Korea International Trade Association (KITA). KOTRA supports international marketing and technology imports and KITA promotes exports by maintaining training programs, research activities, exhibitions and developing foreign markets. The government also expressed the ardent desire to export; for example, since 1965 it has conducted monthly Export Promotion Meetings attended by the President; high ranking government officials, including the MCI; and leaders of the private sector. The MCI awarded commendation letters to firms showing good export performances on the Day of International Trade. While considerable capital accumulation and investment in primary education during this period then later allowed a gradual shift up the value-added chain toward more sophisticated commodities. Key to this shift was also the use of technologies obtained through foreign licensing and adapted for domestic production.

In the mid-1970s, the government's use of a well-targeted industrial policy resulted in a major shift to the development of heavy industries (for example, chemicals, shipbuilding). The HCI Promotion Plan was devised in 1971 and the President formally declared the HCI Drive in 1973³¹. The National Investment Fund (NIF) was established in 1974 to support the HCI Promotion Plan. The government chose six strategic industries – steel, shipbuilding, machinery, electronics, non-steel metal, petroleum and chemical industries – based on criteria such as forward and backward linkages, contribution to economic growth and foreign exchange earnings. The HCI promotion policies were consisted of preferential policy loans, selective protection, entry regulations, and corporate tax deductions. The HCI sector grew rapidly with the promotion program and its share of the manufacturing sector as a whole increased from 39 percent in 1970 to 54 percent in 1980. Many of the products produced in the HCI sector were exported. “As a result of excessive HCI promotion policies, the capacity utilization ratio of the HCI declined substantially in the late 1970s and early 1980s resulting in the real gross domestic product (GDP) growth rate dropping to a negative value in 1980. Therefore, the government took HCI Rationalization Measures from 1979 to 1981, which included the postponement or withholding of capacity expansion schedules with respect to diesel engines, tires, machinery, and shipbuilding³²” Along with industrial and export targeting strategy, policies were enacted to further improve technological capabilities, together with improving access to technical and vocational training, the direction of industrial policy changed again in the first half of the 1980s when government began to emphasize the importance of research and development (R&D) for economic development. It reflected policymakers' recognition that it was necessary for the Korean economy to overcome the stage of imitating techniques developed by advanced countries. In this context, the government chose several strategic sectors which appeared to be important with respect to R&D and were expected to guarantee long term economic growth: semiconductors, automotives, shipbuilding, metal, and small-sized aircrafts. The government, in pursuing the fifth Five-Year Economic Development Plan for 1982 to 1986, also promised to continue the export-led growth strategy. In this decade, Korea undertook efforts to ensure a market-conducive environment by deregulating various sectors and liberalizing trade. Since 1983,

³¹ *ibid.*

³² Kim L. and Lee H. (1987)

Figure 2.1: Economic Growth ,Technological Catching-up and Corporate Diversification in South-Korea



Korea's industrial policy shifted away from sector-oriented support such as the HCI Drive toward function-oriented support for R&D³³.

Government guided corporate diversification besides financial and fiscal incentives were the persuading forces which made the Korean *Chaeblos* to engage themselves in related or unrelated business activities to realize perceived profits. From 1981 to 1986 due to the promulgation of the Fair Trade Act, there were 1,136 reported cases of Chaebol beginning to own new businesses. Among these the number of horizontal integrations (intra-industry) was 324 (28.5% of the total), that of vertical integrations was 215 (19.9% of the total), and that of diversifications into other industries (inter-industry) was 597 (52.6% of the total). The methods of expansion included acquiring stocks, establishing new companies, mergers, acquiring management participation, and acquiring business rights³⁴. According to an analysis as of April 1, 1987, 32 chaebol were reported to have 3,474 billion Won (43.9% of their net assets) in cross-investments among their subsidiaries³⁵. According to A. H Amsden, Korea's business groups may have diversified widely because they had no technical expertise to build upon in related products or in higher quality product niches. Their widely diversified structures complemented their strategy to compete at the bottom end of many markets. In their diversification efforts, they had the full support of the government because the government's vision of industrialization was fixated on bigness, and bigness and diversification overlaps³⁶. The chaebol were able to manage their diverse holdings by virtue of their ability to borrow abroad and buy industry specific technical expertise from foreigners. This allowed them to

Table 2.1: Combined Sales of Top Ten Chaebols as Percent of GNP*

Groups	1974	1984
1	4.9	12.0
2	7.2	24.0
3	9.0	35.8
4	10.3	44.3
5	11.6	52.4
6	12.7	56.2
7	13.5	59.4
8	14.3	62.1
9	14.7	64.8
10	15.1	67.4

* *Average net sales of the largest ten business groups/ GNP x 100 for each year*
Source: Seok Ki Kim (1987) reproduced in A.H. Amsden (1989)

³³ Kim L. (2000)

³⁴ Acquiring stocks accounted for 45.7% of all cases; establishing new companies accounted for 19.8%. *ibid* pp 125

³⁵ Maeil Kyongje Sinmun (1987) cited in A.H. Amsden (1989)

³⁶ A. H. Amsden (1989) p. 151

grow very large, at first organically, and at the same time remain under the control of their original family founders. The chaebol soon became the most progressive firms. Continuity in ownership and control contributed to a uniform group culture and a centralized knowledge of group resources. Both facilitated the intra-group transfer of money and personnel. *An economy of scope arose in the form of the capability to diversify*³⁷. One can easily understand the corporate concentration and their product diversification from the *Table: 2.1* Entering new industries at minimum cost and at lightening speed raised the firm's ability to compete in many markets. With state subsidies and a diversified structure, the chaebol became willing and able to undertake risk which is the chief qualification to innovation activity. In addition to government controls in commodity markets in Korea, the chaebol were largely prohibited to compete against one another on price. Like other oligopolists, they tend to compete on non-price variables – quality, delivery, location. They also competed on those specific non-price variables peculiar to learners: the best foreign technical licenses the best labour, and most of all, the fattest state subsidies. By building a meritocratic element into its system of awarding subsidies, the state extracted from the chaebol – an institution of possibly unprecedented market power – a growth rate of out-put and productivity that may also have been unprecedented³⁸.

TABLE 2.2: Corporate Diversification of 10 Largest Business Groups in Korea

(As of April 1 st 2003. trillion won, number)				
Rank	Business Group	Total Asset	Affiliates	Type of Group
1	Korea Electric Power Corp.(KEPCO)	92.1	13	both A and B
2	Samsung	83.5	63	"
3	L G	58.6	50	"
4	S K	47.5	60	"
5	Hyundai Motors	44.1	25	"
6	K T	30.8	10	"
7	Korea Highway Corp.	28.3	3	"
8	Hanjin	21.0	23	"
9	Lotte	20.7	35	B
10	POSCO	20.5	15	"

Note:
A type (17 Groups): limit their total equity investments
B type (49 Groups): limit cross shareholdings and cross-debt guarantees.
Source: KFTC (2003).

While *table 2.2* shows the top ten Largest Business Groups in Korea³⁹ and their degree of

³⁷ ibid

³⁸ A. H Amsden (1989)

³⁹ The Korean government formally uses the term, a large scale business group, instead of chaebol. Every year, the Korean Fair Trade Commission (KFTC) announces the top 30 large scale groups from the viewpoint of regulating the concentration of economic power). This announcement proceeding began in April 1987 in accord with an anti-trust law. Under this regulation business groups are prohibited from cross-shareholdings with other affiliated firms along with cross-payment guarantees. From 2002, the 30 large scale groups have been

corporate diversification by showing the number of their affiliates. The leading Korean Chaebols comprise major divisions that have no relation to one another whatsoever: consumer electronics and petrochemicals in the case of the Lucky-Goldstar; finance, construction, cement manufacturing, shipbuilding, shipping, steel structures and heavy machinery in the case of Hyundai; consumer electronics, heavy machinery, finance broadcasting, a daily newspaper, and entertainment in the case of Samsung; tourism industry business, an airline, a bus line, and a travel agency in the case of The Hanjin group. The KIA group makes vans and the machine tools that are used in their manufacture. The Doosan group makes bottling equipment and owns a bottling franchise. . As *table 2.1* shows, in 1984 the five largest chaebols alone accounted for a staggering 52% of national product of Korea⁴⁰. This also markedly reflects the extreme degree of corporate diversification and concentration in South-Korea.

2.2) Development of Small and Medium-sized Enterprises⁴¹.

Small and medium-sized enterprises (SMEs), and particularly new firms, have a distinct role in economic growth and in the development of innovation. Recent studies show that SMEs are at least as important as large firms in the creation of gross and net new jobs in the Organisation for Economic Co-operation and Development (OECD) area⁴². In terms of innovation, SMEs have a greater tolerance for higher-risk initiatives and the capacity to reap substantial market rewards in niche markets⁴³. SME access to the formal financial sector, however, is constrained by the high risks and transaction costs associated with commercial lending to that segment of the market. In the 1960s, manufacturing SMEs accounted for 94 per cent of the increase in manufacturing establishments. However, they accounted for only 25-40 per cent of the growth in employment, gross output, value of shipments, and value added. In the 1970s, owing to the heavy and chemical industry development policy which resulted in favouring large enterprises, the share contributed by manufacturing SMEs to the growth in employment, gross output, value of shipments, and value added remained at only 30-45 per cent. From the early 1980s, the government started to strengthen support for SMEs in order to rectify the worsening economic distortion, which had resulted from the concentration of economic power by large business groups. Manufacturing SMEs accounted for 89.2 per cent of the increase in the number of employees in the 1980s. In addition, the share contributed by manufacturing SMEs to the growth of gross output, value of shipments, and value added increased significantly.

In the 1990s, the share contributed by the manufacturing SMEs to the growth in gross output, value of shipments, and value added continued to increase. SMEs made a great contribution to economic growth. SMEs accounted for 99.1 per cent and 74.4 per cent in the number of establishments and the number of employees in all industries, respectively. In 1997, the manufacturing SMEs accounted for 99.7 per cent and 71.6 per cent in the number of

categorized into two types (Table 3) .

- The A type business groups; subjected to limiting their total amount of equity investment
- The B type Business Groups; subjected to limiting cross shareholdings and cross debt guarantees.

According to the announcement in April 2003, 17 groups were categorized as A type and 49 groups as B type.

⁴⁰ General Motors and General Electronics before WWII, these two American giants were highly diversified, but largely in related or remotely related products and were larger in absolute size than Samsung or Hyundai; but they never accounted for as high a share of total gross national product. A.H. Amsden (1989) pp. 116

⁴¹ In general, a firm is classified as an SME if the number of employees in a firm (Manufacturing, Construction, Transportation) does not exceed 300 while 20 for Commerce and other Services.

⁴² OECD, *Technology, Productivity and Job Creation*, vol. 2 Analytical Report, 1996.

⁴³ OECD, "Regulatory reform, industrial competitiveness and innovation" (DSTI/IND/STP(96)7/REV2).

establishments and employees in the manufacturing industry, respectively.

TABLE 2.3: Status of SMEs, 1999

(No. of units, persons, Percentage)

	Total (A)		SMEs (B)		Ratio (B/A)	
	No. of establishments	No. of employees	No. of establishments	No. of employees	No. of establishments	No. of employees
Total	2 777 986	10 829 961	2 769 012	8 866 001	99.7	81.9
Agriculture	2 164	23 208	2 113	19 043	97.6	82.1
Fishery	865	37 674	856	35 604	99.0	94.5
Mining	2 115	21 971	2 108	17 061	99.7	77.7
Manufacturing	297 416	3 170 029	296 548	2 356 265	99.7	74.3
Gas	320	11 809	308	6 431	96.3	54.5
Construction	64 777	652 372	64 593	472 257	99.7	72.4
Wholesale and retail trade	909 205	2 345 671	907 217	2 113 979	99.8	90.1
Hotels and restaurants	601 117	1 453 198	600 415	1 398 217	99.9	96.2
Transport, storage	238 486	728 766	238 204	617 763	99.9	84.8
Communications	3 162	37 871	3 134	25 055	99.1	66.2
Finance	3 280	31 849	3 095	14 367	94.4	45.1
Real estate, renting	97 206	315 224	96 058	248 946	98.8	79.0
Education	78 598	296 584	77 409	233 344	98.5	78.7
Health and social work	52 265	379 762	51 736	245 744	99.0	64.7
Other community, social and personal service activities	249 979	502 060	249 534	472 449	99.8	94.1

Note: The standard numbers of employees of SMEs are between 1 and 299

Source: Small and Medium Business Administration, SME Statistics, 2000

TABLE 2.4: Contribution Ratios to Economic Growth; Breakdown by Firm Size

(Percentages)

Items	Contribution ratio ¹	1960s (1963-69)	1970s (1970-79)	1980s (1980-89)	1990s (1990-97)
Number of establishments					
SMEs ²		94.0	93.1	99.6	101.6
Large firms		6.0	6.9	0.4	-1.6
Number of employees					
SMEs		38.1	45.3	89.2	-3.4
Large firms		61.9	54.7	10.8	-96.6
Gross output					
SMEs		26.5	32.1	44.6	48.4
Large firms		73.5	67.9	55.4	51.6
Value of shipments					
SMEs		26.7	32.2	44.5	48.4
Large firms		73.3	67.8	55.5	51.6
Value added					
SMEs		25.7	35.5	46.9	47.1
Large firms		73.3	64.5	53.1	52.9

1) The contribution ratio is the percentage Share of each group of enterprises to total increase.

2) No. of Employees are 5-299

Source: Korea Federation of Small Business Economic Development and Contribution of SMEs, 1988

The government has provided a wide variety of programmes to assist SMEs. During the financial crisis SMEs were more likely than larger firms to be denied new loans. Since December 1997, the government has implemented policies to strengthen support for SMEs and to overcome the economic crisis. The government has given greater attention to the

“finance gaps” in SMEs and made efforts to help them overcome the credit crunch during the financial crisis. As depicted from *Table 2.3* more than 99 per cent of all businesses in the Republic of Korea were SMEs. In 1999 there were more than 2.7 million small businesses with fewer than 300 employees, providing employment for 82 per cent of all Koreans working in the private sector.

3.1) Role of Financial System in Industrial Strategy of Korea.

Economist’s faith pertaining to the importance of financial system⁴⁴ for economic growth holds diverse and contrasting opinions. . Walter Bagehot (1873) and John Hicks (1969) argue that it played a critical role in igniting industrialization in England by facilitating the mobilization of capital for "immense works," Joseph Schumpeter (1912) contends that well-functioning banks spur technological innovation by identifying and funding those entrepreneurs with the best chances of successfully implementing innovative products and production processes. In contrast, Joan Robinson (1952, p. 86) declares that "where enterprise leads finance follows." According to this view, economic development creates demands for particular types of financial arrangements, and the financial system responds automatically to these demands⁴⁵. Moreover, some economists just do not believe that the finance-growth relationship is important. Robert Lucas (1988, p. 6) asserts that economists "badly over-stress" the role of financial factors in economic growth while development economists frequently express their skepticism about the role of the financial system by ignoring it (Anand Chandavarkar 1992). For example, a collection of essays by the "pioneers of development economics," including three Nobel Laureates, does not mention finance (Gerald Meir and Dudley Seers 1984). Furthermore, Nicholas Stern's (1989) review of development economics does not discuss the financial system, even in a section that lists omitted topics. But the recent literature on finance and growth substantiate Hicks and Bagehot’s view point concluding that financial development induces faster long run growth⁴⁶. As Levine (1997) says that with the availability of systematic evidence during the past decade, the relevance of finance for development is now widely accepted. While, in recent years, policymakers have been advocating a shift toward financial markets, especially in Latin America and Western Europe where financial systems similar to those in US have been proposed⁴⁷. The success of market based systems in US and UK have led some observers to tout their virtues⁴⁸. While contrary to this others have advocated bank based system because of their vital role in German and Japanese industrialization⁴⁹ as few empirical studies and models put emphasis on bank- based financial system because of its role to reduce agency problems. A financial system can influence the allocation of real resources between surplus and deficit units. In addition, a financial intermediating system can be used to channel financial resources to certain favoured deficit units that are expected to use the resources for specific purposes, or the terms on which the financial resources are provided can be manipulated to influence the decisions of potential users as it has been done in the Case of Korea.

⁴⁴ Financial system theoretically consists of bank based (Continental Model) vs. market based approaches (Anglo-American Models); there is an issue of longstanding debate on relative importance of the two approaches. As in the corporate finance literature, we distinguish between them basing upon their involvement with investment projects. Banks are typically more engaged in project selection, monitoring firms and identifying promising entrepreneurs, while market-finance i.e. corporate bonds and equities are an arm’s length transactions, with little involvement in a firm’s investment decisions.

⁴⁵ Levine R. (1997)

⁴⁶ See for example, Rajan and zingales (1989), Rousseau and Wachtel (1998) and Levine et al. (2000)

⁴⁷ Allen and Gale (2000)

⁴⁸ S. chakraborty et T. Roy (2006)

⁴⁹ See for details, Allen and Gale (2000), Holmstrom (1996), and Levine (2002)

3.2) Financial Incentives

During the 1960s to the 1980s, Korean commercial banks were controlled by the Ministry of Finance, and interest rates were regulated and policy loans were often directed towards specific, mostly export-related, industries. Even currently, a few types of financial incentives, such as export insurance, are still being used for the purpose of export promotion.

3.2a) Policy Loans

Government control of interest rates provided the strategic industries with preferential access to capital at substantially subsidized interest rates. During the 1970s, preferential loans increased from less than 40 percent of total bank lending in 1971 to over 55 percent during 1976-77 and almost 70 percent in 1978⁵⁰. Real interest rates of such policy loans were, in general, negative during the 1970s, although they remained positive during the 1980s and the 1990s. As a result of the HCI Drive in the 1970s, the HCI sector not only had better access to capital, but also faced much lower average borrowing costs. For instance, the average borrowing cost of HCIs was almost the same as that of LIs until 1974. It began to fall sharply from 1975 until the late 1970s and the cost of borrowing averaged 36 percent lower for HCIs than the LIs⁵¹. This disparity began to recede after the 1980s, but the lending interest rates to HCIs were never higher than those applied to LIs until the 1990s⁵².

Export industries also enjoyed preferential access to capital. That is, the average borrowing cost of export industries was in general lower than that of other industries, except for 1978-1979 and 1989, from the 1970s to the 1990s⁵³. In 1980, the government reduced policy loans and relaxed restrictions on the managerial autonomy of the commercial banks, with the ultimate aim of privatizing them. However, support for financial market liberalization and bank privatization was moderate until the mid-1980s⁵⁴. Continuing trade balance surpluses in the late 1980s and the pressure of economic liberalization from abroad propelled the government to liberalize most interest rates officially in December 1988. Although a few interest rates, however, remained regulated through various forms of administrative directions by the government, the liberalization ratio of interest rates recorded 95.3 percent at the end of 1995⁵⁵.

Today, policy loans are available to SMEs and are not directly related to export promotion. Policy-related loans for SMEs are supplied from government policy funds, primarily through the specialized bank. Total policy funds to SMEs financed by the government budget were 5,152 billion won in 2000. Banks' lending to SMEs, after a period of relative stability between 2004 and 2005, surged sharply during 2006 in response to fiercer competition among domestic banks to expand the scale of their assets, and its pace continued to accelerate in the early months of 2007. As a result, the share of loans to SMEs in total corporate lending shot up to 50.9% and 81.7% in 2006 and 2007, respectively, from around the 20% level in 2004~2005. The objective to provide these long-term loans to SMEs is to modernize their production capabilities for the development of new products or processes. The government budget appropriations for supporting SMEs increased in the 1990s and accounted for 4.6 per

⁵⁰ Stephan Haggard (1990).

⁵¹ Yoon Je Cho and Joon yung Kim (1997).

⁵² Jin-Young Bae, (2001)

⁵³ Jin-Young Bae (2001)

⁵⁴ Stephan Haggard and Susan Collins (1994), pp. 75-110.

⁵⁵ Won Bae Youn (1998)

cent of the total government budget in 1999. Since the current policy loans channelled toward SMEs are based on objective criteria and not directly related to export promotion. These loans are not regarded as prohibited subsidies under the WTO Subsidies Agreement.

3.2b) Export Finances

Export finances have been provided to exporters in various stages of export-related activities since 1961. Exporters received enormous interest rate subsidies from the 1960s to the 1980s. For instance, during 1966-1972; the interest rate for export finances was 17 percent lower on average than the general lending rate⁵⁶. In 1985, to increase the production capacity of export industries, the government announced they would lend as much as necessary for expanding the production capacities of export industries. The Korea Export-Import Bank, which has been funded by the government, has lent exporting firms up to 90 percent of the contracted value of exports. This was done at a lending rate of certain base rate plus an additional rate determined by the degrees of creditworthiness, period of lending, and amount of mortgages⁵⁷. The average interest rate applicable to export finance was five percent during 1995-1997 and three percent during 1998-1999, which was lower than the market average lending rate of 9-19 percent in 1995 and 8.5--20 percent in 1999⁵⁸. In 2002, the government introduced the Act for the Export-Import Bank of Korea, which enabled it to undertake risks that commercial banks were reluctant to assume⁵⁹.

In addition to the Korea Export-Import Bank, commercial banks in Korea also provide export finance to exporters; while charging prevailing market interest rates⁶⁰. In 2005, the export finance system operated by the Korea Credit Guarantee Fund and the Small Business Corporation also lends export companies up to 10 billion Wons to aid export commodity production. As of 2004, the lending rate applicable to export finances maintained by those two financial institutions was 5.1 percent for up to the first 180 days of the life of a loan⁶¹, which is not preferentially lower than the market rate.

3.2c) Export Insurances

Korea's export insurance programmes were initiated in 1969 to help exporters increase overseas sales by protecting them against unexpected losses. The Export Insurance Fund was established to support those export insurance programmes which were running on behalf of the government through the Korea Fire Re-Insurance Corporation during 1969--1976 and then Korea Export-Import Bank for 1977-1992⁶². Foreign Investment Insurance was added in 1972 to insure against losses due to political risks accompanying foreign direct investment outflows. During 1968-1972, the value of exports supported by export insurance, i.e. the utilization ratio of export insurance, was as low as 0.8 percent. It remained approximately 3.0 percent during the 1980s. Since then, expecting that direct export subsidization would be prohibited as a result of the Uruguay Round negotiations; the government began emphasizing

⁵⁶ Yoon Je Cho and Joon Kyung Kim (1997).

⁵⁷ Korea Export-Import Bank, at <<http://www.koreaeximbank.go.kr>, 2004>.

⁵⁸ WTO, *Trade Policy Review—Korea* (2000)

⁵⁹ United States Trade Representative (USTR), *National Trade Estimate 2004* (Washington D C • USTR 2004).

⁶⁰ Korea Exchange Bank, at <<http://www.keb.co.kr>, 2004>.

⁶¹ Taijoon Yoo, and Sung-Ho Song, (February 2004), pp. 12-13 (in Korean cited in J.S. Maha).

⁶² This change was made because it was more efficient for the Korea Export-Import Bank, which was fully devoted to the export-related programmes, to be in charge of the export insurance programmes. Korea Export Insurance Corporation (KEIC) 1994, p. 46.

the role of indirect export subsidization, such as export insurances⁶³. The KEIC, Korea Export Insurance Corporation, was established by the government in 1992 as the exclusive export insurance provider in Korea, replacing the Korea Export-Import Bank. With the establishment of the KEIC, as shown in *Table 3.1*, the utilization ratio of export insurance increased to 9.6 percent on annual average for the period 1992—1999. Of the various types of export insurance, short-term export insurance that covers export contracts with a payment period less than two years has been over 80 percent of total export insurance amounts. This is because long-term export insurance usually covers exports of ships, plants and overseas construction that share relatively smaller portions of total Korean exports⁶⁴. During the economic crisis, to meet the required capital adequacy ratios, banks became reluctant to lend to exporters without repayment guarantees. Consequently, export insurance demand increased significantly in 1998 and 1999 and the utilization ratio has been above 20 percent since 2001. Thus, Korea has become one of the heaviest users of the export insurance system.

TABLE 3.1: Utilization of Export Insurance and Loss Ratios in Korea, 1969-2003

(Units: US\$ 100 Million, %)

Year	Export Value (A)	Insured Amount (B)	Premium Received (C)	Claims Paid (D)	Recoveries Ratio (B/A)	Utilization loss	Utilization loss Ratio (D/C) %
1969-73	81.2	0.7	n.a	n.a	0.000	n.a	0.8
1974-76	182.5	1.5	0.013	0.006	0.000	41.4	0.8
1977-79	382.3	8.0	0.038	0.022	0.002	56.5	2.1
1980-82	954.3	48.2	0.160	0.037	0.002	23.4	5.1
1983-85	1,053.9	42.5	0.280	0.062	0.006	22.1	4.0
1986-88	1,482.5	20.6	0.194	0.112	0.024	57.6	1.4
1989-91	2,115.2	49.6	0.143	1.546	0.016	1,082.9	2.3
1992-94	2,705.8	118.2	0.771	1.449	0.105	187.9	4.4
1995-97	4,249.1	436.9	0.802	2.499	0.669	311.6	10.3
1998-00	4,653.7	573.7	1.163	10.540	3.164	906.3	12.3
2001-02	3,129.1	631.8	1.366	5.441	0.427	398.3	20.2
2003	1,942.7	421.0	n.a	n.a	n.a	n.a	21.7

Notes: Export values (A) denote the aggregate income that results from commodity exports and from overseas construction. Claims paid (D) is based on the year paid, not the year underwritten; n.a.: not available, (a): during 1974-2002. Sources: KEIC, *Annual Report* and *Monthly Export Insurance*, various issues.

On its operational side, the Export Insurance Act requires the Export Insurance Fund to finance the insurance programmes if the KEIC incurs budget deficits, adding financial security to the export insurance system. In the initial stage of its operation, premium rates were set with reference to those of Japan. The rates were reduced a few times to support export promotion policies⁶⁵. The loss ratio, defined as claims paid divided by premium received, remained less than 100 percent in most of the years up to 1991. Thus the preferential effect of government subsidization in the form of export insurance was, in general, not

⁶³ Ibid P. 36

⁶⁴ KEIC, *Korea Export Insurance Corporation Ten Years History, 1992-2002* (Seoul: KEIC, 2002: in Korean).

⁶⁵ KEIC, as note 72 above, pp. 154-159.

significant until the early 1990s except the periods of 1984-1985 and 1989-1990⁶⁶. However, with the KEIC's establishment the annual average loss ratio increased sharply to over 300 percent since 1995, indicating that the preferential effect of the export insurance programmes under the KEIC became substantial. As shown in *Table 3.2* the total amount of claims and premium revenues amounted to US\$ 21.7 billion and US\$ 4.9 billion, respectively, until year 2002; while recoveries totalled US\$ 4.4 billion, equalling only 20 percent of claims payment.

The government has contributed as much as 2,167 billion Wons to the Export Insurance Fund, equivalent to over US\$ 2 billion, during 1969—2002. The Export Insurance Fund is currently used as the most important export promotion measure in Korea. Although the WTO Subsidies Agreement prohibits most export incentives, export insurances complying with the OECD Arrangement on Export Credits are not prohibited. Therefore under the WTO system, export insurance is expected to continue as an important export promotion measure.

3.3) Financial supporting system for small and medium-sized enterprises

Access to financing can be a critical issue for SMEs, particularly in their early years. The Korean financial support system for SMEs aims to facilitate their access to banks and non-bank financial institutions at low cost. There are various financial institutions to extend finance to SMEs in Korean financial system which can be summarized in four major categories. First, commercial banks provide loans and discount commercial bills to SMEs. Second, the Industrial Bank of Korea⁶⁷, a special bank founded by the government specifically for SMEs, Third, special loans are provided to SMEs under various schemes. These include government-sponsored programme loans, which are extended through the Industrial Bank of Korea to encourage SMEs in facility investment and to strengthen research and development activities. Others include Energy Consumption Rationalization Fund loans and Start-up Company Promotion Fund loans. Finally, a credit guarantee system is in place to facilitate bank lending to SMEs. The Korea Credit Guarantee Fund (KCGF) and the Korea Technology Credit Guarantee Fund (KTCGF) have undertaken guarantee businesses with a special emphasis on guarantees for those SMEs, who have difficulties in qualifying for bank loans.

3.3a) Mandatory minimum ratio of bank loans to SMEs

The government used credit allocation through the banking system as its most powerful means of supporting SMEs. Banks were directed to make loans to SMEs. According to the Credit Operation Guideline of the Financial Supervisory Service, all commercial banks are required to provide more than a specified proportion of their loans to SMEs. For example, nationwide commercial banks are required to supply more than 45 per cent of the increase in loans to SMEs. This mandatory credit extension system has contributed considerably to expanding bank loans to SMEs since 1965. The mandatory credit extension system, however, has intervened in the credit allocation of banks; the financial health of borrowers was often neglected when loan decisions were made.

⁶⁶ Jai S. Mah and Yunah Song, (2001), pp. 603-614

⁶⁷ Industrial Bank of Korea established in 1999

Table 3.2: Mandatory minimum ratio of bank loans to SMEs*(Percentage)*

	<i>April 1965</i>	<i>Decem- ber 1976</i>	<i>Octo- ber 1980</i>	<i>March 1985</i>	<i>April 1986</i>	<i>August 1986</i>	<i>Febru- ary 1992</i>	<i>May 1994</i>	<i>July 1997</i>	<i>Febru- ary 1999</i>
Nationwide commercial banks	30	30	35	35	35	35	45	45	45	45
Local banks	60	40	55	55	80	80	80	70	60	60
Foreign bank branches	-	-	-	25	25	35	35	35	35	35
Industrial Bank of Korea	90	90	90	90	90	90	90	90	80	80

*Note: Based on loans in domestic currency**Source: Bank of Korea ,***3.3b) The aggregate credit ceiling system of the Bank of Korea**

The Bank of Korea encourages deposit money banks to extend more funds to SMEs with its aggregate credit ceiling system. In 2000, the Bank of Korea revised the aggregate credit ceiling method of operation in order to assist business firms in the process of corporate and financial restructuring who were facing difficulties in obtaining funds, and particularly, to encourage bank lending to SMEs. In September 2000, the Bank of Korea changed its method of appraising bank performance on lending to SMEs. It did so to encourage an expansion of bank lending to regionally-based SMEs suffering from difficulties in the process of corporate restructuring, the Bank of Korea increased the aggregate credit ceiling for its regional branches by a total of 500 billion won (from 2.2 to 2.7 trillion won) in December 2000. The total aggregate credit ceiling stood at 7.6 trillion won at the end of August 2000. The value of SME commercial bills discounted accounted for 84.7 per cent of total commercial bills discounted in the first half of 2000. The Bank of Korea made available refinancing under the aggregate credit ceiling to banks for up to 98.3 per cent of SME commercial bills discounted.

3.3c) Corporate procurement loans scheme

In Korea, business firms had for long made use of commercial bills for the settlement of commercial transactions. This practice, however, caused problems because SMEs, which had received commercial bills, had to wait for a considerable time before they could obtain cash settlement in full, aggravating their financial burden. The default of a company that had issued commercial bills ran the risk of causing a chain of defaults by those companies having received or accepted them. Therefore, The Bank of Korea introduced the corporate procurement loans scheme in May 2000 to gradually reduce the use of commercial bills and encourage the expansion of cash settlement. The corporate procurement loans scheme represents a new procedure for the settlement of commercial transactions under which corporations purchasing goods borrow settlement funds from banks, paying the suppliers in cash rather than commercial bills.

In order to secure the widespread adoption of the corporate procurement loans scheme, under the aggregate credit ceiling, the Bank of Korea made up to half of a bank's total corporate procurement loans available for refinancing. The scheme was swiftly established and the outstanding balance of loans extended under the new scheme surged from 65 billion won at

the end of June 2000 to 3.3 trillion won at the end of December 2000. The number of corporate beneficiaries of the scheme also soared from 135 to 5,458 during the corresponding period. In contrast to the rapid rise in the utilization of the scheme, the value of commercial bills discounted continued to decrease. At the end of December 2000, the corporate procurement loans were equivalent to 17.2 per cent of total discounts of commercial bills⁶⁸.

3.3d) Corporate Financial Guarantee⁶⁹ System

The Korea Credit Guarantee Fund (KCGF) and the Korea Technology Credit Guarantee Fund (KTCGF) were established in 1976 and in 1989, respectively, to increase the availability of loans for the establishment, expansion and improvement of SMEs. KCGF and KTCGF provide lenders with a guarantee against losses incurred on loans. This support to lenders helps SMEs that do not have the tangible collateral to obtain debt financing. They provide guarantees for bank loans, bonds, commercial bills and leasing.

The government substantially augmented its contribution to KCGF and KTCGF after the financial crisis in 1997. The government contributed \$2 billion consisting of loans from ADB and the World Bank to KCGF and KTCGF in order to enlarge loan guarantees to SMEs and venture businesses. The outstanding balance of credit guarantees extended by KCGF and KTCGF surged from 4,105.5 billion won at the end of 1989 to 31,496.7 billion won at the end of June 2000⁷⁰.

A major problem of the Korean economy has been the large debt among the chaebol (Korean conglomerate) affiliate companies. Loan guarantees as well as circular share holding and stock pyramid within chaebol firms has been blamed as being responsible for excessive borrowing and over-investment. In the presence of asymmetric information between the bank and guarantor firm, corporate loan guarantees perform the function of transmitting signals and therefore in this sense have a positive effect in enhancing the efficiency of investment fund allocation⁷¹. The debt ratios of Korean chaebol firms are usually higher compared to conglomerate firms in advanced countries while their returns from investments are lower, for example, in Korea during 1997 the chaebols debt/equity ratio was over 350 per cent, which was higher compared to 166.5 per cent in the US, 209.6 per cent in Japan, and 87.2 per cent in Taiwan⁷². Table 3.3 shows the amount of corporate loan guarantee among the top 30 Korean chaebol firms. It depicts that there has been a decrease in the amount of loan guarantee after 1995. Nevertheless, even up until 1997 corporate loan guarantee has remained rather high, and moreover, it is interesting to note that the top 3 firms within each chaebol have accounted for about 85 per cent of all corporate loan guarantees during the period 1995 to 1997. Given that the top 3 firms in each chaebol represent the bulk of corporate loan guarantee, which aggravate economic concentration, resultantly the loan guarantees strengthen the links between affiliates and thus protects even weak firms from market discipline, and that the loan

⁶⁸ Bank of Korea

⁶⁹ Corporate financial or loan guarantee is a kind of option contracts. Under normal business conditions, corporate loan guarantees are ineffective. They however become effective when the borrowing firm is under financial distress and is unable to repay its own debt. A corporate loan guarantee increases the credit rating of the borrowing firm as well as the probability of repayment of a bank loan. Corporate loan guarantees arise when a borrowing firm requests a loan from the bank with the backing of a guarantor firm that agrees to take on some or the entire repayment obligation. In return, the guarantor firm demands compensation, usually in the form of a fee from the borrowing firm for the loan guarantee service.

⁷⁰ Bank of Korea

⁷¹ Keunkwan Ryu (2001)

⁷² Hwang et al. (2000),

guarantee empowers the corporate leaders to govern the entire group of firms.

Table 3.3: Corporate loan guarantee, top 30 Korean chaebols

(trillion won)

year	Equity	Loan Guarantee	Loan Guarantee/ Equity	Guarantee top 3/Total Guarantee
1995	50.7	48.3	95%	84%
1996	62.9	35.2	56%	86%
1998	70.5	33.1	47%	83%

Source: Reconstructed from Lee (1998)

Without the government's implicit support for financially distressed firms and banks, the guarantor firms would face weaker incentives to engage in loan guarantee contracts and the banks would not trust loan guarantees made by a weak guarantor firm. The government therefore acted as an additional element affecting the credibility and hence the endorsement of a loan guarantee. Korea Credit Guarantee Fund (KCGF) and Korea Technology Credit Guarantee Fund (KTCGF), both are non-profit financial institutions whose paid-in capital comes from contributions by the government and banks. KCGF provides guarantees mostly for SME loans, while KTCGF covers mainly technology-oriented SMEs. The importance of these institutions in the economy and financial system can be gauged by the ratio of loan guarantees outstanding to GDP i.e. above 5% of GDP in case of Korea⁷³.

TABLE 3.4: Characteristics of corporate Loan guarantee institutions in Asian Countries

Country	Institution	Coverage Ratio	Guarantee Fee ¹	Maximum (Actual) Leverage Ratio
Korea	KCGF	70-90% (Usually 85%)	0.5–2% (risk-based)	20 (9.8, end-2005)
	KTCGF	70–90% (usually 85%)	0.5–2 % (risk-based)	20 (14.4, end-2005)
Japan	JASME	70–80%	0.87%	No maximum (19.1, March 2005)
	CGCs	100%	1.25%, 2 1.35% ³	35–60 (18.6, March 2005)
Indonesia	Perum Sarana	Max 75%	0.5–1.5% (risk-based)	20 (22.2, end-2004)
	Askriando	50–70%	0.8–2%	-- (6.9, end-2004)
Malaysia	CGC	30–100%	0.5–2%	No maximum (4.3, end-2005)
Taiwan, (China)	SMEG	70–100% (usually 80%)	0.75%, 1%, 1.25%, 1.5% (risk-based)	20 (20.6, end-2005)
Thailand	Thailand SICGC	Maximum 50%, or 50% of actual loss ⁴	1.75%	5 (4.6, end-2005)

1 Per annum. 2 With collateral. 3 Without collateral. 4 Depending on facilities.

Sources: ACSIC questionnaires; individual annual reports; BIS calculations.

Three measures – guarantee coverage, guarantee fees, and leverage – can be used to highlight the main characteristics of these institutions in *Table 3.4*. The guarantee coverage ratio measures the share of qualifying loans guaranteed by an institution. This ratio generally

⁷³ Sources: IMF; ACSIC questionnaires; individual annual reports; BIS calculations.

ranges between 50 and 90% for the entities under review, with the exception of Japan, where local CGCs guarantee 100% of the loan amount. Guarantees of loans are usually partial so as to ensure that banks retain some incentive both to screen and to monitor loans. Second, the annual guarantee fee represents the amount the institutions charge every year as a percentage of the guaranteed amount. The guarantee fee has the potential to partially reflect the riskiness of individual loans. Four of the agencies reviewed – KCGF, KTCGF, Perum Sarana and SMEG – have adopted a risk-based fee system in which the fees vary according to metrics of credit risk. In general, the guarantee fee appears quite comparable across countries, at 0.5–2.0% of the guaranteed amount. Finally, the leverage ratio – defined as the ratio of credit guarantees outstanding to the amount of the institution’s capital (net worth) – is presented in the last column of *Table 3.4*. It provides a good indication of the amount of risk taken by the institutions, and ranges from around 4 for the Malaysian and Thailand institutions to around 20 for institutions from Japan, Indonesia (Perum Sarana) and Taiwan.

The sharp increase in credit guarantees helped SMEs overcome the financial difficulties during the financial crisis. On the other hand, the credit guarantee scheme has not been without cost to the state. Claims paid to lenders by KCGF and KTCGF on defaulted loans have sharply increased, recording more than 3 trillion won in 1998. The ratio of claims paid to the outstanding balance of guarantees also soared from 4.8 per cent in 1993 to 8.1 per cent in 1995, and then to 9.2 per cent in 1998. The high cost of the Credit Guarantee programme has stopped the fund properties of both KCGF and KTCGF from growing over time but the Credit Guarantee programme has been successful in helping start-ups and other Korean SMEs by extending them access to capital for expansion and growth. “In Korea, banks are currently required to contribute 0.25% per annum of their corporate loan balances in certain categories to KCGF and 0.15% to KTCGF. The Korean government also contributes to KCGF and KTCGF every year from the national budget⁷⁴”.

3.4) Financial Crisis 1997 – Blessing in disguise

The international competitiveness of the South- Korea began to deteriorate in the early 1990s owing to amassed structural deficiencies within the economy. A major shock to the economy occurred with the bankruptcy of the Hanbo Group in January 1997. Four more of the thirty largest *chaebols* went bankrupt in 1997. The failure of these *chaebols* revealed problems with low profitability and excessive leverage ratios in the corporate sector and faulty corporate governance in the country. In November 1997, less than a year after its accession to OECD, South-Korea experienced a severe economic and financial crisis. The government formally requested assistance from IMF to mitigate the external liquidity shortage to regain the confidence of international investors.

Korea turned the 1997 financial crisis into an opportunity for major, widespread economic reforms. The reforms, which began in the wake of the crisis, have been extensive and substantial, covering most of the areas in public and private domains. The economic reforms since the 1997 crisis had three major objectives:

1. To transform Korea into a market-oriented economy by deregulating across the sectors and thereby promoting competition and entrepreneurship. At the same time, a modern regulatory framework would be set up to support the efficient and equitable functioning of the markets.
2. To improve the institutional regime by improving the rule of law and by having greater transparency, disclosure of information, and accountability on the part of the government as

⁷⁴ BIS Quarterly Review, December 2006, P. 91

well as the private sector.

3. To continue the transition to the knowledge-based economy by developing a relevant and modern legal and institutional infrastructure in such areas as intellectual property rights, valuation of intangible assets, and laws to cover privacy and security in digital transactions.

Specifically, major structural reforms included improving the efficiency and soundness of the financial system, creating stable corporate environments to support the entry of new players into the economy, enhancing the flexibility of the labour market, and redefining the role of the government by strengthening the basic institutional infrastructure and fortifying the rule of law. The Korean government also undertook efforts to develop venture business firms that were expected to spearhead innovation and generate employment.

As for as cause analysis is concerned domestic wage hikes and the appreciation of the Korean won, financial market liberalization that was pursued throughout the mid-1990s, weak risk management system of Korean Banking Industry, continued erosion of the Korean economy's international competitiveness, massive capital outflow, denied rollover of short-term external debt, Heavy corporate debt leverage, large amount of non performing loans of Chaebols and Southeast Asian Currency crisis are considered to be the main reasons of Korean Financial crisis of 1997.

TABLE3.5: Value of Non-performing loans and as % of total loans in January 2003

Country	NPLs (Value in US\$ Billion)	Percent of Total Loans*
S. Korea	77	24.5 %
Indonesia	44	58 %
Thailand	73	45 %
China	600	41.5 %
Japan	1,310	30 %
Malayasia	24	19.5 %
Philippines	6	19 %
Taiwan	77	19 %
Singapore	11	12 %
Hong Kong	18	8.5 %

*Source: Goldman Sach estimates(* Percentages are rounded off)*

There was evidence of deterioration in the balance sheets of commercial banks in Korea up to four years before the crisis. In 1997, however, this trend took a turn for the worse, as can be seen in *table 3.6* that it raised up to 7.4% in 1998.

TABLE3.6: Non Performing Loans of Commercial Banks

(Ratio to total loans, percentage)

	1994	1995	1996	1997	1998	1999*	2003	2005	2007**
NPL Ratio	5.6	5.2	3.9	5.8	7.4	6.2	2.2	1.0	0.67

Note: * Ratio is for September, ** for end June While figures from end-1996 include the Housing and Commercial Banks from end -1997 include the long-term credit bank and not the five closed banks.
Non-performing Loans(NPL)= Substandard + Estimated Loss+ doubtful.

Source: Financial Supervision Information, Vol. 99 no. 4, Financial Supervisory Service, March 1999. Financial Stability Report, Bank of Korea 2007

The South Korean government took immediate steps against NPLs. The Korea Asset Management Corporation, which was set up in December 1997, has settled NPLs worth 35 trillion won (US\$32.1 billion) and recovered 18 trillion won (US\$16.2 billion). Further, the government initially decided to provide 64 trillion won (US\$57.6 billion) in public funds, but made fresh allocations, so far pumping 89.6 trillion won (US\$107.7 billion) in public funds into the banks and non-banking financial institutions. As a result, bank lending started increasing in May 1999. The process of out-of-court negotiations between creditors and debtors began in June 1998 that a framework targeting 73 medium and small businesses, was agreed upon. With regard to five large business conglomerates, the government has carried out reforms based on five Principles: enhanced transparency, withdrawal of financial guarantees, improvement of financial structures, business restructuring, and strengthening of managerial responsibility. The cross financial guarantee within a business group (equivalent to US\$20 billion as of December 1997) was resolved to a great extent by March 2000.

TABLE 3.7: Public Fund Injected November 1997- June 2007

(Trillion Won)

Source	Support Type	Total
Korea Deposit Insurance Corporation	Recapitalization	50.8
	Compensation for losses	18.5
	Purchase of assets	11.0
	Repayments of deposits	30.0
	Subtotal	110.6
Korea Asset Management Corporation	Purchase of NPLs	38.8
Fiscal Resources	Recapitalization	11.8
	Purchase of subordinate debentures	6.3
	Subtotal	18.1
Bank of Korea	Recapitalization	0.9
	Grand total	168.3

Source: Financial system in Korea, Dec 2007, Bank of Korea.

South Korea achieved positive results through powerful government intervention and initiatives as there was no other effective option to solve NPLs problem. Therefore the NPL ratio reduced up to 0.67% as on end of June 2007 which is not even below to the average among US commercial banks (0.87% as on end of June 2007)⁷⁵ but also well below the corresponding figure for the world's largest (top 30 banks in terms of core capital) banks.

⁷⁵ Financial Stability Report, Bank of Korea, 2007.

TABLE3.7: Ratio of substandard and below loans by industry

(End of period basis in percentage)

Category	2004	2005	2006	2007*
Manufacturing	1.7	1.1	1.1	1.0
Construction & Real Estate	2.4	1.8	1.1	0.8
Services ¹⁾	2.2	1.7	0.9	0.8
(Wholesale & retail trade)	1.9	1.3	0.7	0.7
(Lodging & restaurants)	3.7	4.1	2.8	2.0
(personal services)	4.3	4.4	3.1	2.3
All Industries	2.0	1.5	1.0	0.9

* As on end of June, ¹⁾ Excluding Real Estate

Source: Bank of Korea, Financial Stability Report 2007

In 2007, the ratio of substandard and below loans in commercial banks' total lending continued on a steady downward slide. Banks' total new bad debt fell from 4.6 trillion won in the second half of 2006 to 3.6 trillion won in the first half of 2007, and the volume of bad debt disposed of through redemptions, write-offs and sales totalled 4.1 trillion won, exceeding the value of total new bad debt occurred during this period. As a result, the substandard and below loan ratio was further reduced from 1.0% at the end of last year to 0.90% at end-June 2007. By industry, the substandard and below loan ratio dropped in all sectors. It remained consistently below 1% in the manufacturing and the construction and real estate sectors, and also decreased substantially in the restaurant and hotel sector, where comparatively these were high in the past.

3.5) Government Venture Capital Funds

The Korean venture capital market has grown dramatically in recent years, starting from a negligible base in the early 1990s and almost tripling between 1998 and 2001. Korea now ranks among the leading OECD countries in venture capital investment as a share of GDP and third in the share of venture capital being channelled to start-up enterprises (after the United States and Canada). Venture capital contributed to a proliferation of start-ups in high-technology sectors such as information and communications technology (ICT), which accounted for 64% of venture investments in 2001. Korea after the financial crisis of 1997-98 made an effort to reduce the influence of the *chaebol* by augmenting the role of technology-oriented small firms. The government jump-started the venture capital market in 1998 through direct infusion of equity capital. Certain small firms were designated "venture businesses" which are eligible for investments from venture capital firms (VCFs) and limited partnerships funds (LPFs), both are funded largely by the government and the *chaebols*.

The Small and Medium Business Fund (SMBF) is intended to facilitate financing for SMEs, including venture capital investment for start-ups: Dasan Venture: In 2001, SMBF established a special venture capital firm with KRW 50 billion of paid-in capital. Dasan Venture identifies promising start-ups and provides them with seed money as well as management know-how in co-operation with business incubators across the country.

Limited partnership funds (LPFs): SMBF invests a share of its capital in LPFs in a range of sectors. There is total stock of KRW 1 000 billion for venture investments.

Special funds provide venture capital for start-ups in specific business sectors: The Informatization Promotion Fund (IPF) is a special fund establishing LPFs for investment in information and communications technology (ICT)-related start-ups. During 1998-2001, IPF invested KRW 126 billion in 22 LPFs, which invested KRW 370 billion into ICT ventures. LPFs specialising in ICT start-ups are required to invest at least 40% of their funds in early-stage firms aged less than three years. The Cultural Industry Promotion Fund (CIPF) invests in LPFs which provide venture capital primarily for start-ups in the digital content sector. In 2001, CIPF invested KRW 10 billion in LPFS for digital content to leverage KRW 20 billion in private funding. The Film Promotion Fund (FPF) invests in LPFs which provide venture capital for start-ups in the film sector. FPF invested KRW 10 billion against KRW 40 billion of private funding in LPFs for the film industry.

The Science and Technology Fund (STF) invested KRW 15 billion in LPFs for technology-intensive start-ups together with KRW 25 billion of private funding in 2001.

Guarantee on venture investment scheme: The Technology Credit Guarantee Fund (TCGF) provides financial institutions and venture capital firms with a 70%-100% guarantee on equity investments up to KRW 3 billion in technology-intensive small firms. TCGF receives 2%-4% as the guarantee premium and also collects 20%-40% of capital gains in profits.

Guarantee on primary CBO scheme: TCGF provides 100% guarantees on the primary collateralised bond obligation (CBOs) of venture businesses. A Special Purpose Company (SPC) acquires convertible bonds issued by venture businesses and then issues CBOs based on these convertible bonds, fully guaranteed by TCGF.

3.6) KOSDAQ; Second-tier stock markets

In 1996, the Korean government established the Korea Securities Dealers Automated Quotation (KOSDAQ) stock market to promote access of high-technology start-ups to equity funding, naming it after the NASDAQ in the United States. Listing on the Korea Stock Exchange (KSE) was available only to well-established companies. The KOSDAQ has easier entry requirements and lighter continuing obligations compared with the Korea Stock Exchange (KSE). In particular, a special market exclusively for venture businesses was established within the KOSDAQ. Standard requirements for paid-in capital, level of assets, business performance and debt-to-equity ratio are not applied to venture businesses. In 2002, the government revised the Special Measures Law for Fostering Venture Businesses to enhance exit procedures for venture-backed firms. The KOSDAQ suffered a downturn in 1997 due to the financial crisis and subsequent recession. Due to growth in 1998-2000 linked to the worldwide technology boom, the number of listed companies on the KOSDAQ more than doubled from 359 to 721, of which nearly half were venture businesses accounting for more than 70% of daily trading (by market value) As per 19 February 2008, 1029 companies are listed on KOSDAQ for trading. The number of listed companies in Korea is far less than on the NASDAQ but higher than in many European countries including the United Kingdom. However, the KOSDAQ price index and capital raised declined dramatically in 2001 along with other OECD technology-based markets. In 1998-2001, initial public offerings (IPOs) on the KOSDAQ totalled KRW 6 trillion, and additional equity offerings amounted to KRW 11.6 trillion, together equivalent to 36% of the net increase in bank loans to small firms. In 2000

and 2001, newly listed venture firms which received investment from the VCFs and LPFs accounted for 37% and 17% of the total, respectively and this trend is on rise.

4.1) Imitator to innovator; Transformation of Korea into Knowledge Economy

South-Korea has, indeed, been transformed from a subsistent agrarian economy into a newly industrializing one during the past four decades. Such phenomenal industrial development stemmed largely from the rapid acquisition of technological capability in the process from imitative “learning by doing” to innovative “learning by research” in the course of continuous market and technological change. “Another prominent feature of South-Korean technological development is its “experienced-based-adaptive-engineering” through wide variety of informal transfers that have involved imitation and apprenticeship as well as the use of information obtained in exporting⁷⁶”. Wide variety of exports has also played an arresting role in South-Korean technological development. Export activity has enlarged technological capability in to two ways, by facilitating technology transfer and by stimulating technological effort. Also striking is the selectivity of South-Korean technological development and the part played in it by imports and exports of the elements of technology. Koreans have acquired a good deal of technological capability, but they have done so in a progressive manner as successively more sophisticated technologies have been assimilated and put into practice. The selectivity of imported substitution for the elements of technology has meant continued reliance on imports for at least some elements in almost all industries, but the pattern of imports has continually shifted as local capabilities have replaced foreign one and as new industries have been developed. In turn the selectivity of import substitution is complemented in the pattern of exports by specialization among the elements of technology in line with what one would expect to be south-Koreas comparative advantage⁷⁷.

One of the most systematic approaches to developing technological capability is the followers’ strategy for technological development. It emphasizes the need for human resources to allow an economy or a region to ‘shift’ from labour-intensive operation found in the early stages of the product cycle to more skilled-intensive activities at higher levels in the international division of labour⁷⁸. Over the years, the Korean government has adopted an array of policy instruments designed to facilitate technological learning in industry and in turn strengthen the international competitiveness of the economy. The government not only stimulated the demand side of technological learning through industrial policy instruments but also gave rise to the supply side of technological capability through technology policies. South Korea had to rely on foreign technology imports. However, Korea’s policies on foreign licenses were quite restrictive in the 1960s. In the case of manufacturing, general guidelines from 1968 gave priority to technology that promoted exports, developed intermediate products for capital goods industries, or brought diffusion effect to other sectors. The restrictive policy on licensing strengthened local licensees’ bargaining power on generally available technologies, leading to lower prices for technologies than would otherwise have been the case⁷⁹.

Formal flows of disembodied technology via other modes also appear to have been rather

⁷⁶ L.E. Westphal, see ; World Bank Research Project Ref. No. 672-48. Also to be included under informal transfers is the expertise that has been obtained as a result of the return of South-Koreans from study or work abroad (though the importance of this transfer relative to formal training is not known).

⁷⁷ Kim (1997)

⁷⁸ Sen, (1979).

⁷⁹ Kim, L. (1997)

modest. As shown in *chart 2.1*; the cumulative value of technical assistance in manufacturing from bilateral and multilateral sources during 1962-81 was well under U.S. \$100 million,

TABLE 4.1: Indicators of Technology inflow, Human capital, and R&D for Five Semi-industrial Economies⁸⁰

Items	Year/Period	Argentina	Brazil	India	Korea	Mexico
Stock of DFI as % age of GDP	1967	10.4	4.0	3.0	1.7	7.3
----- as above-----	1977-79	4.7	6.4	2.1	3.2	5.6
Payments for disembodied technology as % age of GNP	1970-71	--	0.20	--	0.04	--
----- as above-----	1977-79	--	0.33	--	0.17	0.23
Import of capital goods % age of gross domestic Investment	1965	5.3	4.6	10.3	13.0	14.5
---- as above----	1977-79	8.6	8.4	5.6	27.2	11.8
Postsecondary students abroad as % age of all postsecon. students	1970	1.0	1.0	1.0	2.0	1.0
---- as above----	1975-77	0.3	0.7	0.3	1.7	1.0
Secondary students as% age of secondary age population	1965	--	--	29.0	29.0	17.0
---- as above ----	1978	46.0	17.0	30.0	68.0	37.0
Postsecondary students as % age of eligible postsecon. age popul.	1965	--	--	4.0	5.0	3.0
---- as above ----	1978	18.0	10.0	9.0	9.0	9.0
Engineering students as % age of total postsecondary age popul.	1978	14.0	12.0	--	26.0	14.0
Scientists & engineers in thousands per million of popul.	Late 1960s	12.8	5.6	1.9	6.9	6.6
----- as above -----	Late 1970s	16.5	5.9	3.0	22.0	6.9
Scientists & engineers in R&D per million of population.	1974	323	75	58	--	101
----- as above -----	1976	311	--	46	325	--
----- as above -----	1978	313	208	--	398	--
R&D expenditures as % age of gross national product	1973	0.3	0.4	0.4	0.3	0.2
----- as above -----	1978	0.4	0.6	0.6	0.7	--

-- Not available

⁸⁰ L.E. Westphal, see ; World Bank Research Project Ref. No. 672-48. However reprinted in a book "*Learning and innovation in Economic development*" by Linsu Kim (1999), Edward Elgar publishing limited, UK.

as was the cumulative value of technical consultancy by private parties. The latter was heavily concentrated in the chemical and machinery (both electrical and non electrical) sectors. The total number of approved manufacturing technology imports during 1962-81 was U.S. \$ 1,840 million; royalty payments over the same period totalled U.S \$565 million. The volume of licensed imports was rather modest until the mid-1970s. Thereafter the increased reliance on licensing can be explained by the accelerated development of the technologically more advanced industries in recent years. Licensing has been an important source of technology transfer in much the same industries as FDI chemicals, basic metals, and machinery.

International comparisons depict a reasonable perspective on Korea's pattern of reliance on different modes of technology transfer. *Table 4.1*; compares South-Korea with four other semi-industrial economies—Argentina, Brazil, India, and Mexico – using the best information that we have been able to obtain. Additional cross-country information cited by Westphal and other supporters the indication given by the first two blocks of comparative data that FDI and disembodied technology inflows via commercial channels have by no means been relatively large in South-Korea⁸¹. In turn, the third block of data confirms what knowledge of the economy would lead one to suspect, namely that the countries reliance on imported capital goods has, in contrast, been relatively large. Imports of capital goods were more than 20 percent of the value of investment in South-Korea through out 1970s. The closest country of the other four in this respect was Mexico, with ratios of 11-14 percent during the 1970s. South-Korea's dependence on imported capital goods should be seen as a result of specialization within the capital goods sector and of the demands of a rapidly growing and diversifying industrial sector, rather than as the result of failure to develop a capital goods sector.

The capital goods sector dates back to the colonial period. Over time, all the imported metalworking processes, such as casting and machining, were assimilated by South-Korean firms and used in copying many types of imported equipment, with the designs subsequently modified on the basis of experience to make them more appropriate to local circumstances. But the capability to design and produce capital goods was oriented toward the more labour-intensive segments of those industries that had a relatively long history in the country. Most export oriented industries used import equipment extensively, as did most new industries established under government incentives.

4.1a) The Acquisition of Technological Capability through Informal Modes

There are several informal modes of transfer that span a wide range of possibilities. Evidence about their importance is difficult to obtain, but there is a lot of information. Some of it comes from a survey of 113 exporting firms by Pursell and Rhee in 1976. The sample was meant to be representative of all exporting firms of South- Korea. The firms were asked about the sources of the basic production or process technologies they then used. Domestic sources were considered to be important slightly more often than were foreign sources. For domestic and foreign sources taken jointly, the sources of technology most frequently cited were buyers of output and suppliers of equipment or materials. Next most important were employees with previous experience working in firms overseas – many as a result of training under turnkey and similar arrangements – and in South- Korean establishments. Indeed, the transfer of labour among firms was more important than contacts with suppliers alone or with buyers alone. In turn, foreign buyers contributed informal transfers of technology, frequently as a

⁸¹ Westphal et al, (1981)

result of periodic visits to inspect production facilities or of ongoing programs to control and improve quality. Through such things as suggesting changes in individual elements of the production process and improvements in the organization of production in the plant and in management techniques more generally, buyers helped many exporters achieve great efficiency and lower costs. There can be no doubt that the transfer of know-how from export buyers has been a contributor to minor process innovations of the sort that sequentially led to gradual improvements, the cumulative effect of which can be great.

For many industries it is important to distinguish between the mastery of production processes and the ability to design products that either confirm to the structure of or anticipate changes in demand. South Korean exporters, almost across the board, relied heavily on foreign buyers for product design technology, far more so than for process technology. Foreign buyers contributed to product innovation through the influence they exercised on the characteristics of export products. Nearly three quarters of the sampled firms stated that they either modified the characteristics of their product to accommodate buyers' specifications. Those most often influenced were product design and styling, followed by packaging, basic technical specifications and minor technical specifications.

The result of the survey of exports clearly indicate that much of what was considered by the respondents to have come from domestic sources consisted of technology originally developed overseas, subsequently transferred or brought to South-Korea, and then effectively assimilated and sometimes adapted by indigenous industry. Some of this technology, particularly in the traditional export sectors, was part of the inheritance from the colonial past. The distinction between domestic and foreign sources thus has little to do with where the technology was invented. It has far more technology by local producers and of diffusion of technology through formal and informal contacts and through labour transfers among domestic firms. Further evidence of importance of diffusions from domestic sources was found in the sizable number of exporting firms that indicated direct knowledge of diffusion to other firms of technologies they had introduced into the country. In industries for which process technology is not product specific, mastery has frequently led to the copying of foreign products as a means of enhancing technological capacity. The mechanical engineering industries, among others, afford many examples; such processes as machining and casting, once learned through producing one item, can easily be applied in the production of other items. One case that has been closely studied is textile machinery, particularly semiautomatic looms for weaving fabric. In this as in some other cases South Korean manufacturers have not only been able to produce a capital good that meets world standards, albeit for an older vintage ; they have, in addition ,adapted the product design to make it more appropriate to local circumstances. The adapted semiautomatic looms fall between ordinary semiautomatic and fully automatic looms in term of the labour industry of the weaving technology embodied.

Detailed evidence derived from "Technological Histories"⁸² of South-Korean firms helps in understanding the evolution in the direction of her technological development. The rapid growth and increasing diversification of exports of all kinds has given the most compelling evidence of the country's acquisition of technological capability over time. From Amsden and Kim's survey two distinct patterns of technology assimilation are evident; one is

⁸² Detailed information about South-Korea's technological capability in particular industries is scanty. Still less information is available about the process by which its capability has been acquired. So, Amsden and Kim have obtained histories of several turnkey plant exporters in their research on South-Korea's acquisition of Technological Capability. These intensive firm-level interviews provide the only feasible way to compile even sketchy technological histories. For further detail See (A.H Amsden and L. Kim, World Bank 1982)

“apprentice pattern” and the other one is “imitator pattern”. Insight about how the South-Koreans were able to assimilate technology effectively comes also from the comparative data on human capital formation in the table 4.1. What stands out about the educational pattern are the high proportion of postsecondary students abroad, the high secondary enrolment rate, and the high percentage of engineering students among postsecondary students. Even more such that by the late 1970s; South-Korea had the highest percentage of scientists and engineers in the population of five countries. It likewise appears that it have had more scientists and engineers engaged in R&D.

4.2) R&D Investment and Technological Assimilation in Korea

Industrial development is a process of acquiring technological capabilities and translating them into product and process innovations in the course of continuous technological change. In this process of industrial development, Korean firms, predominantly *Chaebols*, have transformed themselves from mere imitators of mature technologies to competitor in some of cutting edge technologies in three decades. The Korean government has made significant investment in universities and government research institutes (GRIs) in the hope that the R&D community would play a vital role in helping industries to strengthen their technological capabilities and in turn boost their international competitiveness. The following *table 4.2* reflects the situation pertaining to it. The government established the Five-Year Plan for Development of Cutting-Edge Industries in 1989 and was determined to support them by providing funding and investments. Korea continued to pursue high-value-added manufacturing in the 1990s by promoting indigenous high-technology innovation. Beginning in 1995, various measures were introduced to promote Information Technology (IT) industries, where the share of R&D expenditures to total manufacturing costs – 2.03 percent as of 1995– has been the highest among various manufacturing industries⁸³. Considering the increasing importance of capital goods, the government decided to promote them in the late 1990s. Therefore, in 1995, the Capital Goods Industries Promotion Plan was announced, which was expected to promote the high value-added capital goods industries by supporting the development of new products and establishing them as the main export industries. Emphasis has also been placed on the development of small and medium enterprises (SMEs). Efforts to raise the technological capability to the level of Organization for Economic Co-operation and Development (OECD) countries urged the enactment of the Special Law on Innovation of Science and Technology in 1997 and the formation of the Five-Year Plan for Science and Technology Innovation for the period 1997-2001⁸⁴.

Governmental support of R&D expenditures was concentrated on the IT industry during the 1990s. The share of governmental R&D expenditures on the IT industry increased to 42 percent of the total in 1998⁸⁵. Concurrently, it expanded higher education while investing in indigenous research and development through the establishment of the National Research and Development Program. Since 1998, the government has emphasized building a knowledge-based society and has chosen six technologies as promising next-generation technologies to promote, including IT and Biotechnology, among others. Most of these have been granted tax benefits. Due to the emphasis on R&D, the ratio of R&D expenditures to sales in the manufacturing sector increased from 1.28 percent in 1997 to 1.56 percent in 2003⁸⁶. *Table 4.2* clearly reflects the government’s increased emphasis on R&D.

⁸³ Jai S. Mah (2007) p.79 that is translated from Korean Language published by Kim et al. (1998)

⁸⁴ WTO (2000), Ch. 3, para. 137.

⁸⁵ Korea Information Strategy Development Institute (KISDI) 2003

⁸⁶ Bank of Korea (2004)

Table 4.2: Expenditure on R&D Activities in Korea⁸⁷

(unit: billion won, %)

Year	Govt. Expenditure (A)	Total Expenditure (B)	A/B %
1980	180	283	63.7
1985	306	1,237	24.8
1990	651	3,350	19.4
1995	1,781	9,441	18.9
2000	3,452	13,849	24.9
2003	5,268	19,069	27.6
2005	5,645	23,148	24.4

Sources: Korea Ministry of Science and Technology, *Science and Technology Statistics Database 2005*. and “Explore Korea Through Statistics 2007” by Korean National Statistics Office, Korea

Governmental support of R&D activities gave rise to the development of the semi-conductor industry, which has been noteworthy for the past two decades. It has been actively promoted by the government since the late 1980s. The government began to promote the semi-conductor industry as a strategic industry by instituting the Semi-conductor Industry Development Plan in 1985. It provided as much as 12.5 billion won in research grants from 1986 to 1993 to promote the development of technology levels of semi-conductor producing companies⁸⁸. The semi-conductor industry, which was developed in this way, has become Korea’s leading export industry. Exports of semi-conductors increased from US\$4.0 billion in 1989 to US\$26.5 billion in 2004 – 10.4 percent of total exports. Besides support for R&D, the government currently promotes exports by supporting international marketing activities and exhibitions abroad. In addition to the indirect measures, a substantial amount of duty drawbacks is provided to exporters, since they are not prohibited by the WTO.

The Korean government has made significant investment in universities and government research institutes (GRIs) in the hope that the R&D community would play a vital role in helping industries to strengthen their technological capabilities and in turn boost their international competitiveness. The following *table 4.3* reflects the situation pertaining to it. Initially, universities played little role in helping industry in Korea. They remained primarily as undergraduate teaching oriented institutions, undertaking little research. As shown in table 2.2, university R&D expenditure was a mere W400 million (US \$1.3 million) in 1970. This was insignificant compared with the proportion of the nation’s researchers who were affiliated with universities in the same year. Due to the lacking ability of the universities to conduct

⁸⁷ Table 3.1 shows that governmental expenditures on R&D increased from 180 billion won in 1980 to 651 billion won in 1990. It has also increased substantially since 1990; e.g. 3,452 billion won in 2000 to 5,268 billion won in 2003. In the meantime, private firms’ expenditures on R&D have increased by leaps and bounds, from 103 billion won in 1980 to 2,699 billion won in 1990. Consequently, in the 1980s, despite the increase in governmental expenditures on R&D, its share of total R&D expenditures in Korea decreased significantly from 63.7 percent in 1980 to 19.4 percent in 1990. Since the 1990s, the ratio has increased gradually to 25.6 percent in 2003.

⁸⁸ Kim et al. (1998), 225-230

TABLE 4.3: Research and Development Investment in South-Korea

(Units: Billion Won.)

	1965	1970	1975	1980	1985	1990	1995	2000	2005
R&D expenditure	2.1	10.5	42.7	282.5	1,237.1	3,349.9	9,440.6	13,849	241,55
Universities	--	0.4	2.2	25.9	118.8	244.3	770.9	1,562	--
GRI's	--	8.9	28.1	104.5	367.2	731.0	1,766.7	2,032	--
Private Sector	0.2	1.3	12.3	81.4	751.0	2,374.5	6,903.0	10,387	183,578
Public R&D vs. Private	61:39	97:03	71:29	64:36	25:75	19:81	19:81	25:75	24:75
R&D/GNP	0.26	0.38	0.42	0.77	1.58	1.95	2.69	2.39	2.99
No. of researchers (total)*	2,135	5,628	10,275	18,434	41,473	70,503	128,315	159,973	234,709
Universities	352	2,011	4,534	8,695	14,935	21,332	44,683	51,727	64,895
GRI's	1,671	2,458	3,086	4,598	7,542	10,434	15,007	13,913	15,501
Private Sector	112	1,159	2,655	5,141	18,996	38,737	68,625	94,333	154,306
R&D Exp/ Researcher**	967	1,874	4,152	15,325	27,853	47,514	73,574	86,556	102,787
Researcher/10,00 0 Population	0.7	1.7	2.9	4.8	10.1	16.4	28.6	34.0	48,7
No. of corporate R&D Can'ters.	0	1***	12	54	183	966	2,270	--	--

*Note: The figures do not include research assistants, technicians, and other supporting personnel., ** Currency of expenditure Won 1000 , *** For 1971

Source: Ministry of Science and Technology, South-Korea. and "Explore Korea Through Statistics 2007" by Korean National Statistics Office, Korea

research, the government took initiative in establishing a GRI – The Korea Institute of Science and Technology (KIST) – by recruiting overseas-trained Korean scientists and engineers. As evident from *table 4.3*, GRIs accounted for 83.9 percent of the nation's total R&D expenditures and 43.7 percent of the nation's pool of researchers in 1970, reflecting their dominant role in R&D activities in South-Korea. Despite facing some problems, KIST made important contributions to industrial development in Korea. One of the most important roles played by KIST at this stage was in helping industries strengthen their bargaining power in acquiring foreign technology. In an attempt to develop an effective linkage between KIST and the private sector, the government coerced large firms to undertake joint research with KIST. Such joint research provided opportunities for some firms to acquire sufficient prior knowledge about technology to be imported. This enabled them to identify prospective technology suppliers and to enhance their bargaining power in negotiating technology transfer arrangements. Once imported, such joint research provided a platform on which the firms could assimilate and adapt new technology rapidly. Utterback (1975) also concludes that the major role of public R&D centers in the developing countries is to facilitate and lubricate foreign technology transfer by assisting in the private sector's acquisition of foreign technology, formally or informally. KIST also played significant role in transferring technology to industry through reverse-engineering of foreign technology--an activity which was beyond the capacity of Korean industry at the time.

In addition to intensified in-house R&D, Korean firms began to globalize their R&D activities. LG Electronics, for instance, has developed a network of R&D laboratories in several locations, including Tokyo, Sunnyvale in California, Chicago, Germany, and Ireland. These outposts monitor technological change at the frontier, seek opportunities to develop strategic alliance with local firms, and develop the state-of-the-art products through advanced R&D. Similarly Samsung, Daewoo, and Hyundai Electronics have developed equally extensive R&D outposts. Samsung has R&D outposts in San Jose, Maryland, Boston, Tokyo, Osaka, Sendai in Japan, London, Frankfurt, and Moscow. Daewoo has two in France, one in the UK, and one in Russia. Hyundai has outposts in San Jose, Frankfurt, Singapore, and Taipei. Korean firms are also globalizing R&D through mergers and acquisitions. Hyundai has been the most aggressive at acquiring equity stakes in foreign firms as a way to gain access to cutting edge technologies.

On the other hand university research has also expanded significantly. *Table 4.3* shows that R&D expenditure by universities almost tripled in five year from W244.3 billion in 1990 to W770.0 billion (US \$567.9 million) in 1995. The number of university researchers also more than doubled from 21,332 to 44,683 during the same period and later 64,895 in 2005. In addition emulating the US experience, the government introduced in 1989 a scheme to establish Science Research Centers (SRCs) and Engineering Research Centers (ERCs) in the national leading universities. The number of SRCs and ERCs increased from 13 in 1990 to 35 in 1995. Furthermore in government programme, GRIs continue to serve as the backbone of advanced R&D in Korea. This is well reflected that over 80 percent of national R&D investment goes to GRIs. Some of the GRIs have developed significant research results such as 4M DRAM memory chips, electronic switching system, CDMA mobile telephone system which were subsequently passed across to the private sector. In addition to these two national R&D programmes mentioned above, the government introduced in 1992 the Highly Advanced National R&D (HAN) project, also known as the G-7 project, which is aimed at lifting Korea's technological capability to the level of G-7 countries by the year 2020. These three major national R&D projects are designed to encourage GRIs to enter into consortia with the private sector.

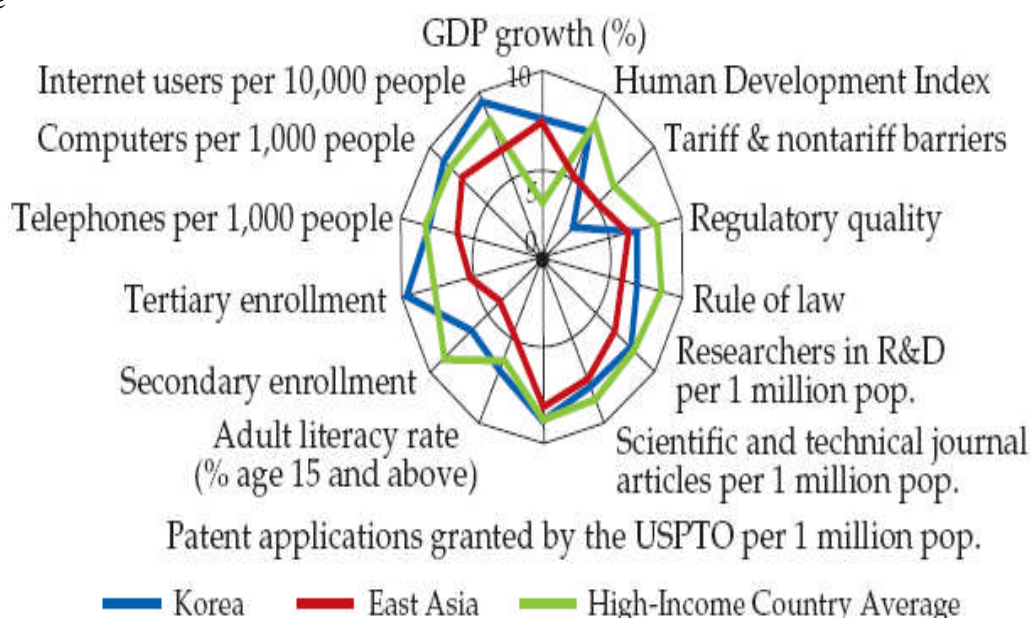
Universities also have access to these projects. A total of US\$5.7 billion will be invested jointly by the government, universities, and industries, about half of which will come from private sector. (The sum of US\$ 1.3 billion has already been invested during the first three years, involving over 13,000 researchers and resulting in 2,542 patent applications and almost two thousand academic articles. Notable outcome include quinolon-based antibiotics, liver disease treatment medicine, and high definition television (HDTV). The 256-Mega DRAM chip development was also one of the target technologies designated by the HAN, but private producers had already built enough technological capability to develop the chip on their own.) One other programme introduced by the government to enhance Korea's basic capability is the "Creative Research Initiative programme", initiated in 1997. This programme, albeit small in terms of investment size in the initial year, is designed to identify two dozen or so promising young scientists and engineers and provide them with sufficient research grants for nine years, subject to two interim reviews, to undertake concentrated advanced research so as to make breakthroughs in frontier technologies.

Education and human resources have been key factors in Korea's rapid economic growth over the past four decades. The World Bank's Knowledge Assessment Methodology (KAM)⁸⁹

⁸⁹ The KAM Basic Scorecard uses 12 knowledge indicators and two performance indicators to illustrate a country's overall readiness for the knowledge economy. All variables are normalized or rescaled onto a 0 to 10

Basic Scorecard, which benchmarks countries' overall readiness to use knowledge for economic development, shows that Korea has evolved into a relatively mature knowledge-based economy, performing well above the average country in East Asia and on par with average high-income countries (see figure 4.1). The OECD has documented Korea's active investment in knowledge⁹⁰, which in 2002 was 5.8 percent of GDP, the fourth highest among the OECD countries. Moreover, Korea's investment pattern has been changing significantly in recent years, from investment in physical capital such as machinery and equipment to knowledge inputs. Among the OECD countries in 2002, Korea still had the highest ratio of spending on machinery and equipment to GDP, but the ratio is rapidly decreasing. From 1995 to 2002 the ratio decreased by 3.7 percentage points. For the same period, in contrast, Korea's investment in knowledge increased by 1 percentage point.

Figure 4.1 : KAM Basic Scorecard for Korea, East Asia, and High-Income Country-Average



Source: World Bank. Knowledge Assessment Methodology (KAM), March 2006. [http:// www.worldbank.org/kam](http://www.worldbank.org/kam).

Recent Korean Performance places it as the 5th largest producer of automobiles and 1st in DRAM. The number of patent registrations of Knowledge Process Output has grown too fast. Korea was ranked 4th in the world in the number of patents and utility models applied in 1997 inventing items that account for 3.7 percent of the world total. In addition, as Table 4.4 & 4.5 below shows, the number of patents by Koreans is consistently increasing. In 2002, the patents by Koreans reached to 29,896 of all patents accounting for 66.7 percent.

interval. The center of the illustrated spider chart denotes the minimum normalized value of 0, and the outer perimeter of the chart denotes the maximum normalized value of 10. Thus, a "bigger" or "fuller" spider chart implies that the country or region is better positioned in terms of the knowledge economy.

⁹⁰ The OECD defined investment in knowledge as spending on R&D, software, and higher education.

TABLE 4.4: Number of KPO Patents Granted*(Unit: Number of Registration, %)*

	1981	1985	1990	1995	2000	2002
Total No. of Patents (T)	1,808	2,687	7,627	12,512	34,579	45,298
Patents by Koreans (K)	231	349	2,554	6,575	22,943	29,896
Ratio (K/T) %	12.8	13.0	33.5	52.5	65.5	66.7

Sources: Korean Intellectual Property Office.

While, *table 4.5* shows the patents registered in U.S, which gives the clue for one country's industrial and technological competitiveness. Korea has jumped from 943 registrations in 1994 to 3,944 in 2003 and ranked 5th in the world. The share of Korea's registration has been steadily growing. The technology strength⁹¹ index shows Korea is 8th country in the world.

TABLE 4.5: Number of US patents granted to Koreans*(Unit: Number of Registration, %)*

	1994	1997	2000	2001	2002	2003
Total No. of Patents (A)	101,676	111,984	157,494	166,037	167,333	169,028
Patents by Korea (B)	943	1,891	3,314	3,538	3,786	3,944
Ratio (B/A) %	0.93	1.69	2.10	2.13	2.26	2.33
World Ranking	10	6	5	5	5	5
Technology Strength Index	9	8	8	8	8	8

Source: Korea National Statistical Office, Intellectual Property Rights Annual Report, 2004

5.1) Critical Analysis of South-Korean Strategy

There has been a debate about the role of government in the economic development of Korea. Economists associated with the neoclassical⁹² tradition have downplayed the role of active government intervention. According to them, the HCI promotion period was seen as an aberration and source of instabilities⁹³. According to the World Bank⁹⁴, East Asian economic development from the 1960s through the 1980s had little to do with government and “[t]he appropriate role of government in market friendly strategies is to ensure adequate investments in people, provision of a competitive climate for enterprise” and “beyond these goals, governments are likely to do more harm than good.” They emphasized the competition-promoting role of the government⁹⁵. The dominant complaint on the World Bank (1993) was that the study gave insufficient attention to the role of the government in fomenting Asia's economic success and downplayed the role of industrial policy and other forms of selective

⁹¹ This index is developed by MIT based on the number and current impact index of patents to measure corporate technology competitiveness, and used by Korea Institute of Industrial Technology Evaluation and Planning (ITEP)

⁹² such as Balassa (1988)

⁹³ Saavedra-Rivano (1998)

⁹⁴ World Bank (1993, 84)

⁹⁵ Hosono (1998).

interventions⁹⁶. After the occurrence of the economic crisis, some economists attributed Korea's rapid economic growth from the 1960s through the 1980s to a decisive role of the government⁹⁷.

According to our analysis, credit goes to Korean government and its financial system to transform South-Korea into a modern industrializing state by playing the role of torchbearer in corporate diversification, technological development along with strengthening the education system to foster R&D efforts at home.

5.1a) The Government as Entrepreneur⁹⁸

Virtually every study bearing on the subject of industrialization in South-Korea has in some sense recognized that big business have had to come to terms with the expanded role of state. The initiative to enter new manufacturing branches has come from primarily from the public sphere except 1950s⁹⁹. Every major shift in industrial diversification in the decades of 1960s and 1970s was instigated by the state. The state masterminded the early import-substitution projects in cement, fertilizers, oil refining, and synthetic fibres – that last greatly improving the profitability of the over-expanded textiles industry. The government also kept alive some unprofitable factories inherited from the colonial era, factories that eventually provided key personnel to the modern general machinery and shipbuilding industries, which were also promoted by state. Furthermore, the transformation from light to heavy industry also comes at state's behest, in the form of an integrated iron and steel mill, which the state pushed in the early 1960s and presided over on ward¹⁰⁰. The government played the part of visionary in the case of South-Korea's first gigantic shipyard and then a big push into heavy machinery and chemicals in the late 1970s. It also laid the groundwork for the new wave of import substitution that followed heavy industrialization to carry the electronics and automobile industries beyond the simple stage of assembly. The government enacted the automobile industries protection law as far back as 1962.

Thus major milestones in South-Korea's industrialization have been decided by the state. Government and business community worked together to transform its economy into a modern industrial state. Off course credit also goes to bureaucracy along with economic managers; who have played the role of facilitator unlike other industrializing countries¹⁰¹, where there are pervasive controls and decisions are generally made on a case by case basis that creates uncertainty and extraordinary delay in business decisions. The South-Korean government has played a pivotal role throughout the entire development process. Since the beginning of the industrialization process, Korea's visionary government provided effective leadership that ensured a stable and conducive macroeconomic environment, providing the mass education and training of the population, encouraging the assimilation of foreign

⁹⁶ Wade (1994), Stallings (1998).

⁹⁷ Chang, Park and Yoo (1998)

⁹⁸ 130 The defining characteristic of entrepreneurship is planning, or deciding what, when, and how much to produce. Entrepreneurship becomes especially meaningful from a social stand point when planning involves a new product or process. A. H. Amsden (1989). The fundamental function of the entrepreneur is innovation. Schumpeter(1938). Jones and Sakong (1980) explained the following functions of entrepreneurship i) Perception of new economic opportunity, including new products, new process of production and new markets, ii) Evaluation of the profitability of a new opportunity, iii) Gaining command of financial resources, iv) Plant design, technology, and construction supervision, v) Recruiting and training of new personnel, vi) Relationship with government, vii) Relationship with suppliers and purchasers.

⁹⁹ Economic policy of Korea, during this period, was under foreign control for all practical purposes. See the discussion in chapter 2, A. H. Amsden (1989)

¹⁰⁰ *ibid*, chapter 12

¹⁰¹ see detail Balassa (1988)

technologies and developing a domestic R&D initiative, and establishing an accessible and modern information infrastructure. As the economy developed and became larger and more complex, it was best to leave economic activities to market forces, and the government consequently adopted a less direct interventionist approach and changed its role to that of an architect and regulator. As in the aftermath of 1997 crisis this new role of government has ardently highlighted in the reforms.

5.1b) Rent creation through Financial System

Section: 3 of this study clearly illuminates that how financial system has played a role as lever to uplift the industrial capacity and technological capability besides enticing the entrepreneur's appetite to bear risks. The process of assimilating existing technologies in the less developed countries is not unlike that of creating entirely new technologies in the developed world. But in each case, learning requires an allocation of resources and investments respond to market incentives¹⁰². Therefore the role of financial institutions and financial sector policies become more curtail for technological progress that results from intentional industrial innovation due to the allocation of resources to research and other knowledge-generating activities in response to perceived profit opportunities. Uncertainty and the profit/risk sharing can be a major obstacle to the technological innovation projects if financial institutions are too risk adverse. Therefore, an effective approach to reduce these constraints is to design such financial sector institutions and policies which can help in the way of technological catching-up. Different institutional set-ups of financial systems will support or limit the process of technological change also depends upon the regulatory and supervisory framework of the financial system. As the time went by "borrowers become more able to articulate their financial needs concerning investments in technological change, the lender might be able to develop financial innovations¹⁰³ to meet these needs". So, this dynamic feature of the financial systems makes them more vital in the recipe of technological catching-up¹⁰⁴. On the other hand the financial system's tendency to short termism is injurious for innovation projects. If the financial sector sticks to traditional lending procedures the industry will run into difficulties with long term finance. It is crucial for the effectiveness of national systems of innovations that the financial system possesses enough channels of information, effective process of learning, social and cultural homogeneity in relation to the firms and a certain willingness to take risks in order to make effective selection. As the time horizon¹⁰⁵ in financing investments is perhaps more important to innovation projects because if lenders are expecting a return in short run, this may pose problems for innovation projects.

Therefore Korean government created rents through incentives and easy access to credit where the financial system being an integral part to this strategy played crucial role, first in corporate diversification then exporting its wide range of output. Export oriented strategy not only brought precious foreign exchange but also refinement in production technology and industrial efficiency due to the competition in local industry as well as in international market

¹⁰² Grossman and Helpman (1991)

¹⁰³ In some countries and periods of time the ability of the financial system to meet financial requirements and develop/take advantage of productive learning processes will depend on the flexibility and specialization of the financial institutions. (Ibid pp. 152) Financial innovations are adapted to finance the diffusion and widespread adoption of new technologies because previous methods of finance remain no longer adequate.

¹⁰⁴ Financial systems change in response to environment

¹⁰⁵ "Generally accepted distinction between a more short-term perspective as characterizing corporate governance in Anglo-Saxon countries and a more long-term one in for instance Japanese investment decisions is one important example of how institutional differences have a decisive influence on the conduct and performance at the national level" Lundvall, B. A. (1998)

and interaction between importer and exporter. This absorptive capacity developed during this phase coupled with the government's commitment to R&D helped Korean economy to transform itself into a knowledge based society.

However it is observed that active rent creation and state intervention in the market has both its pros and cons. This Korean strategy is also regarded responsible for the high share of NPLs, which caused economic crisis in 1997-1998. Due to the banks' practice of connected lending and policy loans at preferential lending rates, private companies tried to borrow as much money as possible from commercial banks. As a result, the debt equity ratio of private manufacturing firms in Korea reached 317 percent in 1996¹⁰⁶. At the end of 1997, the average debt-equity ratio of the 30 largest *chaebols* that were the main beneficiaries of policy loans at preferential lending rates reached 518 percent¹⁰⁷. It is being considered that unrestricted opening of short-term portfolio investment in addition to active industrial policy through government controlled private banks may result in the collapse of the banking sector. Therefore, a more prudent risk management practices are required along with a robust monitoring system to avoid the side effects of this kind of policy-directed credit schemes.

Nevertheless, policy to increase efficiency need not prevent state directed corporate loan and loan guarantees all together. Rather, it should focus on improving the weaknesses in corporate governance and reducing agency costs. Furthermore, to discourage the bank's demand for excess guarantee, the bank's loan supervision and incentive structure should be strengthened. Because all industrial projects do not have equal private returns which act as an incentive to take up them. While the projects whose public social returns out-weight their private returns could only be materialized if some additional incentives are there. Hence non-performing loans may be regarded as the cost of establishing a modern industrial state. But it clearly professes important lessons to other newly industrializing countries to be cautious while following the same path. Many development economists have also praised the rapid economic growth of the Korean economy since the 1960s. For instance, most of them concluded that the benefits of selective intervention of industrial policy must have outweighed the cost¹⁰⁸.

6.1) Conclusion; Some lessons from South-Korean Experience

Technological change, Innovation and uncertainty are inseparably connected therefore national technological development calls for soft-financial intermediation. So, it depends on the financial system that how much flexible, robust, risk mitigating and bearing it is. Greater the risk bearing appetite of a financial system, (actual or managed i.e government guarantees or easy access to finance) larger will be the numbers of entrepreneurs who will expose themselves to innovations and risks, so higher will be the corporate diversification that will give birth to the variety of products to be produced which will ensure more exports because "the utility of adding a new good to the pre-existing pattern of consumption is greater than that of adding an extra unit of a pre-existing good"¹⁰⁹. As in this context Lundvall also reiterates, "if the firm or the country were to focus all efforts on allocating existing resources in a better way, and if every single unit kept producing the same products with the same techniques, it would not only stagnate. It would gradually become increasingly poor because its products would become less and less in demand. Therefore, when the focus is on economic

¹⁰⁶ Chen and Ku (2000)

¹⁰⁷ Mentioned in Lee Chul Hwan (2000) that is in Korean but cited in Jai S. Mah (2007)

¹⁰⁸ Westphal (1990).

¹⁰⁹ Saviotti (2001)

development, successful innovation is more important than efficient allocation¹¹⁰,

As Schumpeter emphasised¹¹¹ that those who are starting “new things”, or innovating, need to be provided with “profits for above what is necessary in order to introduce the corresponding investment” or what he called entrepreneurial profits, which provide “the baits that lure capital on to untried trials”. According to him, this is because of the riskiness of innovative activity which is “like shooting at a target that is not only distinct but moving – and moving jerkily at that”. Schumpeter argued that entrepreneurial profits (or quasi-rents) may some time be provided by the difficulty of imitating the new technology (or organization), but sometimes would have to be secured through “restraints of trade” like cartel arrangements. The thrust of Schumpeter’s argument is then that entry barriers of one form or another are necessary to provide incentives for innovation because it means doing “new things”. Establishing an industry in a late-industrializing or developing country may not involve doing anything “new” from a global point of view, but poses a similar incentive problem, because it still is a “new thing” for that nation¹¹².

In order to set up an industry, South-Korea has to import technology along with other indigenous efforts, but making the imported technology work requires a period of learning to assimilate and absorb it which is a costly activity with highly uncertain returns. Thus the state created restraints of trade through tariff protection and provided rents through a wide range of subsidies, preferential loans and tax exemptions to develop new industries in South-Korea. After following the export-led industrialization; the industrial policy of Korea changed emphasis from light industries (LI) to heavy & chemical industries (HCI) in the early 1970s. In the early to mid-1980s, the government switched the direction of industrial policy from direct subsidization of selective industries toward function-oriented support, such as support for R&D activities that can be utilized generally. The transition from LI to HCI and then to IT industries where R&D expenditures are quite important in their development, gave rise to rapid economic growth and resulted in a higher value-added and well diversified corporate structure. While the accumulated non-performing loans of private banks as a result of preferential policy loans to promote such industries became one of the causes of the economic crisis in 1997-1998. The crisis proved blessing in disguise because government took the advantage and reformed the economy to exterminate the reminiscent of cronyism from the society. Korea’s current industrial policy, which focuses on support of R&D activities, benefits various industries through externalities and improvement of productivities.

Another vital feature of Korean development strategy is its focus on education, particularly important are the coordinated and complementary expansion of the four pillars of the knowledge economy framework—economic incentives and institutional regimes, educated and skilled workers, an effective innovation system, and modern and adequate information infrastructure—which evolved with the economy’s various stages of development. These pillars provided the economy with the necessary means to effectively acquire and use knowledge to improve productivity and enhance long-term economic growth.

Firstly, the Korean experience shows that a development strategy is a complex set of well knitted policies rather than a simple matter of “outward-looking” or “inward-looking” trade regime. Without reservation, trade strategy is an essential ingredient in a developmental recipe, especially because, as we have seen in the Korean case, the fastest way to build up an

¹¹⁰ Lundvall B.A. (1998)

¹¹¹ Schumpeter (1943) P. 87-91

¹¹² Chang H. J. (1993) P.144

advanced industrial base in a developing country is to earn foreign exchange through diversified exports to import advanced technologies and the machines which embody them. Vast variety of exportable products provides vast opportunities to learn from international market through exporter-importer interactions of different kinds besides reducing the risk to absorb foreign demand shocks.

Secondly, the South-Korean experience shows that strong and effective leadership provided by the government, which led to the coordinated development of the education, innovation, and ICT pillars, was particularly important during the earlier stages of industrialization when appropriate institutions to coordinate economy wide development agendas were not yet sufficiently established.

Thirdly, the South-Korean experience shows the importance of a long-term dynamic perspective in managing industrial transition; which in South-Korea was achieved not primarily through the attainment of short-term static efficiency (or getting the prices right) but through the pursuit of long-term dynamic efficiency by the state's constant creation of rents (or Marxian/ Schumpeterian profits). A constant upgrading of the industrial structure based on the development of local technological and managerial capabilities was seen by Korean think tanks as the explicit way to achieve sustained economic growth and efficient structural change, and hence higher living standards. The state's control over technological transfers and foreign direct investments, and the state's commitment to long-term lending through state-owned banks and various special investment funds, has been vital in this respect. However this recipe has high cost to pay in the form of non-performing loans which is avoidable through more prudential risk management of the financial sector.

Fourthly, the Korean experience may be unique in the sense that it was supported by a set of idiosyncratic institutions, moreover historically deep-rooted cultural background such as Confucianism where many bright members of the elite wished to become prestigious bureaucrats regardless of salary levels. In most developing countries where such culture is absent, institution building to attract such people to economic decision-making groups, such as bureaucrats and economic researchers, would be necessary in pursuing the appropriate industrial policy. But this does not mean that it is irrelevant for other countries which have different histories. Institutional building deployed with incorruptible and insightful economic policymakers and bureaucrats to execute the policies by cooperating with private sector is a doorway to the economic growth.

Fifthly, few policies practised in South-Korea for export subsidization are not relevant now for other developing countries due to WTO regulations. However, export insurance, duty draw backs, exports credits or export refinance schemes are still viable tools to augment domestic exports.

Foremost and Last but not least; scientific education especially university-industry-government nexus (triple-helix thesis¹¹³) are exceptional means in technological development strategy.

¹¹³ Etzkowitz, H. and Leydesdorff, L. (2000)

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