Financial Crisis and Industrial Policy in Korea

Yong Sae Lee and Yongseung Jung*

I. Introduction

This paper examines critically Korea's industrial policy over the last three decades of the 20th century and assesses the paradigm shift in Korean industrial policy in the wake of the 1997 financial crisis. The Korean economy achieved unprecedented growth over the three decades prior to the 1997 financial crisis. Across these decades Korea's economic growth rate was one of the highest in the world. The remarkable success of the Korean economy has been attributed to a number of factors including successful policies such as strategic trade policy and industrial policy (Kwon 1997). The Korean government implemented macroeconomic policies in pursuit of export-oriented development, and at the microeconomic level implemented an industrial policy through which it intervened extensively in the structure of the economy.

Many analysts have argued that Korean industrial policy, implemented largely through government control over credit allocation,

* Young Sae Lee is currently a senior research advisor in the Institute for Global Economics. He was former president of the Institute of Industrial Technology Information. Yongseung Jung is a professor in Catholic Univsersity and was formerly a research fellow in the Institute for Industrial Economics and Trade

worked well when the economy was relatively small and simple. However, since the financial crisis that struck the Korean economy in 1997, analysts have argued that it was this industrial policy that generated the underlying causes of the crisis. Government intervention in the financial sector as part of industrial policy rendered the financial sector inefficient. The intervention led to the concentration of economic power in a limited number of chaebols that adopted strategies of excessive expansion and diversification with debt capital. The highly leveraged corporate sector, together with the inefficient financial sector, were the structural causes underlying the financial crisis.

The nation's bitter experience of the 1997 crisis forced the Korean government to realize the limitations of the industrial policy it had implemented over the past three decades. The government has abandoned this traditional industrial policy of promoting targeted industries, and has undertaken structural reforms of the corporate and banking sectors. Reform also ranges more widely. It is now common knowledge that a new era of information and technology is forthcoming and in order to survive in a fiercely competitive world fundamental change to shift national economic structure toward a knowledge-based economy is required. The Korea economy may be able to achieve another economic miracle if the nation is able to develop high technology industries and high-quality human capital. This requires a paradigm shift in Korea's industrial policy from promoting targeted industries to promoting innovation-related activities through market forces.

This paper critically examines Korea's earlier industrial policy and the consequences of this policy for national economic development over the last three decades. It also assesses the future direction of industrial policy in the coming era characterized by globalization.

II. Bank–Oriented Corporate Financing and the Legacy of Pre–crisis Industrial Policy

For three decades until the 1997 crisis, Korea's economic growth rate was one of the highest in the world. Many economists attributed this remarkable performance to a relatively high rate of capital investment and successful government guidance of the nation's economic development through strategic trade policy and industrial policy.

In pursuing an export-oriented development strategy, the Korean government intervened extensively in the micro-economy while implementing macroeconomic policies. Extensive control of credit allocation was the principal instrument of Korea's industrial policy. In this section we will consider the legacy of this government intervention in the market through credit rationing or control, as a crucial part of export-oriented development. We will consider these moves in relation to development of the financial market and vis a vis corporate financing and corporate governance.

1. Industrial Policy through Credit Rationing

An important feature of Korean monetary policy until the crisis is that in addition to indirect instruments such as rediscount policy and reserve requirement policy, the monetary authorities were equipped with a wide range of direct or selective credit control instruments. These included the power to impose ceilings on the aggregate outstanding volume of loans for each banking institution, to approve in advance individual loan applications made to banks in excess of a specified amount in periods of pronounced monetary expansion, and to establish general guidelines on the efficient allocation of bank funds. Fixing credit ceilings for each banking institution and prior approval of bank credit were also used widely to repress galloping inflation during the economic development stage up to the mid-1960s.

After reform of interest rates in 1965, government used the indirect credit control system to play a major role in achieving the nation's monetary target and supplying necessary funds to government-targeted industries. Capital was genuinely scarce in Korea at this time and demand for capital was much greater than supply. With this experience, Korean monetary authorities perpetuated an artificial scarcity in capital during the high-growth era to give government influence over the allocation of private credit. In a normal market situation, the interest rate would have risen high enough to reduce the demand for loans, i.e. interest rates would clear the market. However, domestic capital was scarce when the government implemented its first five-year economic plan (196266) and even though foreign capital was allowed into the country, it was insufficient to clear the market. These circumstances enabled government to retain its leverage over the financial market.

At the same time, the government dictated low interest rates to subsidize the industries it had targeted. This created an artificial scarcity of capital with excess demand for funds. In this situation, the Korean government dictated who could, and could not, obtain loans. The government allocation system also applied to commercial banks. Thus, as borrowers stood in line at the banks, the banks stood in line at the Bank of Korea (BOK). As opposed to the US system where the Federal Reserve expands money supply through open market operations, the BOK expanded money supply by lending directly to the commercial banks. This gave the BOK, or the Korean government, the power to ration capital inside the nation. This kind of financial market repression left a deep and significant influence upon financing of corporations and corporate governance in Korea. Let us turn to consider the features of both of these in turn.

2. Corporate Financing under Financial Repression

As mentioned above, over three decades prior to the financial crisis, the Korean government pursued an export-oriented economic development strategy with an aggressive industrial policy. Combined with regulatory measures such as credit controls, industrial policy provided incentives for Korean exporters through directed credit, subsidized loans, tax breaks and other means, all aimed to promote their export performance. Firms needed massive resources to continuously imitate and upgrade technology and remain competitive in global markets. However it was difficult to develop equity in Korea since securities markets require a more sophisticated institutional and regulatory framework. Thus, firms whose retained earnings were insufficient to finance their ambitious development plans had little option but to borrow heavily from banks.

2.1 A Bank-Oriented Financial System

From the outset of Korea's postwar economic development, commercial banks have been at the center of all the financial intermediaries that lent funds for the nation's industrialization. Korea did not have a well-functioning financial market, with the financial system oriented toward banks rather than the securities market. Yet as we see in Table 8.1, indirect finance involving financial intermediaries increased steadily and provided finance almost five times larger than the amount of direct finance by the time the financial crisis struck.

When we consider manufacturing firms categorized by the number of their employees, we find that firms of all sizes large, medium and small depended more on external than internal funds (Table 8.2). In particular the primary sources of external funds for business were loans from financial intermediaries. Chaebol conglomerates borrowed more from financial intermediaries than small and medium sized firms did and this tendency strengthened in the years leading to the crisis. The dependence of chaebols on indirect funds began to surpass that of small and medium firms from 1996, which reflects the side effects of the underdevelopment of securities markets. Small and medium sized firms had to compete with large firms to borrow as much funding as possible from the financial intermediaries. Small and medium sized firms have been affected more severely than large firms by the contraction of credit since the crisis hit because the former would not rely on securities markets.

Certainly, the Korean government made deliberate efforts to develop capital markets with a view to strengthening resource mobilization and diversifying ways to finance firms. However the securities market was relatively underdeveloped and needed to be developed further for more efficient and transparent resource distribution. For this purpose, market infrastructure and supervision had to be restructured and reformed. The process required stricter financial accounting and disclosure requirements and stronger prudential rules and regulations, as those in place were still weak by international standards.

When we compare the role of non-bank financial intermediaries in corporate financing to that of commercial banks, we find a striking outcome: for a long time the former has surpassed the latter in the extent of both deposits and loans (Table 8.3). This reflects the relative

Table 1. Sources of Internal and External Funds for Manufactures

(Unit: %)

	1979-83	1984-88	1989	1990	1991	1992	1993	1994	1995	1996	1997
Internal Funds	26.7	43.7	46.4	31.3	33.5	42.1	51.4	41.9	44.2	34.0	22.0
External Funds	73.3	56.3	53.6	68.7	66.5	57.9	48.6	58.1	55.8	66.0	78.0
(a) Direct Finance	13.8	14.0	14.4	15.6	14.8	10.4	17.9	11.9	9.1	16.8	11.7
(i) Stocks	7.1	8.4	7.2	5.4	3.8	4.9	6.0	3.6	3.2	3.5	1.6
(ii) Bonds	6.7	5.6	7.2	10.2	11.0	5.6	12.0	8.3	5.8	13.3	10.1
(b) Indirect Finance	29.6	20.5	20.4	31.8	30.4	36.2	17.8	19.5	27.7	37.9	52.0
(i) Financial Loans	19.7	16.4	16.0	24.2	19.4	23.7	13.0	14.6	19.6	26.9	39.5
(ii)Other Loans	9.9	4.1	4.4	7.6	11.0	12.4	4.8	4.9	8.1	11.0	12.4
(c) Others*	32.9	21.8	18.8	21.3	21.2	11.3	12.8	26.7	19.0	11.3	14.3
Total	100	100	100	100	100	100	100	100	100	100	100

Note: (a) (b) (c) account for external funds. (i) (ii) account for (a) and likewise for (a). * Purchased debt etc.

Source: Bank of Korea, *Financial Statement Analysis*, various issues.

Table 2. Sources of Internal and External Funds for Large and Small and Medium Sized Firms

(Unit: %)

	Large firms							Small & medium firms						
	1979-83	1984-88	1989-93	1994	1995	1996	1997	1979-83	1984-88	1988-93	1994	1995	1996	1997
Internal Funds	27.5	44.8	42.0	43.9	45.7	32.5	20.8	21.9	38.4	31.6	34.3	36.8	42.0	28.8
External Funds	72.5	55.2	58.0	56.1	54.3	67.5	79.2	781.	61.6	68.4	65.7	63.2	58.6	71.2
(a) Direct Finance	14.2	14.9	16.1	13.9	9.9	18.4	12.7	11.6	9.8	8.4	4.4	4.9	8.3	6.3
(i) Stocks	6.8	8.7	5.0	3.1	2.8	2.9	1.0	9.0	7.0	6.8	5.3	5.0	6.6	4.8
(ii) Bonds	7.5	6.2	11.1	10.7	7.1	15.5	11.7	2.6	2.8	1.6	1.0	0.2	1.7	1.5
(b) Indirect Finance	28.8	19.4	26.0	18.5	27.3	38.3	52.7	34.5	25.7	36.4	23.3	29.9	35.9	48.1
(i) Financial Loans	18.7	14.8	17.5	13.4	18.6	27.7	40.8	25.3	23.7	28.5	19.2	24.5	22.8	33.0
(ii) Other Loans	10.1	4.5	8.5	5.1	8.6	10.6	11.9	9.2	2.0	7.9	4.1	5.4	13.0	15.1
(c) Others*	29.4	20.9	15.9	23.8	17.1	10.9	13.8	32.0	26.1	23.7	38.0	28.4	13.8	16.8
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Note: (a) (b) (c) account for external funds. (i) (ii) account for (a) and likewise for (a). * Purchased debt etc.

Source: Bank of Korea, *Financial Statement Analysis*, various issues.

advantage of non-bank financial intermediaries in the competition for deposits and loans when money supply is targeted rigidly. Banks were bound to comply with the Bank of Korea's guidelines on the aggregate money supply and could not lend freely to firms. Non-bank financial intermediaries that attracted more savers than banks could make loans to firms of their own accord.

Table 3. Share of Deposit and Loans Banks and Non-Banks Financial Intermediaries

(Unit: %)

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Deposits									
Banks	34.9	35.1	32.6	30.7	30.1	29.1	28.8	28.1	28.5
Non-Banks	65.1	64.9	67.4	69.3	69.9	70.9	71.2	71.9	71.5
Loans									
Banks	48.2	46.7	44.8	42.6	41.2	39.5	38.9	39.2	41.6
Non-Banks	51.8	53.3	55.2	57.4	58.8	60.5	61.1	60.8	58.4

Source: Bank of Korea, *Monthly Money and Banking Statistics*, various issues.

2.2 Owners' Control over Corporate Governance

Korea's financial system appears to more closely resemble the financial systems of Germany and Japan than those of the US and UK when it comes to corporate financing.[1] However with corporate governance the picture is more complex. We see that although banks played a major role in corporate financing, they did not have the capacity to act as the delegated monitor of corporate borrowers. This was because the government intervened in managing commercial

1) Corporations in the US and UK, where securities markets are well developed, use these markets most for financing, whereas in Germany and Japan, where these markets are less developed, corporations make least use of securities markets for financing.

banks and distributing financial resources, which circumscribed the capacity of these banks to assess borrower information and monitor loan repayments. Under these circumstances of asymmetric information, banks could not help resorting to collateral loans.

Banks' dependence on collateral and their lack of experience at both producing information useful for financial activities and monitoring firms ex post, have severely weakened the banks' ability to serve as intermediaries between savers and borrowers. Table 8.4 shows that through the 1990s the ratio of banks' collateral loans to total loans ranged between 30 and 43 per cent. For small and medium sized firms specifically, the ratio of collateral loans to total loans was more than 50 per cent because of the inferior credit worthiness of these firms vis a vis the large firms. At the end of 1997, more than 70 per cent of the external funds of small and medium sized firms was through collateral loans because the impact of the financial crisis increased the risk premium.

Table 4. Trends in Bank's Collateral Loans

(Unit: %)

	1990	1991	1992	1993	1994	1995	1996	1997	1998.6
Collateral	42.2	41.0	40.3	39.2	38.4	37.6	32.4	30.9	31.7
Guarantees	6.4	6.9	8.0	7.7	6.5	6.8	6.1	6.8	8.2
Credits	51.4	52.1	51.7	53.1	55.1	55.6	61.5	62.3	60.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Financial Supervisory Service, *Financial Statement for Banks*, various issues.

Even though the collateral loan ratio was very high through this period, it was not instrumental in reducing bad loans since banks, with no useful credit information about firms, could not monitor firms ex post. Bad loans increased from 1922 billion won at the end of 1990 to 10224 billion won at the end of 1998, and non-performing loans increased from 7246 billion won to 22225 billion won in the same period. A hierarchy did not form among banks, non-bank financial intermediaries, and direct financial markets, which are all essential for a sound and stable financial system. Without this hierarchy there was no efficient mechanism to control the provision of credit to corporations or to enforce stricter supervision of these financial institutions. Thus firms diversified their financing methods, switching from banks to non-bank financial intermediaries and then toward corporate bonds and stocks. These moves served to severely increase moral hazard and adverse selection, and seriously destabilized the financial system.

The failure of financial intermediaries to control and monitor ex post the firms that had borrowed from them resulted in excessive debt accumulation by these borrowing firms and thus precipitated a financial crisis. As Table 8.5 shows, Korean manufacturing firms had a debt-equity ratio more than double that of manufacturing firms in the US and Japan. The government's deliberate efforts to foster the direct financial market and to induce firms to utilize direct finance helped over time to reduce the chaebols' debt-equity ratios. This ratio decreased from 365.9 per cent in the 1970s to 268.3 per cent in 1995. Conversely, the debt-equity ratio of small and medium sized firms tended to increase across the three decades from 1970, despite the government's efforts to foster the direct financial market. The relatively lower interest rate on bank loans, the government's implicit and explicit guarantees on these loans, and the underdevelopment of the securities markets can be regarded as the main causes of the abnormally high debt-equity ratio of Korean firms.

Table 5. Debt-equity Ratio of Manufacturing Firms

(Unit: %)

	1971-80	1981-85	1986-90	1991-95	1994	1995	1996	1997	1998.6
Korea	358.3	377.7	305.4	301.9	318.7	286.8	317.1	396.3	387.0
Large firms	365.9	374.7	295.8	283.1	302.5	268.3	301.6	390.0	386.6
Small & medium firms	254.4	395.9	348.2	398.9	418.5	380.6	387.4	418.4	390.9
US	89.4	108.2	138.8	163.3	166.5	159.7	153.5	154.2	157.9
Japan	443.5	326.6	243.6	213.5	209.3	206.3	193.2	186.4	-

Source: Bank of Korea, *Financial Statement Analysis*. US Department of Commerce, *Quarterly Financial Report*. Japanese Ministry of Finance, *Monthly Fiscal and Monetary Statistics*, various issues.

3. The Legacy of Industrial Policy: A Financial Crisis?

As discussed earlier in this paper, because the government owned commercial banks it dictated low interest rates to subsidize the modern industries it had targeted. These were interest rates too low to clear the market. This kind of Korean government intervention carried an implicit bailout promise and has since been criticized for aggravating adverse selection and moral hazard. Private agents acted under the presumption that the government guaranteed corporate and financial investment. This meant that the return on domestic assets was perceived to be insured implicitly against adverse circumstances, while the government regulated and continued to poorly supervise the Korean economy. Excessive borrowing and careless investment of such implicitly 'insured' funds was therefore virtually inevitable.

When projects were not profitable or experienced a cash shortfall, corporations could resort to overseas funds for re-financing. As Table 8.6 shows, the level of Korean firms' external debt and the number of external loans increased dramatically every year from 1993 until

Table 6. Korean Firms' Overseas Financing

(Unit: $ million, no. of cases)

Classification	1992		1993		1994		1995		1996		1997	
	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.
Loan	2,728	47	3,387	47	7,955	93	7,601	159	11,783	280	10,317	186
Floating Rate Bonds	545	11	1,160	20	3,318	41	5,965	68	6,991	66	5,193	45
Fixed Rate Bonds	2,424	11	4,464	20	2,645	27	4,826	23	7,091	32	7,994	36
Equity Linked Bonds	639	10	916	15	1,857	34	2,286	52	2,738	45	1,875	23
Total	6,366	78	9,927	112	15,775	195	20,678	302	28,603	423	25,332	289

Source: Korea Development Bank (1998), *The Review of International Finance*, various issues (in Korean).

the financial bubble burst in December 1997. It is a stark reality that the extremely high financial leverage of many Korean companies, including the top 30 chaebols, exposed them precariously to the risk of financial difficulty. Their excessive dependence on government-regulated debt-financing methods alongside the government's implicit or explicit loan guarantee have left a far-reaching impact on the Korean economy. Some criticize this industrial policy implemented over the four decades before the crisis on the grounds that it induced excessive debt and distortions in corporate governance, and ultimately made the recent financial crisis unavoidable. We will consider these arguments as we examine the legacy of this industrial policy.

3.1 Low Profitability and Excessive Debt

By the traditional measure of financial soundness, the leverage ratios of Korean companies are almost inconceivable in Western countries such as the US and the UK. Korean companies' average debt to equity ratio was almost 400 per cent at the end of 1985, while in the UK and US this ratio was slightly over 100 per cent. It decreased temporarily during the 198688 economic boom, but bounded back to 300 per cent in 1991. Leverage continued to rise sharply until 1997 and for the median Korean company it reached 620 per cent by 1996.

An insight into the extent of the financial problems of the top 30 conglomerates can be gained from the data in Table 8.7 on assets, liabilities, sales, net profits and debt-equity ratios for the top chaebols at the end of 1996. As we see in Table 8.7, the average debt-equity ratio for these chaebols was 330 per cent, while the comparable figure for US corporations was about 100 per cent. In the case of Sammi (declared bankrupt in January 1997) the ratio was 3245 per cent, while for the Jinro group the ratio was 8598 per cent. These figures now seem unbelievably huge.

At a time when Korean firms have been forced to pay interest on

Table 7. Financial Condition of the Top 30 Chaebols at the End of 1996

(Units: 100 million won, %)

Chaebol	Total assets	Debt	Sales	Net profit	Debt/equity ratios
Samsung	508.6	370.4	601.1	1.8	268.2
Hyundai	531.8	433.2	680.1	1.8	439.1
Daewoo	342.1	263.8	382.5	3.6	337.3
LG	370.7	287.7	466.7	3.6	346.5
Hanjin	139.0	117.9	87.0	1.9	556.9
Kia	141.6	118.9	121.0	1.3	523.6
Sangyong	158.1	127.0	194.5	1.0	409.0
Sunkyong	227.3	180.4	266.1	2.9	385.0
Hanhwa	109.7	97.2	96.9	1.8	778.2
Daelim	57.9	45.9	48.3	0.1	380.1
Kumho	74.0	61.2	44.4	1.1	477.9
Doosan	64.0	55.9	40.5	1.1	692.3
Halla	66.3	63.2	52.9	0.	2067.6
Sammi	25.2	25.9	14.9	2.5	3245.0
Hyosung	41.2	32.5	54.8	0.4	373.2
Hanil	26.3	22.3	13.0	1.2	563.2
Donga Construction	62.9	49.1	38.9	0.4	355.0
Kohap	36.5	31.2	25.2	0.3	589.5
Jinro	39.4	39.0	14.8	1.6	8598.7
Dongguk Jaekang	37.0	25.4	30.7	0.9	210.4
Lotte	77.5	51.0	71.9	0.5	191.2
Kolon	38.0	28.9	41.3	0.2	316.5
Haitai	34.0	29.5	27.2	0.4	658.3
Sinho Jaeji	21.3	17.7	12.2	0.1	489.5
Anam Industrial	26.4	21.8	19.8	0.1	478.1
Dongguk Muyok	16.2	13.6	10.7	0.2	587.9
New Core	28.0	25.9	18.3	0.2	1224.0
Bongil	20.3	18.3	8.7	0.9	920.5
Hansol	47.9	37.1	25.5	0.1	343.2
Hansin Kongyong	13.3	11.5	10.6	0.0	648.8

Source: *Chosun Ilbo*, 29 November 1997.

their debts, their profitability has deteriorated. This low profitability is evident in firm-level data. In 1996, 20 of the largest 30 conglomerates recorded a return on investment below the cost of capital. This evidence highlights the low profitability of new investment projects in the mid-1990s. For Hanbo, Sammi and Jinro, the first chaebols to collapse in 1997, their rates of return on invested capital (ROIC) at the end of 1996 were as low as 1.7 per cent, 3.2 per cent, and 1.9 per cent respectively, while the prime rate in Korea before the crisis was as high as 12 per cent. From this evidence, one can conclude that the 1997 crisis was triggered primarily by a series of bankruptcies of large firms that had borrowed too heavily to finance their investment projects irrespective of their profitability.

3.2 Distortions in Corporate Governance

The impact of the 1997 crisis in its breadth and depth is unprecedented in Korean economic history. Decades back it appeared that without the institutional development of securities markets, the best way for developing economies like Korea to grow rapidly was through bank dominance of corporate finance. But this requires some pre-conditions for the banks: that they are not subject to undue state influence, that they are prudentially supervised and regulated, and that they are exposed to competition. However, none of these preconditions were met in Korea.

The Korean government intervened directly in distributing external funds and managing banks through each stage of economic development, leaving banks with no incentive to monitor firms. Chaebols have been tightly owned and managed by individual families, who exercise control over the whole business group even though they own less than 50 per cent of its businesses, as we see in Table 8.8. The peculiar mesh of relationships between government and banks, and government and corporations, resulted in corporate owners exercising control over corporate governance with little or no interference from the market.

Table 8. Ownership of Korean Business Groups By Insiders

(Unit: % of common shares held)

Business Group	Founder	Relatives	Member Companies	Total
Hyundai	3.7	12.1	44.6	60.4
Samsung	1.5	1.3	46.3	49.3
LG	0.1	5.6	33.0	39.7
Daewoo	3.9	2.8	34.6	41.4
Sunkyong	10.9	6.5	33.5	51.2
Sangyong	2.9	1.3	28.9	33.1
Hanjin	7.5	12.6	18.2	40.3
Kia	17.1	0.4	4.2	21.9

Source: World Bank, *East Asia: The Road to Recovery*, 1998.

In sum we see from this overview of corporate conduct how two features in particular contributed to the inevitability of the financial crisis. One was the reckless push by unrestrained corporations to expand their operations, irrespective of their profitability. The second was poor governance of corporations, through the government's pursuit of unsuitable economic policies. Egregious among these was industrial policy, whose fallout on the economy has come to light particularly since the 1997 crisis. Various credit controls as part of industrial policy appeared to work effectively in the initial stages when the economy was relatively small and simple. However extensive government intervention yielded serious side-effects in the form of a high leverage ratio in the corporate sector and no market discipline in the financial market.

Resurrection and reform of the financial and corporate sectors are prerequisite to successful industrial policy in the new era. We will therefore turn to consider the economic restructuring process under way in Korea since the crisis, which seeks to prepare the economy for a second take-off in the coming years.

III. Economic Restructuring

The Korean government is pursuing reform policies designed to restructure and fortify the national economy. Restructuring corporations and the financial sector is crucial to this reform program. We will therefore look carefully at government efforts to reform both the corporate and the financial sectors, and consider the effects that government moves are having on these sectors as they are re-formed to undergird the economy in a highly competitive era of global markets.

1. Corporate Restructuring

As discussed earlier in this chapter, Korean corporations pursued a high leverage financial strategy. As long as economic growth rates were high, the risks associated with heavy debt on a narrow capital base appeared to be manageable. But high leverage, short-term loans, and unhedged foreign borrowing proved ruinous with a sudden currency depreciation and interest rate surge. The sudden shift in circumstances forced both poorly performing and strongly performing companies to the verge of collapse. Therefore, policy makers needed to identify appropriate criteria and frameworks to disentangle solvent companies from insolvent companies, and to resurrect viable companies. This required corporate restructuring and changes to corporate governance in the short term.

The government had introduced economic policies long before the financial crisis to mitigate the concentration of economic power in the hands of chaebols. Measures to reduce the chaebols' economic power included credit controls on chaebols, enactment of the Fair

Trade Act, and inducements for chaebols to specialize their production lines. However, the various policy measures to weaken chaebols failed.

When the financial crisis struck, the government launched comprehensive policy measures aimed at bolstering the financial soundness of Korean corporations. Other crucial steps were to establish a system of effective corporate governance, with a particular target of the chaebols and regulating unfair competition. The Kim Dae-jung administration and business leaders of the five largest chaebols agreed to work towards achieving five basic principles of corporate restructuring necessary to achieve the goals of economic reform:

1. to enhance transparency of business management;
2. to eliminate cross-debt payment guarantees among affiliates within a business group;
3. to improve financial structures;
4. to concentrate on core business lines;
5. to strengthen the legal responsibility of majority shareholders and management.

To facilitate the implementation of these five basic principles of corporate restructuring, the Financial Supervisory Commission (FSU) proposed the following guidelines:

1. chaebols will be required to submit combined financial statements to enhance their transparency;
2. existing cross-debt guarantees between affiliates should be eased by the end of 1999;
3. chaebols will be required to reduce their debt-equity ratios to

200 per cent by the end of 1999;

4. chaebols will be encouraged to concentrate on their core business lines through 'Big Deals', or asset swaps among the five largest chaebols;
5. chaebols will be required to appoint outside directors and maintain a formal system of checks to strengthen monitoring.

As a result of coordinated efforts, the debt-equity ratios of Korea's five top chaebols (excluding Daewoo) have been lowered below the 200 per cent level based on the Capital Structure Improvement Plans (CSIPs). The top chaebols also reduced their overall subsidiaries by 67 units. Workout procedures modeled on the 'London Approach' have been pushed firmly so that Daewoo Group companies and many of the largest corporations, from the sixth largest to the 64th largest, entered into agreements with their respective creditor banks.

With the improvement of capital structures, the government also successfully eliminated on schedule all cross-debt guarantees among chaebol units and affiliates, except for deferred payments allowed under the Fair Trade Act. Among the government's various approaches to enhancing corporate governance, transparency and accountability, all listed companies are now required to appoint at least one quarter of the members of their boards of directors from outside the company.

The reform policy of the Kim Dae-jung administration seems to have been much more comprehensive and far reaching than that of its predecessor under Kim Young Sam. Of course, the more intensive the reform, the stronger the resistance put up by those being reformed. However, we argue that corporate restructuring should be pushed more intensively and systematically to overcome the financial crisis and restore the Korean economy to its normal path of growth.

As we discuss below, changes in the economic and political environments require reformulation of industrial policy to enhance the competitiveness of corporate performance, deliver sound corporate governance and transparency, and consolidate a functional, sustainable system of corporate financing.

2. Financial Restructuring

A strong financial system performs several key services in a market-oriented economy. First, the financial system evaluates firms and allocates resources based on these evaluations so the better the system's ability to obtain and process information, the better is the allocation of capital. Second, the financial system mobilizes capital from disparate savers through banks, insurance companies, investment companies and capital markets. Many worthwhile investments require large capital inputs and some enjoy economies of scale so by agglomerating the savings of many individuals, financial intermediaries enlarge the set of projects that can be undertaken within the economy. Third, a strong financial system exposes dominant firms to competition by identifying and funding the most competitive enterprises. Fourth, an effective financial system compels managers to act in the interests of those who hold claims on the firm. Fifth, financial intermediaries may be able to improve corporate governance by carrying out the difficult and costly tasks of monitoring managers and obliging them to act in the interests of firms' claim holders.

Sound corporate governance also makes valuable contributions to maintaining a healthy economy. Corporate governance serves to encourage more efficient resource allocation by aligning managerial goals with creditors' goals. It also stimulates further investment by reducing risk and doubt in the market, making investors more confident that firms will maximize owner profits and service debt obligations.

Under industrial policy pre-crisis, Korean financial intermediaries and financial markets that comprised the financing system could not provide the financial services mentioned above because the government controlled credit allocation to maximize the nation's economic growth rate. The severity of the financial crisis of late 1997 jolted the banking system and depressed the financial markets that could not operate smoothly under such major dislocation. A comprehensive and rational strategy is required to solve this unprecedented crisis. As the critically ailing banks and other financial institutions were major obstacles to increasing the overall efficiency of the financial sector, the government closed down those financial institutions that were deemed non-viable after a comprehensive and exhaustive examination of these institutions' financial situation.

The Korean government has pursued financial restructuring in accordance with four strict principles. First, financial restructuring should be completed thoroughly and swiftly to restore the financial market's mediation function. Second, the burden on taxpayers of supporting fiscal needs must be kept to an absolute minimum. Third, shareholders, employees and managerial staff must share the responsibility and the pain to prevent moral hazard arising during the course of financial restructuring. Fourth, financial restructuring should be implemented in line with transparent and objective criteria to avoid the possibility of subsequent disputes.

The government followed these principles in pushing ahead on the exit of non-viable banks to improve banking soundness and efficiency. Ten commercial banks were forced out of the market through closures, P & A and mergers as we see in Table 8.9. But as well as closing down ailing financial intermediaries, the government will also need to take action to restore the key roles of financial intermediaries to remove the prospect of a paralyzing credit crunch.

Table 9. Financial Institutions Closed or Suspended as of March 2000

	December 1999	January 1998-March 2000			March 2000
		Merges	License revoked or suspended	Total	
Banks	33	5	5	10	23
Securities Houses	36	-	6	6	36 [a]
Merchant Banks	30	3	18	21	9
Insurance Companies	50	2	5	7	43
Leasing Companies	25	1	11	12	15 [b]
Investment Trust Companies	31	1	6	7	25 [c]
Mutual Savings and Finance Companies	231	17	52	69	173 [d]
Credit Unions	1,666	69	215	284	1,391 [e]
Total	2,102	98	318	416	1,715

Note: [a] Includes 2 companies converted from other sectors and 4 that were newly established. [b] Includes 2 newly established companies. [c] Includes 1 newly established company. [d] Includes 11 newly established companies.[e] Includes 9 newly established companies.

Source: Financial Supervisory Service (2000), Financial Reform and Supervision in Korea 2000, Seoul.

The most difficult problem in the process of financial restructuring is raising the funds necessary to finance the restructuring program. In principle, financial restructuring should be funded by the financial institutions themselves. However the financial institutions have had great difficulty in raising funds in the stock and real estate markets. This has made the provision of public funds to reform the financial institutions unavoidable. The government earmarked 64 trillion won in public funds in 1998 to purchase non-performing loans and support re-capitalization efforts in the nation's financial institutions through the Korea Asset Management Corporation and the Korea Deposit Insurance Corporation. In addition to this 64 trillion won in 1998, the government injected 29.6 trillion won in 1999, aiming to return banks to normal operation as soon as possible. It is still questionable, however, whether the public funds already supplied are sufficient for fully implementing the financial restructuring program.

Alongside the efforts by government to improve the efficiency of fiscal support, avoid moral hazard and reform the financial sector overall, financial institutions also have responsibilities to fulfil in the financial reform process. To this end, the financial institutions should break the intimate ties that developed between banks and firms under the earlier industrial policy to meet implicit management goals and strengthen their role in disciplining corporate managers. This is necessary too. The financial institutions should also strictly enforce limits on lending, especially through chaebols to connected firms and insiders, to ensure that the relationship between financial institutions and corporations is kept at arms length. It is clear that the banks' violation of this arms-length rule contributed to poor intermediation in the provision of financial services, and as a consequence contributed to the financial crisis. Transparent, credible government regulation and supervision of financial markets are necessary for implementing an effective industrial policy in the new era of globalization.

Table 10. Sources of Public Funds (November 1997–December 1999)

(Unit: billion won)

	KDIC					KAMC	Fiscal support			BOK	Total
	Total	Recapital-ization support	Loss compen-sation	Asset purchase	Deposit insurance claim		Total ization support	Recapital-debt purchase	Subord-inated		
November 1997 - December 1998											
Banks	12,065	6,286	5,779	-	-	16,724	16,327	10,506	5,821	-	45,116
City Banks	12,065	6,286	5,779	-	-	12,596	5,867	1,500	4,367	-	30,529
Local Banks	-	-	-	-	-	1,421	794	-	794	-	2,216
Specialized Banks	-	-	-	-	-	2,705	9,665	9,006	659	-	12,371
Merchant Banks	12,694	42	-	-	12,652	1,755	-	-	-	-	14,449
Securities Houses	14	-	-	-	14	56	-	-	-	-	70
Insurance Co.	1,153	-	1,153	-	-	1,371	-	-	-	-	2,524
Investment Trust Co.	-	-	-	-	-	-	-	-	-	-	-
Others	1,907	10	-	-	1,897	-	-	-	-	-	1,907
Sub-total	2,7833	6,338	6,932	-	14,563	19,907	16,327	10,506	5,821	-	64,069
January 1999 - December 1999											
Commercial Banks	16,100	8,548	3,827	3,724	-	2,764	1,450	900	550	700	21,014
City Banks	16,100	8,548	3,827	3,724	-	2,443	100	-	100	-	18,644
Local Banks	-	-	-	-	-	298	450	-	450	-	748
Specialized Banks	-	-	-	-	-	21	900	900	-	700	1,621
Merchant Banks	-	-	-	-	-	-	-	-	-	-	-
Securities Houses	-	-	-	-	-	-	-	-	-	-	-
Insurance Co.	5,392	5,144	247	-	-	-	-	-	-	-	5,392
Investment Trust Co.	-	-	-	-	-	-	900	900	-	-	900
Others	2,261	-	-	-	2,261	105	-	-	-	-	2,366
Subtotal	23,754	13,693	4,075	3,724	2,261	2,869	2,350	1,800	550	700	29,673

Table 10. (continued)

	KDIC					KAMC	Fiscal support			BOK	Total
	Total	Recapital-ization support	Loss compen-sation	Asset purchase	Deposit insurance claim		Total ization support	Recapital-debt purchase	Subord-inated		
Aggregate											
Banks	28,165	14,834	9,606	3,724	-	19,488	17,777	11,406	6,371	700	66,131
City Banks	28,165	14,834	9,606	3,724	-	15,040	5,967	1,500	4,467	-	49,173
Local Banks	-	-	-	-	-	1,720	1,244	-	1,244	-	2,965
Specialized Banks	-	-	-	-	-	2,727	10,565	9,906	659	700	13,993
Merchant Banks	12,694	42	-	-	12,652	1,755	-	-	-	-	14,449
Securities Houses	14	-	-	-	14	56	-	-	-	-	70
Insurance Co.	6,545	5,144	1,400	-	-	1,371	-	-	-	-	7,917
Investment Trust Co	-	-	-	-	-	-	900	900	-	-	900
Others	4,168	10	-	-	4,158	105	-	-	-	-	4,273
Total	51,588	20,031	11,007	3,724	16,824	22,776	18,677	12,306	6,371	700	93,742

Sources: Unpublished data from The Ministry of Finance and Economy, Korea Asset Management, and Korea Deposit Insurance Corporation.

IV. Korean Industry in the New Era

The discussion above brings us to a crucial issue in this examination of industrial policy: how can industrial policy improve the social welfare of Korean people by stimulating economic growth in an era of swift and dramatic change in economic life? To address this question we must first consider trends in the world economy and the place that Korean industry is likely to take within the global economy.

1. A Mega-competitive Global Economy

The global economy is entering an era of mega competition with national boundaries becoming less significant than ever before in terms of the flow of technology, goods and services. The WTO in particular is guiding economic actors towards a globalized market, through international trade, business, and technology. New modes of communication such as Internet, interactive TV and CD-ROM help to globalize markets through telemarketing and mail order sales.

The magnitude of economic change requires all nations to reformulate their industrial policies to meet the very different demands of a global economy in the current era. To achieve economic growth in response to this globalization, Korea must now follow guidelines set by the WTO and the OECD to eliminate subsidies to target industries, Korea will need an industrial policy that promotes highly sophisticated product-oriented technology to meet the growing global demand. Especially, Korea requires the industrial policies aimed at eliminating the object gaps to be formulated to eliminate idea gaps in the future.

2. Korean Industry After the Financial Crisis

The structure of the Korean economy by sectors is similar to that of other OECD economies. In 1997 agriculture and industry occupied 6 per cent and 32 per cent of GDP respectively, while the OECD averages are 2 per cent and 29 per cent respectively. The share of manufacturing declined from a peak of 36 per cent in 1988 to 26 per cent in 1997 because of expansion in the transport and utilities sector. The service sector is still below the OECD average, which indicates significant potential for future growth in this area.

Table 11. Forecast for the Future Sectoral Structure of GDP

(Unit: %)

	1997	2003	2008
Agriculture	6.0	5.3	4.1
Manufacturing and related services	32.3	32.3	32.8
Manufacturing	25.7	24.9	24.4
Related services	6.6	7.4	8.4
Services	61.8	62.4	63.1

Note: Related services refers to telecommunications, software, databases, R & D and engineering, consulting, culture, media, advertisement, design.

Source: Lee, Y. S., D. Kang and D. Y. Jung (1999), 'How Korean industry must adapt to survive in the 21st century', *KIET Policy Discussion Paper*, Seoul: Korea Institute for Industrial Economics and Trade (in Korean).

Heavy industries such as automobiles, steel, shipbuilding and semiconductors are still Korea's core industries. These industries are capital intensive, taking advantage of economies of scale, and thus require substantial initial investments. A majority of corporations in these industries used initial government support to great advantage and became powerful competitive forces. Through the government's policies of protection and promotion, Korea's major export industries achieved outstanding success. Industrial policy could stimulate such high economic growth during this period because it followed successful strategies that included using economies of scale, learning-by-doing, rapid technological change and extensive inter-industry spillovers.

With significant structural reforms of the economy implemented by the Kim Dae-jung administration, the nation is now reshaping its economic path with industrial restructuring. Korea has returned to a path of industrial growth and the economy is expected to rebound strongly from here.

3. Korea's Top Ten Industries

What do these developments suggest about the industries that are expected to grow most rapidly? As we see from the information forecasted by the Korean Institute for Industrial Economics and Trade presented in Table 8.12, some of the traditional industries as well as new knowledge-based industries, particularly those related to information and computer technology (ICT), are expected to drive the Korean economy throughout the next decade. Capital-intensive industries such as steel and automobiles are expected to expand and technology-intensive industries are expected to develop further as new pillars of growth.

When we consider forecasts of the nation's highest growth industries we see clear signs of Korea's drive to leapfrog into the group of high-tech countries. Information and Computer Technology industries and high-tech industries are expected to grow quickly over the next decades. Six ICT industries are included on the list of the top 20 industries expected to grow most rapidly (Lee, Kang and Jung 1999). Industrial policy therefore needs to be designed to foster this growth, especially for the increasingly important service industries.

Table 12. Forecasted Leading Industries Over the Decade Ahead

(Unit: %)

Ranking	Industry	Contribution to Growth
1	Automobiles	3.23
2	Semiconductors	2.42
3	General machinery	2.38
4	Textiles	1.83
5	Pharmaceuticals	1.52
6	Fine chemicals	1.51
7	Software	1.20
8	New materials	1.13
9	Telecommunication equipment	0.95
10	Computers	0.86

Note: Contribution to Growth=growth rate times the relative importance of each industry.

Source: Lee, Y. S., D. Kang and D. Y. Jung (1999), 'How Korean industry must adapt to survive in the 21st century', *KIET Policy Discussion Paper*, Seoul: Korea Institute for Industrial Economics and Trade (in Korean).

Table 13. Korea's Top 10 High Growth Industries of the Decade Ahead

(Unit: %)

Ranking	Industry	Growth Rate
1	FTP LCD*	31.8
2	New materials	24.6
3	Software	21.9
4	Bio-industry	21.7
5	Mechatronics	20.5
6	Films, music	19.2
7	Car electronics	16.9
8	Book publishing	16.1
9	Consulting	14.8
10	Medicine	14.4

Source: Lee, Y. S., D. Kang and D. Y. Jung (1999), 'How Korean industry must adapt to survive in the 21st century', *KIET Policy Discussion Paper*, Seoul: Korea Institute for Industrial Economics and Trade (in Korean).

V. A New Direction for Industrial Policy

In the initial stage of postwar industrialization, Korea had little capital to produce capital-intensive products for export and instead focussed on labor-intensive goods such as shoes and textiles. The initial shortage of capital helped to create a situation where government could justify targeting certain export-oriented industries for development, with public funding and preferential treatment in the form of huge tax breaks and favorable credit allocation. Industrial policy worked as successfully as it did during the high-growth largely because it was applied to genuine infant industries with economies of scale and inter-industry spillovers.

However, much of the criticism of Korean industrial policy is that government did not always limit preferential treatment to industries that truly deserved this treatment in line with industrial policy goals. Sometimes government extended the advantages of industrial protection and promotion to infant industries that did not have economies of scale, rapid productivity growth or inter-industry ripple effects.

Undeniably earlier industrial policy recognized the over-riding importance of technology for industrial development. From the 1980s industrial policy encouraged the build up of considerable technological capability through continued expansion of investment in indigenous research and development (R & D) and imported technology. Korea's technological progress has been achieved mostly by the private sector's drive into high-tech industries with increasing investment in R & D. Korean firms had earlier expanded their efforts in high-tech production by investing domestically and overseas with government support. Nevertheless, Korea is still behind the leading economies in the core technologies of major technical and knowledge-based industries.

Bridging the technology gap is not a primary reason, nor a key role, for industrial policy in the new era. As economic analysts claim, the reason for government intervention in the market should be market failure. However since modern economists view the R & D sector as the engine of economic growth, there may be reason for government involvement in this sector. Recent developments in growth theory reveal there are patterns in market failures in R & D and if society relied on the market alone there would be far less R & D in an economy. Furthermore, when a firm performs R & D, the spillover benefits for consumers, suppliers and the firm's competitors are generally huge; the firms doing the R & D capture only a small part of the benefits. In this light we can say there is still a place for industrial policy in the new era, especially in stimulating the R & D necessary for technological development.

New growth theory argues that technology, accumulation of human capital through R & D, learning-by-doing, and on-the-job training are the most important determinants of productivity and industrial development. Education is central in the process of economic growth as the quality of human capital is the principal determinant of resolving gaps in ideas. The accumulation of human capital through education can expand and diversify production of frontiers and provides opportunities for rapid knowledge spillover into other areas of the economy.

We should keep in mind that poor countries are poor because their citizens do not have access to the ideas that are used in developed countries (idea gaps) and because these countries lack the materials necessary for production such as machines and equipment (object gaps).

Technical progress has a similar path. It does not occur accidentally as a by-product of economic activities undertaken for other purposes. It is the result of deliberate efforts by economic actors to improve their products. This is an important consideration in assessing Korea's industrial policy needs, especially when we learn that Korea lags far behind industrially advanced countries in sophisticated technologies. Korea's leading industries such as semi-conductors and shipbuilding have mature manufacturing and production technologies that are comparable with those of industrially advanced countries. But on core technology such as design in these industries, Korea ranks at only half the level of advanced economies. Moreover, prominent economists claim that Korea's total factor productivity is half the US level. These assessments can be confirmed when one looks at the rank of Korea's national competitiveness in Table 8.14.

Table 14. Korea's National Competitiveness Rankings

	1993	1994	1995	1996	1997	1998	1999
Korea	28	32	26	27	30	35	38

Source: Lee, Y. S., D. Kang and D. Y. Jung (1999), 'How Korean industry must adapt to survive in the 21st century', *KIET Policy Discussion Paper*, Seoul: Korea Institute for Industrial Economics and Trade (in Korean).

Comparative findings on Korea's technological strength point to technological advancement as a key concern for industrial policy. R & D develops technological strength, and especially when product-oriented it leads to economic growth. R & D is a key determinant of long run productivity and welfare. Industrial policy must therefore incorporate the issue of R & D. There is a broad literature on R & D that can usefully inform industrial policy. Theoretical and empirical studies provide convincing evidence of the poverty of private R & D. In particular, Jones and Williams (1999) show that in the US optimal R & D investment is at least four times greater than actual spending. This is partly because distortions such as monopoly pricing and the nature of knowledge as a public good promote under-investment in R & D.

There are lessons here for industrial policy in Korea. Since generally, R & D has positive impact on the entire economy, but the market alone delivers less than a level necessary to achieve maximum benefit for the economy, the government should endorse incentives to promote R & D through industrial policy. In Korea the level of government R & D investment relative to private sector R & D investment is small when compared with advanced economies against which Korea competes for markets (Table 8.15).

Table 15. Ratios of Public R & D to Private R & D

	Korea (1994)	US (1994)	Japan (1994)	UK (1993)	Taiwan (1992)
Govt/Private	16:84	43:57	20:80	32:68	52:48

Source: Lee, Y. S., D. Kang and D. Y. Jung (1999), 'How Korean industry must adapt to survive in the 21st century', *KIET Policy Discussion Paper*, Seoul: Korea Institute for Industrial Economics and Trade (in Korean).

For this reason we argue that industrial policy should be implemented to promote R & D in both the public and private sectors. It should also aim to transform Korea's industrial structure to respond most effectively to a knowledge-based economic environment. So what kind of industrial policy should the government implement to promote R & D and orient the nation towards a knowledge-based economic environment?

1. Preparing the Economy for Knowledge-based Industry

Korea will gain in the long run from transforming the national industrial structure towards knowledge-based industries.[2)] In a world where economies are rapidly globalizing and innovation is based mostly on information technology, the importance of traditional factors of production is changing dramatically. Capital, labor and land are loosing importance while information and knowledge are gaining importance. It appears inevitable that economies seeking to advance further must transform into a knowledge-based economy.

As discussed earlier, Korea's industrial structure is based on heavy industries such as iron and steel, electronics, automobiles, petrochemicals and machinery. This kind of industrial structure relies on economies of scale and requires huge amounts of investment capital. It was instrumental in causing the financial crisis since it encouraged excessive investment, over-competition and heavy borrowing, and consequentially the weak financial structure of the chaebols. We argue here that a knowledge-based industrial structure is the best alternative for Korea but what form does it take? Knowledge-based industry has three economic characteristics: increasing returns to scale, economies of network, and self-enforcement properties. These characteristics enable governments to justify intervening in the market to foster knowledge-based industries because if operations are left to the market mechanism, there will be less investment than is socially and economically desirable. There are three forms of this industry: knowledge-based primary industry such as high-tech farming and high-tech fisheries; knowledge-based manufacturing industry such as mechatronics, fine chemicals, aerospace, new materials and environmental products; and knowledge-based service industry.[3)]

---

2) We define knowledge-based industry as those that produce high value-added knowledge products or knowledge services by using in the production process the knowledge-intensive factors of production such as intangible knowledge.

3) The knowledge-based service industry includes consulting, software, engineering, industrial design, educational services, databases, information

The government should therefore support these industries by encouraging the conditions in which these industries will flourish. Policy measures include funding for R & D, protection of intellectual property rights, investment in human capital, and construction of infrastructure such as databases or an initiative such as the Scientia Tech Belt or Photonics Town.[4)] According to a study by the Korean Institute for Industrial Economics and Technology (1998), government support for knowledge-based industry will generate an additional 770000 jobs in this sector over the first four years of this decade.

2. Support for Venture Businesses

In the same context as support for knowledge-based industries, government support for venture business is also needed to transform Korea's industrial structure. Most venture businesses in Korea deal with software and computer-related areas, information and communication, multimedia, medical appliances and environmental fields.

The number of venture businesses in Korea more than doubled from 2042 at the end of 1998 to 4934 at the end of 1999. This came with government support, but was also due very much to the desires of business agents to develop their ability and realize entrepreneurial aspirations in a new business. At the end of 1999 the average number of employees in venture businesses was 35, and average sales for that year reached 4.7 billion won. Both figures registered a fall from

---

services, finance and insurance, medical services, advertising, broadcasting, and cultural industries such as animation and printing.

4) We maintain that local government should cooperate with the central government to promote knowledge-based industries. The Photonics Town to be constructed in Kwang-Ju City is a good example of local - central government cooperation.

the previous year, reflecting the growing number of new venture businesses entering the market.

Venture businesses in Korea are characterized by high growth and high returns. Their average growth rate was 27.0 per cent in 1996, far surpassing the average rate of 10.3 per cent in the manufacturing sector. At the end of February 2000, 150 venture businesses were registered in KOSDAQ. This accounted for 32 per cent of all its registered firms. The capital of venture business firms registered at KOSDAQ was then 886 billion won, which accounted for 6.6 per cent of the capital of all the firms registered at KOSDAQ. Their market value was then 35.6 trillion won, which was 34.0 per cent of the market value of all firms at KOSDAQ.

Table 16. Firms Registered at KOSDAQ

(Units: number, billion won)

	December 1997	December 1998	December 1999	February 2000			
				Total	Venture business	General business	Mutual funds
Registered numbers	359 (-)	331 (114)	453 (173)	469	150	261	58
Capital (A)	3,494	5,407	13,061	13,418	886	9,071	3,461
Market value (B)	7,068	7,892	106,280	104,899	35,620	65,945	3,333
B/A	2.0	1.5	8.1	7.8	40.2	7.3	0.96

Note: ( ) denotes number of venture businesses.

Source: Bank of Korea (2000), *Venture Business System in Korea*, Seoul.

Venture firms are usually confronted with many problems that are not observed in ordinary firms. Foremost of these is a constant shortage of funds. The venture capital market is under-developed and fragmented among a few finance companies such as the Korea Technology Bank, the Korea Technology and Finance Corporation, and the Korea Development and Investment Finance Corporation.

The second major problem facing Korean venture businesses is a shortage of human capital. Venture businesses thrive on creative ideas and risk-taking entrepreneurship. Contrarily, however, as in many Asian countries, the education system in Korea takes a top-down approach and fosters learning by copying. This system feeds into the labor market a mass of people who are counter-creative, conventional and largely conformist. Those who take initiative, are creative and progressive are therefore in short supply to meet the workforce needs of venture businesses.

The third problem for venture businesses is their lack of original technology, which has its root in the second problem above. According to one survey, the principal source of technology for venture businesses in Korea was improvement to existing technology (49.8 per cent), while only 33.5 per cent of developments stemmed directly from creative technology. The remaining 15.8 per cent came from copying foreign technology.

It is difficult but not impossible to solve the first problem of funding through the combined efforts of government and the private sector. One useful way to address this problem is to activate the Angel Club (a private venture capitalist club) to foster the venture business sector. Concerted efforts by government and the private sector to stimulate venture business through a coordinated program involving the Angel club, venture capital banks and private consulting firms will be essential to make funds available for this sector. The incumbent government has implemented a 'matching fund' scheme for venture capital to encourage venture business. Various projects under this scheme, such as hosting the Venture market, may reap excellent gains.

Solving the second and the third problems in the near future appears extremely difficult, however, since these are structural problems inherent in the Korean education system and are embedded in a long tradition. Addressing the problem of preparing a suitably skilled workforce to meet the needs of the economy is outside the ambit of industrial policy. Nevertheless the dire consequences of this situation for the national economy point to the need for coordinating industrial policy with other national policies particularly education policy in this instance recognizing that an integrated approach to national policy can maximize chances for achieving national goals that include the wellbeing of the national economy.

3. Inducing Foreign Investment

There is no doubt that financially afflicted countries like Korea need foreign investment as well as foreign capital for solvency and enhancing competitiveness. The incumbent president promised that he would make Korea one of the best places in the world for foreigners to do business and he has implemented some serious measures to keep this promise. He liberalized almost all sectors of the economy for foreign investment, including real estate purchasing and leasing, and allowing hostile M & As. He offered incentives in taxation and financing to attract foreign investors. Procedures for foreign direct investment were simplified by institutionalizing the 'One Stop Service for Foreign Investors'. The government has plans to privatize several government corporations such as POSCO (Pohang Steel Corporation), KEPCO (Korea Electric Power Corporation) and Seoul Bank. It has already abolished 50 per cent of regulations across the ministries.

But this is not the end of the story. Foreign investors still do not recognize these measures as de facto improvement for foreign investment, however much they appreciate the efforts of the Korean government. The government therefore needs to continue improving the business culture and climate for foreign investors, and industrial policy should be implemented judiciously to achieve these ends while foreign capital remains crucial to Korea's economic development.

4. Inducing Development of Endogenous Technology

The gap in technology is conceptually different from the gap in ideas. We can, however, use the technology gap as a proxy for the ideas gap. The international technology market is in general imperfectly competitive. Some technologies are available at low cost and can be applied to the production process. Korea imported technologies from the US and other countries, and gained returns through mixing endogenous inputs with imported capital goods and technologies. But technological dependence on advanced countries made Korea's technology development capability very poor. Comparative data in Table 8.17 indicate the poverty of Korea's performance in technology development relative to some leading industrialized economies.

Table 17. Technology Development Index Comparisons

US	Japan	Germany	France	Korea
100	70.19	46.30	24.36	6.55

Note: US technology index at 1994 = 100.

Source: Lee, Y. S., D. Kang and D. Y. Jung (1999), 'How Korean industry must adapt to survive in the 21st century', *KIET Policy Discussion Paper*, Seoul: Korea Institute for Industrial Economics and Trade (in Korean).

These data highlight severe market failures in the R & D sector in Korea. Yet R & D is crucial for developing the technology necessary to undergird Korea's economic performance. The key factor determining corporate strength and survival in the intensely competitive globalized economy is ability to adapt to a dynamic international environment in which the production cycle becomes ever shorter. Technology is crucial to this ability to adapt to, and develop markets profoundly changing the production process through expanding product varieties and improving production practices. Since the market in Korea has clearly failed to deliver the level of R & D necessary for this technological development, government must intervene through industrial policy to foster technological development. Indeed, given that advanced technology is crucial to the economy, we believe that one cannot over-emphasize the importance of R & D in industrial policy, especially since the major industries such as automobiles and semiconductors will likely play a leading role in the nation's economic growth across the decade.

In earlier years the Korean government played a major role in importing technology and nurturing human capital for industrial development. As mentioned above, Korea enjoyed high returns from this imported technology but the consequent dependence on imported technology that this strategy produced will hinder, if not cripple, economic growth in the 21st century. The government must strengthen its role in pushing endogenous R & D to ensure the nation stays on a path of independent technological progress. One concern here will be the need to conform to WTO rules concerning intellectual property rights and policy must be mindful of this constraint. Nevertheless, with appropriate policy planning, government can stimulate dynamic comparative advantage with an industrial policy that promotes and supplements conscious investments in technology through effective R & D.

VI. Concluding Remarks

After the financial crisis that struck the Korean economy in the late 1990s, the Korean government launched an economic program to restore and sustain market confidence and return the economy to a path of strong sustainable growth. Most important among the policies in this reform program are those aimed at far-reaching financial sector reform and improvement in the structure and governance of Korean corporations. The economic crisis reduced short-term growth prospects, but recovery is clearly under way, guided by the significant structural reforms implemented by the Kim Dae-jung administration. These ongoing economic reforms have enabled the Korean economy to recover faster than any other economy affected seriously by the crisis. Structural reforms, if implemented successfully, will create a more competitive and dynamic economy with long-term growth prospects more stable and sustainable than before the crisis. In particular Korea will have a more open and fair business environment for foreign traders and investors. Overall, successful corporate and financial restructuring will result in a fundamental change in the Korean economy through transformation of its industrial structure.

Korea's industrial policy has shifted from promoting targeted industries to promoting innovation-related activities. The government has led a drive to improve the country's technological infrastructure and to strengthen national technological capacity, particularly the competitiveness of information industries. Recognizing that Korea is a long way behind in the software sector, the Korean government announced a plan to intensively promote the domestic software industry.

However we must stress that technological development depends on improving the quality of human capital and having funding available to stimulate R & D activity. These technology prerequisites require the government to provide effective support for education and a stable and sound financial market. An economy with constraints on liquidity because of financial market depression or other problems will experience slow growth. This means there is less funding available to improve human capital and stimulate R & D, which slows development of new and improved products in a downward economic spiral.

To prevent downturn and hasten the flow of the benefits of financial restructuring, corporate restructuring including more effective corporate governance is required without delay. The recent experience of the Hyundai group, which has made some progress with separating ownership from control, provides valuable insights for planning industrial policy with an eye to the future. Corporate governance mechanisms can be altered through the political process, and industrial policy should be flexible to address urgent issues such as improving corporate governance as a matter of priority.

References

Bank of Korea, *Financial Statement Analysis*, Seoul, various issues.

Bank of Korea, *Monthly Money and Banking Statistics*, Seoul, various issues.

Bank of Korea (2000), Venture Business System in Korea. in Korean

Bernanke, B.S. & 1993) 'Credit in macroeconomics', *Federal Reserve Bank of New York Quarterly Review*, 18 (1).

Cho Soon (1994), *The Dynamics of Korean Economic Development*, Washington, D.C.: Institute for International Economics.

Chosun Ilbo, various issues.

Financial Supervisory Commission of Korea, *Bank Management Statistics*, Seoul, various issues.

Financial Supervisory Commission of Korea (2000), *Financial Reform and Supervision in Korea 2000*, Seoul (in Korean).

Financial Supervisory Commission of Korea, *Financial Statements for Bank*, Seoul, various issues (in Korean).

Japanese Ministry of Finance, *Monthly Fiscal and Monetary Statistics*, Tokyo, various issues.

Jones, C. I. and J.C Williams (1999), 'Too much of a good thing? The economics of investment in R & D', Stanford University, mimeo.

Jung, Y. and S.J. Baak, (1998), 'IMF bail-out and Korea's economic reform', *KIET Economic Review*, 3 (1), 315.

Korea Asset Management, unpublished data.

Korea Deposit Insurance Corporation, unpublished data.

Korea Development Bank (1998), *Review of International Finance*, various issues (in Korean).

Korea Finance Institute (1999), *How to Restore the Korean Financial*

System, Seoul: Korea Finance Institute (in Korean).

Kwon, O.Y. (1997), 'Korea economic developments and prospects'. *Asia-Pacific Economic Literature*, 11 (2), 1539.

Lee, Y. S., D. Kang and D. Y. Jung (1999), 'How Korean industry must adapt to survive in the 21st century', *KIET Policy Discussion Paper*, Seoul: Korea Institute for Industrial Economics and Trade (in Korean).

Lee, Y. S. (1999), 'Implications of the financial crisis on industrial development in Korea', *KIET Occasional Paper*, no. 31, Seoul: Korea Institute for Industrial Economics and Trade.

Ministry for Finance and Economy, unpublished data.

Rodrick, D (1995), 'Trade and industrial policy reform', in J. Behrman and T. N. Srinivasan (eds), *Handbook of Development Economics*, New York: Elsevier.

Stiglitz, J. S. and A. Weiss (1982), 'Credit rationing in markets with imperfect information', *American Economic Review*, 71.

World Bank (1998), *East Asia: The Road to Recovery*, Washington D. C.: World Bank.