

**The State and Industrialization in the  
Republic of Korea: A Case Study of the  
Electronics Sector Since 1969**

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## Certificate

This is to certify that the dissertation, entitled **The State and Industrialization in the Republic of Korea : A Case Study of the Electronics Sector Since 1969** submitted by **Sanjay Sharma** in fulfilment of six credits out of total requirements of twenty-four credits for the Degree of Master of Philosophy ( M.Phil.) of the University, is his original work according to the best of my knowledge and may be placed before the examiners for evaluation.

**Prof. K.V. Kesavan**  
Chairperson

**R.R. Krishnan**  
Supervisor

*To My Parents*

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## Preface


There are several excellent and exhaustive studies explaining the pattern and processes of industrialization in the Republic of Korea since 1961. The focus of the studies, especially in the 1980s, was on the context and characteristics, extent and effectiveness of the role of the state in the rapid and remarkable industrialization of Korea. Most of the scholarly studies were of a theoretical nature and dealt with macroeconomic issues. There have been very few empirical sector-specific studies on the role of the state. It was, therefore, felt that it would be useful to examine how the role of the state varied across the industrial sectors and over the developmental phases. More specifically, an in-depth study of the role of the state in a technology-intensive industry like electronics that registered an impressive growth during the 1970s and 80s was considered feasible and desirable. Another reason for highlighting the electronics industry stemmed from the fact that the industry was developed in the private sector and came to be dominated by a few leading industrial conglomerates, called *Chaebol*.

This dissertation is , therefore, a modest attempt at understanding the dynamics and determinants of the development of the electronics sector in Korea. It also seeks to explain the nature of the relationship between the state and the *Chaebol* in the promotion of a technology-intensive, sunrise industry. *State*, in this study, is understood to mean "a bureaucratic apparatus and institutionalized legal order in its totality". The study has been divided into three chapters. It begins with an exposition of the state's role in Korea's industrialization during last thirty years. The second chapter deals with the dynamics of development of electronics as a strategic industry in the 1970s and 80s. The third and final chapter looks at the mechanism and modality of interaction between the state and the *Chaebol* in the development of this sector. The last section sums up the conclusions of this study.

Although research is an ongoing process in which no findings are ultimate and no conclusions are final yet, pursuing research with a view to understanding and explaining the socio-economic process of development has its own intrinsic intellectual value. My greatest intellectual debt is to Prof. R.R. Krishnan, my teacher and the supervisor of this dissertation. It is he who persuaded

me to work on this subject and sustained my enthusiasm and zeal to accomplish an intellectually challenging and exciting task. I do not have adequate words to express my gratitude to him. I extend my sincere thanks to his family members also who, despite the inconvenience caused by several unscheduled visits, always gave me a warm welcome. I am also thankful to Prof. Kim Sun-Keun, visiting professor from Korea at J.N.U., who not only taught me Korean language for two year but also was a constant source of encouragement all through my work. My thanks to the Chairperson, Centre for East Asian Studies, Prof. K.V. Kesavan for his support and encouragement. I owe a great deal to my teacher Prof. B.S. Agrawal, Jiwaji University, Gwalior, who introduced me to the study of International Relations and Mordern East Asia. I am grateful to the diplomatic staff of the Embassy of the Republic of Korea for their generous and ever helping gestures. I am also indebted to the library staff of Jawaharlal Nehru University, World Bank, UNDP, Indian Institute of Foreign Trade, Indian Institute of Public Admimstration, Indian Institute of Technology Jawaharlal Nehru University, American Centre, for their fullest support and cooperation. I am thankful to Mr. Vimal Dhuliya for putting this work in print. The accomplishment of this exhausting task required

a great deal of encouragement and emotional support. I have been fortunate enough to receive them from my very loving and caring parents, sister, Neetu and brother, Manish. They made me realise *the can-do spirit* within me.



Sanjay Sharma





# Chapter I

## The State and Industrialization in Korea : Perspective and pattern

The state of the Republic of Korea made its debut on the international scene as an independent, sovereign entity on 15 August, 1948. It was the first time in over 5000 years of Korean history that a Republican State had emerged. The event marked the realisation of one of the major objectives of the political modernisation and anti-colonial movements. The objective was to dismantle the pre-colonial *ancien* regime and the colonial state structure and to establish a new state on modern, republican and democratic ideological foundations. The proclamation of the Republican State, based on a written and democratic constitution was adopted by the elected representatives of the newly constituted national assembly.<sup>1</sup> Following the May 10, 1948, general elections was, therefore, a development of extraordinary significance. The true significance of the emergence of a new state in Korea can be understood better

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1. For colonial and post-Korean War era see, Gregory Henderson, *Korea: The Politics of the Vortex*, Harvard University Press, Cambridge, Massachusetts, 1968, pp.59-194 ; also see, Andrew C. Nahm, *Korea : Tradition & Transformation*, Hollym International Corp., New Jersey, 1988, pp.223-474. . .

when it is seen in its proper perspective. The Japanese colonial state structure had been super imposed on the Korean *ancien* regime which had by then already become decrepit and incapable and incompetent to effectively face up to the challenges from within and without. The Japanese colonial rulers of the Showa period denied the Koreans any semblance of self rule while perpetuating the myth of the devine right of Japanese imperial house to rule over not only the Japanese but also colonial subjects like the Koreans. It is, therefore, not surprising that anticolonial movement had also antimonarchical ideology. However unlike most of the ex-colonial countries, in Korea, the termination of colonial rule did not bring about the end of alien rule. The area south of the 38th parallel came under the de-jure and de-facto occupation of the U.S. military for three years from September 1945 to August 1948. Thus the Korean republican state, that emerged on 15 August 1948, was distinctly different from all the three earlier state structures : the pre-colonial monarchical state ; Japanese colonial state; and the alien state apparatus imposed by the U.S. military.<sup>2</sup>

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2. For detailed discussion on American military rule in Korea see, Andrew.C. Nahm, *Korea : Tradition and Transformation*, Hollym International Corp., New jersey, 1988, pp.329-356.

Although the emergence of the new republican state was hailed the circumstances, under which the state emerged, created considerable controversy, The state emerged against the backdrop of the artificial, arbitrary territorial division of a homogenous nation into two parts --the South and the North. The division caused enormous hardship to the members of millions of divided Korean families, dislocated the national economy and worsened the already adverse conditions, characterised by a dependent, and distorted economic development.

During the colonial rule, the Japanese had invested in heavy industries in Korea for a variety of reasons. However it is misleading to identify this industrialization as progressive as has been pointed out by some scholars. As Japanese owned 94 percent of the total paid-in capital, industrial facilities in Korea were no more than geographical extension of Japanese factories. Korean industrialization under Japanese colonialism was basically dis-articulated industrialization lacking any of its own dynamic. Taking the example of Korean export of manufacturing goods, one can see that only 10.9 percent were the finished goods and rest of it, unfinished. Korea reimported finished goods from Japan. So this colonial *enclave* character of

Korean industrialization seriously lessened the spread effects of economic growth.<sup>3</sup>

The unedifying economic legacy of Japanese colonialism was further worsened with the unexpected territorial division of the nation. It destroyed the inter-industrial and geographical complementarity that was existent to some extent under the colonial rule. According to one observation "in 1940 the North Korea's estimated share of heavy industry production was 8.6 percent of the total for Korea. By 1944, it was producing 92 per cent of the total electric power, 88 percent of the fuel, 78 percent of the mineral output, 98 percent of the metallurgical output and 82 percent of the chemical output."<sup>4</sup> Thus the Republic of Korea was cut off from badly needed raw materials and electricity as well as market for its agricultural products, with only light industry on its side. It also had a rather lop-sided structure which was strained by the need

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3. Sonn Hochul, *Towards a Synthetic Approach of Third world Political Economy: A Case of South Korea*, Ph.D. Dissertation, The University of Texas, Austin, 1987, p.170.

4. Shin-Rinn Sup, et. al, *Area Handbook for North Korea* : Washington, D.C.1969, P. 295

to absorb the larger share of population.<sup>5</sup>

The context and circumstances in which the new state emerged set the agenda and tasks for the leadership that seized power. However, the perception of the problems, be it political, economic, national, strategic, and their solutions were influenced by ideological orientation of President Syngman Rhee and his government. President Rhee was strongly committed to anti-communism and felt that South Korea could play an important role of an ideological, political, and strategic ally of the U.S. in the context of the cold war. It is against this complex situation of a vivisected nation and the virulence of cold war that the Rhee regime went about addressing itself to the political and economic problems of the nascent state. Even as the Rhee regime was trying to cope with the political and economic tasks that confronted the state, Korea was engaged in a horrendous war from 1950-53.<sup>6</sup>

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5. Jon Worroneff, *Asia's "Miracle" economies*, Seoul, Korea, 1986, p.93.

6. There are several works dealing with Korean War, see, Shannon McCune, *Korea : land of Broken Calm*, D. Van Nostrand Co. Inc., Princeton New Jersey, 1966, pp.97-109 ; Bruce Cumings, *The orgines of Korean War : Liberation and the Emergence of Separate Regimes, 1945-1947*, Princeton : Princeton University Press, 1981 ; Gregory Henderson, *Korea: The Politics of the Vortex*, Cambridge; Harvard University press, 1968, pp.113-194. ; Stone, I.F., *The Hidden History of the Korean War*, Turnstile Press Limited, London, 1952.

The three year war was a traumatic and disastrous experience both in terms of the human casualties and damages caused to the Korean economy. The loss of industries and infrastructure amounted to some 400 million Korean *hwan*, comparable to the levels of 1953 GNP.<sup>7</sup> The extensive destruction caused by the war forced Korea and the U.S. to shift their attention to the problems of immediate reconstruction and development of the Korean economy.

The Korean war in 1950 had serious implications for the global politics and economy. Ideological and strategic reasons compelled the U.S. to be involved in this conflict. Supply of economic and military aid was continued even after the Armistice agreement was over on 27 July 1953. Korea received more than US \$ 4 billion in military and economic assistance in the form of grants from the U.S. during the year 1953-61. How substantial was the U.S. assistance to Korea can be observed in the fact that "during the period 1952-61, the U.S. donated 95 percent of total foreign aid which amounted to some 8 percent of Korea's GNP, 77 percent

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7. Paul W. Kuznets, *Economic Growth and Structures in the Republic of Korea*, Yale University Press, 1977, pp.37-38

of capital formation and about 70 percent of total imports"<sup>8</sup> During the post-war reconstruction period 1953-1960, almost a half of the total general government expenditures were financed by this foreign aid<sup>9</sup>

In spite of several packages of foreign aid Korea had very little capacity to build its own production base, investment goods constituted only 14 percent of all imports in the years from, 1953 to 1960.<sup>10</sup> In the period 1953-1962, the growth rate of GNP was 4.1 percent. The annual average growth rates of both per capita consumption and gross domestic capital formation were below 2 percent and exports were in consequential (less than US \$ 40 million a year) while substantial imports (US \$ 300- 400 million a year), were financed mainly by American aid. The economy was still predominantly agricultural (over 60 percent of the labour

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8. Mason E.S., et. al, *The Economic and Social Modernization of the Republic of Korea*, Cambridge 1980, p.185.

9. Jong Jip Choi, *The strong state and weak labour Relations in SouthKorea their Historical Determininants and Bureaucratic Structure*, in Kyong Dong Kim,(ed.), n.4 p.308.

10. Choong Yong Ahn, *Economic Development of South Korea, 1945-1985*. Korea and World Afiars Vol. 10 No.1 Seoul, 1986, p. 27.



force worked on farms, 40-50 percent of output originated in agriculture), there was little change in structure and not much growth in output per worker.<sup>11</sup>

The eclipse of the 12 year old regime of Syngman Rhee, or what later came to be known as the First Republic of the state of the Republic of Korea, took place under extraordinary circumstances. *Sa Il Ku Hyong Myong* (19 April 1960) toppled the Rhee government. It was at that time an unprecedented event in the annals of world history. Never before and nowhere else students' power had asserted in such an effective and dramatic manner. The debate continued about the achievements and failures of the 12 turbulent years of Rhee regime in political, social, strategic and economic domains. With regard to the economic balance sheet what needs to be stressed is that the State adopted a low economic profile and industrialization was given a low priority. Probably, it could be said that the state tried to salvage the economy from the after effects of the division of the country and ravages of the war, however, it did not work for strengthening the economy and making it resilient and responsive

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11. Kuznets, Paul W., n.7, pp. 43-83.

to the global changes. To what extent this, performance, was the consequences of a weak, dependent state sustained by external support and lacking the will to enforce economic dynamism coupled with discipline, is difficult to say. Probably the state was witnessing a series of political crisis revolving around the issues of legitimacy, credibility and viability. With the result the state's power to enforce economic dynamism could not be accomplished.

The military coup d'état of 1961 that catapulted Major General Park Chung-Hee to power marked a turning point in the polity and economy of Korea. The capture of power by the military in 1961 was only the second such event in the history of Korea.<sup>12</sup> With the seizure of power by the military, a process of redefining restructuring a political, economic and social order and reinforcing the authority of the state began.

While the rationale of restructuring political, economic order has been a subject of debate, the fact remains that the state assigned

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12. Henderson Gregory, *The politics of the Vortex*, Cambridge, Harvard University Press, 1968. p. 183

for itself a pivotal role in the economic affairs. It redefined its economic space in a clear manner. Its economic strategy of development got crystalized during the year when SCNR was in the helm of affairs. By early 60s, two inter-related dimension of economic strategy became evident. They were that the Korean state would adopt planned economic development, or what was described in the First Five -Year Plan document, *as a state-led-capitalist-development*. In other words the state would take the initiative in propelling the economy and placing it on the track of economic development. However this would not be a negation of the place and role of private capital and market forces in the economy. On the contrary the state would support, sustain and strengthen the private capital and market force wherever it was necessary. To put it differently, the state would supplement but not supplicate private capital and private enterprises. Had it been otherwise, Korea would not have witnessed the phenomenon of the emergence and domination of *Chaebol* during least 3 decades. It has been argued that the emergence of *Chaebol* as one of the principle actors in the Korean industrial development was an outcome of conscious and calculated policy of those who were in the helm of affairs of the state. It is, however, true that the *state-chaebol*

relationship was determined by a number of factors. The state's policy towards *chaebol* had elements of favour, fear, flexibility and firmness. It is debatable whether the state used the *chaebol* to achieve the goal of industrialization or the *chaebol* used the state machinery to enlarge its hold over the economy in the process of industrialization. In the subsequent chapter the state-*chaebol* interaction in the development of electronics sector which has been held out as a symbol of capital-technology intensive phase of industrialization will be discussed.

Another dimension of the state's economic profile or objective was to liberalize and globalize the economy through what came to be known as an export-oriented industrialization. The state recognized the advantages of developing the manufacturing sector with a view to exporting value-added products for the development of the economy. Subsequently a symbiotic relationship developed between export-oriented growth and growth-oriented export as the process of deepening of industrialization. Export of manufactured goods was not only assigned priority but also 'absolute priority'. The national economic developmental plans and the export developmental plans came to be fused in the 1960s and 70s and still later

in the 1980s. science and technology developmental plan was also integrated into the over all development, goals and objectives. The extent and effectiveness of the State's economic intervention were greatly influenced by the objectives and orientation and the pace and pattern of industrilization. The powerful institution of the Economic Planning Board (EPB) played a crucial role in formulating, implementing and evaluating the economic plans.

It has been observed that what really distinguished the planning process is Korea from other developing countries was not so much at the level of formulation of the plans but at the level of implementation.<sup>13</sup> Following the first economic development plan. The objectives of guiding principles behind subsequent plans were designed to creat a self-sustaining industrialized nation. What is important is that Korea successfully completed several stages of industrialization within a brief space of three decades (six Five Year Plans) of planned development. A summary of the stage and strategies of Korean economic development plans

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13. Krishnan, R.R., *The State and Economic Development in Korea*, Paper presented at a seminar on "Future International Roles of India-Korea : Long Term Policy Implications", India International Centre, New Delhi, 17-18 December 1990, p.10.

are given in Table 1 and 2.

A brief elaboration of the above table may be in order. The focus of the First Plan (1962 -66) was "toward building a self sufficient industry structure which was not consumption-oriented and which was not excessively dependent on imported oil."<sup>14</sup> The Second Plan (1967- 71) laid emphasis on modernisation of industrial structure while trying to build import-substitution industries including steel, machinery, and chemical industries. The Third Plan (1972-76) which may be described as a truly indigenous plan was a bold and determined exercise that laid the foundation of Korea's industrialization, since it sought to promote Heavy and Chemical Industries (HCI). The important new industries in the third plan included the Iron Steel plant, Petrochemical house hold appliances etc. "It was projected that HCI in the 3rd plan would supply new industries with raw materials and capital goods and the dependence of these new industries on foreign capital would be eliminated. At the same time, the effect on the creation of income from the

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14. The Federation of Korean Industries (FKI), Korea's Economic Policies (1945-1985), Seoul, 1987, p.10.

## Strategies of Korean Economic Development Plans

Table 1

| Plan Title<br>Contents of Plans                  | The First<br>5-Year Plan<br>(1962-1966)   | The Second<br>5-Year Plan<br>(1967-1971)  | The Third<br>5-Year Plan<br>(1972-1976)  | The Fourth<br>5-Year Plan<br>(1977-1981)  | The Fifth<br>5-Year Plan<br>(1982-1986)   |
|--|---|---|--|---|---|
| <b>Plan Targets</b>                              | <ol style="list-style-type: none"> <li>1. Correction of vicious circle of social and economic aspects</li> <li>2. Establishment of the foundation of a self-sustaining economy</li> </ol>   | <ol style="list-style-type: none"> <li>1. Modernization of industrial structure</li> <li>2. Acceleration of self-sustaining economy</li> </ol>  | <ol style="list-style-type: none"> <li>1. Balanced growth, stabilization and a balanced economy</li> <li>2. Realization of self-sustaining economic structure</li> <li>3. To ensure balanced regional development</li> </ol>   | <ol style="list-style-type: none"> <li>1. Growth, equity, and efficiency</li> <li>2. The creation of economic structure for self-sustaining growth</li> <li>3. Promotion of social development</li> <li>4. Technological innovation and raising of efficiency</li> </ol>  | <ol style="list-style-type: none"> <li>1. Stabilization, efficiency, and balance</li> <li>2. Completion of the foundation for economic stabilization</li> <li>3. Increase in job opportunity and income</li> <li>4. Promotion of national welfare</li> </ol>  |
| <b>Rates of Planned (Actual) Economic Growth</b> | 7.1% (8.5%)   | 7.0% (9.7%)   | 8.6% (10.1%)   | 9.2% (5.5%)   | 7.6%  |
| <b>Development Strategy (policy)</b>             | <ol style="list-style-type: none"> <li>1. Correction of structural imbalance in national economy caused by increase in agricultural productivity</li> <li>2. Securing of resources supply energy</li> <li>3. Expansion of basic industry and sufficient supply of social overhead capital</li> <li>4. Utilization of idle resources</li> <li>5. Improvement of the balance of payments</li> <li>6. Promotion of technology</li> </ol> | <ol style="list-style-type: none"> <li>1. Self-sufficiency in food and development of water resources</li> <li>2. Establishment of the foundation for rapid development of industries (chemical, iron and steel, and machinery)</li> <li>3. \$700 million worth export performance and acceleration of import substitution industries—improvement in the balance of payments</li> <li>4. Increase of employment, expedite family planning measures and restrain population growth</li> <li>5. Diversification of farming and increase in farm income</li> <li>6. Promotion of science and management technology and increase in productivity</li> </ol> | <ol style="list-style-type: none"> <li>1. Self-sufficiency in major food grains</li> <li>2. Improvement of living standards in farming and fishery villages</li> <li>3. Promotion of manufacturing through the build-up of heavy and chemical industries</li> <li>4. Promotion of science and technology and development of manpower</li> <li>5. A balanced expansion of social overhead capital</li> <li>6. Efficient development of national land resources and optimum dispersion of industries and population</li> <li>7. Social security and promotion of national welfare</li> </ol> | <ol style="list-style-type: none"> <li>1. Self-reliance in investment financing</li> <li>2. An equilibrium in the balance of payments</li> <li>3. Change in industrial structure and rapid development thereof</li> <li>4. Expansion of Saemaul (new community) Movement</li> <li>5. Increased investment in science and technology</li> <li>6. Management of economy and system improvement</li> </ol> | <ol style="list-style-type: none"> <li>1. Price stabilization</li> <li>2. Nurturing of comparative advantage industries</li> <li>3. Maximization of investment efficiency</li> <li>4. Promotion of marketing competition</li> <li>5. Acceleration of liberalization or market-opening to foreign goods</li> <li>6. Resolution of management-labor disputes</li> <li>7. Expansion in social development</li> </ol> |
| <b>Principles of Industrialization</b>           | Adjustment of the foundation of industrialization   | Outward-oriented industrialization  | The build-up of export-oriented heavy and chemical industries  | Development of technological and skilled-labor intensive industries   | To attain a stage of advanced industrialization   |

Source: Economic Planning Board (EPB), Republic of Korea

## Summary of Industrialization in Korea

Table 2

| Plan Title   | The First 5-Year Plan (1962-1966)  | The Second 5-Year Plan (1967-1971)  | The Third 5-Year Plan (1972-1976)  | The Fourth 5-Year Plan (1977-1981)   | The Fifth 5-Year Plan (1982-1986)   |
|--|--|---|--|--|---|
| <b>Development Strategy of the Manufacturing Sector</b>                                    | Nurturing of basic industry and adjustment of social overhead capital (the establishment of the foundation for self-sustaining industries) | Capital goods import substitution and exportation of light manufactured goods (outward-looking industrialization) | The build-up of heavy and chemical industries (change in industrial structure)                             | Change in industrial structure and promotion of competitiveness (realization of economic structure for self-sustaining growth) | Advance in industrialization as seen in developed countries (Development of information intensive industries) |
| <b>Rate of Economic Growth (Average per annum; Actual (Planned))</b>                       | 8.5% (7.1%)  | 9.7% (7.0%)   | 10.1% (8.6%)   | 5.5% (9.2%)  | 7.5% (7.6%)   |
| <b>Rate of Growth in Mining and Manufacturing (Average per annum)</b>                      | 14.2%  | 9.8%  | 18.1%  | 10.3%  | 9.6%  |
| <b>Ratio of Mining and Manufacturing Sector to total Industries (Target Year)</b>          | 25.7%  | 20.9%   | 29.5%  | 21.3%  | 29.9%   |
| <b>Ratio of Heavy and Chemical Industries to Manufacturing Sector (Target Year)</b>        | 36.0%  | 37.3%   | 45.6%  | 51.8%  | 57.0%   |
| <b>Ratio of Heavy and Chemical Industrialization to Manufacturing Sector (Target Year)</b> | 10.2%  | 14.2%   | 29.8%  | 45.3%  |   |
|  | Electricity, fertilizers, oil refining, synthetic fibres (nylon yarn), cement, P.V.C.  | Synthetic fibers (polyester yarn), petrochemicals, electrical appliances (T.V. and refrigerator)                  | Iron and steel, transport machinery, household electronics (T.V. Transistor), shipbuilding, petrochemicals | Iron and steel, industrial machinery and equipment, electronic appliances, components and parts, shipbuilding                  | Precision machinery, electronics industry information industries  |
| <b>Ratio of Growth in Mining and Manufacturing to Economic Growth</b>                      |  | 34.2%   | 38.7%  | 30.8%  | 37.0%   |

Notes: 1) Achievement (1982-1984)

2) Figures shown in parenthesis are the set targets

3) Figures for target year of each plan

Source: Economic Planning Board, Republic of Korea, The Five Year Economic Development Plan corresponding to Plan Period



development of HCI would be spread. In addition, the existing industries where dependence on foreign exchange had declined would raise their international competitiveness and foreign exchange earnings through expansion of domestic and foreign markets. The HCI led the way for Korea to become export-oriented economy"<sup>15</sup>

Technological innovation and efficient management of industries were emphasised in the Fourth Plan (1977-81) Major strategic industries consisted of technological and labour-intensive industries such as machines, shipbuilding, electronics. By the time Korea launched the Fifth Plan (1982-86), two decades of planned development and four successful plans had already helped Korea to emerge as the most rapidly developing industrial and trading country in the later half of this century. What is significant to note is that the commitment to planned development remained unaffected by political storm in the months preceding and following the assassination of President Park Chung-Hee in 1979. The Fifth plan aimed at increasing productivity and international competitiveness by "coordinating development of the materials industries emphasizing

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15. Ibid., p.12.

domestic demand, guaranteeing normal operation of capital goods industries in a bid to ensure the continued development of such technological and skilled labour-intensive industries as electronics and machinery."<sup>16</sup> The shift in the objectives of planning became evident when the nomenclature of the plan underwent a change as it was called Economic and Social Development Plan. One of the objectives of the new plan was setting up a comprehensive social security system and the emphasis shifted from economic growth to social equity. The basic objectives of this plan were stability, efficiency, balances. The Plan also emphasised for the first time the principles of a market economy, encouraging private initiative, creativity. The Sixth Economic and Social Development Plan (1987-91), which marked the completion of three decades of successful and sustained planned development, tried to look beyond merely developing an economic structure and represented the first phase of laying a foundation of the nation towards the goal of an industrialized advanced state in of the 21st century. "The Sixth Plan speeded up the current industrial restructuring, emphasizing industries that produce high value-added products and

16. Ibid., p.14.

spurring the advancement of industrial technology.<sup>17</sup>

The Korean state's strategy for rapid industrialisation had two dimensions -- planned economic development and export--oriented industrialization. In fact the two were inter-related. It could even be said that they were the two sides of the same coin. To put it differently industrialization depended on exports and exports depended on industrialization. Thus exports were at once the cause and consequence of industrialization. The course and content of industrialization were influenced by exports. The increase in value, volume and variety of exports reflected the changing industrial structure. State's central concern was how to ensure that the simultaneous emphasis is laid on both. However, it seems that primacy was given to the promotion of exports as the main instrument of growth. Thus the exercise at dovetailing the short term export plans and targets to the long term plans for industrialization was carried out. The factors, both domestic and international for Korea emerging as a leading trading state has been a subject

17. Government of the Republic of Korea, *Sixth Five-Year Economic and Social Development Plan*, Seoul, Korea, 1986, p.52.

of intense debate during last three decades among the scholars, policy planners.

Several policy measures have been announced from time to time to promote foreign trade, in general, and export, in particular, as they were considered to be of critical importance in the state's efforts to bring about rapid industrialization. It is against this background of the state's pre-eminent role in Korea's industrialization that the dynamics of development of the electronics sector will be discussed in the following chapter.



## Chapter II

### Korean Electronics Industry: Dynamics of Development

"The semiconductor chip means as much to the nation's well being as did natural resources like iron, timber, coal and water in the earlier industrial age."<sup>1</sup>

The *chip* is to the current era what the steam engine was to the mid-nineteenth century. Electronics has often been described as the *heartland technology* of economic growth in contemporary times. It is a knowledge intensive, dynamic and global industry that has registered a spectacular growth in the post-Second World War era. It is believed that electronics can work miracles for late industrializing economies by providing the target-oriented darting force behind a new *growth ensemble*.<sup>2</sup> The world economy is currently undergoing a fundamental transformation as a result of new electronics technologies which process, transmit and store

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1. *Washington Post*, May 10, 1987.

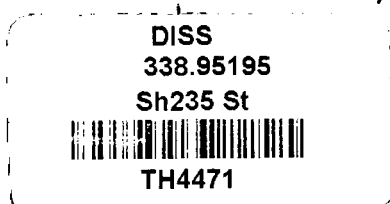
2. Morgan, Kelvin and Sayer, Andrew, *Microcircuites of Capital : Sunrise Industry and Uneven Development*, Polity Press, Cambridge, 1988, p.3.

information -- computers, telecommunications systems, and the microelectronic components upon which they are based. "The *information revolution* is increasingly being viewed as nothing less than a *new industrial revolution*, transforming every aspect of human economic activity from agriculture to manufacturing."<sup>3</sup>

The United States was the pioneer in the electronics industry. The major technological breakthroughs in this industry were the U.S. achievements. It is, therefore, not surprising that the American companies achieved and maintained for many years a clear dominance in the global electronics market until the early 1970s. However, towards the end of the 1970s, the U.S. dominance came to be challenged by Japan and west European countries.

Korea's advancement into the ranks of the newly industrializing countries (NICs), was due in great part to the growth of electronics industry. The advantage of developing the electronics industry in a country like Korea was recognized in terms of economic and

3. Laurant Fabius, French Minister of Industry, *Electroniques Actualities*, October 14, 1983.



strategic reasons. The industry was considered particularly ideal for Korea in the early phase of industrialization because of a combination of factors. These include paucity of natural resources, abundance of low-wages labour force, high investment efficiency high value-addedness, labour intensity, low energy content, high growth rate, high degree of transferability of both products and technology between national boundaries, linkage effects (both economic as well as technological) to other related industries, relative freedom from pollution and significance of electronics materials in military hardware etc.<sup>4</sup>

It was not a fortuitous conjunction that the electronics sector emerged in Korea in the 1960s and gained momentum during the next two decades. Four major factors may be identified for the timing of the emergence and rapid consolidation of this industry:

(a) The advent of the new strategy of economic development based on Microeconomic Planning and Export-Oriented Industrialization (EOI) pursued by the new political leadership in Korea that came

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4. Yu Seongjae, *The Development of the Korean Electronic Industry with Special Reference to Samsung Electronics*, Paper presented at International Forum on Industrial Planning and Trade Policies, Seoul, Korea, June 1-12, 1982, p.3.



to power following the military revolution of May 1961;

(b) willingness on the part of leading U.S. and Japanese multinationals to take advantage of the new policy of liberalization and globalization of Korean economy. Korea obtained both capital and technology from the offshore assembly investments by these two countries;<sup>5</sup>

(c) Normalization Treaty of 1965 between Korea and Japan provided the new Context and framework for bilateral economic relations.<sup>6</sup>

(d) Japan also was passing through a difficult phase in its economy. Shortages in labour and industrial space and rising wages and rent propelled Japan to transplant its factories to Korea. the most popular host country for overseas investment by 1970.

The electronics industry of Korea started in 1959 with the local assembly of radios by Goldstar from imported parts and components.

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5. For details see, Amsden Alice H., *Asia's Next Giant : South Korea and Late Industrialization*, Oxford University Press, Oxford, 1989, pp.231-235.

6. Many studies have focused on bilateral economic relations between Korea and Japan following Normalization Treaty of 1965. See, Chang Dal-Joong, *Economic Control and Political Authoritarianism : The Role of Japanese Corporations in Korean Politics 1965-1979*, Sogang University Press, Seoul, Korea, 1985, pp.180-193.

Production was initially oriented towards the local market.<sup>7</sup> This was the time when various measures for rebuilding war-damaged country were being taken. However attainment of political democracy and national reunification were the main issues in the student's revolution of the 1960. Within less than a year of the advent Chang Myon government, there emerged a turning point in Korea's polity and economy policies in the form of the military coup in May 1961. To earn political legitimacy, the military regime had no other option, except bringing economic development. Recognizing the acute need of foreign capital for the first economic development plan, the military dominated state managed to restore the diplomatic relations with Japan despite widespread opposition. Meanwhile in response to the U.S. government's promises regarding strategic support and various kinds of aids and financial assistance, Korea sent troops to Vietnam in February 1965. Finally, a perfect blend of Japanese capital and earnings in Vietnam resulted in a unique growth during the latter half of the 1960s. In order to sustain and enhance this growth, two factors -- increased reliance on foreign

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7. Larry Westphal, Y.W. Rhee and G. Pursell, *Korea : Managing the Industrial Transition*, World Bank, 1986, p.189.

capital and export promotion -were emphasised in the revised First Five-Year Plan in August 1963.<sup>8</sup> This was the moment when the potential for exports did draw the state's attention to the electronics sector. However there was no significant development in sector for the next six years or so. The decision of the MCI to place the electronics industry in the crucial 13 priority sectors marked the beginning of a new phase in the development of this sector. This marked the government's first serious attempt at sector-specific policies to enhance export. This led to the creation in the MIC of the electronics Industry subsection.<sup>9</sup> It was a gesture of the government's special attention to this sector. Semiconductor manufacturing was first introduced in Korea in 1965 with the establishment of a joint venture to produce simple transistors by a small American company, Komy.<sup>10</sup>

The American firms saw Korea as an attractive site to establish

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8. For details see, *Korea's Economic Policies (1945-1985)*, The Federation of Korean Industries (FKI), Seoul, 1987, pp.3-24.

9. Yoon Jeong-Ro, *The State and Private Capital in Korea: The Political Economy of the Semiconductor Industry 1965-1987*, Ph.D. Dissertation, Harvard University Cambridge, Massachusetts, 1989, p.45.

10. Ibid.

plants at reduced production cost. It has been argued that the most important reason for a leading firm like Fairchild to invest in Korea was the relatively cheaper cost of production due to differentials in the labour cost. This could be seen in the fact that the Korean female workers, earning only 10 percent of the average U.S. wage, provided 20 - 25 percent higher efficiency than those in the U.S.<sup>11</sup> In 1966, Fairchild became the first 100 percent equity participant. Within a year two more leading US semiconductor manufacturers - Signetics and Motorola - joined together to set up their wholly-owned subsidiaries in Korea.<sup>12</sup> Meanwhile the Korea state undertook an exercise to restructure the legal system to facilitate foreign direct investment. The government's decision to encourage the electronics industry in a big way during the second Five year Plan (1967 - 1971) was announced in December 1966. President himself proclaimed the policy framework.<sup>13</sup> Three

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11. Hasan, Parvez. *Korea: Publics and issues in a Rapidly growing economy*. Baltimore: The Johns Hopkins University Press, 1976, pp 171-77.

12. Braun, Ernest and Start Macdonald, *Revolution in Miniature : History and Impact of Semiconductor Electronics*. second Edition New York. Cambridge University Press. 1982, pp. 123-27

13. Jones Leroy and Il sakong. *Government, Business, and Entrepreneurship in Economic Development: The Korea Case*, Cambridge, MA: Council in East Asian Studies, Harvard University. 1980, pp.58-66.

major incentives were emphasised. The first was concerned with the concerned with active attraction of foreign investment. The second involved strengthening the export orientation of existing domestic firms. In urging domestic firms to increase exports the state freely invoked the forceful instrument of regulatory authority. Thirdly, domestic capital and large *Chaebol* groups, in particular were encouraged to invest in the electronics industry with a view to nurturing vertically integrated domestic firms. Two leading *Chaebol* -- Taihan Electric Wire and Samsung extended the business in electronics sector in 1968 and 1969 respectively.<sup>14</sup>

One of the most significant moves of the state to promote the electronics industry was the enactment of Electronics Industry Promotion Law (EIPL) which came into force in January 1969.<sup>15</sup> The law empowered MCI to undertake comprehensive promotion measures. These included establishment of electronics industrial complexes, preferential financing and establishment of various advisory councils and institutions. In accordance with the law, MCI drew up the 8-Years plan for the promotion of the electronics

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14. Yoon Jeong-Ro, n.9, p.52.

15. Amsden Alice H, n.5, p.82.

industry (1969-1976) and the plan was to be completed at the same time as the Third Five-Year Plan. Over the eight years, the state was to contribute 14 billion or slightly less than US \$ 50 million, to the newly established Electronics Industry Promotion Fund.<sup>16</sup> By 1969 seven firms became engaged in semiconductor manufacturing in Korea. All of them represented American investments. The four wholly-owned subsidiaries in the Korean semiconductor industry were producing approximately 95% of transistors and 99.5% of integrated circuits in 1969, as shown in the table 3.

During the early 1970s, the Korean semiconductor industry became diversified in its source of capital as a result of Japanese investment and the growing participation by domestic capital. The second phase of foreign capital inflow into Korea began after the establishment of diplomatic relations between Korea and Japan. More importantly Korean expatriates in Japan were most welcome. No restriction was imposed regarding required minimum amount of investment or ownership for the projects undertaken, as a special gesture towards the Koreans in Japan. In 1969, the establishment of

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16. Yoon Jeong-Ro, n.9, p.53.

**Table 3**  
**KOREAN SEMICONDUCTOR PRODUCERS**

| <b>Firm</b>                                      | <b>Wafer Fab Facilities</b> | <b>Foreign Technology Ties</b>   | <b>Principal Targeted Semiconductor Products</b>   | <b>Will Make IM Dram</b> | <b>US Subsidiary</b>              |
|--|-----------------------------|--|--|--------------------------|-----------------------------------|
| Samsung Semiconductor & Telecommunications (SSI) | Yes                         | HP Hewlett Packard<br><br>Rolm Micron Technology<br>Exel Micro-Electronics | 64 K DRAM<br>256K DRAM<br>16 K EPROM<br><br>16 K EPROM<br>16 K EPROM<br>256 K ROM<br>8 K Microprocessor<br>16 Microprocessor | Yes                      | Samsung Semiconductor Inc.        |
| Hyundai Electronics                              | Yes                         | Inmos<br>Texas Instruments   | 64 K DRAM<br>256K DMOS DRAM<br>16K SRAM<br>64K SRAM<br>128K ROM  | Yes                      | Hyundai Electronics America (HFA) |
| Lucky-Goldstar                                   | Yes                         | Zilog<br>AMD<br>AT & T Technologies  | 64 K DRAM<br>256KDRAM<br>64 K SRAM<br>Gate Arrays<br>8-bit Microprocessor  | Yes                      | United Microtech Inc. (UMI)       |
| Hangkuk Electronics                              | Yes                         | Toshiba  | Bipolar ICs Diodes   |                          |                                   |
| Aman Electronics                                 |                             |  | Custom ICs   |                          |                                   |
| Daewoo   |                             | Northern Telecom   | Discretes<br>Linear ICs  |                          | ID Focus                          |

Korea-Toshiba, a joint venture to produce silicon, was the first Japanese investment in the Korean electronics industry. The factory was located at Kumi which incidentally was also the home town of president Park Chung-Hee. Before long, Kumi, earned the distinction of being one of the foremost electronics industry complexes in Korea. The government gave all out support to create an impressive infrastructure and facilities. These included--tax reduction comparable to that provided for foreign investment, exemption from bureaucratic red tape through one-stop service at the administration office of the complex and low rent leases for state-built factory buildings.

In addition to the Kumi industrial complex, in 1970, the Korean government established the Masan Free Export Zone (MAFEZ) in 1970, which was modelled after the Kaohsiung Export Processing Zone (EPZ) in Taiwan.<sup>17</sup> When MAFEZ was fully occupied in 1974, the Japanese capital predominated, accounting for about 90% of total investment in terms of both amount and number of operating firms<sup>18</sup> Three Japanese companies Toko, Sanyo and Sanken

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17. Tsuchiya Takeo, *South Korea: Masan-- An Epitome of the Japan-Republic of Korea Relationship*, *Ampo*, Special issue (vol 8, no.4), 1977, pp.53-56.

18. Tsuchiya no. 10, p.56.



set up wholly owned subsidiaries in MAFEZ. Tokyo silicon, a subsidiary of Sanyo Electronics was established in 1972 along with three other medium-sized firms, Korea-Mitsumi, Korea-Sanken, and Toko-Korea, all exclusively with Japanese capital. Apart from Kumi and Masan, Seoul was another suitable place. In 1972, Rohm-Korea (the ex-Toyo Electronics Industry) was established there with 95 percent equity.<sup>19</sup> It has been observed that the manufacturing process transferred to Korea was the most labour-intensive and least technology-intensive.

During 1965 - 77, Korea received a total of 211 foreign investments in electronics. Of the total 211 cases, joint venture accounted for 167 cases and in the component electronics subsector alone joint ventures numbered 126 cases. While foreign subsidiaries amounted to 33 cases. The Japanese investments reached 170 cases and totalled US \$ 93 million the U.S. investment amounted to 38 cases and US \$ 52 million. Many Japanese electronics firms, in the form of joint venture were successful in replacing the United States'

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19. Kim, Hyung-Kook, *The Political Economy of Industrial Adjustment Strategies in South Korea: A Comparative Study of the Textile, Steel and Semiconductor Industries*; Ph. D. Dissertation, Duke University 1988, p.297.

dominant position in Korea in the 1970s.<sup>20</sup> The establishment of a semiconductor assembly firm in Anam, in 1969, may be said to be the beginning of the participation of domestic firms in the electronics sector. It was established to start production as a subcontractor for various foreign semiconductor firms.<sup>21</sup>

Between 1970-84, the industry grew at an impressive average annual rate of 35%. In 1970, electronic components accounted for 55.7% of output and consumer electronics 28.3%. Industrial electronics constituted the remaining 16%. By 1979, the share of consumer electronics had risen to 41.9% and that of components had fallen to 48.4%.<sup>22</sup> The industrial electronics share, meanwhile, had slipped to 9.7%. After 1979, a significant change was discernable with consumer electronics. The consumer electronics share was shrinking and that of industrial electronics was rising. By 1984, consumer electronics accounted for only 33.8% of output while that of industrial

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20. Korean government encouraged joint ventures since the enactment of the EIPL, for further details see, Fine Instruments Centre (FIC), *Foreign Investment Inducement Policies and Tax Exemption in Electronics Sector*, Seoul, FIC, 1973, p.137.

21. Yoon Jeong-Ro, n.9, p.64.

22. Larry Westphal, Y. W. Rhee and G. Pursell, *Korea: Managing the Industrial Transition*, World Bank, 1986, p.190.

electronics had slightly surpassed its 1970 share.<sup>23</sup>

The consumer electronics industry in Korea made tremendous progress along with diversification and improvement of quality. In the 1960s-70s, the main products were labour-intensive devices like radio and black & white television sets. The beginning of the 1980s saw the consumer electronics industry come forward with the development of technology-intensive electronics products such as colour TV, VCR, Microwave Oven, Compact Disk Player (CDP), Digital Audio Tape (DAT) etc. In seven years Korea became the world's largest producer of microwave ovens that were first developed by Samsung in the 1970s and first exported in 1980.<sup>24</sup> Becoming the world's third-largest producer of consumer electronic products, as well as components and parts within the past twenty years, the electronics industry overtook the textile industry as the nation's leading export industry in 1988. Top ten export items in 1990 are as follows as shown in Table 4. In addition, Korea's share of world consumer

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23. Ibid., p.190.

24. Martin Bloom, *Technological Change* in Korean Electronics, in the *OECD Observer* 175, April/May 1992, pp.32-34

electronics production and export increased remarkably.

Table 4

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| <b>Top Ten Export Items (1990)</b> |                 |
|------------------------------------|-----------------|
|                                    | (in million \$) |
| Parts of Electronics               | 8,860 (13.6)    |
| Textile Products                   | 8,204 (12.6)    |
| Home Appliance Electronics         | 5,529 (8.5)     |
| Textile Fabrics                    | 4,633(7.1)      |
| Footwear                           | 4,307 (6.6)     |
| Iron & Steel Products              | 4,237 (6.5)     |
| Industrial Electronics             | 3,481 (5.4)     |
| Ships                              | 2,803 (4.3)     |
| Transportation Equipment           | 2,718 (4.2)     |
| Organic Chemicals                  | 1,677 (2.6)     |

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Note. 1) Based On MTI code 2 digit

2) Figures in Parentheses are composition ratio to total

Source : Korea Foreign Trade Association

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Full scale exports of video cassette recorders (VCRs) started only in 1985. Within a few years, Korean producers had 20% of the of the world market<sup>25</sup>

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25. Ibid., p.32.

Industrial electronics, a high value - added and technologically integrated and energy - and - resource efficient industry, generally consists of communication equipment, hardware, measuring instruments, etc. With a substantial growth of 32.8% per year during the 1986 - 90 period, Industrial electronics' share of total product value of the electronics industry as a whole increased from 17.5% in 1986 to 22.2 percent in 1990.<sup>26</sup>

Semiconductors are the largest single item for electronics production and Korean total exports. Huge investments and *Chaebol's* outstanding handling have been the prominent factors responsible for semiconductor industry. The semiconductor industry's share of total electronics production increased from 12.2 percent in 1986 to 17.2 percent in 1990. In addition, its share of total electronics exports jumped from 19.2 percent in 1986 to 26.4 percent in 1990. (see below Table 5).

The production shares of video equipments, audio equipments, home electrical appliances in 1990 were 36.5 percent, 25.0 percent

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26. The Korea Development Bank, *Industry in Korea 1991*, Seoul, 1991, p. 73

Table 5

## Status of Semiconductor Industry

|                    | (in million dollars %) |         |         |         |         |
|--------------------|------------------------|---------|---------|---------|---------|
|                    | 1986                   | 1987    | 1988    | 1989    | 1990    |
| <b>Production</b>  |                        |         |         |         |         |
| Semiconductors(A)  | 1,473                  | 2,165   | 3,066   | 4,799   | 5,104   |
| Electronic(B)      | 12,095                 | 17,438  | 23,512  | 28,306  | 29,713  |
| Manufacturing      | 104,327                | 138,872 | 183,872 | 221,152 | 232,644 |
| Industry(C)        |                        |         |         |         |         |
| A/B                | 12.2                   | 12.4    | 13.0    | 17.0    | 17.2    |
| A/C                | 1.4                    | 1.6     | 1.7     | 2.2     | 2.2     |
| <b>Exports</b>     |                        |         |         |         |         |
| Semiconductors (A) | 1,397                  | 2,075   | 3,179   | 4,023   | 4,538   |
| Electronics (B)    | 7,262                  | 11,130  | 15,715  | 16,562  | 17,215  |
| Manufacturing      | 32,565                 | 44,467  | 57,321  | 58,953  | 61,728  |
| Industry(C)        |                        |         |         |         |         |
| A/B                | 19.2                   | 18.6    | 20.2    | 24.3    | 26.4    |
| A/C                | 4.3                    | 4.7     | 5.5     | 6.8     | 7.48    |

Note- Production of manufacturing industry in 1990 is estimated

Sources- 1) The electronic Industries Association of Korea

2) National Statistical Office of Korea

3.) The Office of Customs Administration.

and 38.5 percent respectively. In the case of video equipment colour TVs have been the major items recording a compound annual growth rate of 19.3 percent since 1986 due to the increase in both domestic and overseas demand. Exports increased from US

\$ 687 million in 1986 to US \$ 1,348 million in 1990 with an annual growth rate of 18.4 percent. By region, about 70 percent of exports were directed to the US and the EC countries till the mid - 1980s, VCRs which require more advanced manufacturing technology than colour TVs, were produced by major companies such as Samsung Electronics, Goldstar, Daewoo Electronics. The production of VCRs recorded a compound annual growth rate of 19.9 percent, 17.8 percent respectively during the 1986 - 90. VCRs became Korea's biggest production and export item among consumer electronics products during 1988 - 89, exceeding colour TV. Korea became the second largest VCR producing and exporting country after Japan.<sup>27</sup>

The production of audio equipment, such as car stereos, recorders and stereo components continuously increased since 1986. The compound annual production growth rate was 20.4 percent during the 1986 - 90 periods exceeding that of video equipment.<sup>28</sup> Such rapid growth can be attributed to the following: (1) development

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27. Ibid., p. 84

28. Ibid.,

of related industries, such as the automobile industry, (2) new comers to the industry such as the big three, Samsung, Goldstar Co. and Daewoo Electronics Co. (3) rising national income and reduction of special excise taxes (4) development of new products such as CDP, DAT. Home electrical appliances, such as microwave ovens, refrigerators and washing machines have also been expanded rapidly during 1986 - 90. Production and exports of home appliances recorded a compound annual growth rate of 26.4 percent and 12.0 percent respectively during the same period. This sector's share of the total product value of the consumer electronics industry increased from 32.1 percent in 1986 to 38.5 percent in 1990. Microwave ovens and room air conditioners which recorded a compound annual growth rate of 5.1 percent and 60.5 percent respectively in production during 1986 - 90, emerged as leading export items. The export of microwave ovens recorded a sharp increase from US \$ 214 million in 1985 to US \$ 848 million in 1988, with annual an increase rate of 58.2 percent. Thus, Korea became the world's largest exporter of microwave ovens. Airconditioners are also a promising items in the consumer electronics industry. During 1986-90, exports recorded a high compounded annual growth rate



of 101.3 percent while the item's share of the total exports of consumer electronics products reached 1.5 percent in 1990. In addition, domestic demand for room airconditioners has increased continuously with compound annual growth rate of 46.6 percent.<sup>29</sup>

Production of industrial electronics in Korea showed an average annual increase of 32.8 percent during the period of 1986 - 90, amounting to US \$ 6,584 million. The industrial electronics industry demonstrated the characteristic of a growth industry by outstripping the growth rate of the electronics industry as a whole. Computers and computer peripherals, whose production recorded the growth rate of 1986 - 90, have led the industry, due to the buoyant demand from overseas markets. Electronics exports increased by 24.4 percent per annual for the same period. The industrial electronics exports of Korea during the first half of 1980s were mostly composed of such simple assembly-type products as telephone sets. After the mid - 1980s, however shipment of data processing machines increased remarkably, with personal computers in the forefront untill 1989 - computer peripherals was the strongest sector with

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29. Ibid., p. 85

the average annual growth rate of 39.8 percent in exports, as shown in the table 6

|                         | Exports by Item (in million dollars %) |       |       |       |       |                              |
|-------------------------|--|-------|-------|-------|-------|------------------------------|
|                         | 1986                                   | 1987  | 1988  | 1989  | 1990  | Annual Growth Rate (1986-90) |
| Communication Equipment | 506                                    | 862   | 910   | 938   | 1040  | 19.7                         |
| Wire Communication      | 202                                    | 325   | 501   | 485   | 489   | 24.7                         |
| Radio Communication     | 304                                    | 537   | 409   | 453   | 551   | 16.0                         |
| Hardware                | 724                                    | 1,141 | 1,864 | 1,026 | 1,969 | 28.4                         |
| Central Processing Unit | 375                                    | 511   | 941   | 976   | 653   | 14.1                         |
| Peripherals             | 349                                    | 630   | 923   | 1,050 | 1,334 | 39.8                         |
| Measuring Instrument    | 53                                     | 63    | 73    | 82    | 81    | 11.2                         |
| Others                  | 170                                    | 294   | 383   | 445   | 391   | 23.1                         |
| Total                   | 1,453                                  | 2,360 | 3,230 | 3,491 | 3,481 | 24.4                         |

Source: The Electronic Industries Association of Korea

While central processing unit saw a mere 14.1 percent growth, due to the drastic decline. The total production value of semiconductors made in Korea grown from US \$ 1,473 million in 1986 to US \$ 5,104 million in 1990, for an average annual increase of 36.4 percent. The trend in supply and demand can be easily understood through the figures given in the table 7.

In particular, integrated circuit production increased at an annual rate of 39.3 percent and discrete devices by 23.1 percent. Accordingly,

Table 7

## Trends in Supply and Demand (in million dollars %)

|                             | 1986  | 1987  | 1988  | 1989  | 1990  | Annual Growth<br>Rate (1986-90) |
|-----------------------------|-------|-------|-------|-------|-------|---------------------------------|
| <b>Production</b>           | 304   | 383   | 563   | 760   | 700   | 23.1                            |
| <b>Imports</b>              | 943   | 1,287 | 1,562 | 1,245 | 1,135 | 9.1                             |
| <b>Discretes</b>            |       |       |       |       |       |                                 |
| Domestic Demands            | 958   | 1,269 | 1,688 | 1,553 | 1,570 | 13.1                            |
| Exports                     | 289   | 401   | 437   | 452   | 465   | 12.6                            |
| <b>Production</b>           | 1,169 | 1,782 | 2,503 | 4,039 | 4,404 | 39.3                            |
| <b>Imports</b>              | 521   | 927   | 1,590 | 2,385 | 2,758 | 57.1                            |
| <b>Intergrated Circuits</b> |       |       |       |       |       |                                 |
| Demostic Demend             | 582   | 1,035 | 1,351 | 2,853 | 3,089 | 56.1                            |
| Exports                     | 1,108 | 1,674 | 2,742 | 3,571 | 4,073 | 38.5                            |
| <b>Production</b>           | 1,473 | 2,165 | 3,066 | 4,799 | 5,104 | 36.4                            |
| <b>Imports</b>              | 1,464 | 2,214 | 3,152 | 3,630 | 4,093 | 29.3                            |
| <b>Total</b>                |       |       |       |       |       |                                 |
| Domestic Demand             | 1,540 | 2,304 | 3,039 | 4,406 | 4,659 | 31.9                            |
| Exports                     | 1,397 | 2,075 | 3,179 | 4,023 | 4,538 | 34.2                            |

Note: Discrete includes parts of semiconductor

Source: 1) The Electronic Industries Association of Korea

2) The Office of Customs Administration

production of integrated circuits accounted for roughly 85 percent of total production. Export value of semiconducters grew from US \$ 1,397 million in 1986 to US 4,538 million in 1990, with an average annual exports growth rate of 34.2 percent. Korea's recent increase in semiconductory export stems largely from the general recovery of the world semiconductor market and Japan's

reduced marketing in the U.S. due to trade friction between the two nations. By sector integrated circuits grew by 38.5 percent per annum, far exceeding the 12.6 percent average annual growth rate for discrete devices. Such high growth for integrated circuit can be attributed to the fact that domestic wafer - processing manufactures have made massive investments in facility expansion and R & D.

Korea's consumer electronics industry is heavily dependent on exports, which represented about 70 percent of total domestic production in 1987. The compound annual growth rate of exports recorded 16.0 percent during the second half of the 1980s. In 1988 consumer electronics export amounted to US \$ 6,308 million and accounted for 10.4 percent of the nation's total exports of US \$ 60,696 million. In 1990, exports of video equipment and colour TVs increased from US \$ 687 million in 1986 to US \$ 1,340 million with an annual growth rate of 18.4 percent, (see table 8). By region, about 70 percent of exports were directed to the U.S. and EC countries until the mid - 1980s. The export of microwave ovens recorded a sharp increase from US \$ 214 million in 1985

Table 8  
Exports by major Item

|                             | (in million dollars,%) |       |       |       |       |   |
|-----------------------------|------------------------|-------|-------|-------|-------|---|
|                             | 1986                   | 1987  | 1988  | 1989  | 1990  | Compound<br>Annual<br>Growth<br>(1986-90) |
| Video Equipments            | 1,547                  | 2,192 | 2,739 | 2,594 | 2,637 | 14.3                                      |
| Colour TVs                  | 687                    | 977   | 1,174 | 1,168 | 1,348 | 18.4                                      |
| VCRs                        | 593                    | 895   | 1,322 | 8,239 | 1,140 | 17.9                                      |
| Audio Equipments            | 778                    | 1,573 | 1,889 | 1,776 | 1,737 | 22.2                                      |
| Home Appliances<br>& Others | 733                    | 1,108 | 1,680 | 1,430 | 1,155 | 12.0                                      |
| Microwave Ovens             | 483                    | 639   | 348   | 815   | 534   | 2.5                                       |
| Refrigerators               | 83                     | 166   | 260   | 146   | 177   | 20.8                                      |
| Room Air conditioners       | 5                      | 50    | 122   | 91    | 82    | 101.3                                     |
| Total                       | 3,058                  | 4,873 | 6,308 | 5,800 | 5,529 | 16.0                                      |

Source : The Electronic Industries Association of Korea.

to US \$ 848 million in 1988, with annual increase rate of 58.2 percent. Korea thus became the world's largest exporter of microwave ovens. During 1986 - 90 exports of airconditioners recorded a high compound annual growth rate of 101.3 percent while the item's share of the total exports of consumer electronics products reached 1.5 percent in 1990.<sup>30</sup>

30. Ibid., p. 10.

Korea's rapid employment growth further confirms its expanding profile in the international division of labour in electronics. A six-fold increase that raised its electronics employment to one third and one fourth of Japan's and the United States' totals, respectively, over a period of barely fifteen years, remains unmatched by any other less developed nation. An important indicator of the organizational differences between Korea, and the United States and Japan is its significantly greater proportion of production labour. Its emphasis on labour - intensive production and assembly reflects both the labour cost advantage and a less skilled work force, were organizational components commonly found in advanced nations, such as R & D and various professional and administrative support services, are often missing.<sup>31</sup> This results in a simpler organizational structure with fewer levels of hierarchy, an emphasis on more standardized word task and production routines that would accommodate both

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31. Stewart F, Technology Transfer for Development, in *Science and Technology: Lessons for Development policy*, Evenson R.E. and Ranis G. (eds). Westview, Boulder CO, 1990, pp.301-24 ; Park W. H. and Enos J.L., *The Adoption and Diffusion of Imported Technology: The Case of Korea*, Routledge. London, 1988 ; also see, Westphal L.E. et. al, The Development of Technological Capability in Manufacturing: A Macroscopic Approach to Policy Research, in *Science and Technology: Lessons for Development Policy*, Evenson, R.E and Ranis G. (eds), Westview, Boulder, CO. 1990, pp.81-134.

low skill levels and less automation than is comparable American and Japanese plants.<sup>32</sup>

In term of employment, the contribution of the electronic industry to the overall manufacturing sector employment is quite significant. Due to a combination of domestic and world market conditions, electronics employment began falling after 1978. By 1982 some 30,000 jobs had been eliminated, a 16.3 % decline from the 1978 level of 183,635 employees while production increased over the same period by 76%. Employment rose steeply again in 1983 and 1984, reaching a level of 218000 workers by the latter year. By 1985 employment was approaching 300,000. The structure of the workforce has undergone a dramatic shift since 1978, whereas in that year factory workers accounted for nearly 80% of the total employees, by 1982 this share had fallen to 55%. Meanwhile the share of engineers and technicians in total employment rose from

32. Dahlman C.J., Ross-Larson B. and Westphal L.E., *Managing Technological Development: Lessons From the Newly Industrilizing Countries*, World Development 15, 1987, pp.759-75. ; Fukuda K.J., *Japanese-Style Management Transfer : The Experience of East Asia*. Routledge, London, 1988.

18% to 27%.<sup>33</sup> Much of that shift is attributable to rising automation levels, especially in semiconductor assembly. The increasing R & D intensity of Korean electronics has also contributed to the shift toward skilled labour. Employment in the local electronics sector numbered 477,000 persons in 1990, representing 9.8 % of the nation's total manufacturing employment of 4.8 million.<sup>34</sup>

It is significant to note that the 60% of the industry's workers are female, in the age group of 18 and 24. By 1976, over half of all employment in Korea's electronics industry was in foreign-owned or joint venture companies. Between 1976 and 1985, the numbers employed in wholly owned foreign subsidiaries was reduced by a third while employment in the industry as a whole grew by almost 50%.

The Korean state has been emphasising the fact that if Korea is to become a technology-intensive industrial nation under the "technology first" policy, she needs to develop a highly skilled technical workforce.

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33. Larry Westphal, Y.W. Rhee and G. Pursell, *Korea: Managing The Industrial Transition*, World Bank 1986, p.195.

34. *Korea News Review*, Seoul, Korea, September 21, 1991



The government estimates that Korea will need 150,000 specialists for research and development and engineering in 2001, a ratio of 30 per 10000 in population. Of that figure, the demand for nuclear research manpower is estimated at 15760 and mid-level research manpower of 42,760. To meet the demand, the government is taking various steps designed to elevate educational quality in Korean graduate schools, to drastically increase the training functions of the KAIST, and to establish technological institutes.

Korean semiconductor makers trail developed countries' manufactures in terms of technology. Manufacturing technologies for assembling are quite good compared with those of advanced countries. Memory devices, the most advanced item in Korean semiconductors, such as 1M DRAM and 4M DRAM are now being mass produced. So as a result in terms of DRAM, the technology gap with advanced countries narrowed more and more. Following the development of the highly sophisticated 16 mega DRAM by Samsung and Hyundai, the Electronics and Telecommunications Research Institute (ETRI) succeeded in developing core technology for the powerful 256

mega DRAM for the first time in the world.<sup>35</sup>

The Korean computer industry has concentrated mainly on the development of mass production know-how based on cheap labour force, which was accelerated by the export boom, instead of developing original products. Though the technological level of the Korean computer industry is lower than that of archrival competitors, some technological advances have been made on PC's and peripherals such as 286 PCs, 386 PCs and laser printers. Korean PC makers are paying royalties of approximately 10 % of the PC price to the technology suppliers such as IBM, microsoft and the like. The computer industry in Korea has been investing 4-5 % of their revenues in R&D activity to keep up with technologically advanced countries than any other industry in Korea.<sup>36</sup>

The technology of the Korean consumer electronics industry nearly matches that of developed countries in simple design or productions . Korean video and audio makers lag behind their counterparts

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35. The Korea Development Bank, n.26, p. 112

36. Ibid., p. 120

in advanced countries by 2.4 years in the development of new products at present, but the gap widens to 5-7 years in the development of next generation high-tech products. Korean video and audio makers investment in R&D projects is one twentieth of the investment by their Japanese counterparts. Korean makers use 4-7 percent of their turnover for R&D investment compared with 9-16 percent by Japanese manufacturers.<sup>37</sup>

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37. Ibid., p. 88



## Chapter III

### State, *Chaebol* and Electronics Sector

In the previous chapter, we have examined the dynamics of development of the electronics industry in Korea. In this chapter, an attempt will be made to highlight the nature of the correlation between the state, the *chaebol* and the electronics sector. Electronics industry like several other industries but unlike steel industry has been exclusively located in the private sector. The industry has been dominated by four or five leading *chaebol* almost from the beginning. The domination has not been confined to manufacturing only. It has extended to marketing both within the country and abroad. The industry being technologically intensive has had to invest progressively greater share of its outlay on R&D to keep itself abreast with the state-of-the-art and promote product innovation and diversification. While working for cost reduction it has had to simultaneously cooperate and compete with leading American and Japanese transnational corporations who had almost monopolized this post-Second War industry.

Thus, more than other industries the growth and development of the electronics industry in Korea has depended on the mechanics of interaction between the state and the industrial conglomerates that were engaged in manufacturing and marketing a range of ever increasing consumer and industrial electronics products. The chapter will be divided into two parts. In the first part, the phenomenon of the *Chaebol* dominating the Korean economy, in general, and the electronics sector, in particular, will be highlighted. The second part will deal with how the state intervened with the *chaebol* in the efforts to protect and promote the electronics industry.

The term *Chaebol* refers to a number of large scale centralized, cross sectoral companies under the control of an identifiable family or families.<sup>1</sup> The emergence of the *Chaebol* as a significant and striking aspect of the Korean economy is of recent origin, although it has not been easy to identify the exact year of its origins. It is generally believed that the origins of the *Chaebol* have to be located in the context of the efforts of the Korean government

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1. The concept and definition of *Chaebol* have been discussed in several works. See Steers, Richard M., Shin, Yoo-Keun, Ungson, G.R., *The Chaebol: Korea's New Industrial Might*, Harper & Row Publishers, New York, 1989, pp.33-48.

to accelerate economic development in the early 1960s. According to some analysts of the Korean economy, many *Chaebol* groups have their origin in the acquisition of *vested enterprises* beginning in 1947.<sup>2</sup> These include Samho Textile, Dongyang Cement, Ssangyong, Doosan, Korea Raw Silk, Korea Explosives and Sunkyung.

What needs, however, to be stressed is that the emergence and consolidation of the power and influence of the *Chaebol* was not an accidental phenomenon. The phenomenon was an outcome of a conscious policy of the Park Chung-Hee's government. His government believed that concentrating economic power in the hands of a few big family-held enterprises represented a cost efficient and expeditious path to development. Chairmen of the companies were held personally accountable to the government for task accomplishment and the cost of failure was high. The government cleared road blocks to corporate growth and often provided monopolistic conditions (and resulting economies of scale) that were conducive to success.<sup>3</sup>

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2. For detailed discussion on *vested enterprises*, see, Jones Leroy P. and Sakong Il, *Government Business and Entrepreneurship in Economic Development : The Korean Case*, Cambridge, Mass: Harvard University Press, 1980, pp.33-37.

3. Steers R.M., no. 1, p.19.

Thus there was a correlation between the expansion of industrial economy or deepening of the economy and concentration of economic power in the hands of a few big families or *Chaebol*. It could even be argued that the emergence of the monopolies began with the emergence of private capital in Korea.<sup>4</sup> In order to understand how the leading *Chaebol* came to acquire economic power and clout and industrial and nonindustrial assets, it is necessary to examine the size, diversity and market power of the leading *Chaebol*.

The electronics sector, as pointed out earlier, registered phenomenal growth in the 1970s and 80s. A few of the top *Chaebol* have been closely associated with the growth of this sector. These include Samsung, Goldstar and Daewoo.

Samsung, meaning *three stars*, was founded in 1936 with a total

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4. For discussion of the concentration of economic power, see Lee Kyu-Uck, *Government Business Relations in Korea: with a Special Reference to the Concentration of Economic Power.*, seminar paper presented in the 14th policy forum on Private-Public Interaction Toward Economic Development at the International Development Exchange Programme (IDEP) Centre of Korea Development Institute (KDI), Seoul, Korea, April 10-17, 1989, pp 127. also see, Leroy P. Jones, *Chaebol And the concentration of Economic Power in Korean Development: Issues, Evidence and Alternatives* ; in Macroeconomic Policy and Industrial Development Issues, Ed. by Il Sakong, Korea Development Institute, Seoul, Korea, 1987, pp.87-192



capital of \$21,000 and just forty employees. In the last fifty five years of existence, it has emerged as one of Korea's internationally well known companies. It could be said that the rise and growth of the Samsung group, especially during the last thirty years, is the story of the dynamic growth and diversification of the electronics industry through planned strategy.

The company in 1950s provided basic necessities to a war-torn country. Cheil Sugar & Co. Ltd. was founded in 1953, followed closely by Cheil Wool Textile Co. Ltd. in 1954. By the end of 1960s, Samsung had an annual turnover of US \$ 100 million.<sup>5</sup> In the 1970s the company entered electronics and heavy industries, and by the end of the decade Samsung's combined turnover reached \$ 3 billion. In the 1980s a high tech ventures were preferred. In 1980, a government-invested company producing electronic telephone switching equipment was acquired to become the fifth addition to Samsung's group of electronic companies. The acquisition was made in anticipation of the industries trend toward the integration

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5. Steers, R.M., no.1 p.50.

of telecommunications with the electronics industry in the larger context of the information industry.<sup>6</sup> The Samsung group consists of 25 companies. (see table 10). These have formed joint ventures or other alliances with Amoco, Corning, General Electric, General Instrument, Hewlett Packard, Lockheed, Motorola, Pratt & Whitney and Texas Instruments among U.S. companies and with Japanese Toshiba, Oki Electric and Mitsui Petrochemical (see table 9)

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Table 9

**SAMSUNG'S GLOBAL PARTNERS**

**U.S.**

**Amoco**

The U.S. company has a 35% stake in Samsung Petrochemical, which produces raw materials for textiles in South Korea.

**Corning**

A joint venture in South Korea makes glass for TV picture tubes, ceramics for integrated circuits, and parts for VCRs. It is also building plants in China and Malaysia.

**General Electric**

Samsung Medical Systems, a joint venture, sells and services GE high tech medical equipment

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6. Yu, Seongjae, *The Development of the Korea Electronic Industry with Special Reference to Samsung Electronics*, Roving seminar paper iv, Presented at International Forum on Industrial Planning and Trade Policies, Seoul, Korea June 1-12, 1982, p. 6

in South Korea. It plans to produce less costly versions of GE equipment there for sale in Korea and for export.

#### **General Instrument**

There's an agreement in principle to cooperate with Samsung Electronics in developing high definition television (HDTV).

#### **Hewlett Packard**

A joint venture called Samsung Hewlett-Packard markets the American company's products in Korea, some of which are made in Korea for H-P by Samsung Electronics.

#### **Lockheed**

The U.S company provides technical assistance to Samsung Aerospace, Prime Korean contractor for local assembly of Lockheed's F-16 by fighter and production of companies.

#### **Motorola**

With Samsung, it is jointly developing a palm-top computer which users can write with an electronic pen and send message via radio.

#### **Pratt and Whitney**

Samsung Aerospace has a 2% stake in production of the engine that powers jumbo jets, for which the Korean manufacturer supplies components.

#### **Texas Instruments**

The two companies are jointly building a semiconductor plant in Porto, Portugal.

#### **JAPAN**

##### **Mitsui Petrochemical**

This company has a 15% stake in Samsung Petrochemical.

##### **Oki Electric**

It has an agreement to obtain Samsung's technology for developing new generation 16-megabit computer memory chips.

**Toshiba**

It is working with Samsung Electronics to develop advanced memory devices under an eight-year agreement for sharing technology.

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Source : *Fortune International*, May 3, 1993, p.19

Samsung electronics has switched over to being an innovator in selected technological area of the world electronics market from a mass producer of cheap TV sets. The group has made its mark by developing the 64-megabit chip which can store, the equivalent of 512 standard newspaper pages.<sup>7</sup> Samsung has had the unique distinction of transferring technical knowledge in a reverse direction, i.e. from a Korean to Japanese Company when Samsung sold memory chip technology to Oki Electorics.<sup>8</sup>

The field of chemistry -then cosmetics-then plastics--was the sequences of shift adopted by Lucky-Goldstar, another big *Chaebol* founded in 1947. It was only after the Korea war that its trading company

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7. *Fortune International*, May 3, 1993 p. 18

8. *Ibid.*, p.18.

Table -10

**Principal Business Fields, Companies, and Employees of the Samsung Group.**

| Business Field and Company   | Main Product or Service   | Number of Employees |
|--|---|---------------------|
| <b>Trade</b><br>Samsung Co., Ltd.  | Exports, imports natural resource development.  | 4,360               |
| <b>Electronic</b><br>Samsung Electronics Co., Ltd.                                     | Color and black-and white television, VCR, stereo system, home appliance, industry electronic equipment                         | 19,955              |
| <b>Electronics</b><br>Samsung Electron Devices Co., Ltd.                               | Picture tubes, CRTs for data display, display monitors, receiving tubes, transistors, diodes, computers                         | 6,567               |
| Samsung Electro-Mechanics Co., Ltd.  | VHF and UHF tuners, condensers, ceramic capacitors, speaker, deck mechanisms  | 6,093               |
| Samsung Corning Co., Ltd.  | Television glass bulbs, electronic gun-mounts, glass rods, glass bulbs for computer display                                     | 2,397               |
| Samsung Semiconductor & Telecommunications Co., Ltd.                                   | 64K DRAM, 256K DRAM, and 1 MB DRAM semiconductors, optical cable and fibers, electronic switching system, computers, facsimiles | 10,639              |
| <b>Heavy Industry and Chemicals</b><br>Samsung Shipbuilding & Heavy Industry Co., Ltd. | Industrial machinery and equipment, structure steel, shipbuilding and offshore structures                                       | 6,983               |
| Samsung Petrochemical Co., Ltd.  | Purified Terephthalic Acid  | 381                 |
| Samsung construction Co., Ltd.   | Civil engineering, architectural construction and plant installation  | 11,507              |
| Korea Engineering Co., Ltd.  | Plant engineering   | 590                 |
| Chonju Paper Manufacturing Co., Ltd.   | Newsprint, printing paper, bleached ground wood pulp  | 1,201               |
| <b>Precision Instruments</b>   |   |                     |

|   |   |        |
|---|---|--------|
|   |   | 58B    |
| Samsung Aerospace Industries, Ltd.      | Jet-engines, electro-optics equipment, cameras, industrial robots, process control systems, computer peripherals              | 2,289  |
| Samsung Watch Co., Ltd.                 | Digital and analog watches, electronic display boards   | 830    |
| <b>Food Processing and Textiles</b>     |   |        |
| Cheil Sugar & Co., Ltd.                 | Sugar, MSG, flour IMP, GMP, cut pork, formulated feed, soybean meal, vegetable oil, processed meat, premix organic fertilizer | 4,131  |
| Cheil Wool Textile Co., Ltd.            | Worsted textiles, woolen textile, men and women's garments, knitwear, blankets  | 3,645  |
| Cheil Synthetic Textiles Co., Ltd.      | Polyester staple fiber, polyester filament  | 2,713  |
| <b>Services</b>                         |   |        |
| Dongbang Life Insurance Co., Ltd.       | Individual and group life insurance   | 52,529 |
| Aukuk Fire & Marine Insurance Co., Ltd. | Fire, marine, and casualty insurance  | 1,234  |
| Hotel Shilla Co., Ltd.                  | Hotel services  | 1,291  |
| Shinsegae Department Store Co., Ltd.    | Consumer retail   | 1,578  |
| <b>Cultural and Social Welfare</b>      |   |        |
| Joong-ang development Co., Ltd.         | Development of groundwater resources  | 1,550  |
| Joong-ang Daily News Co., Ltd.          | Daily newspaper, magazines  | 1,019  |

Source : Samsung: Its Role and Activities as a General Trading Company: 1986-1987 ( Seoul, 1987) 46-47 .

was established in 1953 followed by the creation of Goldstar Company Limited. in 1958 to produce radios, refrigerator(1965) and television(1966). After the establishment of the oil refinery in 1967, the company continued to grow as a "dual track" entity stressing product innovations in both chemistry, through Lucky Ltd, and electronics, through Goldstar Company Ltd (see Table 11).<sup>9</sup>

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Table 11

**Principal Business Groups and Companies of the Lucky - Goldstar Group.**

**Chemistry and Resources**

Lucky, Ltd.  
 Honam Oil Refinery co., Ltd.  
 Lucky Advanced materials, Inc.  
 Korea Mining & Smelting co., Ltd.

**Electric and electronics**

Goldstar Co., Ltd.  
 Goldstar Semiconductor, Ltd.  
 Goldstar Electronics Co., Ltd.  
 Goldstar Telecommunication Co., Ltd.  
 Goldstar Electric Co. Ltd.  
 Goldstar Alps Electronics Co., Ltd.  
 Goldstar Precision Co., Ltd.  
 Goldstar Industrial Systems Co., Ltd.  
 Goldstar Instrument & Electric Co., Ltd.  
 Goldstar Electric Machinery Co. Ltd.  
 Goldstar Honeywell Co., Ltd.  
 Goldstar Cable Co., Ltd.

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9. Steers R. M. no. 1. p.58. ; also see the *Fortune International* 500, 1988, D1-D36

### Services

Lucky - Goldstar International Corp.  
 Lucky Securities Co., Ltd.  
 Pan Korea Insurance co., Ltd.  
 Goldstar Investment & Finance Corp.  
 Pusan Investment & Finance Corp.  
 Lucky Development & Co., Ltd.  
 Lucky engineering co., Ltd.  
 LG Ad, Inc.

### Public Services & Sports

Lucky - Goldstar sports  
 Yonam Foundation  
 Yonam Junior College of Engineering  
 Yonam Junikor Collage of Livestock and Horticulture

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Source : 1988 Goldstar Company Report (Seoul), 63.

In 1986-87, the major divisions of the Goldstar (electronics) part of Lucky-Goldstar were recognised into five groups as given below

Table 12

### 1987 Reorganization of Goldstar Consumer and Industrial Electronics.

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#### Lucky-Goldstar Electric and electronics Industry

#### Consumer Products Sector

consumer Products Sector of  
 Goldstar Co. Ltd

#### Computer and Communications Sector

Information system Products group of goldstar Co. Ltd  
 Goldstar Semiconductor Ltd.  
 Goldstat Software Co. Ltd.  
 Goldstar Hitachi systems co. Ltd.  
 Goldstar Tele-electric Installation Co. Ltd.



**Electronics Devices Sector**

Goldstar Electronic Devices Co. Ltd.  
 Goldstar Telecommunication Co. Ltd.  
 Goldstar Electric Co. Ltd.  
 Goldstar Alps Electronics Co. Ltd.  
 Goldstar precision Co. Ltd.  
 Sung Yo Co. Ltd.  
 Goldstar Poster Co. Ltd.  
 Goldstar Micronics Co. Ltd.  
 Goldstar Medical Systems Co. Ltd.

**Industrial Systems Sector**

Goldstar Industrial Systems Co. Ltd.  
 Goldstar Instrument & Electric Co. Ltd.  
 Goldstar Electrics Machinery Co. Ltd.  
 Goldstar Honevel Co. Ltd.  
 Goldstar Vending machine Co. Ltd.

**Semiconductor Group**

Semiconductor Division of Goldstar Co. Ltd.  
 Semiconductor Division of Goldstar Semiconductor. Ltd.

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Source : *1988 Goldstar Company Report*, Seoul, pp.6-7.

Consumer products computers and communications, electronic devices, industrial systems and semiconductors were the main autonomous sectors where Goldstar emerged prominently. It has been clearly shown in the Table 13.

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Table 13  
*Notable Accomplishments of Goldstar*

|      |  |
|------|--|
| 1958 | Founded.                                 |
| 1959 | Produced Korea's First Radio.            |
| 1965 | Manufactured Korea's First Refrigerator. |

|      |  |
|------|--|
| 1966 | Manufactured Korea's first television.   |
| 1968 | First overseas branch established in New York. Produced Korea's first elevator and escalator.  |
| 1969 | Manufactured Korea's first washing machine and air conditioner.  |
| 1975 | Established Korea's First R & D facility, the goldstar Central Research Laboratory.  |
| 1976 | founded Goldstar Semiconductor.  |
| 1978 | Became Korea's First electronics Company with exports exceeding \$ 100 million.  |
| 1979 | Developed the nation's first computerized color television.  |
| 1980 | Developed Korea's first electronic memory typewriter.  |
| 1981 | Developed Korea's first electronic VCR.  |
| 1982 | Completed Goldstar America's color television production facility in Huntsville, Alabama.<br>Manufactured the nation's first microcomputer.<br>Produced the first Korean cable television broadcasting system.   |
| 1983 | Founded the Goldstar Design Center, the first such center in the Korean electronics industry.<br>Manufactured Korea's first compact disk player.<br>Developed Korea's first direct broadcasting system.<br>Goldstar Instrument and Electric developed Korea's first programmable controller. |
| 1984 | Produced Korea's first portable VCR.<br>Produced Korea's first digital color television.   |
| 1985 | Produced Korea's first 8 mm camcorder.<br>Developed a 3.5 inch hard disk drive (HDD) for the fourth time in the world.   |
| 1986 | Manufactured Korea's first laser printer.<br>Goldstar Europe established in Worms, West Germany.   |

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Source : *Goldstar Company Report 1988* Seoul. p.62.

Lucky-Goldstar's huge investment in research is 5 percent of total sales (compared to 3 percent for similar companies) which is planned to be increased to 7 percent by 1998, Goldstar has

been actively engaged in overseas production and marketing . The first big plant was started in Huntsville, Alabama in 1982 where around 1 million colour TVs and 50,00,00 microwave ovens for sale in the American continent are produced. The second plant started in Worms, West Germany in 1987 with an annual capacity of 3,00,000 TVs and 4,00,000 VCRs.<sup>10</sup>

The third major *Chaebol* in the electronics sector is Daewoo . Daewoo, meaning *great universe* in Korea, is undoubtedly a perfect example of entrepreneurship in a Korean firm. From the time of its foundation in 1967, it has covered quite a long journey from textiles to computers.

The Korean state has been engaged in a number of efforts at developing science and technology since the mid- 1960s. As the resourceless nation was thoroughly dependent on the export of manufacturing goods, which is often considered, as the engine of Korean economic growth, the development of science and technology seemed to be the exigency of the time. At this crucial stage, the state's commitment to develop technology and applied science

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10. Steers R.M. no. 1, p.64.

manifested itself in various ways. In 1967, the Science and Technology Promotion Law was passed. Once the state expressed its determination to care for this segment of overall development strategy, a series of laws came to be enacted which provided incentives to private enterprises. Local engineering capabilities were also developed by ensuring market as well as enforcing performance standard for local engineering firms. The laws included Technology Development Promotion Law of 1972, and Engineering Services Promotion Law of 1973.<sup>11</sup> More importantly the incentives given in the Technology Promotion Law were targeted at accelerated depreciation on industrial research, development and engineering (RD&E) facilities : reducing the costs of foreign technology imports and of industry's inhouse RD & E work by allowing reduced tariffs on the import of R & D equipment ; a tax credit for investment in facilities for RD &E work of for commercialization of locally R&D result ; and deduction of annual non-capital RD&E expenditures from taxable income.<sup>12</sup> Another outcome of the law was the technology

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11. Kim Linsu, *Science and Technology Policies for Industrial Development*, Seminar Paper presented at International Forum on Industrial Planning and Trade Policies, Seoul, Korea, June 1-12, 1982, p.14.

12. Kim Linsu, no. 11, p. 75.

Development Resource Fund which initiated a tax reducing system

In the process of development, the state adopted various sector-specific policies. As mentioned earlier, electronics, being technology-intensive and a sector which has forward-backward linkage with other industries, received special attention and treatment. Electronics figured prominently in keeping the engine of growth i.e. export, move in the top gear.

The state has played a very critical role in the development of electronics industry since January 1969 when the Electronics Industry Promotion Law was promulgated.<sup>13</sup> Eight- year Electronics Industry Development Plan (1969- 1976) and the following five year Economic Development Plans were specific measures to promote the development of this sector. The Eight-year plan for the promotion of electronics industry included encouragement of foreign capital and joint venture, and the export of electronics targeted at US \$ 400 million out of the projected total US \$ 3 billion of exports in 1976. In

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13. Amsden , Alice H., *Asia's Next Giant: South Korea and Late Industrialization*, New York: Oxford University Press, 1989, p.82. ; also see, Mody A, *Comparative Study of Electronics in India and Korea*, Washington D.C., World Bank (Mimeographed.) 1984, p.4.

order to give electronics a new thrust as a highly advanced industry, the Electronics Industry Promotion Law was revised and an executive plan was drawn up by the state in 1981. The establishment of an Electronics Support Fund (ESF) was one of the several proposals in that plan. The ESF was meant to be financed by public and private sector contributions. The size of the ESF was to be 7.5 billion and the money was to be lent at preferential rates to firms investing in high priority areas. Particularly, the preferential access to loans was especially for those firms establishing R&D subsidiaries overseas.

The status of being a strategic sector enabled electronics firms to get a lot of financial support from the state. This enabled the firm to invest in the sector and have access to credits for their initial construction of facilities. For this purpose the National Investment Fund (NIF) was set up in 1974 which covered 70 percent of the construction whereas 70-80 percent of daily operation credits were channelled by foreign sources.<sup>14</sup> In 1985, the state signalled

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14. Kim Hyung-Kook, *The Political Economy of Industrial Adjustment Strategies in South Korea: A Comparative Study of the Textile, Steel and Semiconductor Industries*, Ph.D. Dissertation, Duke University, 1988, p.320.

the sanction of US \$ 346 million loan to the semiconductor industry. This was a huge amount. However, the amount was greatly exceeded by the \$ 2 billion in private capital which Samsung, Hyundai and Lucky-Goldstar were expected to allot to semiconductor plant and facilities during the same period.<sup>15</sup>

The state continued its efforts in the enactment of large number of tax measures which were designed to promote investment in research, development and production of new technology. First comes the Reserve Fund for Technology Development. This programme permits companies to write off as a loss, in advance, funds which will be used in the future for technological development. Secondly, a 10 percent deduction is allowed for R&D and manpower development and a 6 percent for the cost of commercializing new technologies (in case of the use of domestic equipment - 10 percent), or alternatively, during the first year, the investing company is permitted to write off 50 percent of the investment as a depreciation expense. Lastly, companies investing in equipment for R&D may depreciate 90 percent

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15. *Business Korea*, Seoul, August, 1985- p. 62

of the acquisition cost of this equipment during the year of acquisition.<sup>16</sup> Moreover, in order to give technology related lending and venture capital activity, a new dimension and thrust, various kinds of measures were taken. The establishment birth of Korea Technology Development Corporation(KTDC) in 1981 was the outcome of these efforts. KTDC's role was to lend to R & D projects as well as taking equity positions in technology oriented start-up firms.<sup>17</sup> Both the private sector and the state funded the initial amount of 8.5 billion won, required for the formation of this institution. Several technology-Development proposals are financed by the KTDC. IBRD also assists in there development programmes. These include R & D, commercialization of R & D results and payment for technology imports. In the series of conventional loans, conditional loans and equity investment,conditional loans occupy a unique place. In fact, regarding these loans, KTDC share the risk with the firm by requiring it to pay some percentage of sales if the

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16. Howell T.R, Noellert W.A., MacLaughlin J.H. and Wolff A.W., *The Microelectronics Race : The Impact of Government Policy on International Competition.*, Westview, Boulder, Colorado, 1988 pp. 154-155.

17. Larry Westphal, Y.W.Rhee and G.Pursell, *Korea: Managing the Industrial Transition*, World Bank 1986, pp. 204



firm is successful.<sup>18</sup> Nearly one third of KTDC's portfolio projects are in the electronics field. With a view to encouraging greater risk taking activity among Korean financial intermediaries, the state planned to enact a new law for the promotion of venture capital activities.<sup>19</sup>

Many institutions were formed as the need for investment in equity and equity type finance grew. Korea Development Investment Corporation (KDIC) established in 1982 with an initial sum of 5.3 billion won, took the responsibility of investment of convertible debenture of technology-intensive small and medium firms with good growth potential ; and of conventional loans, too.<sup>20</sup> Established in 1974 as a subsidiary of KAIST to facilitate the commercialization of research results developed at research organisation under the Ministry of Science and Technology. Korea Technology Advancement Corporation (KTAC) main role is to link research organisations

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18. Lee Won-Young, "Science and Technology Policy in Korea", in Lee Kyu-Uck(ed), *Industrial Development Policies and Issues*, Korea Development Institute Seoul, Korea, 1986 , p. 180.

19. Larry Westphal, no.17, pp.202-206.

20. Lee Won-Young, no.18, p.180.

with business and entrepreneurs by translating research and development into practical applications. Based on techno-economic feasibility studies, KTAC offers a wide range of services, including technical and managerial assistance, the sale, licencing or purchase of technology, and the establishment of new enterprises based on appropriate technology through joint investments with the business community. Many new technology based firms have been set-up with the support of KTAC.

Another measure step was the operation of Korea Technology finance Corporation(KTFC) in November 1984. The institute wholly owned by the Korea Development Bank(KDB) has an initial paid-in capital of 10 billion won. KTFC basically deals with financing expenditure for R & D, commercialization of new technologies and the improvement of manufacturing process. KTFC also provides information on high technology from abroad in collaboration with KDB. KTFC finances upto 80% of the funding required for each project subject to a limit of 500 million won.<sup>21</sup> A sharp line of difference between the financing arrangements of KTFC and the usual bank-lending

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21. Lee Won Young, n.18, p.183.

practices in providing risk-sharing opportunities with the firm can be drawn. In case of project failure, the firm's responsibility is to repay only 30 percent of the original loan. On the other hand, if the project succeeds, the firm is required to pay a pre-specified royalty. Here the arrangements are similar to the conditional loan practical by KTDC. KTFC's planning has been to involve itself directly in international joint ventures in high-tech areas. Funds for technology development are also provided by the Small and Medium Industry Bank and the Korea Development Bank.<sup>22</sup>

Where the scientific and technological level is low and industry is almost incapable of developing industrial technology, government must play a leading role in all areas. Korea's serious attempts to develop science and technology began in the light of the aforesaid observation. It was because of this, the Ministry of Science and Technology (MOST), the first such move in history on the part of the government of a developing country, came into being in 1967. Thereafter R & D cultivation and exploitation of skilled human resource, international technical cooperation and the development

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22. Howell T.R. et. al, n.16, pp.155-58.

of research organisations and resources were some of the issues which were the subject of extensive discussion in the context of development of science and technology as an integral part of the national development policy.<sup>23</sup> As a follow up, the establishment of the Korean Institute of Science and Technology (KIST), financed by the World Bank, was the striking manifestation of the state's major efforts for the promotion of research facilities. Further the Fine Instrument Centre (FIC) was also established for domestic and external market survey until 1977, when it merged with the Electronics Industry Association in Korea (EIAK), which was run by the private sector.<sup>24</sup>

A government entity KIET was established to function as a supplier of that high technology to develop electronics industry into a strategic one for the export market as well as to provide research and development capacity for applying advanced technology to domestic needs and to search for a breakthrough towards the independence of electronic

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23. Kim Linsu, n.11, p.11

24. Fine Instruments Center (FIC). *Foreign Investment Inducement Policies and Tax Exemption in Electronics Sector*. Seoul: FIC, 1973. p. 24

fatherland. KIET is the central body for the development of micro-electronics and software. It is developing semiconductor device prototypes and process technology and is establishing a national centre for automated semiconductor designing and training centre for electronics technicians. It provides mask making, wafer processing and epitaxial services to Korean semiconductor producers, and sells a small quantity of semiconductors. The KIET sponsors additional industry-government development projects in the semiconductor, computers and software fields. KIET also developed semiconductor manufacturing facilities which have then been acquired by private companies entering the field. Proclaiming the intention to draw on the technology of the more advanced nations, all four of Korea's leading industrial houses (Samsung, Lucky-Goldstar, Daewoo and Hyundai) established subsidiaries or joint venture in silicon valley. They made their initial commitment to micro-electronics in 1983, because of the prospects of acquiring U.S. technology in 1984, the KIET announced a plan to send trainees to those companies in the United States which can design ICs from LSIs.

The electronics industry has been provided with two options for fiscal relief for facilities investments ; tax credit of 3.5% of

the amount invested or accelerated depreciation. Other strategic industries have only the latter incentive available.<sup>26</sup> Apart from these limited incentives which are aimed particularly at the electronics sector, several other functional incentives are at the disposal of this industry like, technology and manpower development. One of the most important incentives is the allowance to set aside a percentage of profits in a reserve fund (exempt from taxation for a fixed time period) for eventual investment in R & D activities. In the Sixth Five Year Plan, the government has chosen to rely more extensively on such activity-specific as opposed to industry-specific-incentives to promote technology development and manpower training.

The state followed a classic infant-industry policy designed to establish indigenous production. The Ministry of Trade and Industry issued regulations in 1982 which effectively banned the import of mini and micro computers, and contained provisions designed to encourage the transfer of foreign technology to Korean firms. The development of electronics industry was to a great measure possible because it has been seen as an export industry. All the

basic export incentives, which were instituted beginning in the early 1960s, therefore, proved beneficial to the electronics development programme.

The success story of Korean development, in general, and electronics sector, in particular, would not be complete without a reference to the Korean work ethics which has become by now legendary. The state has been successful in exploiting the *Can-do spirit*. However, it would have not been possible without the fullest support and cooperation of diligent, disciplined, dedicated, dependable, enthusiastic, adroit, active, self-sacrificing Korean workers. These features are reflected in the fact that Korean have probably the longest work week in the world. i.e. average of 53.8 hours per week work schedule which is done by an average male industrial worker.<sup>25</sup>

The table below (no. 14) reveals very interesting figures of 'average hours worked per year and vacation days actually taken.

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25. Business Korea, *Women Power: Unsung Praises*, Seoul, September 1986, pp.20-26.

Table 14

| Country       | Average Hours Worked Per Year | Vacations Days Actually Taken |
|---------------|-------------------------------|-------------------------------|
| Korea         | 2,833                         | 4.5                           |
| Japan         | 2,180                         | 9.6                           |
| United States | 1934                          | 19.5                          |
| Great Britain | 1941                          | 22.5                          |
| West Germany  | 1652                          | 309.2                         |
| France        | 1649                          | 25.0                          |

Source: Based on data reported by Japanese Ministry of Labour- "The Japanese Work Week," White paper, Japanese Ministry of Labour : Tokyo, 1986 ; *Womanpower : Unsung Praises*, Business Korea, September 1986, 20-26 ; and T.W. Kang, *Is Korea the Next Japan*, New York ; Free Press, 1989.

Hence, the state left no stone unturned as it were in giving the sharp edge to the basic creativity and 'eui-yok' (will or ambition) of hard-working Korean Labour.<sup>26</sup> By 1960 Korea had achieved virtually universal literacy.<sup>27</sup> Korea's pattern of human resource development with a per capita income of US \$ 107 were equivalent to that of countries with on GNP per capital of US \$ 380.<sup>28</sup> Before

26. For a detailed study on Korean work environment, see, Steers R. M., Shin Y.K., Ungson G.R., *The Chaebol: Korea's new Industrial Might*, Harper & Row, Publishers, New York, 1989, pp. 95-106.

27. *Human Development Report 1992*, UNDP, Oxford, 1992, p.71.

28. Frederick Harbism and Charles A. Myers, *Education, Manpower and Economic Growth*, New York : McGraw Hill, 1964, p.



1966, a modicum of vocational training centres was existing but it was only in 1966 that a serious and systematic planning of the state resulted in the formation of the vocational Training law to complement the formal education system. Soon an in-plant training was made compulsory for all industrial enterprises with 300 or more workers. This change occurred due to the amendments to the vocational Training Law in the year of 1976. This compulsory in-plant training system coupled with the levy system for those who do not conduct such a programme, demanded private enterprise to develop skilled craftsmen to meet their own needs. A sharp increase in the number of graduates from vocational training programs was noticed. Technical high School graduates increased from 20.1 thousand in 1972 to 55.0 thousand in 1980, a little more than double. Those from public vocational training centres increased from 0.7 thousand to 15.0 thousand and those from in-plant vocational programmes increased from 10.8 thousand to 66.2 thousand during the same period.<sup>29</sup> In the process of development, the prominent position of human resources led the state to invest quite substantial amount in education. Consequently, in the 1970 constant price the government expenditures rose from 91 billion in 1972 to 193

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29. Kim Linsu, n. 11, p.24.

billion in 1980. In the government budget, a sharp increase in the share of the education occurred from 2.5% in 1951 to over 17 percent in 1980. With the increase in investment as parallel process, began the increased enrollment in the various levels of the formal educational system. Elementary school enrollements increased over 5 times high school more than 18 times and higher educational institutions more than 51 times between 1945-80. As a result illiteracy rate decreased from 27.9 percent in 1960 to 11.6 percent in 1970, and to almost nil in 1980. In 1985, an estimation by KIET revealed that between 1983 and 1993, there would be great need to increase the number of research positions tenfold, and that in the following decade the number of such personnel would need to increase at an annual rate of over 13 percent every year (see table 15 ).

Table 15

| <b>Korean Semiconductor Industry Projected Manpower Need<br/>1983-2000</b> |             |             |             |                         |                  |
|--|-------------|-------------|-------------|-------------------------|------------------|
| <b>Category</b>  | (Persons )  |             |             | Annual Rate of increase |                  |
|  | <b>1983</b> | <b>1990</b> | <b>2000</b> | <b>1984-90</b>          | <b>1991-2000</b> |
| Research Position  | 220         | 2,350       | 8,280       | 40.3%                   | 13.4%            |
| Technical Position   | 1,600       | 5,170       | 13,800      | 18.2                    | 10.3             |
| Skilled Workers  | 19,880      | 35,720      | 64,400      | 8.7                     | 6.1              |
| Offer Worker   | 2,300       | 3,760       | 5,520       | 7.3                     | 3.9              |
| Total  | 24,000      | 47,000      | 92,000      | 10.0                    | 6.9              |

Source :KIET,1985

A Semiconductor Joint Research Center (SJRC) was established by the Seoul National University (SNU) in 1985 where professors of electronics, physics, computer science and controlled instrumentation are participating.<sup>30</sup> The SJRC is in the process of attaining state-of-the-art design production and test equipment. It plans to conduct joint research in semiconductor with industrial organisations, universities and the state and will train semiconductor specialist manpower. Despite the significant changes in emphasis in the Korean state's industrial policy since the early 1970s, the electronics industry has continued to be strategically important sector and has played a key role in the industrial and technological transformation of Korea.

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30. Howell T.R. et. al n. 16, p.159.

**Conclusion**

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## Conclusion

The last forty-five year's history of the Republic of Korea has witnessed a remarkable political, social and economic transformation. The scale and sweep of this transformation have been impressive. Two aspects of this transformation, especially during the last about three decades, are significant. The first is concerned with the nature of change in the authority and power of the state. The second aspect has been the rapid economic development and incredible structural changes.

In this study, we saw the change that had come about in the authority and power of the state following the military revolution in May 1961. The new leadership in a lightning speed sought to redefine state-civil society equations, restructure political institutions and reinforce the authority and power of the state. So much so, the state came to be seen as an awesome, authoritarian institution which was successful in enforcing fear and compliance from the citizens. What is however equally noteworthy characteristic of the new state was its commitment, capability and competence

in carrying out the grand project of industrial transformation.

Assigning a very central role for itself, the state took the path of *a state-led-capitalist development*, as has been clearly defined in the First Five-Year Plan (FYP) document. But the State did not create any obstacle for the existence of private capital and market forces. In fact, the state took all the required measures to support, sustain and strengthen them. After having recognized the advantages of liberalizing and globalizing the economy in order to progress relatively quicker, the state announced its course of action as *export-oriented industrialization* (EOI). With a view to boosting exports, manufacturing sector was given special attention and 'absolute priority'. Thus there appeared a symbiotic relationship between export-oriented growth and growth-oriented export with the of deepening of industrialization. One point that needs to be emphasised, is that the planning process in Korea was not restricted to the level of formulation. It also extended to the level of its successful implementation. This is something which distinguishes Korean industrial development from that of other developing countries. Beginning with the *import-substitution industries* (ISI) in the

Second Plan (1967-71), the state soon entered the Heavy and Chemical Industries (HCI) development. Hence, the Third Plan can be said to have laid the true foundation of industrialization. With the passage of time, technology-intensive industries proved to be the only solution to sustain the higher growth rate. At this time, high-tech industries, especially electronics, came into limelight. As a result Korea entered the new phase of high value added export-oriented industrialization. The hypothesis of "growth-oriented export and export-oriented growth" came across its parallel in the form of close relationship between electronics and exports. They both became cause as well as consequence, supporting each other. Consequently, the pace of industrial development increased. Meanwhile, following the exigency of the time, the objectives of planning began to shift towards 'stability, efficiency and balance'. The sixth plan, for the first time, emphasised the principles of a market economy encouraging private initiatives and creativity.

What is more prominent in this context is that the emergence of electronics industry in Korea was not an accidental event. As a matter of fact, prevalent circumstances, within and outside Korea,

made its emergence indispensable. The Korean state had already indicated its intention to launch macro economic planning and export-oriented industrialization process. Multinational companies from technologically advanced nations, especially from the U.S. and Japan were eager to exploit the new policy of liberalization and globalization of Korean economy. They were looking for offshore assembly venues to invest capital and transfer technology. Shortages in labour and industrial space and rising wages and rent compelled Japan to transplant its factories in a suitable country. The Normalization Treaty of 1965 paved its way to enter and get established in Korea. By the time, Korea also had become equipped with certain level of technological capabilities which was a pre-requisite to acquire and assimilate foreign sophisticated technology.

In 1965, the electronics industry was selected by the Ministry of Commerce and Industry (MCI) as one of the 13 priority sectors for export. This special status entitled electronics sector for several special benefits and incentives. One of the most significant moves of the state to promote this sector was the enactment of Electronics Industry Promotion Law in January 1969. Allocation of funds,



establishment of industrial complexes like Kumi, MAFEZ, Anam, speeded the development process up. The electronics industry overtook the textile industry as the nations leading export industry in 1988. Korean share of world consumer electronics production and export increased remarkably. In seven years Korea became the world's largest producer of microwave ovens that were first developed by Samsung, the leading *Chaebol* in electronics, in the 1970s and first exported in 1980. It became the world's third largest producer of consumer electronics products as well as components and parts in 1988. Full scale exports of video cassette recorders (VCRs) started only in 1985. Within a few years Korean producers had 20% of the world market. Korea became the second largest producing and exporting country in 1988.

These stunning figures, cited above, reveal the success-story of Korean electronics industry where the state provided every possible support. However, this successful process is not confined only to the state and electronics. It has one more dimension, viz. *Chaebol*. Thus, Korean industrialization has a triangular shape -- state, industry (here electronics) and *Chaebol*. As electronics sector is dominated

by *Chaebol*, huge investments and *Chaebol's* outstanding handling have been the prominent factors responsible for the excellent performance of this sector. The rapid development took place under the initiative of leading industrial conglomerates, the *Chaebol-Samsung*, Lucky Goldstar and Daewoo. They expanded their business amidst keen competition, which has been characterised as *semiconductor war*.

The emergence and consolidation of the power and influence of *Chaebol* was not a phenomena that happened all of a sudden. On the contrary, it was a conscious policy of the state to promote and protect *Chaebol* in order to ensure a cost efficient and expeditious path to development. Thus there existed a correlation between the expansion of industrial economy and concentration of economic power in the hands of few *Chaebol*. The state lent maximum support and assistance to them for the development of electronics industry. The State launched a major campaign to upgrade the local electronics industry's technological capabilities. It targeted semiconductor process technology as a priority area for development by the newly established, government-backed Korean Institute for Electronics Technology (KIET). In addition to this, it also encouraged private firms to

invest in R&D and production of new technologies. These include reserve fund for technological development, deduction for R&D and manpower costs, deduction for commercialisation for new technology, depreciation allowance for R&D .

With its continuous growth through the past three decades, Korea's electronics industry has become important not only domestically but also internationally. It is clear that the development of the Korean economy during the 1990s will, to a large measure, depend on the growth and progress of the electronics sector. By the time Korea enters the 21st century, it would have joined the group of advanced industrialized countries.

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