

# Korea-United States Industrial Alliance

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## **Introduction**

Historically, Korea has been under the influence of its ambitious neighbors, China, Japan and Russia, which causes Korea's intense concern for its long-term independence. Through the budding signs of North-South Korea unification, Korea perceives that long-term peace and security derive from having a close diplomatic and economic relationship with the United States as the most crucial ingredient. Thus President Kim Dae Jung of South Korea and his counterpart of the North, Kim Jong Il, at the June meeting emphasized the continued presence of United States troops in the Korean peninsula for stability and peace in East Asia even after the unification. In association with the United States economy, the unified Korea could play a major role as a regional balancer, giving stability to a new order in Northeast Asia and the Asia-Pacific region as a whole.

The United States and South Korea (from here on designated Korea) have entered into an era of renewed economic activity and a commitment toward closer bilateral ties. One of the striking developments in the international economy of the past few years has been the greatly expanded role of the United States direct investment and the emergence of the United States as the major investor in Korea. Most economic reasoning tells us that a free flow of commodities is a good thing for both economies, and the benefits of a free flow also apply to capital. If capital resources move to where they can be employed most productively, everyone should stand to gain.

By having United States foreign direct investment Korea gains the use of capital resources as well as the technical know-how and management ability that come with it. As a result, labor and other resources in Korea can be employed more productively and should raise capital inflow strengthening Korea's balance of payments. IMF policy has forced Korea to implement significant reforms. It is imperative for

Korea to construct dynamic and advantageous policies and to promote a Korea-United States industrial alliance in order to enhance Korea's competitiveness in the global market. The industrial alliances involve primarily joint ventures associated with capital and technology transfer so as to create new synergies from working together with partners.

Granted the changes necessary to catalyze a revitalization of the Korean economy, this paper contends that Korea is going to emerge from the crisis more competitive, having better allocated its resources. It examines how United States-Korea economic cooperation can bring out their competitiveness in global markets as related to capital flow and technology transfer. This study also contends that a United States-Korea industrial alliance (IA) can significantly increase the partners' ability to manage formidable risks of international business. The industrial alliance does strengthen the competitive advantages of the partners, having the mutually beneficial transfer of capital and technology from one partner in return for the nontechnological assets of the other.

### **Korean Industries and the United States**

Korea offers the unique advantages of holding a central position in the dynamic East Asian market, being located in a region with a huge customer base and between two of the world's biggest markets, Japan and China, with its own expanding domestic market and one of the world's most productive and diligent work forces. Korea has achieved remarkably high growth rates - about 8% per annum - since 1962, by mobilizing its factors of production for rapid industrialization. Industrial competitiveness has been influenced by structural problems, which include those of infrastructure and economic institutions. Korea's industrialization has indicated that the United States investment has been efficient and beneficial.

Facing the changing position of technology policy in Japan and the United States, Korea has to comply with the new situation in the global economy, reformulate its technology policy, and promote its technological collaboration with the United States. In the era of global competition, Korea can no longer rely on imported technology. It has to promote its own technological innovation with R & D efforts that are essential in meeting constraints imposed on it in changing world economy.

Trade between the United States and Korea has involved the exchange of products within the same industry, i.e., intra-industry rather than inter-industry trade. Korea revitalized and encouraged intra-industrial entrepreneurs such as the Korean American society of Entrepreneurs, Korea Software Incubation Center, and Digital Cast of

Korea. Under the World Trade Organization (WTO) system there was greater investment in Korea by foreign countries, especially the United States, including a significant liberalization of restraints on investment.

Korea has been seeking strategic industrial alliances with countries such as the United States, involving investment flow, technology transfer and joint venture. Korea has demonstrated that industrial technology was not simply brought from the United States, but that careful local technology support networks of indigenous sources were developed at the same time.

In the 1960s and 1970s, the primary motive for the United States investment in Korea was the increased price competition for technology, which reached the maturity phase of its product life cycle. Labor costs and economies of scale were the two most important factors, granted that the specific motivation for each United States firm to transfer technology to Korea varies from case to case.

Korea built up considerable technological capability through expansion of investment in indigenous R&D and imported technology since the 1980s, along with the communication facilities, adaptation, and use of technology imported from the United States. Korea picked up existing machinery and technology at bargain prices. It has established its own R&D institutes, bringing together scientists and engineers to work on common problems with efficient utilization of research equipment and facilities.

Korea intellectual property rights (IPR) protection was consolidated and adapted to the changing international environment.<sup>1</sup> The patent Act was designed to promote the development of technology and contribute to industrial development by protecting and encouraging invention and its application. It became clear that patents to protect intellectual property rights were ineffective in some leading sectors, such as semiconductors, computers, telecommunications, and aircraft. Korea liberalized its technology transfer policy along with foreign direct investment.

These leading sectors grew mainly by achieving a head start on their rivals, which they then exploited by seizing the market and moving rapidly down the learning curve. Korea's industrial policy accordingly shifted from the promotion of targeted industries to that of innovation-related activities.

Industrial alliances give firms a golden opportunity to expand sales channels globally. It is important for a firm to enter the market early and to quickly establish a lead. A shorter time to market can greatly enhance the probability of becoming a dominant player and creating a de facto standard. IA could shorten the development time by supplementing necessary technologies and funds. Behind the moves toward

IAs lies the structural change in the environment of corporate management - we have entered an era in which an individual company cannot by itself ensure its competitive edge in the world market. Regarding IAs, Korean automobiles alliance with foreign firms is a case in point. The automotive vehicle industry, the single most important industrial sector in most advanced economies, exercises a powerful multiplier effect on other sectors.<sup>2</sup> The growth in Korea's automobile industry relied heavily on industrial alliances with multinationals, drawing on partners' model designs and on help with setting up modern manufacturing facilities and component suppliers. Although much corroboration was established to share development costs, automobile companies also cooperated to gain access to difficult export markets.

The Big Three automotive companies in the United States filled a part of the subcompact end of their product line with Korean models. As for market and production specialization, automobile marketing is noted for its large-scale economy, especially when the dealer organization is an exclusive one as in the United States market. The Ford-Kia alliance was an example of production and marketing specialization. To get technology and parts, the IA was mostly technological in nature where late-starting Korean companies were collaborating with technologically advanced United States companies. The motivation of United States partners was either simply to get extra revenue by selling technology or to get an extra source product, usually on the low end of its product line.

Firms have an even greater incentive to enter the market early because they have only a very short time during which to recoup the enormous cost of R&D. It is therefore understandable that we observe a great number of industrial alliances among the firms in the electronic industry, where the market is global and the product life cycle is becoming ever shorter. The emergence of new communications media such as the Internet, interactive television and CD-ROMs, in addition to telemarketing and mail order sales, is contributing to the explosive growth of new direct sales markets. Technology fusion has become increasingly important nowadays, exemplified by the fiber-optics communication system emerging from fusion of optics and electronics.

Korea has engaged in the progressive opening of its communications industry and the development of a fairer regulatory network, and its vibrant information-technology sector is producing world-class personal computers, mobile phones, palm clones, and other devices at an accelerating rate. Information technology in the year 2000 makes up nearly 11% of Korea's GDP; it is expected to hit 20% by 2010. Export earnings from the information technology sector with consumer spending on tech gadgets and the Internet amounted to 40% of 1999's

10.7% GDP growth.<sup>3</sup>

United States investors look for local Korean partners to export a booming domestic market and use Korea as an export platform for the rest of Asia, particularly China. Ericsson is associating with Lucky Goldstar, as part of an alliance to sell telecom products across the region, and Sun Microsystems Inc.'s local sales, including Korea, jumped 150% year-to-year through June 2000, to \$315 million - about 6% of Sun's worldwide revenue. Korea actively seeks the United States investment as a partner to facilitate joint ventures of R&D and production, and to engage in fields like HDTVs, next generation automobiles and semi-conductors, and new materials for the purposes of formulating technological and industrial alliances, enhancing the trade balance of the two countries while strengthening their competitiveness.

The aggregate foreign investment in Korea since 1962 totaled \$ 11.2 billion at the end of 1993. New foreign investment in Korea amounted to \$1.04 billion in 1993 over \$894 million in 1992. By industry, \$527 million of 1993's foreign investment was made in the manufacturing sector and \$517 million in the service sector. During 1998 - 1999 Korea got \$24 billion in foreign direct investment, and \$ 16 billion more is expected in the year 2000.

As Korea embraced code-division multiple-access (CDMA) technology for its new mobile telephone system in 1993, it has been poised in the development of an industry of advanced digital communication.<sup>4</sup> These innovations provide Korea with bargaining options for cross licensing. Its strategy was to become a partner country in the cross fertilization of the international technology market. Joint ventures, licensed production, and subcontract agreements with Asian partners have been increased as American aerospace manufacturers seek lower fabrication costs and an expanded presence in developing Asian markets. For example, Sikorsky has co-manufactured UH-60P Black Hawk helicopters in Korea since September 1990.<sup>5</sup> Hi-tech advances in science and semiconductor technology have become the United States' dynamic comparative advantage industry, resulting in more research in this field in order to maintain the level of competitiveness.

United States hi-tech, such as semiconductors, led in world markets and surpassed the Japanese in high-definition TV, electronic books, wireless phones and other devices. Apple Computer Inc. and Compaq Corporation have been flooding the Japanese market, slicing the personal computer share of Nippon Electric Corporation (NEC).<sup>6</sup> This turnaround illustrates the role the United States government can play in hi-tech industry. Thus, Sematech-like partnerships indeed signify industrial policy that government assists United States corporations in

capturing economic profits from foreign competitors.<sup>7</sup>

Changing Korea's export product structure, equipment (mobile phones, satellite receivers, and high-end liquid-crystal displays) cover 27% of all exports in the year 2000, up nine percentage points from 1998. Korea's \$11.9 billion in technology exports in the first half of year 2000 includes \$6.1 billion of nonchip products.<sup>8</sup> As rising labor costs in electronics, automobiles and machinery threatened competitiveness in world markets, Korean industries were launching an overall restructuring of industry toward more technology-intensive, higher value-added products. Korean industry was placed at the threshold of transition from labor-intensive to technology-intensive manufacturing up until the early 1990s.

Following the guidelines of OECD, Korea eliminated subsidies, liberalized foreign investments and its capital market, and privatized commercial banks and financial institutions. With more internationalizing trade, business, and technology, Korea pushes its economy toward globalized markets, more consolidation and greater efficiency in production, and its boundaries signify much less than they used to in terms of the flow of capital and technology after this opening of the economy.

### **United States Industries and Korea**

The United States has the largest share of high-tech production and exports in global markets, and the United States industries are overwhelmingly successful in big system software, computers, aerospace, basic science, inventions, and new product design, areas where the United States can meet Japan's industrial challenge head on and thus can improve the bilateral trade balance.<sup>9</sup> America has a broad business, university and government technological base and an overall environment conducive to basic research and development. It leads the world in high-tech areas. Hi-tech industries have shown distinctive features. Their costs fall rapidly as production builds up, mainly due to economies of scale and the influence of the learning curve. And these leading-edge industries get replaced fairly frequently, mainly because of short product cycles.

The United States has established the Defense Advanced Research Projects Agency (DARPA), which has a \$2 billion budget with \$500 million in defense conversion programs in areas of regional technology alliances, agile manufacturing and dual-use critical technology partnerships. It is the model for a proposed new commercial technology facility. This agency influenced many commercially successful innovations ranging from packet-switched telecommunications to artificial intelligence. The agency is a catalyst in strengthening

American companies such as Sun Microsystems, Inc., the leading computer workstation maker since the 1970s.<sup>10</sup>

DARPA involves commercial ventures just like those of MITI's Agency of Industrial Science and Technology (AIST), and it even has an office in Tokyo for facilitating its access to Japan's new technology. DARPA supported microchip fabrication such as the Very High Speed Integrated Circuits program (VHSIC), and the spin-off of the program has resulted in development of the high-resolution X-ray lithography systems needed to produce the next generation of computer memory chips. In 1992, DARPA initiated a high-definition display-manufacturing consortium to cope with Japan's lead in the manufacture of thin electronic screens, commercial display systems, and high definition T.V.

Korea actively seeks United States investment as a partner to facilitate joint ventures of R&D and production, and engage in fields like HDTVs, next generation automobiles and semiconductors, and new materials for the purposes of formulating a technological and industrial alliance. If the two countries were to make most of their opportunities in Asia, it would be desirable that they develop economic policy, which stresses mutual comparative advantage of technologies.

Korea has increased investment in new technology and equipment, and initiated a drive for higher quality to meet the current competitive challenges in the post-GATT era.<sup>11</sup> Under the WTO system there will be greater investment in Korea by foreign countries, especially the United States, in the near future as Korea gears up to globalize its economy, including a significant liberalization of restraints on investment.

Granted that Korea's industrial technology has been developed from imported technology, the major feature of technological policy was, however, the fostering of indigenous technology through research centers established in both public and private sectors, and Korea has emerged as a growing market for its trading partners. With more internationalizing trade, business, and technology, the WTO will promote the world economy toward globalized markets, more consolidation and greater efficiency in production. Higher costs of technological innovation may be expected due to short life cycles, and increased privatization is probable.

Japanese inputs accounted for between 20% and 30% of the value of a Korean car and 85% of the value of a Korean-produced color TV set; 70 to 90% of the components of a Korean laptop computer came from Japan and account for more than 60% of its price. Since Korea tries to break out of dependence on its imports of intermediate products from Japan, the U.S.-Korea industrial alliance could ameliorate the

situation so as to maximize the synergistic benefits.

### **Korea and United States Technology**

Until the end of the Cold War United States policy had focused on the threat to security posed by the Soviet power, thus concentrating on defense R&D. Due to the geopolitics of the Cold War, Korea became one of the biggest recipients of United States foreign aid and technical assistance. Korea had relatively easy access to America as the most important source of capital and technology. For Korean industries, the American military local procurement program also offered opportunities to local manufacturing to "learn-by-doing" so as to meet product specifications. In the 1960s and 1970s Korea's industrialization began with technologies at the mature and declining stages in the product life cycle in the United States. Since United States firms cannot strengthen their competitiveness by stretching technologies at this stage, it became easy for Korea to purchase the technologies at a fraction of the cost of developing

Korea's R&D system has been geared to "latecomer catch-up" to close the gap. America has been the major source of Korea's imported technology, with the average size of both direct foreign investments (DFI) and technical licenses (TL) increasing significantly over time. The average size of America's DFI has been more than twice that of the Japanese, and the American TLs are more technologically sophisticated than those of the Japanese.<sup>12</sup>

As technology was recognized as the driver of productivity and economic performance, the Korean government changed the direction of the science and technology policy at the beginning of the 1990s. Korea, pursuing its drive toward the high-tech sector, has been selectively achieving dynamic comparative advantage from technology acquisition, learning-by-doing and productivity growth. Korea's becoming an advanced information society was to give impetus to the progressive opening of its communications industries and the development of a fairer regulatory network.<sup>13</sup>

Korea concentrated on wide-scale application of improvement engineering to borrowed technology, with emphasis on consumer goods for expanding exports. The government adopted policies that encouraged and actively guided technology imports. Korean appliance makers also have recently launched a series of new products, which they claim are capable of improving environmental conditions. The world's first bio television, which Samsung Electronics Company introduced in December 1993, emitted infrared rays off a ceramic coating on the inner and outer walls of the set's brawn tube. Exposure to the invisible rays stimulates the metabolism rate, according to the developers.



Korea assimilated imported technologies and beefed up technological capabilities by redirecting its technology policy since it became less competitive in labor-intensive industries. As America moved to higher technological levels, Korea did not simply buy technology from the United States, but emerged from careful domestic support networks of indigenous technology that were developed at the same time. Korea's technological progress was mostly implemented by the private sector's drive into high-technology industries along with their increasing R&D investment. Complemented by technology from the United States, Korean industries have promoted their own technological innovation with R&D efforts that were essential in meeting the constraints imposed on them in a changing global economy.

Anam Electronics Company stated that the 'n' in its name stands for the negative oxygen ions, which were emitted from its speakers and acted as an air freshener. In a move to keep pace with Samsung's latest television, Goldstar Company came out in January 1994 with its Art Vision Green. As a leader of the domestic consumer electronics and appliance markets, it was well known for its high-quality products and innovativeness in responding to customer needs; the Goldstar version emitted infrared rays as well as negatively charged oxygen particles.

The government has shifted toward protecting the technological development of small and medium enterprises rather than promoting the Chaebol. Almost 8,000 new companies were started in 2000, up 50% over 1999. To nurture venture or small enterprises the government has provided tax breaks and other incentives. The interests of these small and medium enterprises are better served through greater market liberalization.<sup>14</sup>

Public policy has led a drive to improve the country's technological infrastructure and to strengthen the competitiveness of the information industries and overall national technological capacity. Given the country's need for technology transfer and know-how, this drive is simultaneously expected to generate market openings and opportunities for United States high-tech firms. What makes these alliances strategically important was that many of them, whether equity-based or not, involved some form of technology transfer or collaborative R&D activities. While alliances involved joint marketing arrangements or distribution agreements, some form of cross-national transfer of technology has been usually involved. The IAs involving technology transfer can take many forms, such as technical exchange and cross-licensing, co-production, and marketing agreements, joint product development programs, or stand-alone joint venture firms with equity distributed among the partners.

Although the specific alliances vary in motivation, scope, and

duration, they all are aimed at enhancing the current competitive advantage of the collaborating firms. Korea cannot in the future rely on the United States without evolving its own research and development centers; to do so only deepens dependency, waste and helplessness. It presents a powerful argument on catch-up strategy of industrialization.

Korean companies also emerged as innovators in plasma-display panels, mobile phones, and digital televisions instead of reverse-engineering copies of products. *Business Week* reports that Korea ranks seventh in the world in spending per capita on research and development. It is also in the top 10 in patent registrations.

### **Technology-Transfer Series**

The United States has a huge financial and hi-tech capacity, whereas Korea has poor endowments of these factors, but it has a disciplined, high-quality work force and a proven record as a shrewd trader in the world market, producing quality products at low cost. The industrial alliances are likely to become bigger players in Asia, swapping Korea's manufacturing process technologies for United States product technologies. Korea may also play an increasingly important partner role for the United States in gaining access to the markets and talents of developing countries in the region.

Most developing countries have not built the necessary technology support networks that would allow them to absorb their high technologies imported from industrial countries. This vast technological strategic unpreparedness stems from the simplistic view of technology as simple hardware/software problems. Technology is a complex social relationship tying people, institutions and their skills together. Countries that have abundant unskilled labor and little physical or human capital need appropriate technologies that are labor intensive on a small scale.

Korea appears to be one of the few economically refreshing examples of realizing what industrialization should mean in the context of knowledge-oriented enterprises. The example of Korea that industrialized through such small-scale technologies could therefore play a role as a catalyst in international technology transfer.

As globalization has engulfed every regional market of the world, product life cycle has pushed industries to focus on market share competition. Increasing returns to scale plays an even more important role in market competition in technology-oriented industries. Because of globalization, the introduction of new products from the home country to the world market is virtually instantaneous, which can greatly shorten the product life cycle.

Since Korean industrialization was undertaken from scratch, serious

constraints existed everywhere in the form of insufficient capital, inferior technology, inadequate demand for industrial products and poorly developed infrastructure. Korea developed its own way of using technology and capital goods, including reverse engineering.

Furthermore, the government has reformed to do away with economic restrictions to secure flexibility in corporate management so as to enhance global competitiveness. It has speeded up its efforts to help industries' technology innovation and carry out educational reforms.<sup>15</sup>

Because of Korea's rising costs of factors of production such as labor and land, Southeast Asian countries and China offer opportunities and challenges. The shift to leading-edge goods or middle-level technology production will enable Korea to compete more effectively in the markets of higher value added products in the global market. Since problems of imported technology in developing countries have been centered on the problem of absorption, the suitable technologies to them are labor intensive and small-scale technology easily adaptable to any given situation. Korea, which industrialized through labor intensive and small scale technology, can play a role as a catalyst in international technological transfer series between developing countries and advanced-industrial countries such as the United States.

The crucial feature of Korean imported technology was its modification and adaptation, and it has developed its own way of using technology and capital goods, so-called indigenous production engineering. Machinery and technological application have been handled in simpler ways than originally designed, since workers were poorly equipped with skills. As long as the simpler way of doing a thing resulted in the desired production with higher value added, not only have output goals been reached, but also Korean management and workers have gained confidence and have themselves undertaken further improvement and adaptation of imported technology. Korea has encouraged the development of indigenous technology and has acquired those technological elements that have not been developed at home. As Korea has moved to high value-added industries, labor-intensive industries have been shifted to developing countries in Southeast Asia and Latin America. This is an interesting example of technological transfer series with Korea being the catalyst.<sup>16</sup>

Insofar as developing countries can borrow either specific elements of technology or the policies and practices of adaptation, they will move far ahead in their development stage. Korea can be a moving force in technology transfer to developing countries.

Korea's trade with Southeast Asian countries and China could be significant to United States interests. Utilizing its inexpensive labor

and land, China is being transformed into the world's emerging manufacturing center. China has achieved much in the last 25 years since it adopted the policy of reform and openness by bringing a portion of the population, the 260 million people in coastal areas along the Yellow River and the Southeast China Sea, into the market-oriented economy. The United States can capitalize on its close ties with Korea in the arrangement of the industrial alliance.

To counter the loss of competitiveness due to rising labor costs, both the Korean government and industries are promoting a new strategy for continued growth, namely, moving Korean industry decisively into technology, high-value added production. To Korean technocrats as well as leading corporate executives, this means upgrading technology in traditional industries such as textiles and garments, and pushing Korea into the frontiers of microelectronics, mechatronics, automobiles, aerospace, biotechnology, and superconductor.

### **Human Capital Formation**

Industrial competitiveness simply derives from the enhanced productivity of Korean workers producing goods and services to meet the test of domestic and international markets so that Koreans enjoy a standard of living both rising and sustainable. The ability to do so depends on the productivity of Korea's labor associated with skills and knowledge.

There was also a major reform in labor markets. In an attempt to enhance flexibility in labor markets, the Korean legislature passed a law allowing more flexible layoffs by employers. Labor market reform centers on the actual implementation of the institutional measures already introduced for increased labor market flexibility, such as a system for manpower leasing. Overall, the crisis has brought major reforms to the Korean economy which otherwise would be difficult to achieve.

The World Bank report describes Korea's educational achievement, saying that its success in improving the educational level of its population would appear to be unmatched by any other country. Industry is benefited as every year, universities and technical schools turn out 5,000 engineers. The broad sweep of modern economic history of industrial competitiveness has been one of innovation and creative destruction. Korea is in the stages of a powerful new thrust of industrial restructuring in association with high technology. Semiconductors along with computers and electronics technology already spawn a beginning wave of coming growth. The venture upstarts and innovation pipeline is full of promising new activities. Technology has been

recognized as the driver of productivity and economic performance.

If a primary economic goal of a nation is to generate an increasing standard of living for its people, accomplishing this objective depends not on the blurred concept of maintaining national competitiveness, but rather on achieving high productivity of its employed resources. If Korea desires to revitalize its competitiveness, it must invest in people, not in nationally defined corporations as such. Korea should welcome equally both foreign and domestic investing companies. And the government should increase investment in education, training, research, and infrastructure, so that Korea becomes a good location to set up shop for any international firm seeking talented employees.<sup>17</sup>

The vital aspect of these processes lies in the assimilation of the technology into the local industries' fabric. Korea with a modern educational system, and a strong internal scientific and engineering community can promote its own technological innovation complemented by technology transfer. As a mid-tech country,<sup>18</sup> it might actively involve United States investment as a partner so as to facilitate joint ventures of R&D and production. A country cannot rely on imported technology without evolving its own research and development institutions. The formulation of the science and technology policy has been undertaken for the national R & D program as the Korean government has changed the direction of science and technology policy during the 1990s.

Because knowledge has become the currency of modern economic competition, the strength of industry lies in its openness to ideas from the outside world. The new realities of global competition are forcing Korea to adapt its economic policy to attract foreign firms, Korean-American professionals\* and investment. Korean-American professionals, in their role in human capital formation and manpower training, would serve the critical role of a catalyst implementing increasing mutual benefits of the two countries. Their efforts could generate further market openings and opportunities for United States high-tech firms. A large number of Korean students were sent abroad for education, mostly to the United States, and these educated Koreans became elite administrators, engineers, scientists and managers who can increasingly move to responsible positions, promoting Korea-United States business transactions and linkages as well as industrial alliances.

Korea solicits highly qualified scientists and technologists to return through institutions such as the Korean Institute of Science and Technology, the Korean Advanced Institute of Science and Technology, and Kwangju Institute of Science & Technology. In addition, the Korean government established Free Trade Zones throughout the country to lure them back as entrepreneurs and industrial employees.

Korea must muster the human capital, financial and other resources for domestic R&D to maintain a continued industrial growth path, complemented by imported technology. Its industrial policy is geared to the fostering of indigenous technology through research centers established in both public and private sectors, and maintaining contact with Korean professionals abroad. Korea has to promote its own technological innovation with R&D efforts that are essential in meeting the constraints imposed on it in the changing global economy.

### **Conclusion**

The rise of the Asia Pacific region should be reckoned with in the international economic arena of the 21<sup>st</sup> century. These countries in the year 2000 have invested massively to sustain economic development. Granted that Korea's industrial technology has been developed from imported capital and technology, the major feature of its industrial policy was, however, the fostering of indigenous capital formation and technology.

Korea, with a modern educational system and a strong internal scientific and engineering community, can promote its own technological innovation complemented by the industrial alliance. As a mid-tech country, it has actively involved United States investment as a partner so as to facilitate industrial alliances and joint ventures. With more internationalizing trade, capital flow and technology, WTO will move the world economy toward globalized markets, more consolidation and greater efficiency in production. That is, national boundaries signify much less than they used to do in terms of the flow of capital and technology. Korea's present crisis signifies a challenge that the success of developmental efforts brings with it. The war Korea is waging may be considered to be a rite of passage into the maturity of a truly developed economy.

As Korea comes out of this crisis with success, it does so with a thoroughly reformed economy, and with one that is truly open to the world. Having a highly educated and diligent labor force Korea has achieved remarkably high growth rates since the IMF crisis. With its own expanding domestic market and its location very close to China and Japan, Korea offers the United States the unique advantages as well as the gains from the industrial alliance.

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### **Notes**

1. The revisions of various Korean laws related to IPRs were passed in the Korean National Assembly in 1997 in order to accommodate the WTO/Trade-Related Aspects of Intellectual Property Rights agreement. *Review of National Science and Technology:*

- Republic of Korea*, Paris, France: OECD, 1996, pp.43 - 46.
2. T. Collins and T. Doorley. *Teaming up for the 90s*. Homewood, IL, Irwin, 1991, p.132.
  3. *Business Week* (September 25, 2000), pp. 75 - 76.
  4. Korea's further ambition is to develop a CDMA transfer mode system for its network by the year 2,000. See *Far Eastern Economic Review*, Vol. 157, April 7,1994, pp. 40-41.
  5. See Paul Procter, "North America Seeks New Production Pacts" *Aviation Week & Space Technology*, Vol. 140 February 21, 1994, pp. 67 - 69.
  6. In 1987 the United States responded to the Japanese challenge in the semiconductor industry with Sematech, formed as a government-backed consortium whose sole role is to bolster the U.S. semiconductor technology. See Youn-Suk Kim, "Japan's Technology Policy and the United States" *Human Systems Management*, Vol. 13, No. 2, 1994, pp. 135-136.
  7. Paul Krugman, ed., *Strategic Trade Policy and the New International Economics*. Cambridge: MIT Press, 1986.
  8. *Business Week* (September 25, 2000), p. 72.
  9. The U.S. has competitive advantages in software and microprocessors, the two most profitable segments of the computer industry. See " Foreign Patents: Timing Is Everything" *Management Review*, Vol. 83, April 1994, pp. 58-59.
  10. See *The New York Times* (September 18, 2000), p. C4.
  11. See *Fortune*, Vol. 129, April 18, 1994, pp. 153-159.
  12. Linsu Kim. "Absorptive Capacity and Industrial Growth: A Conceptual Framework and Korea's Experience," *Institute Reports*, East Asian Institute, Columbia University, March 1993, p. 24.
  13. Youn-Suk Kim. "Korea's Technology Policy for Industrialization" *Korea Journal of Population and Development*, Vol. 26, No. 2, December 1997, pp. 108-112.
  14. *Business Week* (September 25, 2000), p.70.
  15. See *Business Korea*, (January 1998), p. 20.
  16. Youn-Suk Kim, "Managing Technological Transfer with Korea as a Catalyst" *Human Systems Management*, Vol. 8, No. 3, 1989, pp. 217-223.
  17. Robert Reich's "Who Is Us?" *Harvard Business Review* (January-February 1990): 53-64.
  18. Alice H. Amsden, "The South Korean Economy: The Mid-Tech, Middle-country Complex" *Korea's New challenges and Kim Young Sam*, edited by Christopher J. Sigur, New York: CARNEGIE Council on Ethics and International Affairs, 1993, pp. 75-96.