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Road to a KBE: The Case of Korea

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Korea

- Background
- Summary of the Background Report for the Master Plan
- Prospect and Challenges Ahead
 - Appendix: Making of Korea's KBE plan
 - Table and Figures

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I. Background

Korea's development paradigm is now at a crossroads. Most of the impressive economic growth of Korea in the past has been underpinned by strong capital accumulation and growth in labor inputs, to which the role of the government as nationwide resources mobilizer and manager was critical. Toward the mid 1990s, the limit of such input-driven, statist model of development began to loom up, engendering various ailing symptoms such as mounting trade deficits, rampant credit growth by financial institutes and highly overextended Chaebols based on excessive leveraging. Nonetheless, the sweeping majority of Korean people remained inattentive to or inactive on these symptoms, whether out of unawareness, self-indulgence, or interest dead-lock -- a good example of a systemic failure.

With the onset of the financial crisis toward the end of 1997, however, there came a dramatic turnaround. Facing the imminent danger of a complete economic melting-down or collapse - the first of such since the Korean War – the Korean society started to look at their problems anew and from a critical perspective. As the crisis deepened, ensuing a series of grave structural problems, an increasing number of the Korean people came to recognize that those problems are truly deep-rooted, all associated with their long beheld development paradigm.¹ Even though the Korean economy started to show the sign of revival by the early 1999, concern remained deep and strong over whether it could ride out the crisis completely and whether it could find a way back to its super-growth track. What has caught the minds of the Korean society anew in the meanwhile was a radical changes underway beyond its borders – changes in the production, exchange, and use of goods and services, driven by what can be described as a 'knowledge revolution'.

The background, facades, and the dynamism of the knowledge revolution and an emerging knowledge-based economy(KBE) are well known by now. Increasing scientific understanding and very rapid advances in ICTs are making knowledge and information one of the most important factors for competitiveness. Reductions in transportation and communications costs, technical progress, and fierce forces of globalization are leading to a more interdependent and competitive world. Investors are increasingly seeking first-mover advantages, new products and services which can respond to customers' diverse and rapidly changing demands, speed to the market, and first-rate access to key customers and sources of information. The rapid development of ICTs and the Internet are exposing inefficiencies in the functioning of markets, firms, and institutions, putting downward pressure on prices, and accelerating the need to restructure and adapt to changing conditions. New forms and means of networking are altering social patterns of work, shopping, education, leisure, communications, and the role and functioning of the government (see Figure 1). While the globalization and free information flows may make it easier to narrow knowledge gaps across countries in principle, it could actually bring about the opposite – a widening knowledge gap or a

¹ While the financial crisis in Korea was triggered by the regional contagion, capital flight from the local currency, and a weak financial system with poor prudential regulation and supervision, it was in large part also a corporate crisis, driven by excessive corporate debt and associated structural problems (OECD, 1999b).

'knowledge divide' in disfavor of the relatively backward, ill-prepared nations.²

Amid rising recognition that all these changes are creating overarching challenges for Korea's future development strategy, Korea's journey to KBE started. Since early 1999, a number of initiatives have been undertaken in Korea in an effort to develop its vision of becoming an advanced KBE. Mandated by the annual address of the President of Korea, the Ministry of Finance and Economy (MOFE), in conjunction with thirteen think tanks led by KDI (Korea Development Institute), prepared a series of background papers and a single volume of draft report on Korea's transition to a KBE. Following a public hearing in October 1999, the final version of the report (the Background Report) was prepared and presented to the subsequently created National Economic Advisory Council (NEAC) and the President.³ In April this year, after another three months of work on specifics and focusing, NEAC finally unveiled a long-term vision and three-year master plan for KBE development, advancing five strategic goals: i) making Korea into one of the world's top-ten information and knowledge superpowers; ii) developing the next generation Internet and the information superhighway by 2005; iii) promoting the use of computers by students, teachers, and the military; iv) conducting radical reforms in education to arm the country for its drive to transform itself into a KBE; iv) envisioning the dawning of an Internet society, where people will participate in the governance process through ICT, in a democracy based on human rights; and v) closing the development divide through productive welfare and balanced regional development (See Appendix about the procedural details on the making of the Background Report and the Master Plan)

Just two months into its implementation, it is just too early to tell anything about the success and failure of Korea's KBE plan. Although it purports to be an official representation of Korea's new development paradigm for the age of the knowledge revolution, it is not even clear whether the Korea society managed to identify a new development paradigm, and if so, what it is. By all accounts, it may well to say that Korea is still in pursuit of its new KBE development paradigm, that is as elusive as the very concept of knowledge itself. Nonetheless, Korea's recent endeavor in this vein would help illustrate what the knowledge revolution and a KBE mean to some late-industrialized country like Korea, how the associated challenges and opportunities can be perceived and handled, and what difficulties are expected in crossing-over the old, but tenacious paradigm of state industrialism.

The rest of this note will go as follows. The next section outlines the basic perspective,

² World Bank, World Development Report 1998/99: *Knowledge for Development*, Washington DC, 1999.

³ A fact deserving special attention here is the championship shown by the private sector, especially by the Korean press. Since late 1996, the Korean press started to lead the way in highlighting the risks facing the nation in a series of reports centered on the theme of change, the need for productivity-based growth, and a vision for the future based on knowledge. The press also initiated discussions and dialogue with civil society and business groups on these issues. The Maeil Business Newspaper, in particular, has sponsored three reports: Revitalizing the Korean Economy Toward the 21st Century 1997 by Booz Allen Hamilton; Productivity-led Growth in Korea 1998 by McKinsey; and Knowledge for Action 1998 by the Monitor Company. This fact cuttingly indicates that by the time Korea embarked on the official KBE plan, it has already reached a mature stage of development such that championship needed to cope with some national agendas could come from some sources other than the government.

strategy and main policies of Korea's KBE plan, as described in the Background Report produced in late 1999. The section after that briefly remarks on the limit of Korea's KBE plan, focusing on the problems associated with its implementation. Appendix contains procedural details on the making of the Background Report and the Master Plan

II. Summary of the Background Report: “Comprehensive Plan for Korea’s Transition to a KBE”

1 Vision and Strategy

A. Perspective on KBE

□ KBE is emerging fast as the new paradigm of the 21st century, replacing the old paradigm of two-century long industrial age. The transition process toward a KBE is now accelerating, and its potential opportunities and challenges will materialize fully in a foreseeable future.

- KBE is ‘real’, despite its low awareness among the Korean public. KBE is a natural, evolutionary outcome of more than two-century’s long maturing of industrial capitalism, which culminated in the forms of new mega-trends such as ICT revolution, globalization, and advent of knowledge workers en masse (Figure1).
- Facing the impending threat of ‘digital divide’ between the knowledge-rich and the knowledge-poor countries. Korea, being neither knowledge-rich nor knowledge-poor, is situated at a critical bifurcation point between making a new digital champion or becoming a digital fallout. Already, a group of countries US, UK, Finland, Ireland started to emerge as new digital leaders, while some traditional performance leaders such as Japan and Germany stagnate. (Table1 and Figure2). It is urgent for Korea to set out efforts to transform itself into a KBE.

□ In general, the transition to a KBE means making the entire society more suitable for the creation, dissemination, and exploitation of knowledge. However, practical and policy implications of the transition to a KBE vary across countries, depending on the stage/phase of economic development, industrial characteristics, and institutional or cultural environments, etc. It is very unreasonable to expect for some country like Korea to reach an advanced form of KBE in a short period of time, since a stock of knowledge and technical capabilities desired can be obtained only gradually through an evolutionary process.

- Therefore, in order to make a successful transition toward the KBE, Korea need to analyze its situation as objectively as possible, and seek practical and feasible ways to raise its overall knowledge intensity level close to that enjoyed by today’s leading countries. The crux of the challenge is how to make most out of the existing set of technologies, intellectual assets, industrial base, and all others productive assets, existing inside and outside of Korea.

B. Situational Analysis of Korea

1) Basic Indicators

□ When analyzing knowledge activities by dividing them into input, output, and processing/exploitation activities, the level of Korea’s knowledge input activities almost parallels those of the most advanced countries in the world. However, Korea’s knowledge ‘processing/exploitation’ and ‘output’ activities fall significantly behind them (Table 2a).

- This indicates that Korea is not getting the full benefit of the investments made in education, information infrastructure, and research and development (R&D), because of issues specific to the associated policies and possibly due to deficiency in the overall economic incentive and institutional regime.
- According to the IMD and WEF's analysis on the structural and environmental determinants of knowledge activities and national competitiveness, Korea lacks most seriously in the areas of globalization and financial sectors. In these two areas Korea is found to trail behind its East Asian competitors such as Taiwan and Malaysia, let alone the global leaders. In specifics, corporate governance, regulatory system, and the government's policy-related capacity were found to be most wanting (Table 2b-c).

2) Industry and Technology Infrastructure

□ Korean industries' level of knowledge intensity trails behind that of advanced countries, and Korean industries' level of productivity and technology innovation capabilities exhibits a significant gap compared to advanced countries (Table 3a-d). However, the productivity gap is showing a continuously decreasing trend, R&D investments in the entire industries have expanded substantially since the mid 80s, and the industries' efforts to develop technologies and innovation capabilities were strengthened (see Table 4a).

- In particular, Korea's leading corporations, including leading electronic and automobile manufacturers, have been achieving noticeable progress not only in the improvement of product and processing technologies but also in the commercialization of technologies.
- In the machinery and chemical industries, which are of critical importance to Korea's further industrial advancement, Korea's technical capabilities lack far behind that of advanced countries in high-quality high-end products. However, even in these industries, Korea possesses internationally-competitive level of processing and production technologies, that could be effectively tapped on by foreign MNEs interested in making strategic investments in the East Asian region.

3) Human Resources Basis

□ As seen in the small number of skilled workers, and in the large number of repetitive production workers, the quality of Korean workers trails far behind that of advanced countries. However, since the Korean society has a very high level of basic learning ability and knowledge absorption potential, Korea is considered to possess a flexible labor force that can be used to build the KBE.

- Korea's youth and adult population's literacy rate is at a world-class level. In terms of industrial labor force, Korea is not short of skilled workers and engineers that possess medium technology. Also, in terms of human resources distribution (gauged, for instance, by education level and academic achievement), Korea has very homogenous labor force characteristics, so Korea is considered to have huge potential for 'collective-creativity' through 'horizontal networking' among its labor force.

4) Locational Advantages in East Asia

□ As the cross-border movement of capital and corporations accelerates, the importance of MNEs as the source of knowledge-intensive industries and high-quality creation of employment is increasing rapidly.

- Ever-intensifying competition among leading MNEs and the rising importance of the Asian market will combine to lead a host of MNEs to step up their efforts to advance into Asian markets. Especially, the focus of MNEs' northeast Asia strategy to East Asia may gradually shift toward the northeast Asia in which China is situated (Table 5a).
- Also, MNEs' business interests in East Asia will be upgraded into high value-added, knowledge-intensive activities, such as product development, production of high-quality product and after sales service. MNEs' investments into Asian market are expected to become increasingly more strategic in nature.

□ Given its human resources, industrial infrastructure, domestic market conditions, and geographical situation, Korea is situated at an advantageous position to host world-class MNEs not only in major manufacturing industries but also in key service areas such as financial services and distribution industries.

- In the case of the manufacturing industry, Korean firms have a comparative advantage in hosting MNEs' strategic investments in a range of mid-, and high-tech industries, such as electronics, automobile, chemical products and machinery.
- To illustrate, compared to Japan, Korea can supply technical and research personnel at a lower cost. And compared to China, Korea is equipped with better R&D, production technologies, industrial infrastructure, and transparency in regulatory systems (Table 5b).
- Given its manufacturing firms' degree of technological advancement and the size of domestic market, Korea has huge potential to host leading MNEs in major service areas, such as finance, insurance, distribution, communications, and professional services.

C. Strategic Thrusts and Core Policy Areas

□ Figure 3 summarizes the vision and strategy of Korea's KBE transition plan.

- Korea's weaknesses can be summarized into two problems. They are the 'input-resources gap' and the 'institutional gap'. The input-resources gap refers to Korea's lack of core production factors, such as knowledge, technology, and capital compared to the leading industrialized countries. And the institutional gap refers to Korea's under-developed market economy system, which is needed for utilizing existing resources efficiently.
- Korea's opportunities and potential can be summarized into three: (1) MNEs are strengthening their northeast Asian strategy, looking for a regional platform for a range of mid-to-high level of knowledge-intensive activities. (2) Korea is at an advantageous position to induce MNEs' corporate activities into the domestic market, and has the tremendous learning capability that can be used in absorbing and applying advanced knowledge and technologies. And (3) the latest crisis brought about a fortuitous chance for Korea to undertake drastic restructuring and

reform measures to make itself more market- and knowledge friendly.

- The core development strategies, that take Korea's opportunities and weaknesses into consideration, are (1) establishing a basic order for market economy through restructuring; (2) transforming into a fully-open, globally-connected society through thorough liberalization measures and proactive FDI promotion policies. and (3) Enhancing internal innovation capacity by establishing an advanced level of national innovation system.

□ Making the transition toward KBE does not mean promoting specific industries or solving specific problems. It refers to the complete transformation of entire economic and social system. So, one should not overlook the fact that establishing a basic order for market economy through restructuring is an important part of making the transition toward KBE.

- A market-based economic order, that ensures fair competition and cooperation among concerned parties, is the most valuable system asset of a KBE, needed for effective diffusion and reproduction of knowledge. Serious deficiency in this area shall fatally hamper Korea's attempt to attract leading MNEs.

□ It is almost impossible for Korean firms to overcome the 'resources gap', an absolute gap between Korea and advanced countries, in a short period of time. It is imperative that Korea gives up its semi-open, self-contained development strategy and switches to 'fully-open development strategy', that will enable Korean firms to tap on a virtually unlimited pool of advanced tangible and intangible assets hoarded in the advanced foreign nations and firms. Hosting leading MNEs is the most import element of such strategy.

- To achieve this goal, Korea has to improve the Korean labor force's potential by developing human and intellectual capital, which constitute the core factors of competitiveness in the KBE. At the same time, the government should strive to build an open society, where effect of learning becomes maximized by closely linking global knowledge networks and hosting highly educated workers from overseas.

□ Areas that require continuous policy-level efforts for the establishment of the national innovation system include education and HRD, science and technology, information, SMEs, and social safety net.

- Korea should re-align or re-organize its R&D activities and HRD effort so that they can meet the changing needs of industries. For this, entire HRD system as well as the S&T/R&D system may need to be restructured drastically
- To precipitate knowledge creation, diffusion, and absorption, it is important to upgrade an information infrastructure in the earliest possible times. It is also necessary to realign various government regulations, including regulations on intellectual property rights, and to foster a new knowledge markets in line with the global market trends.
- In addition, Korea need to foster innovative SMEs that have capability of becoming strategic partners with leading domestic and international corporations. The existence of a pool of such SMEs is pivotal to the long-term competitiveness and sustainable growth of Korea.

□ Expanding service sector is one of the most salient features of all advanced KBEs but strengthening knowledge-intensity and competitiveness of the manufacturing sector are essential for stable and sustainable growth as a KBE.

- Given the Korean manufacturers' comparative advantage in production technology, the government should seek a way to achieve balanced growth among manufacturing industry, manufacturing-related services, and new service industries.

□ Knowledge and skill gaps will become sources of inequality in the KBE. Workers without useful skills and knowledge will not survive in the labor market. And individuals who cannot survive in the labor market have a potential risk of losing opportunity to participate in society as a citizen.

- In this regard, Korea should move away from its past social policy centered around direct income support to the less privileged. Instead, Korea need to establish a new system of productive social safety net couching on the concept of 'ex-ante' insurance of accessibility. Strengthening intermediary function of labor market, improving access to knowledge and information, and making efficient lifelong education and training systems exemplify some specific measures in this line.

3. Core Policy Areas

1) Developing Human Resources for KBE/S⁴

□ The Korean government must establish a competitive education system that is built on the principles of autonomy, responsibility, and productive competition by reorganizing current education system.

- For secondary education, establishment of autonomous private schools, specialized schools and other alternative schools should be encouraged. And for higher education, various government regulations should be realigned and eased for a freer environment, so universities based on education management and competition principles can be formed.
- The government should seek to improve primary and secondary school teachers' professional quality by improving personnel management and the payment scheme for teaching staffs. They can do this through the introduction of a performance-based remuneration system, hiring contract-base teaching staffs, and converting teachers' status into local government employees. To implement a curriculum system that values creativity, and to implement a rational performance assessment system, the number of students per teacher should be gradually reduced. Also, the college entrance system should be changed into a more flexible and diversified one.
- Universities should move away from the uniform management of undergraduate programs, and they should implement customer(students)-oriented education programs and university management. By introducing a variety of professor evaluation systems and a flexible guest professor system based on each university's unique characteristics, universities can improve their social responsibility, strengthen research function, and strengthen their link with industry, academia, and research institutions by forming a knowledge cluster that uses regional centers as strategic points.

□ The government must establish a lifelong learning system that can be accessible whenever and wherever citizens want, so that citizens can actually realize the benefits of learning and developing themselves 'from cradle to grave'.

- The government must reorganize the current education system into a system that conforms with the idea of a lifelong learning system. An 'education credit system', which records an individual's academic achievements through out his/her life, should be introduced. A 'revolving education system' should be established to provide more educational opportunities for adults.
- A 'cyber education system', that allows people to get the education they need whenever and wherever they wish, should be established. Also, to establish a consistent and consolidated support system for lifelong education, central and local-based lifelong education centers should be established.

2) Nurturing New Knowledge Workers with focus on vocational training & the HRA system⁵

⁴ Authored primarily by Korean Educational Development Institute (KEDI)

⁵ Authored primarily by Korean Labor Institute (KLI)

□ The government must reform its job training, certification, and compensation systems. This will allow efficient learning and training activities to take place, which can satisfy a variety of demands at the actual labor market under a competitive environment.

- The government should gradually privatize public job training agencies after converting them to self-supporting accounting systems. And the government should promote job training industries led by private sector (especially by encouraging the participation of foreign manpower development institutions) through the establishment of 'comprehensive manpower development companies', that provide comprehensive job related services, such as providing job market information, counseling, training, and worker dispatch services.
- Through the implementation of an official license system for private operators, the government can promote a certification system managed by the private sector, and introduce a basic job skill certificate system. Also, the government should introduce a manpower development organization like the U.K.'s 'Investor in People' and Singapore's 'People Developer' certificate system.

□ The government must prevent the collapse and marginalisation of the underprivileged class by providing practical job training for the unemployed.

- The job training system has to be transformed into an individualized and specialized training system that takes the trainees' capabilities and characteristics into full consideration. A job training quota system for the unemployed has to be introduced as well. Also, by establishing job training centers in which many different SMEs can participate, and by setting a minimum level of support for job skill development training costs, the government can promote SMEs' manpower development efforts.

□ The government must encourage corporations to invest in human resource development through the promotion of a Human Resources Accounting System (HRA)

- The government must develop a practical system, and encourage corporations to list their employees' major human resource values on their financial statements by implementing HRA on public institutions.
- Individual human resource accounts should be linked to education subsidies and training voucher systems. Individuals should be encouraged to choose a variety of services they are entitled to. These services include education, training, medical benefits, and unemployment payment.

3) Improving the efficiency of government's R&D investment

□ The government should strengthen the coordination function of "National Science and Technology Council" chaired by the President to avoid duplicative national R&D projects that are undertaken by various government ministries. The coordination among those R&D projects should be strengthened as well..

- By utilizing 'technology foresight project', strategic technologies which are key factors for the future growth will be developed. The resources for R&D investment should be allocated based on the importance of these strategic technologies. In addition, Korea must acquire know-how on state-of-the-art technologies and the implementation of R&D projects by encouraging foreign research institutions' and

corporate participation into national R&D projects.

□ It is necessary to institute a fair and objective R&D management and assessment system, so that Korea can make a transition toward 'creative R&D' from 'imitation-oriented R&D'.

- It is necessary to create a fair assessment environment that can improve the effectiveness and credibility of assessment. This can be done by expanding the industry's participation in the selection process of R&D assignments, conducting on-site assessments on lower-ranking R&D assignments, and increasing the number of publicly announced R&D assessment results.
- In order not to discourage corporations' desires to take on creative research projects with high economic uncertainties, it is necessary to introduce a 'free to fail' system. This allows corporations to take on high risk R&D projects by providing support for corporations' R&D failures on a short-term basis.

□ It is necessary to establish a support system that maximizes the effect of technology transfers to private sectors. Also, the public sector's R&D achievements must be utilized and expanded.

- It is necessary to strengthen the technology transfer function between the universities and research institutions, and to improve incentives for applying new technologies into practical areas. At the same time, it is necessary to expand technology transfer projects for the innovative SMEs and set a foundation for promoting the technology market function.

□ To expand the mutual exchange of knowledge among industry, academia, and research institutions, the collaborative system between these three pillars of innovation system should be strengthened. To achieve this goal, the government's R&D investments on joint research projects should be expanded, and exchanges among researchers should be expanded to increase the flow of knowledge.

□ The government must establish a knowledge-friendly environment to promote technological innovation in the private sector, realign and indiscriminate the overlapping tax support system, and finally improve tax and financial systems to create more demands for products that employ new technologies.

4) Establishing Information Infrastructure⁶

□ Thanks to active investments in the information sector by using measures such as providing increased numbers of PC units, Korea's hardware-side infrastructure has improved drastically. However Korea's software-side infrastructure, such as the link between different information systems, still remains weak. Because of this reason, developing the software-side infrastructure has emerged as an urgent issue that requires drastic improvement.

- Imbalances in the data communication system (including the Internet), unreliable linkage among different information systems, weak institutional infrastructure, and

⁶ authored by National Computerization Agency

the public's lack of information utilization capacity, are hampering Korea's advancement into an information society.

- Realizing the fact that building a high-quality information infrastructure is a prerequisite for the transition toward KBE, advanced countries have been making tremendous efforts to build a next generation Internet infrastructure that will run 100 –1,000 times faster than the current one.

□ The government must achieve the following goals by year 2002 in order to build a high-quality information infrastructure.

- Creating a proper environment to become a leading Internet-using nation in the world.
- Realigning related laws and regulations on the accumulation of basic information resources at an early stage.

□ The government must implement these seven key policy agendas to achieve aforementioned goals.

1. Establish a high speed, high quality information-communications network.
2. Establish a systemic link for the Internet infrastructure
3. Establish a national knowledge management system
4. Provide information education for all citizens at the national level.
5. Streamline laws and regulations into appropriate ones for making the transition toward KBE.
6. Establish a safe information system for the users, and establish a sound information culture.
7. Strengthen the foundation for electronic commerce.

□ It is very urgent that the government make accelerated efforts to establish a high-speed info-communication base, so that everyone can use high-speed, high-quality communication and Internet services.

5) Promoting the Software Industry⁷

□ Providing support to expand demand base for the software industry.

- The government must require public institutions to use legal software products, and allocate the appropriate budget for purchasing these legal software products.
- To encourage the public sector to make improvements in the areas related to software project commissions, such as bidding, contracting, supervising, computing project costs, and project management, the government must make systematic improvements by revising related laws.

□ Providing support to strengthen the development of high quality manpower and the software industry's development capabilities.

- The government must provide financial support for Korean software producers so they can strengthen collaborative programs with countries producing advanced

⁷ authored by Korea Information Society Development Institute (KISDI)

software, and provide support for joint product development projects with international corporations.

- When students complete software related courses offered by software companies, the students should be allowed to get credit for the courses taken at the software companies when the courses meet requirements set by universities.
- It is necessary to provide financial support for foreign language programs for software specialists, and it is also necessary to provide financial support to high-quality workers who wish to study abroad.
- It is necessary to establish a joint R&D system, industry, universities, and research institutions participating, that will place emphasis on major technologies, including technologies related to component software and virtual reality.

□ Strengthening the software industry's competitiveness by encouraging software companies to form a geographical concentration in a specific region

- By designating an area, where a natural concentration of software companies is formed as a 'Softtown', the government can support prospective startup software companies by providing technical and market information, free equipment facilities that can be used by all software companies, and by offering exhibition and distribution functions.
- Instead of providing incubator support, which has its own main focus on being providing a place and facility for startup businesses, the government should seek to reform its management directions. The directions that the government should pursue include providing support for various business-related services, providing business information, matching startup businesses with project financing, and introducing a performance-based payment system for business incubator facility operators.

5A) Promoting Culture Industries⁸

□ By taking the culture industry's tremendous growth potential into consideration, the government should make concentrated efforts in promoting areas where improvements can be made. Those areas include the animation industry, game industry, and traditional culture industry.

- It is necessary to expand support for a "One-stop support center for the game industry" and a "Game Academy". It is also necessary to support domestic corporations' participation in overseas exhibitions and advancement into overseas markets.
- The government should provide active support for developing animation specialists by supporting 'Animation Academy', and by supporting the domestic animation industry's joint production efforts with overseas animation producers.
- By forming a 'Film Venture Support Center', the government will be able to utilize the center as a base for further growth.
- The government should promote the globalization of cultural products that apply traditional Korean culture into products by encouraging Korean corporations' participation in international exhibitions, and by strengthening public relations

⁸ authored by Korea Cultural Policy Institute

activities. In addition, it is desirable to designate cultural products as the government's official procurement item (for example, the government can designate cultural products as souvenir items for foreign visitors) to expand the demand for cultural products.

- To secure the culture industry's competitiveness, it is necessary to seek ways to promote entire culture-related systems, including the development of content industry, establishment of an information system, and improving the distribution structure for cultural products.
- In order to accelerate the development of content industry, it is necessary to promote the publication of books and establish a 'Translation Center' to expand contact with foreign culture.
- To establish an information network for the culture industry, it is necessary to strengthen the 'Electronic Gate Project' on Korean culture, and strengthen the information link between different cultures and industries.
- To improve the distribution structure of cultural products, it is necessary to provide support for the establishment of an EDI (Electronic Data Interchange) system that handles electronically received orders, and to implement strong measures to prevent the distribution of illegal duplicates of cultural products.

5B) Promoting Tourism Industries⁹

- For the promotion of tourism industry, it is necessary to 1) secure the attractiveness of tourist destinations through their own merits, 2) establish a network among tour operators by using technology and information, and 3) improve the quality of tourist services to an international level.
- In order for Korea to secure attractiveness as a tourist destination, and to increase the value-addedness of the Korean tourism industry, it is necessary to promote convention, shopping, and theme park industries.
- The government should simplify approval and permission processes related to the construction of convention centers and theme parks. The government should also improve various tax systems, minimize the amount of required investments, establish a link to the state-of-the-art technologies, develop skilled workers, introduce a tourism operator certificate system, and provide support for hosting more tours and advertising tour products.
- To promote shopping tours, the government should provide comprehensive support, including support for joint brand development and R&D projects, and operating tour product guarantee systems. The government should provide support for promoting shopping tours. That includes the production of products, planning, designing, product development, distribution, marketing, and other sales activities related to shopping tours. In addition, the government should consolidate the support systems offered by various government ministries before it implements a variety of measures for promoting shopping tours.

⁹ authored by Korea Institute for Human Settlements

□ It is necessary to implement a ‘Win-Win strategy’ for all participants through the establishment of networks that utilizes the state-of-the-art information technology to make the tourism purpose exchanges easier and to move away from small-scale tour operations.

- To achieve this goal, the tourism industry has to develop new markets by utilizing state-of-the-art information technology. The tourism industry must develop figures of famous personalities, products, and specialties related to famous historic sites in order to maximize the advertising effect of those historic sites. Also, the tourism industry should strive to achieve a synergy effect by building a tourism network among central and local governments, private and public sectors, and tour operators.

□ To improve the quality of tourism service to an international level, it is necessary to strengthen the multi-language proficiency of employees of tour operators, and to establish a tour map information system. In addition, to build trust with Korean tour operators, it is essential to introduce a tour product guarantee system.

6) Dissipating Knowledge Management¹⁰

□ Although Korean corporations recognize and have a high degree of conceptual understanding on knowledge management, they are experiencing a great deal of confusion because they have not been able to find concrete implementation measures that are suited for them. To improve business performance through the implementation of an effective knowledge management system, the Korean corporations have to tackle the following issues.

- Corporations should establish clear and differentiated business strategies based on each corporation’s own core capabilities, and implement knowledge management to support these business strategies. It is very important to effectively utilize in-company knowledge management infrastructure, such as information technology and an assessment system for knowledge management activities.
- CEOs should create a vision for knowledge and disseminate knowledge. Also, CEOs must institute an organizational culture that values trust and sharing, and encourages employees to make changes within the organization. To achieve these goals, corporations should implement performance-oriented personnel management systems, and transform the existing management system into a more practical one where more responsibilities and authority are given to working-level employees. At the same time, corporations should implement changes in the management of organizations that can create knowledge, and promote the knowledge sharing and utilization seen in multi-function teams and knowledge communities.

□ Corporations should play a major role in implementing knowledge management in their management, and the government should play the role of supporting corporations’ knowledge management and creating a favorable environment for corporations’ knowledge management. The role of government can be summarized as follows; 1) making reforms in related laws and regulations; and 2) building an infrastructure for

¹⁰ authored by LG Management Development Institute

knowledge management.

- To implement a performance-based payment system, it is necessary to make changes in the standards of legally allowed payment, average wages, and regular wages specified in the Labor Standard Law to reflect realities. To develop high-quality workers, the government must provide more support for SME training programs, improve vocational skill development projects, and promote cyber education. To promote R&D projects, the government must change the professional researcher system into a more practical one, and improve the patent application process.

7) Enhancing Knowledge-Infra and Advancing Knowledge Market

(i) The Role of the Government¹¹

□ To prepare for new factors that will cause market failures, and to promote and support the private sector's knowledge and innovative activities to the maximum level, the government must have an innovative spirit and leadership that will allow them to make drastic reforms in legal areas, regulatory areas, and policy-making environments.

□ The government must avoid playing the role of an agent that supervises the private sector's economic activities, and it should also avoid playing the role of a direct provider of public goods. Instead, the government has to play the role of creating an environment and inducement system that will establish an institutional framework that promotes creation and the diffusion of knowledge.

- It is very important that the government play a supporting role in the 'establishment of institutional framework, inducement systems, and building a network related to various knowledge activities'. In addition, the government should make efforts to transform itself into a knowledge-oriented government by implementing continuous reforms in its organizations and its management system.
- At the same time, the government should make efforts in maintaining solidarity, which is the key factor that has to be attained first for long-term stable growth among members of society by making proper policy responses for dealing with increasingly the polarizing income and employment situation.

□ In administrating fiscal expenditures, the government must shift its focus to areas where the government expenditures are directed toward building knowledge capital instead of building social overhead capital. And the government should make a balanced approach toward the production, diffusion, and utilization of knowledge and information.

- The government must place emphases on improving the knowledge capital utilization rate by building knowledge capital through making investments on basic R&D projects, developing human resources (through university education and lifelong education systems), building information infrastructure, and establishing easily accessible information facilities (such as schools and post offices). At the same time, the government must transform its current fiscal support system where

¹¹ Korea Institute of Public Finance

the government provides financial support and various subsidies to the private sector into a knowledge-based fiscal support system that encourages the development of skilled workers.

- It is necessary to make improvements in the tax system and tax administration to conform with a new knowledge-based economic framework.
- In preparation for expanding the service sector, the government must make efforts to identify the source of tax revenues and to secure those tax revenues that will come from increasing the amount of electronic commerce, and increasing the number of transactions for intangible assets,
- The government must improve the efficiency of its tax administration by improving the effectiveness of the tax support system for R&D projects, venture businesses and human resources development, by introducing electronic tax filing system, and consolidating government's computer network.
- The government has to induce the public and private sectors related to procurement businesses to improve their information structure by making electronic procurement a mandatory requirement, and the government should encourage people to become familiar with the idea of information society.

(ii) Advancing the Knowledge Market¹²

- Strengthening protection for intellectual property rights: It is necessary to drastically increase the number of personnel that evaluate intellectual property rights applications so they are on a similar level as that of advanced countries. The government should provide support to new universities that open or expand the intellectual property rights-related departments.
- Respecting the protection of intellectual property rights: It is necessary to establish a separate commission under the President's office to coordinate a variety of functions. The commission should function as a government agency that provides prompt responses on making regulatory reforms and pending trade-related issues.
- Standardization strategy that conforms with international standards: Besides technical standards, such as product standards and measurement standards, the government should pay close attention to trends in areas such as the discussion of international standardization on the technical certificate system, engineering education, patent application, and make proper responses to these trends.
- The government must provide support to Korean knowledge experts so that they can play an active role in international organizations that handle standardization issues. The government must establish a 'Basic Plan for National Standards' in order to implement and manage a variety of issues related to standardization.
- Improving the government system to establish a knowledge capital evaluation system: It is necessary to introduce a technology evaluator system and to develop experts that specialize in evaluating various technologies to promote the private sector's investment in technologies, i.e. knowledge capital.

¹² authored by Science & Technology Policy Institute

III. Prospect and Challenges Ahead

The Asian financial crisis has brought about a re-examination of Korea's structural problems and a new willingness and social energy to change the Korean economy and society. Korea's accomplishments to date were quite impressive in many aspects. Not only successfully taking on sweeping reforms to cope with her grave structural problems, Korea also moved swiftly to articulate a new vision and plan to transform itself into an advanced KBE. However, even as Korea is coming out of the crisis with a comprehensive and well-articulated KBE plan, it is well expected to face a stock of new challenges in maintaining the present recovery momentum and in implementing the KBE plan itself.¹³

Despite significant progress made over the past two years or so, much of the deep structural problems of the Korean economy remain quite unresolved, leaving it highly vulnerable to external shocks yet. Turning to the global competitive environment, if Korea were being squeezed between the developed OECD countries and later-industrialized NIEs in her manufactured exports before the crisis, such so-called 'nut-cracker pressure' remains virtually the same or probably be greater. Although trade balance of Korea switched into a sizable surplus since 1998, there is no ground to believe that it is because the competitiveness base of the Korean businesses has improved greatly, compared to the pre-crisis era. Given that Korea still remains an egalitarianism-oriented society at large, maintaining social cohesion could cast another serious challenge. Signs are already there that the new 'digital divide' or 'knowledge divide' started to shape up in the Korea society, as it opted to embrace more elements of free market competition in the wake of crisis management. Now should the Korean start to loose the present growth momentum somehow, the threat of new digital divide could easily turn into an imminent and daunting reality, which Korean may not be ready to handle yet.

While all these potent problems point to the vital importance of Korea's new KBE plan in the post-crisis era, formidable tasks lie ahead in respect of its successful implementation. First, most reform strategy and various policy programs contained in Korea's KBE plan are systemic in nature and must involve the design and implementation of measures which are consistent across different, traditionally disparate areas of policy making. While piecemeal reform of individual elements can yield some improvements, the results will not be as promising as in the case of a series of reforms being jointly undertaken. In this regard, Korea's KBE plan is wanting a lot. Prepared in a hurried fashion over a short period of less than two years, it is less a fully-integrated form of comprehensive plan than a mere amalgam of disjoint set of variegated policies or programs drawn up by a number of specialized governmental agencies or experts. Contained in the plan are many overlapping and potentially conflicting initiatives, each geared to address a particular objective of its own. (e.g., developing S&T, coping with digital divide, SME development, and upgrading education). Developing and

¹³ After marking - 6.7% growth in 1998, the growth rate picked up dramatically to 10.7% in 1999. The growth rate in 2000 is forecast to be around 8-9%

implementing a fully-integrated and well-concerted version of reform strategy and plan would require intimate networking and horizontal interactions among various concerned and responsible parties. But despite the increased awareness, the importance of such issue is not fully recognized in Korea yet, and the present institutional frame of Korea is just too lacking for such networking and interaction to take place at desired level.

Second, insomuch as knowledge is free-will good hard to elicit or mobilize forcefully, it is hard to steer the development of the KBE in a centralized manner. It is essential that the government makes sure that all groups are well informed about trends and forces affecting them and therefore the need for change. Based on the experience of other countries that have crafted and implemented broad strategies (e.g., the UK, Ireland, and Finland), it is clear that the development of the strategy must be undertaken in consultation with the private sector and civil society. However, such a wide consultation with society is not yet the norm in Korea's model of government. Surely, the public hearings and consultations with various groups of private experts undertaken in the course of Korea's making its KBE plan was an encouraging trend. Nonetheless, the tradition of the government mandating reforms, taking initiatives and moving into actions remains too strong in Korea yet. Still the predominant tendency in Korea is to seek for instant solution guaranteeing quick results. In consequence, even some major reforms that could affect a vast number of people critically and for long tend to be undertaken so easily in a top-down, hurried fashion. Building consensus and buy-in from stakeholders on the desired measures would require a greater effort of dissemination, explanation, and consultation with a wider range of the public, including civil society. How much of success Korea could make out with a number of major reform agendas envisaged in the plan will critically hinge on how much of resources and patience the Korean society could exert for this time-consuming and often-fatiguing process of bona-fide consultation and conflict resolution.

Appendix. Making of Korea's KBE Plan

1. Chronology

- 1997 Recession deepened; Public interest in 'knowledge-Gap' heightened; Entered IMF rescue program.
- 1998.12 Grounding-up policy forum concerning KBE and its implication for Korea (held by MOFE-KDI)
- 1999.1. 'Enhancing Knowledge-Base' announced as and of Korea's top national agenda in the annual address by the President Kim Dai-Jung
1999. 5. Task force formed and research project launched to draw up a "Comprehensive plan for Korea's Transition to KBE (Master Plan)
1999. 10. Public hearings on the draft Background Report¹⁴
1999. 11. Finalized Background Report, "New Paradigm for the New Millenium, Comprehensive Development Plan for KBE", submitted to the President and NEAC(National Economic Advisory Council)
2000. 1. The Background Report endorsed, leading to a subsequent mission to prepare Master Plan (3-Year Comprehensive Plan for KBE).
2000. 3 Public hearing on the draft Mater Plan (MOFE-NEAC-KDI)
2000. 4 Final Mater Plan approved by the Cabinet and put into implementation ¹⁵

2. Background Report: "Comprehensive Plan for Korea's Transition to KBE"

A. Procedure

- KBE named as the government's focal commissioned research project of 1999
 - mandated by the President's annual address in 1999
 - engaging all major ministries and research institutes in Korea
- goals/missions
 - identify the challenges and opportunities of the KBE in the global & Korea-specific Context
 - develop a long-term vision and development strategy
 - identify and chart out basic policy directions and core programs
- Proceeding
 - timespan: May '99 - Oct. '99
 - 14 Research Agendas and 25 Policy Agendas identified
 - funding: approximate half million (USD) extra funds for contract-based research, aided by internal resources of participating research institutes

¹⁴ In the meantime, the Government launched a higher-concept "Vision 2010" project (Sep. 1999), aiming to integrate KBE plan with three other parallel plans (regional development plan, budget plan, social safety net plan) in a single framework. However, the 'Vision 2010' project did not manage to make out in any significant form.

¹⁵ Now only providing advisory consulting to Korea's endeavor in this vein, the World Bank launched an independent project of its own concerning Korea's transition to KBE. in partnership with OECD. The final report of the project is expected to be released soon.

- lead ministry: Ministry of Finance and Economy
- lead research institute: Korea Development Institute (KDI)
- external advisory group: the World Bank (invited by MOFE on September 1999)

ÿ Outcome

- July 1999: Interim report for Background Report and contents of field agendas
- Oct 16: public hearings on the draft report
- Nov.: Finalized Background Report submitted for review and endorsement

B. Participants

1) Government

- **Ministry of Finance and Economy** (MOFE: Lead Ministry)
- Ministry of Commerce, Industry and Energy (MOCIE)
- Ministry of Information and Communication (MOIC)
- Ministry of Science and Technology (MOST)
- Ministry of Education (MOE)
- Ministry of Labor (MOL)
- Ministry of Health and Welfare (MOHW)
- Ministry of Culture and Tourism and several other government departments

2). Research Institutes

- **Korea Development Institute** (KDI, Research Coordinator)
- Korea Institute for Industrial Economics and Trade(KIET)
- STEPI (Science and Technology Policy Institute)
- Korean Institute for public finance (KIPF)
- Korea Education Development Institute (KEDI)
- Korea Labor Institute (KLI)
- Korea Institute for Human Settlements (KIHS)
- Korea Information System Development Institute (KISDI)
- LG Economic Research Institute
- Hyundai Economic Research Institute
- Korea Cultural Policy Institute (KCPI)
- Maeil Economic Research Institute (Maeil Business Daily)

C. Construct of Research Project for the Background Report

- 14 research agendas** (including one industrial case study), each assigned to a best-qualified research institute in Korea (the institutes for agendas Nos. 1-8 were selected through open bidding);
- 25 policy agendas**, each undertaken by a government branch responsible for the actual drawing of key policy proposals/programs

	Agendas	Department/Institute
Coordinator		KDI
Research Agendas(13)	1. Overview: Challenges & Strategy 2. The Roles of Government 3. Education System 4. HRD (and labor market issue) 5. S&T and R&D 6. Cultural Industries 7. Tourism Industries 8. Knowledge Management	KDI KDPF+STEPI KEDI KLI STEPI KCPI KIHS LGRI
	9. Information-infra 10. Knowledge-intensive industries 11. S/W industries 12. SMEs and Venture Enterprises 13. Inbound FDI	MOIC – KCI MOCIE - KIET MOCIE - KISDI MOCIE - KIET MOCIE - IMDI
Industry Case Study	Micro-analysis Of 50 select industries	MOCIE – KIET
Policy Agendas(25)	Medium-term policy plan until 2002	Ministry in charge

3. Master Plan and Implementation

A. Procedure

- ÿ Background Report finally reviewed and endorsed by NEAC on Jan. 19, 2000
 - Subsequent mandate issued to develop Mater Plan called "Three-year Comprehensive Program for KBE Development"
 - Under the co-leadership of NEAC and MOFE, a new task force formed, encompassing all governmental and research bodies including those not explicitly engaged in preparing the Background Report.

- ÿ After review of the draft Mater Plan by the private experts advisory group of NEAC (March 17)
 - public hearing on the draft Mater Plan held on March 21 (MOFE-NEAC-KDI)
 - modified Mater Plan reviewed and endorsed by Economic Policy Coordination Committee (EPCC) and NEAC
 - the final Mater Plan endorsed by the Cabinet meeting and effectuated (May 5th)

- ÿ The Mater Plan put into implementation (5 core functional areas highlighted)
 - supervisory body: several associated governmental bodies such as EPCC, NEAC, National S&T Committee, Informatization Promotion Committee, Informatization Strategy Committee
 - Task Forces: comprise virtually all ministries (14) and research institutes (19) engaged in drawing up the Mater Plan

- ÿ Slightly modified/refined on May 11 (after deputy ministers' meeting)
 - Implementation to be checked-up on quarterly basis, with goals and performances to be set and evaluated each quarter (Rolling Strategy Process of Finland benchmarked)
 - New 'coordination task force' announced to be established, on top of five functional task forces originally envisaged. The coordination TF comprises MOFE, MPB, civilian experts, and heads of other five TFs. Director General of economic policy bureau of MOFE designated to lead the coordination TF. ¹⁶

B. Contents

ÿ Goals

1. Leapfrog to top 10 knowledge-information leaders in the globe
2. Upgrade educational environments to OECD standard
3. Upgrade spearhead S&T such as bio-engineering to G-7 standard

¹⁶ Originally EPCC designated to take ultimate charge of all implementation and updating procedures.

ÿ Core Program Areas

1. Thorough nationwide **Informatization** to protect vulnerable regions/social classes
2. Enhance **Innovation system** through more effective industry-university-GRI cooperation for instance.
3. Promote new **Knowledge-industries** such as information and culture-tourism. At the same time, enhance knowledge-contents of traditional industries.
4. Revamp **HRD** scheme to the need of the Age of Knowledge society
5. Develop solid **Safety Net** to cope with social disparity problem

<Tables and Figures>

(Table 1) New Trend in National Economic Performances

Countries	GNP per capita (98, \$PPP)	Real per capita GDP growth (%)			Unemployment rate (%)		
		89-93 (A)	94-98*(B)	B-A	1993 (C)	1998 (D)	D-C
U.S.	29,340	0.7	2.4	1.8	6.8	4.6	-2.2
U.K.	20,640	0.3	3.3	3.0	10.4	4.7	-5.7
Denmark	23,830	0.8	3.2	2.4	12.4	6.5	-5.9
Netherlands	21,620	2.0	2.7	0.7	6.5	4.1	-2.4
Ireland	18,340	4.5	6.3	1.8	16.7	7.7	-9.0
Finland	20,270	-1.8	3.5	5.3	17.9	11.4	-6.5
Japan	23,180	2.6	1.5	-1.1	2.5	4.1	1.6
Korea	12,270	6.1	3.5	-2.6	2.8	6.8	4.0

Note: * 94-97 average for U.K.

Source: KDI, *Development Strategy of Korea after Financial Crisis*, 2000.

(Table 2a) KBE Index of Korea (Average of 5 Advanced Countries = 100)*

Input Index	Flow Index				Stock Index			AVG.
	R&D Inv.	Edu. Inv.	Training		No. of Researchers	Collage Graduates		
	117.2	101.6	83.5		65.4	83.3		
Performance Index	Output Index				Influence Index			AVG.
	Patent Application		Articles Published		Contribution to Growth	High-tech Industries	Tech License Fee Receipts	
	54.9		3.4		23.9	57.0	11.1	
Process Index	Infrastructure Index				Utilization Index			AVG.
	Computer	Internet Hosts	Support HR	Prof.	Commercialization	University R&D	Employment Rate	
	45.8	14.7	28.8	34.6	74.1	62.6	60.7	

Note: * 5 Advanced Countries are United States, United Kingdom, Canada, Germany, and France.

(Table 2b) IMD Ranking of International Competitiveness By Categories

Nations Sectors	G-5					Korea	East-Asia Nations		
	US	UK	GER	FRA	JAP		SING	TAIW	MAL
Domestic	1	19	21	36	15	34	2	8	3
Openness	1	5	8	10	34	46	2	32	24
Government	13	10	36	42	27	34	1	14	3
Finance	1	6	7	16	23	45	10	19	28
Infra	1	17	7	14	21	31	15	26	24
Corporate	1	18	20	23	24	34	2	7	22
S&T	1	17	3	4	2	28	9	7	24
People	8	25	21	23	11	22	1	18	34
Total score	1	14	17	20	23	35	2	19	23

Source: IMD, "The World Competitiveness Yearbook", 1998.

(Table 2c) Major Problem Areas of Korea (IMD 1998)

	Weakest Areas		Weakest Areas
International - alization	Protectionism(46), culture(46) Government procurement (45), Incentives for inbound FDI (42)	Finance	Presence of foreign institutions(46) Access to foreign markets(45) Capital cost(45), Central bank(44)
Government	Regulation (46), Legal frame(45) Transparency(43), Policy-making (40)	Corporate	Governance (46), Venture firms(43) Labor relations(43), Image(42)

Source: IMD, *The World Competitiveness Yearbook*, 1998.

Note: Number in parenthesis is Korea's ranking among 46 nations surveyed

(Table 3a) Labor Productivity of Major Industries (1995) (US Manufacturing=100.0)

	Korea	Japan	Germany	France	Italy('94)	UK('94)	US
Manufacturing	62.2	122.6	99.7	107.3	68.0	57.2	100.0
6 Major Industries	59.7	119.2	104.0	109.2	64.9	55.6	106.4
Textile/Apparel	19.9	39.5	58.2	67.2	45.5	36.5	48.2
Chemicals	87.1	174.1	160.3	169.0	93.6	88.6	155.4
Machinery	49.9	123.9	84.1	85.6	75.2	50.2	98.7
Electrics & Electronics	79.4	125.2	85.5	106.3	74.7	44.5	123.0
Transport Equipment	63.3	146.1	109.4	98.5	67.0	53.9	107.3
Scientific Equipment	42.3	123.4	69.9	106.6	72.9	51.2	85.4

Source: OECD, STAN DATABASE, 1999.

(Table 3b) Export Shares of Major Industries (1994) (Unit: %)

	US	Japan	Germany	France	UK	Italy	Korea
Textiles & Apparel	3.6	1.8	4.9	6.2	5.1	18.0	18.9
Chemical Products	16.3	10.3	18.5	20.4	21.1	13.2	12.4
Machinery	19.1	21.0	16.9	10.8	17.4	18.2	7.5
Electrics & Electronics	15.5	23.7	11.2	9.9	11.9	8.2	28.9
Transport Equipment	20.3	26.5	21.5	20.5	15.0	10.4	13.6
Scientific Equipment	5.0	5.9	3.8	1.3	4.3	2.0	1.1
6 industries total	79.9	89.1	76.9	69.1	74.9	70.0	82.5
Manufacturing total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: OECD, The OECD STAN D/B, 1997

(Table 3c) Patterns of Trade Specialization (1995)¹⁾ (Unit: %)

	US	Japan	Germany	France	Italy	Korea
Chemical Products	0.20	0.17	0.24	0.11	-0.29	-0.21
Rubber & Plastic Products	-0.04	0.63	0.17	0.13	0.27	0.43
Drugs & Medicines	0.07	-0.45	0.21	0.11	-0.04	-0.44
Basic Metal	-0.31	0.45	0.12	0.05	0.17	0.06
Machinery & Equipment	0.02	0.72	0.44	0.06	0.45	-0.51
Electrics & Electronics	-0.18	0.55	0.13	0.06	0.10	0.32
Office & Computing machinery	-0.28	0.39	-0.26	-0.19	-0.12	0.16
Communication Equipment	-0.30	0.51	-0.00	-0.01	-0.23	0.49
Motor Vehicles	-0.37	0.72	0.31	0.07	0.01	0.68
Aircraft & Shipbuilding	0.52	0.58	0.21	0.50	0.23	0.16
Scientific Equipment	0.02	0.42	0.20	-0.08	-0.10	-0.47
Textiles, Apparel & Leather	-0.64	-0.59	-0.28	-0.16	0.45	0.53
Others	-0.27	-0.65	-0.20	-0.13	-0.56	-0.53

Note 1) All numbers denote trade specialization coefficient, defined as '(export-import)/(export+import)'

Source: OECD, Foreign Trade by Commodities, 1995.

(Table 3d) Korea's Int'l Technology Transaction

(10 million USD, %)

	Trade Volume			Major Import Products			Major Source Countries		
	Im	Ex	Im-Ex	EE	ME	CP	US	Japan	EU
Total Value (% share)	1,200	630	-1,137	601 (50.1)	232 (19.3)	138 (11.5)	633 (52.8)	360 (30.0)	177 (14.8)
CAGR(90-97)	12.1	33.3	11.3	15.3	10.7	-0.7	16.2	5.8	8.3
CAGR(94-97)	23.7	13.7	24.5	17.8	31.3	24.1	28.4	14.2	33.8

Note: EE= Electrics & electronics, ME=Machinery & Equipment; CP = Chemicals & Petroleum Products

(Table 4a) Evolving R&D Profiles of Korea

		1980	1985	1990	1995
R&D Expenditure	GDP share (%)	0.77	1.58	1.95	2.61
	Government share (%)	64.0	25.0	19.0	16.0
	R&D/Sales (%)	0.50	1.51	1.96	2.72
Research Scientists & engineers (% in manufacturing sector)*		-	19,000 (89.2)	70,500 (89.9)	100,500 (86.2)
No. of R&D Centers/Labs		54	183	996	2,270

Note: Numbers for 1990 and 1995 are for 1989 and 1994.

(Table 4b) Comparison of R&D Expenditure

	□R&D ('91-'96)	R&D (billion \$)*	R&D/GDP		R&D/Sales		Gov't R&D Share
			'92	'96	All Sectors	Mfg.	
US	2.83	184.7 (13.7)	2.78	2.54	2.8	2.9 ³⁾	33.6
Japan	1.83	138.6 (10.3)	2.94	3.00	2.8	3.4	26.5
Germany	1.39	53.1 (3.9)	2.48	2.26	4.0 ³⁾	-	37.3
France	2.68 ⁴⁾	35.9 ¹⁾ (2.6)	2.42	2.34 ¹⁾	4.8 ²⁾	-	43.6 ¹⁾
UK	3.63 ⁴⁾	22.6 ¹⁾ (1.7)	2.18	2.05 ¹⁾	-	-	36.4
Korea	21.21	13.5 (1)	2.08	2.79	2.4	2.8	22.1

Note : 1)'95 2)'94 3)'93 4)'90~'95

*) Number in parenthesis denotes the size of each country's R&D relative to Korea.

Source : MOST, Report on the Survey of R&D in S&T, 1997.

(Table 4c) Researchers, Scientists, and Engineers (RSE)

	US	Germany	Japan	Korea	Taiwan	Singapore	China	Malaysia
Total No.	962.7	231.1	680.0	102.7	61.1	7.7	588.7	1.6
(Ratio)	(9.37)	(2.25)	(6.62)	(1)	(0.59)	(0.07)	(5.73)	(0.02)
RSE Density	36.7	28.3	54.3	22.2	28.3			

Note: Korea, Taiwan, Japan; 1996; US: 1993; Singapore: 1994; Malaysia: 1991, RSE density refers to the number of RSEs per 10,000 population.

(Table 5a) Patterns of World Trade Flows by Regions (unit : %)

	1981-85				1991-95			
	EU	NAFTA	Asia	Import Total	EU	NAFTA	Asia	Import Total
EU	18.1	3.4	1.9	34.0	24.1	3.3	3.4	33.8
NAFTA	3.6	7.1	3.5	18.5	3.4	7.3	4.4	17.8
Asia	2.3	5.3	6.4	18.2	4.5	6.8	12.0	26.0
Export Total	35.7	20.9	17.6	100.0	39.1	20.0	23.8	100.0

Note : Asia refers to 38 countries excluding Middle East area

Source : IMF, Direction of Trade Statistics, Yearbook.

(Table 5b) Locational Advantages of the Far East Three: Conceptual Illustration

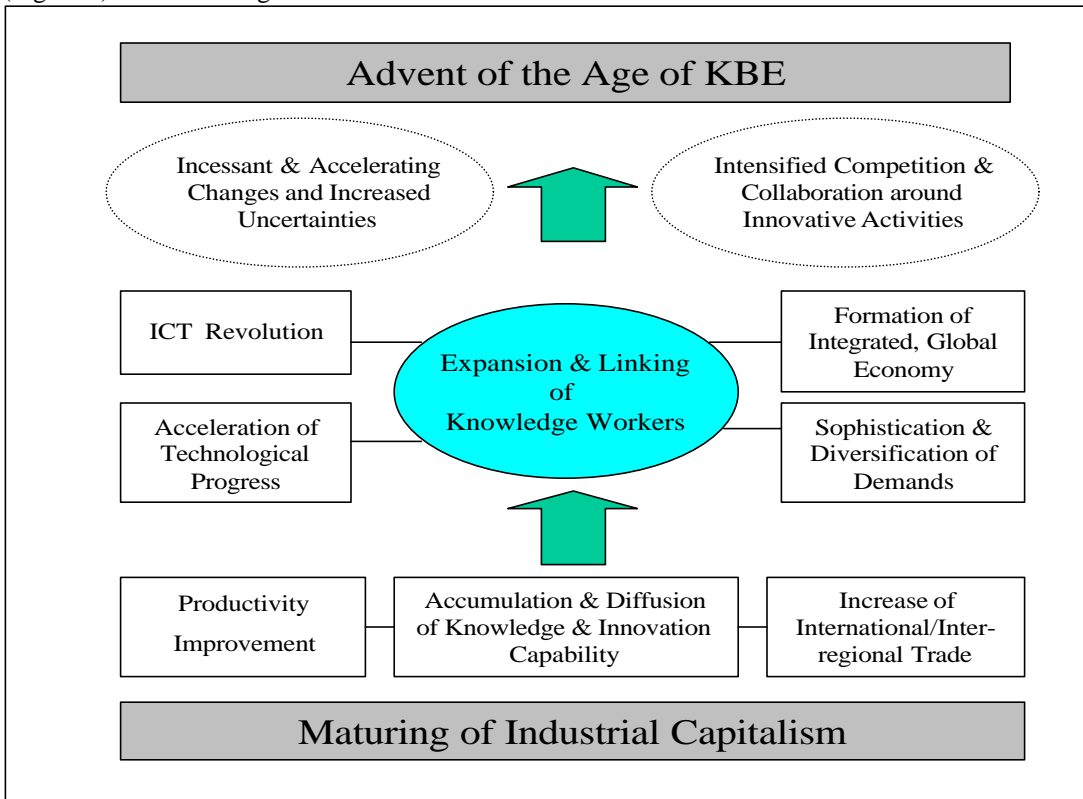
	Japan	Korea	China
Advanced research (generic/applied)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Commercial research & basic engineering	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
Product-process adaptation-improvement	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>
Production (mid to high-end product)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Production (low to mid-end product)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Source: strong advantage, advantage, neutral, disadvantage

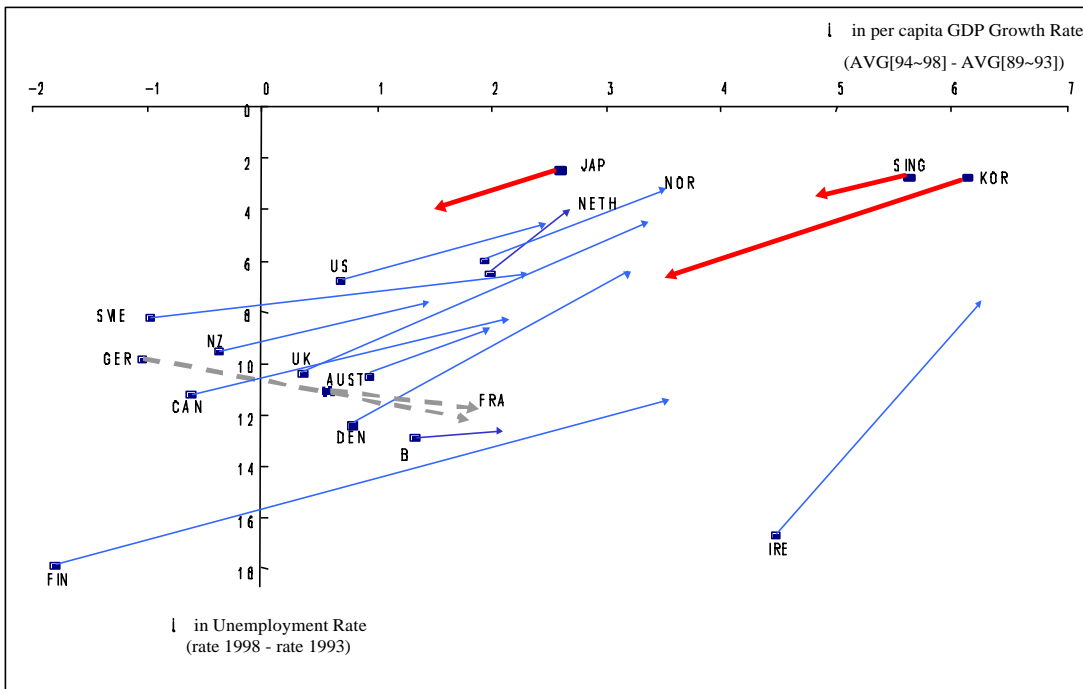
(Table 5c) Inward FDI in Korea by Source Countries (Unit: million \$, %)

	1981~1985	1986~1990	1991~1997	1998
U.S.	375.9 (45.17)	1005.2 (27.14)	2182.0 (20.88)	1450.3 (28.13)
Asia	304.7 (36.62)	1996.3 (53.89)	3288.9 (31.47)	877.2 (17.01)
Japan	263.2 (31.63)	1850.2 (49.95)	1733.3 (16.58)	413.6 (8.02)
Europe	109.0 (13.09)	598.3 (16.15)	4615.9 (44.16)	2662.5 (51.64)
Germany	24.2 (2.91)	165.2 (4.46)	761.5 (7.29)	643.8 (12.49)
France	9.1 (1.09)	63.5 (1.71)	814.3 (7.79)	352.7 (6.84)
Netherlands	8.8 (1.06)	107.2 (2.89)	1338.4 (12.81)	1218.3 (23.63)
Total	832.1 (100.0)	3704.2 (100.0)	10452.0 (100.0)	5155.6 (100.0)

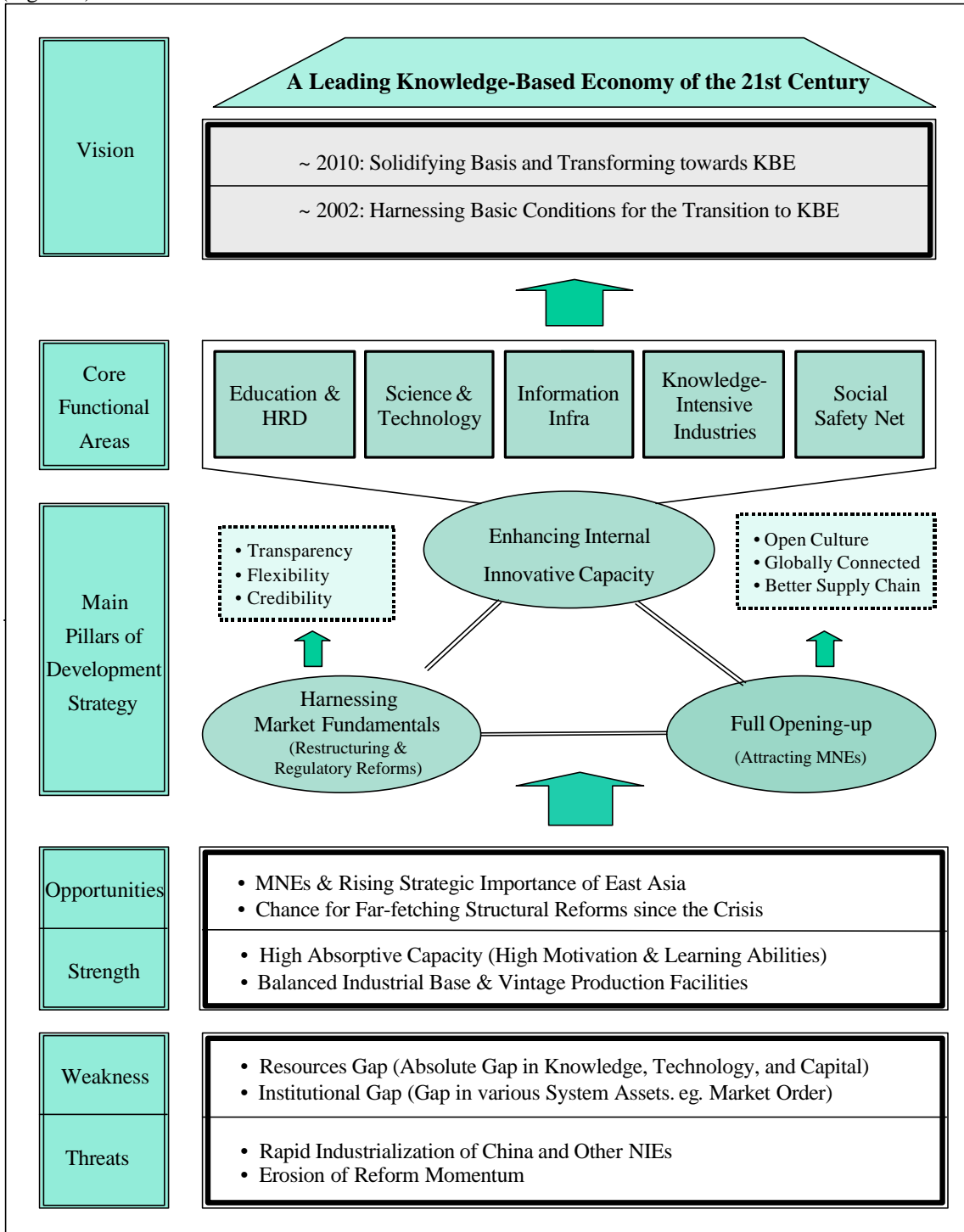
(Figure 1) Rise of the Age of KBE



(Figure 2) Emerging New Trend in National Economic Performances



(Figure 3) Construct of Korea's KBE Plan



(Table 6a) Evolution of the Manufacturing SMEs in Korea

	1980	1985	1990	1995
No. of Establishment	29,779 (96.9)	42,950 (97.5)	67,679 (98.3)	95,285 (99.0)
Employees (thousand)	1,000 (49.6)	1,368 (56.1)	1,864 (61.7)	2,034 (68.9)
value-added (billion)	4,168 (35.2)	10,059 (37.6)	31,432 (44.3)	73,808 (46.3)
Productivity Differential	55	47.2	45.8	39.4

Note: Number in parenthesis is the percentage share of SMEs in total manufacturing sector in each category. Productivity differential is as against the large companies with 300 or more employees.
Source: National Statistical Office, Basic Survey on Korea's Manufacturing Sector,

(Table 6b) Korea's R&D Investment by Industry and Size

	Total	Types of Establishments (Numbers of Employees)			
		5-99	100-299	300-999	1000 +
All sectors	100.0	3.5	5.4	9.7	81.4
Manufacturing	84.5	2.8	4.6	7.3	69.8(82.6)
6 Principal Industries	77.9	2.5	4.2	6.3	64.9(83.3)
· Electric/Electronics	36.6	0.9	1.5	1.6	32.6(89.1)
· Transport Equipment	25.9	0.1	0.5	1.9	23.4(90.3)
· Precision Machinery	0.7	0.2	0.3	0.1	0.1(14.3)
· Chemical Products	10.0	0.7	1.1	1.8	6.4(64.0)
· Machinery	3.6	0.5	0.5	0.7	1.9(52.8)
Construction	5.0	0.0	0.0	1.0	4.0(80.0)
TST	3.7	0.0	0.1	0.5	3.1(83.8)

Note: TST denotes 'Transportation, Storage, and Telecommunication' services. Number in parenthesis denotes the R&D share of the '1000+ establishments' within each industrial group.