기획논문 「정부학연구」 제13권 제4호(2007): 181~211

The Korean National Innovation System:
A Lesson in Public Administration and Governance for the Philippines

Eleazar (Eli) E. Ricote*

In this part of Asian region, the Korean National Innovation System (KNIS) is probably the best case to look at if the Philippinesis to learn about how a National Innovation System (NIS) can be the most potent tool for development. Such, however must be approached from the perspective of the public administration and governance.

Now distinctly Filipino in major aspects despite its historically western orientation, the study and practice of public administration and governance in the Philippinesis the most appropriate venue for a workable NIS policy/strategy to evolve. In fact, Korea's NIS framework, mainly characterized by the roles and efforts of key players, is consistent with Philippine public administration's current "beyond-the-state" character now called governance, where all stakeholders - government, private sector, civil society, business, academe - are appropriately taken in as actors or participants with specific and definite roles.

In the context of this similarity and the common ground that both countries have in terms of political and public administration realities, that the paper will attempt todissect the KNIS experience and draw out lessons in public administration and governance for the Philippines.

Key Words: Innovation System, Governance, Philippines

* He obtained his Bachelor of Arts in Social Sciences (major in Political Science) from the University of the Philippines in 1992. In 1997, he also obtained his Master in Public Administration (MPA) with specialization in Public Policy and Program Administration from University of the Philippines (UP), Diliman. He then took Master in Business Administration (MBA) courses at Dela Salle University in 1998 and is currently finishing his Doctoral Program of the National College of Public Administration and Governance (NCPAG), also at UP Diliman. He is the Area Head (Asst. Dean) of the Master in Public Administration (MPA) Program and Research Director of Jose Rizal University in Mandaluyong City, Philippines. He is also the current President of the National Capital Region (NCR) Chapter of the Association of Schools of Public Administration in the Philippines (ASPAP)(eli.ricote@jru.edu).

Ⅰ. INTRODUCTION: What is NIS and Why Korea?

National innovation systems (NIS) have been broadly defined as the structural and functional profiles of a nation that determine its innovative capability and economic performance. With the changing economic landscape characterized by technological progress, entrepreneurship and competitive global markets, a country's national innovation system is expected to integrate the roles and efforts of all the key players – government, education, business, finance, and civil society – towards nationwide economic development.

These roles and efforts of key players can and should be embodied in what Lalkaka (2002) outlined as "sub-systems" that must comprise the country's national innovation system: 1) science and technology policy; 2) innovation strategy; 3) technical human resources; 4) technical support services; 5) mobilizing financial resources; and 6) international cooperation. These "subsystems" comprehensively highlight major policy, structural and institutional requisites that a country – industrialized, developing or third-world –must critically establish in developing and/or restructuring its national innovation systems.

It is in the light of this comprehensive characterization of NIS that this paper about the (South) Korean case is being undertaken. With its remarkable economic growth sustained through the years by its national innovation system and its science and technology policy, the Korean case is worth highlighting as the world takes notice of the tremendous economic prospects increasing by the day, in this part of the Asian region.

For the Philippines, a developing economy nearby that cannot seem to take off economically as it should have decades ago, the Korean case is a rich source of critical innovations and lessons in public administration and governance that this paper will attempt to highlight.

Ⅱ. THE REPUBLIC OF KOREA: Economic Miracle through Technology

The South Korean Economy has rapidly advanced since the 1950 and is now the 11th largest economy in the world. South Korea is also one of the world's most technologically advanced and digitally connected countries. It has the 3rd most broadband internet users among the OECD countries and is a global leader in transport equipment, electronics, digital displays, semiconductor devices and mobile phones. It has encouraged the growth of family-owned industrial conglomerates, known as "chaebol" such as the Hyundai and Samsung groups.

Along with technological gaps, the presence of Chaebol companies was previously regarded as inherent structural problems that would cause difficulties for Korea's growth. However, with its strong national innovation systems as a driver of growth, Korea has remarkably developed over the last four decades.

Ⅲ. THE KNIS AND ITS SCIENCE AND TECHNOLOGY POLICIES[1)]

Korea's remarkable economic growth over the past 40 years can be attributed to its National Innovation System, which also went through drastic changes over the years. Such changes in the Korean National Innovation System (KNIS) that evolved according to its industrial development, can best be described by the changes in its research and development (R&D) investments, manpower, technological achievement and the individual innovation actors. Of specific importance are Korea's Science and Technologies (S&T)

1) The portion has, as major reference, Dr. Deok Soon Yim's Paper entitled Korea's National Innovation System and the Science and Technology Policy, written for the Science and Technology Policy Institute (STEPI), Seoul, Korea. 2004. The author gratefully acknowledges him for this.

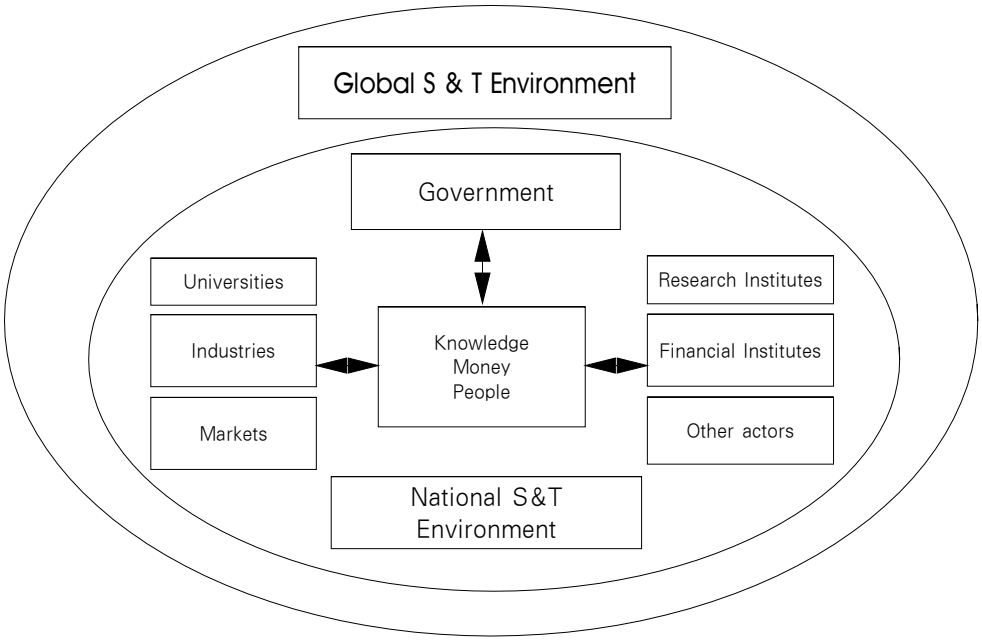
policies as the changes in KNIS are argued to be evolutionary responses and the outcomes in fact, of the government's S & T policies.

Initially led by the Korea's Government Research Institutes (KGRIs), the development of Korea's science and technologies gradually moved to private companies. In addition, a new S&T administrative system was set up to coordinate overall national S&T policy, investment and evaluation. Truly, these innovation actors in GRIs and private companies are the central forces that evolved the KNIS into a development strategy that produced concrete economic achievements. In 2003, Korea was ranked 37th in overall performance among 60 countries and regional economies with GDP per capita of 12,638 and total GDP $ 605.7 billion in 2003. In 2004, Korea was ranked first in the information technology infrastructure such as broadband subscription rate and third in S&T achievement index that indicates patent productivity and patents granted to residents. In was also ranked 8th in technological infrastructure competitiveness performance among 60 countries and regional economies.

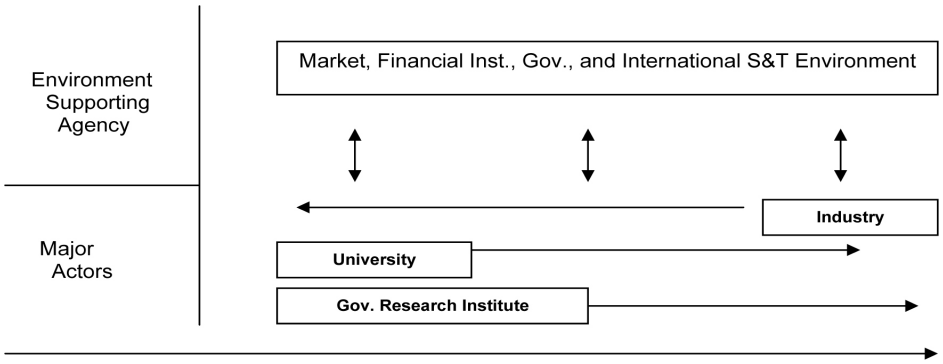
1. KNIS' Innovation Concept: Knowledge Cluster and the Role of Actors

Dr. Deok Soon Yim of the Science and technology Policy Institute (STEPI) stressed how Korea acknowledges the while NISmodel which drew much attention from policy makers in the 1990s, is a rather abstract concept, the innovation cluster model can give practical guidelines. As innovation takes place around a certain area under the interaction between market and innovation actors, innovation cluster can, in a sense, be considered as a "reduced" National Innovation System. The innovation cluster theory includes multi-disciplinary perspectives from sociology, economic geography, network theory, and industrial organization theory and it can be applied regardless of area. This systematic perspective implies that policy makers should emphasize not only the quantitative aspect of S&T policy such as S&T investment, number of R&D personnel, but also the management of S & T resources.

He noted further that in order to have a practical application of the theories of national innovation system and innovation cluster, it is necessary to define the innovation actors according to their generic roles in system.



The main elements in innovation cluster or system are Knowledge, Money, and People. The main activities are knowledge creation, transferring and utilization in the market. For this purpose, all the innovation actors interact with each other and exchange knowledge, financial and human resources.



In traditional S&T policy, the university is regarded as the actor that produces scientific knowledge only. However, there are many universities, which also make some business out of its research. The industries and GRIs also extend their roles. In addition, the financial institutes and consulting companies are becoming very critical agencies for the commercialization of research and development.

2. Research & Development: Investing on People and Production of Knowledge

Over the years, Korea has consistently increased its R&D expenditure. According to the survey on R&D activities in the fields of Science and Technology in 2004, the total R&D expenditure in the field of science and technology for the year 2003 was 19,687.0 billion won. R&D expenditure as a percentage of Gross Domestic Product was 2.64 %, which is an increase of 0.11 % from the last year. The table below shows that consistent R&D expenditure increased along with the increase in its ratio to GDP.

Total R & D Expenditure and Ratio to GDP

Year	R&D Expenditure(Thou sand $)	Ratio to GDP(%)
1994	100,098	2.44
1995	121,861	2.37
1996	128,857	2.42
1997	86,107	2.48
1998	93,862	2.34
1999	104,084	2.25
2000	109,935	2.39
2001	121,488	2.59
2002	144,328	2.53
2003	159,198	2.64

Source: Yim (2004)

Compared to other developing countries, the R&D expenditure in Korea in 2003 was

1/10 of the U.S., 1/4 of Japan, 1/2 of Germany, but the ratio of R&D to GDP shows 2.64 %, which is higher than other major countries.

While the Korean government provides funding for R&D expenditure, it is not the only funding source. Consistent with its principle of innovation clusters between and among innovation actors, Korea's increasing research funding is also sourced from private companies and foreign sources. Compared to other major economies, it is also notable that the share of government and public R&D expenditure in advanced countries were higher than that of Korea. The ratio of foreign source of funds in Korea was 0.4 percent which is very much lower level that of France (7.2%), U.K. (20.5%) showing similar size of R&D expenditure.

R&D Expenditure by source of funds in major countries(%)

Korea (2003)	U.S.A. (2003)	Japan (2002)	Germany (2003)		France (2001)	U.K. (2002)
Gov & Pub	24.5	36.9	25.8	32.5	38.6	32.8
Private	75.1	63.1	73.9	65.1	54.2	46.7
Foreign	0.4	0.0	0.4	2.4	7.2	20.5

Sources: OECD, Main Science and Technology Indicators, 2004/1 as cited in Yim (2004)

Rightfully, the government public institutes and/or the government supported research institutes get the huge share of the R & D Expenditure. Public research institutes receive R&D funds mostly from the government and public sector while private companies receive from private sources. The universities receive some R&D funds from private sources too. The R&D expenditure flow indicates that there is no strong relationship between private and public sectors and also with foreign countries. Especially the government supported research institutes are less active in partnership with private sectors than universities

Expectedly, this R& D expenditure is consistently translated into an increasing number of researchers. In 2003, of the total number of researchers (198,171 people), 124,030 or 62.7% came from companies. A total of 59,746 people corresponding to 30.1 %, worked in the universities, and 14,395 researchers (7.3%) were from public research institutes. The

growth rate of the number of researchers in the companies was increased by 5.1 % over the last year, which means higher growth rate than the total growth rate of the number of researchers, which is at 4.4%. On the other hand, the growth rate of the number of researchers in the public research institutes and universities remained as 2.1% and 3.7% respectively.

Researchers are classified by degree earned. With funding support pouring to universities, the number of people (researchers) who received doctorate degrees in 2003 was up at 52,595, an increase of 5.9% (2,928 people). Masteral degree holders also went up to 67,695, increasing by 5.6 % (3,574 people) while bachelor's degree holders was at 69, 892, an increase of 3.4% (2,280 people). Doctoral degree holders account for 26.5% of the total number of researchers while masteral and bachelor's degree holders account for 34.2% and 35.3% respectively. The remaining 4.0% have earned other academic credentials.

3. S&T and R&D Programs As Growth Factors: The Economics of Innovation

Korea's phenomenal economic growth cannot be attributed to a specific economic theory developed by the Korean government or a brilliant Korean economist. Nor was it based on an economic model influenced by international best practices and/or imposed by international agencies. Korea's growth is founded on the following concrete S&T policies as well as R&D programs pursued under consistent policy, institutional and administrative frameworks that facilitate/reinforce the translation of these policies and programs into real economic gains, for the entire world to notice.

1) Establishment of Research Institutes: Government as Champion

As early as the 1960s, Korea already knew the critical importance of research and development. It initiated the first modern R&D activity by establishing the government research institutes (GRI). The growth that Korea experienced during the 80s and 90s,

further reinforced the premium it puts on R&D. The remarkable GDP growth of 62 billion dollars in 1980, which soured to 253 billion dollars in 1990, did the much-needed boast in R&D expenditure. During this time, industries have grown so fast thereby increasing their R&D investment with the establishment of their own R&D laboratories. Universities also began to play an essential role in providing high caliber human resources for R&D.

After the late 1980s, the growing R&D activities in industrial firms and universities have led many scholars and policy makers to point out the relative inefficiency of Government sponsored Research Institutes (GRIs) and raised a question over their ineffectiveness in industrial technology development. For example, the government made an R&D investment of 207 million dollars for the period of 1982-1990 on 2,400 projects that were mainly proposed and carried out by GRIs. While the government jointly funded 30.9 % of the projects and industries were successfully commercialized, only 4.1% of the government-funded projects went to market successfully.

The major criticisms on the GRIs at that time were duplication of researches, poor R&D project management, and low R&D productivity. These problems were mainly attributed to the lack of consensus of institutional missions among government authorities and top managers of GRIs, excessive monitoring and control by government, and its government's unstable budgetary support. To address this, the government, in 1996, changed its research funding policy from the lump-sum system to Project Based System (PBS) in order to enhance research productivity in Before the introduction of PBS, manpower costs of researchers of GRIs were supported from the governmental budget and GRIs charged only direct research costs to each project. Under the PBS, GRIs have to charge the manpower cost to research project and compete with universities and industries to get research contracts. The PBS contributed to diffuse the competitive R&D funding system for creative researchers as well as the customer relationship and price concept in government researches.

In 1999, the Act on the Creation, Operation, and Development of GRIs, was enacted. This policy established a new management system for GRIs, the Research Council System

(RCS) patterned after the German and British systems. GRIs under the related ministries were brought to a unified control of the Prime Minister's Office, freeing GRIs from the excessive control of related ministries. Under the new RCS, five research councils were established. Each research council acts as a supervisory body to oversee its member GRIs. Since its foundation in 1999, this policy on GRIs brought about positive results. It afforded them autonomy in their operation, management, decision-making, and organization functions thereby strengthening each director's leadership. It also fostered a competitive climate among industries, universities, and GRIs. Further, it improved the compensation system with the introduction of annual salary system and a performance-based system. There remain however three major issues: governance structure (RCS itself), budgetary allocation structure, and the internal management within GRIs.

2) The National R & D Program: Competitiveness of a Knowledge Economy

The national R&D program was first initiated by the Ministry of Science and Technology in 1982. The program, which aims to strengthen Korea's technological capability and competitiveness, has made significant contributions to economic growth as well as the improvement of the quality of life. Today, national R&D efforts are geared toward meeting the challenges in a move to a knowledge-based economy with a view to placing the nation among the ranks of the advanced economies by the early 2010s. In order to accomplish this goal, the government emphasizes efficient use of S&T resources based on the principle of "selection and concentration."

The current National R&D Programs include the 21st Century Frontier R&D Program, the Creative Research Initiative (CRI), the National Research Laboratory (NRL), the Biotechnology Development Program, the Nanotechnology Development Program, and the Space and Aeronautics Program.

There are also five major research councils: 1) Korea Research Council of Fundamental Science and Technology.; 2) Korea Research Council for Industrial Science and Technology; 3) Korea Research Council for Public Technology; .4) Korea Council of

Economic and Social Research Institutes.; and 5) Korea Council of Humanities and Social Research Institutes. The major functions of each research council are: planning, budgeting, and evaluating. The research councils plan the research areas, evaluate the performances, and submit the budgets for the GRIs. In addition, the research councils are given the power to nominate the directors in concerned GRIs and to restructure the GRIs if the performances are not satisfactory.

The 21st Century Frontier R&D Program was launched in 1999 to develop scientific and technological competitiveness in newly emerging areas. The government planned to invest a total of U.S$3.5 billion over a period of ten years in this program that would comprise twenty-three (23) projects in new frontier areas. The most outstanding feature of the program is that each project director is given full authority in managing the program. The project director is responsible for designing the details of the research projects.

3) Basic Research and Manpower: Homegrown Research Competencies

Universities in Korea retain 72.6 % of the research with doctoral degrees, but they do not offer adequate research environments due to lack of funds, poor research facilities, and excessive teaching-oriented environment. In 2001, only 10.4 % of the national R&D investments were allocated to universities while the government research institutes and private industries were 13.4 % and 76.2 % respectively.

As basic research is essential to the strengthening of the nation's foundation long-term development, the government plans to increase its investment in basic research up to 25 percent of the government R&D budgets by 2006. The Ministry of Science and Technology and the Ministry of Education & Human Resources (MOE) via their respective agencies, the Korean Science and Engineering Foundation (KOSEF) and the Korea Research Foundation (KRF), mainly sponsor basic research.

In order to promote university research, the government designates university research groups with distinctive research capabilities as centers of excellence (COE). The COE includes Science Research Centers (SRCs), Engineering Research Centers (ERCs) and

Regional Research Centers(RRCs). The SRCs and ERCs focus on cooperative researches between regional universities and industries.

The SRCs and ERCs are selected on the basis of their research capability and performance. In the selection of the RRCs, the capabilities to contribute to the regional economy and community are important factors. Once the centers are selected, they receive government funding for nine years provided that they survive the interim evaluation conducted every three years. So far, 43 SRCs, 57 ERCs, and 54 RRCs have been selected and funded.

In 1996, the government created the KOREA INSTITUTE for Advanced Study (KIAS) as a world-class institution for basic research. The Asia-Pacific Center for Theoretical Physics was also established in 1997 as a regional center for basic research. To facilitate basic research, the government also provided universities with modern research facilities through the Korea Basic Science Institute (KBSI), which maintains more than 300 sets of research equipment for joint use among universities.

Scientists and engineers are the main players in the advancement of science and technology in Korea. In order to foster scientists and engineers of top quality, it is critical to develop a system of advanced education to nurture said creativity especially among the youth. This is being done through government policy to transform the current teaching-oriented universities into research-oriented universities. To stimulate such a transformation, the government is providing financial incentive support to those universities with excellent research outputs.

Many of the major universities in Korea have responded to this policy by embarking on reform programs anticipated to bring about drastic changes in university education in Korea, one that will reinforce a culture of research. These changes include changes in admission processes, undergraduate curricula, graduate programs, etc. The Korean Advanced Institute of Science and Technology (KAIST) is a model in this pursuit towards a research-oriented education. The Korean Government established KAIST in 1971 to generate world-top quality engineers and has since its inception received preferential funding from the government. As such, it attracts the best students.

Its research performance record is recognized as evidenced by the abundant research funds it gets from the industry. By 2004, it already graduated 26,707, of which 5,380 received doctoral degrees. KAIST also established the Graduate School of Management tasked to train technology executive officers. Modeled after KAIST, the government founded Gwangju Institute of Science and Technology (GIST) in 1995. It has already produced 1,130 graduates, of which 121 received doctoral degrees. Likewise, the Pohang University of Science and Technology (POSTECH) represents the first private sector initiative of its kind in Korea.If during the early stages of industrialization, the demand was for more engineers, the current thrust in the education sector is towards "quality" graduates in response to the emergence of the information-based economy.

4) International S&T Cooperation: Presence in the International S&T Community

Since Korea started without modern technological base, Korea had to seek foreign technological sources. Therefore, the main purpose of Korea's international S&T cooperation was to acquire the foreign technologies and technical training.

However, as the economy grew, Korea also tried to contribute to international scientific advancement. It actively promoted both bilateral and multilateral cooperation with foreign countries and international organizations. The International Joint Research Program, first launched in 1985, served as a major financial source for international joint research under bilateral, intergovernmental and inter-institutional agreements. Thus far, the program has funded 1,896 joints projects.

The international joint projects have been small in scale, and have been used more as a means to facilitate international scientific exchanges as projects research and development. The international joint research projects have also been very concentrated on a limited number of countries, such as Japan, U.S.A., Germany, France, Russia, China and the U.K. The program is now being restructured so it can facilitate bona fide international joint R&D.

Through multilateral cooperation in the international community, Korea has committed

to join international research and development efforts for the advancement of science and technology and to solve the issues of global concern, such as climate change, global warming, and acid rain. In the arena of trade agreements and business alliances, Korea participates actively in international S&T activities and projects of multilateral and regional organizations, particularly, the Overseas Economic Cooperation and Development (OECD) and the Asia-Pacific Economic Conference (APEC).

Said international cooperation on S&T also extends to North Korea. The summit meeting between South and North Korea held in Pyongyang in 2000 has opened a new era for S&T cooperation between the two Koreas. The main objective of inter-Korean S&T cooperation is to facilitate cooperative economic development through an S&T cooperation agreement. On the short term though, the objective is for South Korea to aid North Korea in helping to resolve such difficulties such as food and energy shortages. For instance, the Ministry has recently undertaken five R&D projects with North Korea, including the development of super corn, the development of agricultural medicine suitable for North Korean terrain, and the joint R&D in computer software, establishing the channel of S&T for systematic and effective implementation.

Ⅳ. NEW DIRECTIONS: Getting Ready for the Future

Aside from its consistent S&T policy, Korea's strength is its clear vision of what it intends to achieve within the in the international S&T community. Building upon its very strong research base, Korea expects to be a front runner in responding to S&T challenges, trends, and directions.

1. New Trends and Issues in S&T: Business Process Outsourcing and China

Korea saw the prospects of large companies moving into foreign countries not only for cheaper production costs and new markets but also for R&D activities. Even the education sector is seen to be affected as students will now prefer business and law degrees given tremendous prospects at employability under the landscape of global business outsourcing (BPO), rather than degrees in the fields of science, technology and engineering.

Korea also sees China as a challenge it has reckon with. China has been catching up with Korea's industrial and technological lead at a very fast pace. Korea has to move faster to retain its competitive lead. It has to accumulate more knowledge in the areas of basic science and fundamental technologies, which require accumulated investment and longer time frame. Under this situation, Korea needs to upgrade its national innovation system both in quality and quantity. It may have to increase the R&D productivity of universities and GRIs. It has to attract more innovation actors into research and development in science and technology, locally and internationally.

2. S&T Policy Directions for the 21st Century: Reforming GRIs, Investing in 10 Industries

The Korean government recognizes the need to balance national development with the new and emerging roles of science and technology, which can be different from its past and/or existing S&T policy direction. This balancing act draws its importance from its objective of making the S&T policies respond to human, societal and environmental realities.

At the international front, Korea plays an active role in international efforts to contribute to human welfare through the advancement of science and technology. This is a drastic transition from the past policy of industrialization. In order to achieve this objective, the Ministry of Science and Technology sought to establish a more balanced

innovation system that encourages cooperative and competitive tripartite partnerships among industries, academia, and public research organizations. For one, the National Science & Technology Council (NSTC) revised the Basic Plan and also changed the period over which the plan was to be carried out.

The new government also created the position of Presidential Advisor for Information, Science and Technology Policy, completing institutional and organizational framework for an S&T policy that will build the groundwork for "science and technology-driven society."

GRIs were reformed. First, the Korean government has relocated a total of about 268 public organizations among 344 ones (including GRIs) from Seoul to local areas as a part of the administrative capital relocation program to Chungcheong province. This physical movement of GRIs is expected to foster regional innovation clusters to promote "balanced" national development by relocating public organizations (including GRIs) to local areas. This highlights the critical role of GRIs in the building of regional innovation clusters. Second, the structure of governance was improved as a response to the problems of RCS' efficiency and effectiveness been raised since in 1999. The Office of Prime Minister, the upper-level institution of GRIs did researches on the effective management structure and desired future roles of GRIs.

This was complemented by organizational reforms as well Korea's S&T administrative system. The concept of "science and technology" is being expanded and developed into "technological innovation." As part of this strategy, the Minister of Science and Technology was promoted to the higher rank of Deputy Prime Minister. In addition, an independent Office of the Ministry for Science and Technology Innovation, headed by a vice-ministerial level official was established within the Ministry of Science and Technology. The head of the Office will also serve as the secretariat to the National Science & Technology Council (NSTC). At the same time, the Science & Engineering Research Society, a group of government-funded research institutes was moved to fall under the umbrella of the NSTC from the Prime Minister's Office.

Finally, as the economy expands and industries develop, the lack of basic technology is becoming a setback for the continued advancement. As such, investments were made in

basic sectors. In 2004, the Korean government designated ten industries of growth where S&T efforts and R&D investments will be concentrated −1) biotechnology, drug discovery, organs; 2) digital display; 3) intellectual robot; 4) semiconductors for the new generation; 5) batteries for the new generation; 6) digital TV, broadcasting; 7) mobile communications for the next generations; 8) intellectual home network; 9) digital contents, software solution; and, 10) cars of the future.

3. The First Five-Year S&T Principal Plan: Clear Policy Start

The first five-year S&T Principal Plan set the framework S&T development and management, including specific measures such as S&T investments and national R&D, enhancement of public awareness of S&T, S&T human resource development, promotion of technology transfer and commercialization, and the globalization of S&T activities.

Finalized in December 2001, this plan served as the action plan for reaching the first stage of the development goal set in Vision 2025 and supplements the Five-year Plan for S&T Innovation. The plan aimed to put Korea within the top ten S&T powers by the year 2006. This was achieve through the following strategies: 1) investments in S&T development on the principle of "selection and concentration"; 2) best use of the creativity of scientists and engineers; 3) linkage between domestic innovation systems with the global system; 4) enhancement of public understanding of and interests in S&T; and, 5) efficient use of R&D resources

The Korean government also established the National Technology Road Map (NTRM), which describes target technologies for development, timetables for development, and their anticipated effects. Approximately 800 experts from industries, academe and research communities participated in the process of formulating the NTRM. The NTRM is updated periodically to take into consideration the new changes taking place in science and technology.

4. The Revised S&T Basic Plan (2003-2007): Continuity and Consistency in Policy

With the inauguration of the new government in February 2003, the Plan was revised to reflect recent developments and pursue new directions. Compared to the original Basic Plan established earlier, the revised plan laid out a broader role for S&T, both at the national and community levels. If S&T was previously considered to be meaningful only when it contributes to national development and enhances the country's competitiveness, it now took a broader perspective to include social considerations.

While the specific goals were essentially retained, a new objective was to be pursued. This was to towards enhancing S&T competitiveness to become the world's 8th best by 2007, not the world's 10th best as originally planned in 2006. Specifically, the revised plan had the following strategies: 1) advance the national S&T innovation system; 2) select and focus on strategic future S&T areas; 3) strengthen future growth engines; 4) systemize regional innovation capacity; 5) create new jobs matching the demands of a knowledge-based society; and, 6) expand people's participation and spread S&T culture among them.

5. Vision 2025: Long Term Vision for Science and Technology Development

Over the long term, Korea envisions major S&T gains through the following policy directions and strategies: 1) shift in the national innovation system from government-led to private-led innovations; 2) improvement in the efficiency of national R&D investments; 3) alignment of R&D systems with the global standards; and, 4) meeting the challenges and harvesting the opportunities presented by new technologies.

To realize its S&T vision by the year 2025, the Korean government launched the 21st Century Frontier S&D Program and enacted the Science and Technology Framework Law in 1999. This was the same law that provided for the formulation of the Five-Year Science and Technology Plan and National Technology Road Map.

6. Regional Science and Technology Plan: Decentralizing S&T, localizing Innovations

While looking at competitiveness in the international S&T Community as a objective, Korea also pursued strategies to trickle down S&T gains at the national level to regional centers to sustain and expand the coverage of development achievements.

Following the movement of several GRIs to regional locations to encourage regional innovation clusters, government set up the Five-year Comprehensive Regional Science and Technology Promotion Plan, which consists of following programs and strategies: 1) development of local competences in strategic technologies; 2) creation of regional centers for technological innovation; 3) development of local S&T human resources; 4) establishment of regional S&T information systems; 5) nurturing a culture conducive to S&T innovation; and, 6) increasing R&D investments of local governments

Ⅴ. The KNIS AS GOOD PUBLIC ADMINISTRATION & GOVERNANCE: Culture of Innovation Sustained by S&T and R&D

Over the past 40 years, Korea impressed the world with remarkable economic growth. Along with said growth, the world also saw major changes in its National Innovation System (NIS) along with the rapid development of its industrial sector. Truly, Korea's NIS and its ability to respond to the changing economic environment, was a definite growth factor. The strength of Korea's NISis founded on its well-defined S&T Policies as its consistent pursuit of research and development, with government as the champion consistently forging collaborations and support from other innovation players and capacitating its homegrown R&D expertise.

Of course, the Korean case is not exactly perfect and can be replicated in other countries. It may have its inherent policy, institutional and administrative weaknesses. Its

gains however, can be attributed to its ability to evolve and adjust to the challenges and prospects that come its way. Such ability is clearly reinforced by consistent policy on S&T, unwavering pursuit for R&D and willingness to learn from and collaborate with the rest of the international S&T community. Most importantly, it is sustained by the government's trust and continued investment in its people's talent, ability and dedication to innovate not just for the sake of S&T competitiveness but also ultimately for human and social reasons.

The Koreans themselves may not call it as such, but it is unmistakably good public administration and governance –at least at least given our broad definition of it. The KNIS case is good public administration and governance in that it made the most out of its resources and its administrative structure. With the state as the prime mover, it capitalized on the potential of its human resource by R&D capabilities, pursued consistent S&T policies, managed fiscal resources to support said priorities and generated support and acceptance from its major stakeholders.

Of course, the applicability of the KNIS experience as a lesson for the Philippines will be a function of how this can fit our definition of public administration and governance.

Ⅵ. PHILIPPINE PUBLIC ADMINISTRATION AND GOVERNANCE

1. From Public Administration to Governance: Consciously Multidisciplinary

Public Administration in the Philippines formally began with the establishment of the then Institute of Public Administration at the University of the Philippines under a technical assistance from the United States and the United Nations in 1952.

However, the roots of Philippine PA's administrative character can be traced back to as early as the pre-colonial era, the colonial period and the later, independence period which have all enriched it. And so, when PA was formally instituted in 1952, the country already

had a sense of the nature and scope of its administrative character which was possibly an uneasy mixture of indigenous Filipino concepts of social/community management, raw ideas/symbols of military rule courtesy of the Japanese colonizers, vague concepts of a central government-church rule courtesy of the Spaniards and, huge American ideals of democracy and election systems.

Such an "uneasy mixture" of influences however did not render Philippine PA nagging to be defined or approximated by clear philosophical characterization when PA was formally introduced in the country with a strong American flavor of "conflict controversy" with political science. Philippine PA steered away from American PA's preoccupation with its definitional and philosophical issues as a distinct discipline. Rather, it evolved independently as an academic discipline and continued to grow as a fusion of external theorizations, constructs, principles and internal concerns.

1) Inward-looking PA: The Anomalies of the Environment, not the Field

These internal problems of the public organizations and administrative system as well as the overriding goal of instilling traditional PA values of efficiency, effectiveness and equity, made Philippine PA more conscious of what Danilo Reyes, in 1995, termed as the "anomalies of its environment" rather than American PA's propositions of politics-administration dichotomy, which Reyes also aptly called "anomalies of the field". PA literature during this time was "inward looking"or preoccupied with the problems engulfing the public sector as well as the internal problems of the bureaucracy.

This inward looking theme continued to persist as PA expanded towards wide-ranging concerns from institution building to the strengthening of its network and collaborative activities with the public sector. This period (1957-1972) which Reyes categorized as a period of institution building and the search for new frontiers was marked by the involvement of more Filipino scholars in the study and practice of PA. This period ended with the dark years of martial law in the early 70's.

2) Socially Conscious and Politicized PA: Reform Orientation

The next phase in the evolution of Philippine PA was a turbulent one as the country was then plunged into the uncertainties of transition. While the martial law administration effected sweeping changes in government under an authoritarian regime, it also sought to foster the philosophy of development, largely drawn from influences then ranging from the international community. This period was characterized by the restructuring of the bureaucracy under the Integrated Reorganization Plan, the rise of technocrats, the fixation with development goals of the Marcos'model of constitutional authoritarianism. It was a difficult period for scholars of PA. In their quest for efficiency in the administrative system, they were faced with the choice of either collaborating with an authoritarian regime which hopefully would correct fundamental anomalies in the bureaucracy or resisting it in favor of slow but democratic means of reform. This period also marked the emphasis on development administration during the Marcos years. This period saw the flowering of concern for a client-focused orientation or the outward-looking theme, as the discipline become engrossed with such problems as equity, redistribution of wealth, better service delivery, and also as a result of the influence of the outlook towards new PA. (Reyes: 1995)

From 1982 to 1992, Philippine PA was associated with the increasing activism of the discipline as regards inequities in society. It was in this era where the embers of political activism began to be fanned as PA, as well as the rest of Philippine society, saw the Marcos regime as a corrupt and illegitimate dispensation that cannot deliver the desired reforms both in government and in society as a whole. Much of the studies in this period represented the then prevailing mood for change, for reforms and for attention to the populace, which has been habitually neglected by government. PA in the Philippines continued to evolve a socially conscious, social reform-oriented but highly politicized character. (Reyes: 1995)

3) Governance: Beyond the State PA

The 1999 World Conference on Governance held in the Philippines has been regarded as a coming of age for Philippine PA as it formally redefined Philippine PA's scope and extent. Broadly defined, governance now refers to the sound exercise of political, economic and economic and administrative authority to manage a country's resources for development. It embraces not only the affairs of the government but also the proactive role of the private sector and civil society in national development. Its basic elements are accountability, participation, predictability and transparency. (Carino: 2000)

Consistent with the governance's encompassing "beyond-the-state" character, Philippine PA thus widened its horizons and expanded to diminish the confines of the state and look beyond it to include in its purview, all other (democratic) state institutions (legislative, judicial, civil society, etc.) that are involved/engaged in the activities of the public sphere. In dissecting the governance concept that now characterizes Philippine PA, Cariño highlighted what she termed as processes pushing for governance, chief among is the continued quest for growth and development.

2. Public Administration, Governance, Development and Innovation Systems

The most prominent theme or strand of thought that characterize the study and practice of public administration in the Philippines over the last four decades is that of development. Specifically, it is the challenge of development administration that represents the commitment of the discipline's study and practice towards addressing the problem of poverty alleviation and of modernization on the Philippines.

This invariably provided the discipline with the perspective of developmentalism, whereby all issues confronting public administration in the country and its critical fields (public policy, local governance, fiscal management, etc.) can all be subsumed under Philippine public administration's most urgent concern –the critical need for a development model that is implementable given existing administrative structures,

sustainable given scare resources, consistent with the current political makeup, and culturally appropriate to a country of diverse sub-cultures.

This solid grounding of Philippine public administration on development has never been more pronounced than in its current "beyond-the-state"character called governance, where all stakeholders (private sector, civil society, etc.) are appropriately taken in as actors of the conduct of governance.

Governance has been defined in various ways. The World Bank, for example, defines governance as the exercise of political authority and the use of institutional resources to manage society's problems and affairs. Other definitions revolve around the use of institutions, structures of authority and even collaboration to allocate resources and coordinate or control activity in society or the economy.

Elements	Dimensions	Areas of Action
Accountability (answerable to public; responsive to source of authority)	Criteria to measure performance Institutionalized mechanisms to ensure standards are met	Public sector mgt Public enterprise mgt Fiscal Management Civil Service Reform
Participation (people's access to and influence on public policy processes)	Undertaking development for and by the people	Participation of beneficiaries Gov-Private Sector Interface LGU Empowerment Cooperation with NGOs
Predictability (fair and consistent application of laws, policies)	Legal & Institutional Arrangements Upholding the Rule of Law	Law and development Legal framework for private sector development Executive-Judicial relations
Transparency (availability of info & clarity about government rules and decisions)	Access to accurate and timely info about government regulations and decisions	Disclosure of information

Source: ADB-Governance Assessment of the Philippines 2003:23

The more commonly used definition of governance in the country is that of the Asian Development Bank. ADB broadly defined governance as the sound exercise of political, economic and administrative authority to manage a country's resources. It involves the institutionalization of a system through which citizens, institutions, organizations and

groups in society articulate their interests, exercise their rights and mediate their differences in pursuit of the collective good. Its basic elements are accountability, participation, predictability and transparency which are also the key principles of sound development management (ADB 2003:22).

As mentioned, the 1999 World Conference on Governance held in the Philippines has been regarded as the coming of age for Philippine PA as it also redefined its scope and extent. Citing the United Nations Development Program in 2000, Brillantes further pointed out that governance has been the missing link between antipoverty efforts and poverty reduction and that, faulty governance can nullify the impact of pro-poor national policies and targeted interventions. Good governance is the single most important factor in the war against poverty and in the struggle to promote development.

Under the governance framework, all of society is involved in managing the public affairs, yet the state does not shrink into nothingness. In continues to play the key roles of enabling and facilitating the participation of the other elements of society, the so-called other actors of governance. As such, the country's development administration agenda is expected to define specific areas where these actors have specific and definite contributions

This is where the KNIS has made a mark. It may not have been characterized it as good governance, but its success is nothing short of what can be considered good governance. Principally anchored on the roles of the key players and/or actors, subsystems of national innovation as well as policies (mainly S&T) reinforcing them have been, to a large extent, institutionalized through the same elements of accountability, transparency, predictability and most importantly, participation.

Ⅶ. THE KNIS AS LESSON FOR PHILIPPINE PUBLIC ADMINISTRATION AND GOVERNANCE

The 2003 Governance Assessment of the Philippines commissioned by ADB outlined seven critical areas for governance reforms: 1) civil service and the bureaucracy; 2) public

financial management and fiscal administration; 3) legal and judicial systems; 4) local governance and decentralization; 5) electoral systems; 6) legislative system; and 7) civil society.

In all of these areas, specific reforms to be pursued consistent with the elements of good governance have to be approximated and realized through a National Good Governance Agenda. Four years after, a lot remains to be done and the success of the KNIS experience certainly highlights major lessons in public administration and governance for the Philippines.

1. Sustained economic growth is definitely a function of a comprehensive national innovation system.

Legitimized and enacted through a participative public policy process, a national innovation system founded on concrete S&T policies and programs and situated in a strong culture of R&D, is a major requisite in an economy's bid to be competitive.

In the Philippines, the closest to a national innovation system are varied public policies (republic acts, executive orders, etc.) on science and technology bereft of a unifying policy framework between and among the various strategies, programs and projects that these policies are pursuing or are supposed to pursue. Sadly, there seems to be no attempt by the current leadership to do just that and evolve a National Innovation System or a even an innovation strategy that puts premium on S&T in terms of priorities, funding, support and incentives.

As such, the country's competitiveness in major areas/sectors (manufacturing, mining, telecoms, etc.) that heavily require policy and investments in R&D and S&T remains last when compared to its Asian neighbors. In turn, this does not bring in much needed direct foreign investments and encourage dynamic growth in internal markets and industries, particularly in the said sectors. For an economy that badly needs foreign direct investments in even the most basic requirements at competitiveness (infrastructure, power, water, etc.), the current situation is not very promising.

2. The country's national innovation system has to evolve along with the development of its industries and markets as well as the country's international business alliances and trade relationships.

As evident in the Korean case, the KNIS was in fact a response to the evolving character of the local economy. Its timely revisions to reflect new developments in S&T also consistently look at the prospects of international cooperation.

For the Philippines, this is a huge challenge. Its local industries and markets have only shown modest gains precisely because of the lack of an NIS that should have developed the competitiveness of the country needed to develop them.

To this day, a lot remains to be done in establishing concrete competition policies for critical sectors (telecoms, banking and finance, manufacturing, mining, etc). There have been attempts to enact said policies, but the comprehensive competition policy legislation still has not taken off from Congress. The irony is that these competition policies are commitments the Philippines made in the trade agreements such as APEC that have set long term goals for industrialization in the Asia-Pacific by 2020 during its 2004 meeting in Bogor, Indonesia.

3. The country's national innovation system (policy) will thrive only in a strong institutional and administrative framework.

A strong national innovation policy is one that lends itself to implementability, enabled by a strong institutional and administrative set-up. Korea knew this as it continually employed structural changes along with the dynamic transformation of its S&T policies.

This is a major problem in the Philippines. Aside from various laws and policies on S&T, there seems to be no defined institutional framework that spells out and delineates functional specializations (regulation, implementation, policy making and monitoring /evaluation) as well as administrative arrangements between and among line agencies, regulatory bodies, government corporations, academe, local government units and the

various ad-hoc bodies/committees created within or among them. This confusion translates to the allocation of resources and prioritization of programs and projects. The challenge is for all actors of governance, with the state as lead, to get their "acts together".

3. Clustering of knowledge among innovation actors

Korea knew this from the start. Its innovation system was a strongly formalized, government driven, top-down structure of policy planning and decision making with all sources of knowledge ¬GRIs, universities, private industries, etc. ¯ taken in with defined inputs enabled by necessary funding support.

This is hardly the case in the Philippines. To begin with, the government is not the prime agent in generating knowledge through R&D and S&T. In its prioritization of things and resources, S&T and R&D do not figure prominently as it should. There are no government research institutes that we can speak of in the country, at least those that are comparable with Korea's. The state colleges and universities are mainly there to absorb the huge demand for basic primary, secondary and tertiary education, not to generate S&T professionals and/or PhD holders.

The support from private industries is minimal if not negligible. They have their own S&T agenda and/or an R&D framework that are, most often, way advanced from that which government is advocating and/or capable to do. The major sources of R&D funds are donor agencies and the country's track record in making the most out of this official development assistance (ODA) is not very impressive. Admittedly too, these are mainly farmed out to development efforts (poverty alleviation, peace development, health, etc.) that cannot be translated into concrete S&T projects. The Philippines has yet to forge an S&T cooperation with a donor agency/country that is not under the framework of development assistance.

The challenge is to forge a "clustering of knowledge" mechanisms between and among innovation actors with government as lead. This too, has to be embodied in that policy and institutional framework for national innovation in the Philippines.

4. Education system to reinforces innovation, research & development

The Philippine education system inherently does not encourage R&D, much less in the area of S&T. While there are mandated curricula requirements oriented towards S&T, these are mostly superficial and "generic"in nature. Over the last decade, we have consistently been weak in the science area. While there have been successful innovative attempts in the education sector, these are mostly concentrated in private schools as they are the ones with adequate funding and support facilities. The public sector can barely survive from meager government allocation.

Ⅷ. CONCLUSION

While public administration in the Philippines is highly evolved, its current character called governance has yet to be pinned down into more concrete terms. The appropriateness of our working definitions and/or framework of good governance to the peculiarities of the Philippine political, social, cultural, economic and administrative realities has yet to be fully captured.

As such, we look beyond definitions and frameworks in our continued search for answers and lessons. National innovation systems may be a defined field but for our conscious effort to pursue an encompassing perspective, thanks to Philippine public administration's multidisciplinary orientation, the lessons learned from the Korean National Innovation System are certainly critical inputs to our governance model, which is and should be a continuing work in progress.

▣ References

ADB-Philippine Governance Assessment Study Team. 2003. Governance Assessment of the Philippines. *Asian Development Bank, Ortigas Center, Manila. August 2003.*

Brillantes, Alex B. 2003. "*Public Sector Reform and Poverty Reduction*"in Pernia, E. et al (eds.) Poverty, Growth and Institutions in Developing Asia. Asian Development Bank, Manila. 2003

Country Profile: South Korea. Downloaded from http://newsvote.bbc.co.uk.

Cariño, Ledivina V. 2002. "*From Traditional Public Administration to the Governance Tradition: Research in NCPAG, 1952-2002."* Paper Presented at the International Conference on Public Administration. National College of Public Administration and Governance, University of the Philippines, Diliman, Quezon City. October 2003.

Cariño, Ledivina V. 2000.*"The Concept of Governance"* in Victoria A. Bautista, et al. (eds.), Introduction to Public Administration in the Philippines: A Reader. (2nd Edition). National College of Public Administration and Governance, University of the Philippines, Diliman, Quezon City. 2003.

Lalkaka, Rustam. 2002. "National Innovation Systems: Role of Research Organizations and Enterprises ". International Symposium on Environmental Biotechnology. Veracruz, Mexico. June 2002.

Reyes, Danilo R. 1995. *A Search of for Heritage: An analysis of Trends and Content of Public Administration Literature at the UP College of Public Administration, 1952-1992*. Unpublished doctoral dissertation submitted to the UP College of Public Administration.

Ricote, Eleazar E. and Rodriguez, Elizabeth P. 2006. *Regulation and Competition in Global Business: Policy Issues and Challenges for a Country in Crisis*". Paper presented at the Annual Conference of the Academy of International Business-Southeast Asia(AIB-SE) at Clearwater Beach, Florida, USA. 25-27 October 2006.

Ricote, Eleazar E. 2005. "*Peace Administration in Philippine Public Administration and Governance"*. Paper Presented in the Annual Conference, Network of Asia Pacific

Schools and Institutes of Public Administration and Governance (NAPSIPAG), Asian Development Bank, Beijing, China, 5-7 December 2005.

Ricote, Eleazar E. 2004. *"Poverty Alleviation and the Role of Public Administration in the Philippines."* Paper presented in the Launching Conference of the Network of Asia Pacific Schools and Institutes of Public Administration and Governance (NAPSIPAG), Kuala Lumpur, Malaysia. December 2004.

Ricote, Eleazar E. 2005. *Indigenization as "Refounding" in Philippine Public Administration and Governance"*. Essay written for PA 301 (Theories of Administrative Systems, 1st Semester, SY 2005-2006) and selected for Publication in the Philippine Journal of Public Administration (PJPA), National College of Public Administration and Governance (NCPAG), University of the Philippines. 2005.

Yim, Deok Soon. 2004. "*Korea's National Innovation System and the Science and Technology Policy",* Science and technology Policy Institute (STEPI), Seoul, Korea. 2004.