Building S&T Policy Capacity: Korean Experience

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Emergence of S&T as a policy issues in Korea

- The issue of S&T first emerged in Korea in the process of the formulation of the First Five-year Economic Development Plan (1962-1966).
- In January 1962, the draft of the plan was briefed to the political leadership. After hearing the draft, the political leaders raised several critical issues, such as:
  1) Do we have the technologies and skills required for the industrialization?
  2) How can we acquire the technologies required for the industrialization?
  3) How can we meet the skill requirements?
  4) Who are responsible for all these?
  5) Given the technical constraints, would it be possible for us to realize the ambitious goals set by the plan?
- Indeed, the questions were pointing out that the plan lacked critical strategic elements – how to acquire and/or mobilize scientific and technological resources required for industrial development or scientific and technological strategy.

Why Korea needed strong S&T policy capacity?

- In response, the Economic Planning Board, responsible for the planning, prepared in 1962 a technological back-up plan as a supplement to the plan.
- Since then, science and technology have been placed in the core of Korea's development policy.
- In the early stage of development, science and technology policy was very much tuned to building science and technology capacity for industrialization.
- As no sector in Korea was technologically prepared for industrialization, the government had to intervene in almost every sector for science and technology capacity-building, which required **solid S&T policy capacity**.

Policy process: From identifying issues to taking actions

- First of all, we should understand the nature of policy issues:
  1) Information system: statistical system (statistics, indicators, etc.)
  2) Policy research: systematic analyses of the nature of the problems
- Based on the understanding, we should be able to formulate policy measures to deal with the issues, which requires:
  1) Organizational apparatus to formulate policy measures
  2) Technical competence of bureaucrats
- Finally, the policy measures should be put into action, which requires:
  1) Resources to implement the policy measures – financial and organizational resources
  2) Political leadership: long-term policy commitment to the science and technology (which depends on the political competence of S&T leadership).

What we mean by 'policy capacity'

- Policy capacity is determined by a set of skills and resources that are required to perform policy functions, such as:
  1) Analytical competence,
  2) Operational competence, and
  3) Political competence,
- Each of the above involves resources and/or capabilities at individual, organizational, and systemic levels
- Therefore, policy capacity is defined here as an integration of:
  1) Capability to systematically diagnose policy problems;
  2) Capability to formulate sets of measures to respond to the problems;
  3) Capability to put the policy measures into action in a consistent and effective manner.

Korean Experience in S&T policy capacity-building:

1. Building S&T information system

1. Korea's efforts to build S&T policy capacity began with building S&T information system: The Technology Management Bureau (TMB) of the Economic Planning Board (EPB) deserves a high credit for laying a foundation for S&T statistical system in Korea by initiating the following efforts.
   - Survey of the Nation's Technical Manpower, 1961, to back up the formulation of the First Five-year Technology Promotion Plan (1962-1966).
   - Launching the " S&T White Paper," an annual report presenting the state of S&T of the nation.
   - Most importantly, launching in 1963 the annual survey of R&D activities based on the UNESCO manual. The survey covered all organizations engaged in R&D, including government agencies, public R&D institutes, universities, private R&D centers.
   - In 1967, the Ministry of Science and Technology was created, and took over the S&T – related functions and responsibilities from the EPB.

Building S&T information system -- cont.

2. The Ministry of S&T further improved and broadened the information system, such as:
   - Initiation of the Technology Foresight Program (Every 5 years) in 1993
   - Revamping the R&D Survey in order to accommodate the OECD standard (Frascati Manual), 1996
   - Launching of the "Innovation Survey" based on the Oslo Manual, 1996.
   - Launching a Biennial "Survey of Public Understanding of Science," 2000
   - Launching an Annual "Statistics of Technology Trade," 2001
3. The information system was integrated into the National Science and Technology Information Service (NTIS) in 2005
   - A national science and technology portal that provides information on:
     1) S&T policy, R&D programs, human resources, R&D outputs, etc.
     2) R&D institutes and funding agencies
     3) Rules and regulations regarding national R&D

Building S&T information system -- cont.

Year	S&T information system launched	Conducted/managed by
1961	Survey of Technical manpower: Single year programs	TMB, Economic Planning Board
1963	R&D Survey of Korea: Annual, based on the UNESCO manual	TMB, MOST
1976	Statistics of Intellectual Property: Annual	KIPO
1993	Technology Forecast: Every five years	Launched by STEPI, transferred to KISTEP
1996	R&D Survey of Korea: Annual, based on the Frascati Manual	STEPI, transferred to KISTEP
1996	Korea Innovation Survey: Biennial, based on the Oslo Manual	STEPI
2000	Survey of Public Understanding of Science: Biennial	KOFAC
2001	Statistics of Technology Trade: Annual	KOITA
2005	National S&T Information Service: An integrated portal	KISTI

TMB: Technology Management Bureau, MOST: Ministry of Science and Technology, KIPO: Korea Intellectual Property Office, STEPI: Science and Technology Policy Institute, KISTEP: Korea Institute of Science and Technology Evaluation and Planning, KOFAC: Korea Foundation for the Advancement of Science and Creativity, KOITA: Korea Industrial Technology Association, KISTI: Korea Institute of S&T Information

2. Building analytical capacity

1. In the early stage (1960s)
   - Relied on international consultants (very often with assistance from the USOM (US Operations Mission)) for analysis of S&T policy issues
   - Domestic experts also supported government officials for policy analysis
2. Oversea technical training of government officials (1960s-1970s)
   - Technical training of government officials in advanced countries provided by ODA programs
3. Creation of policy think-tanks to support policy-making (1970s-)
   - Korea Institute of Science and Technology (KIST), 1967
   - Korea Development Institute (KDI), 1971
   - Science and Technology Policy Institute (STEPI, Spin-off from KIST), 1987
   - Korea Science and Technology Evaluation and Planning (KISTEP, Spin-off from STEPI), 1998

3. Building policy-planning capacity

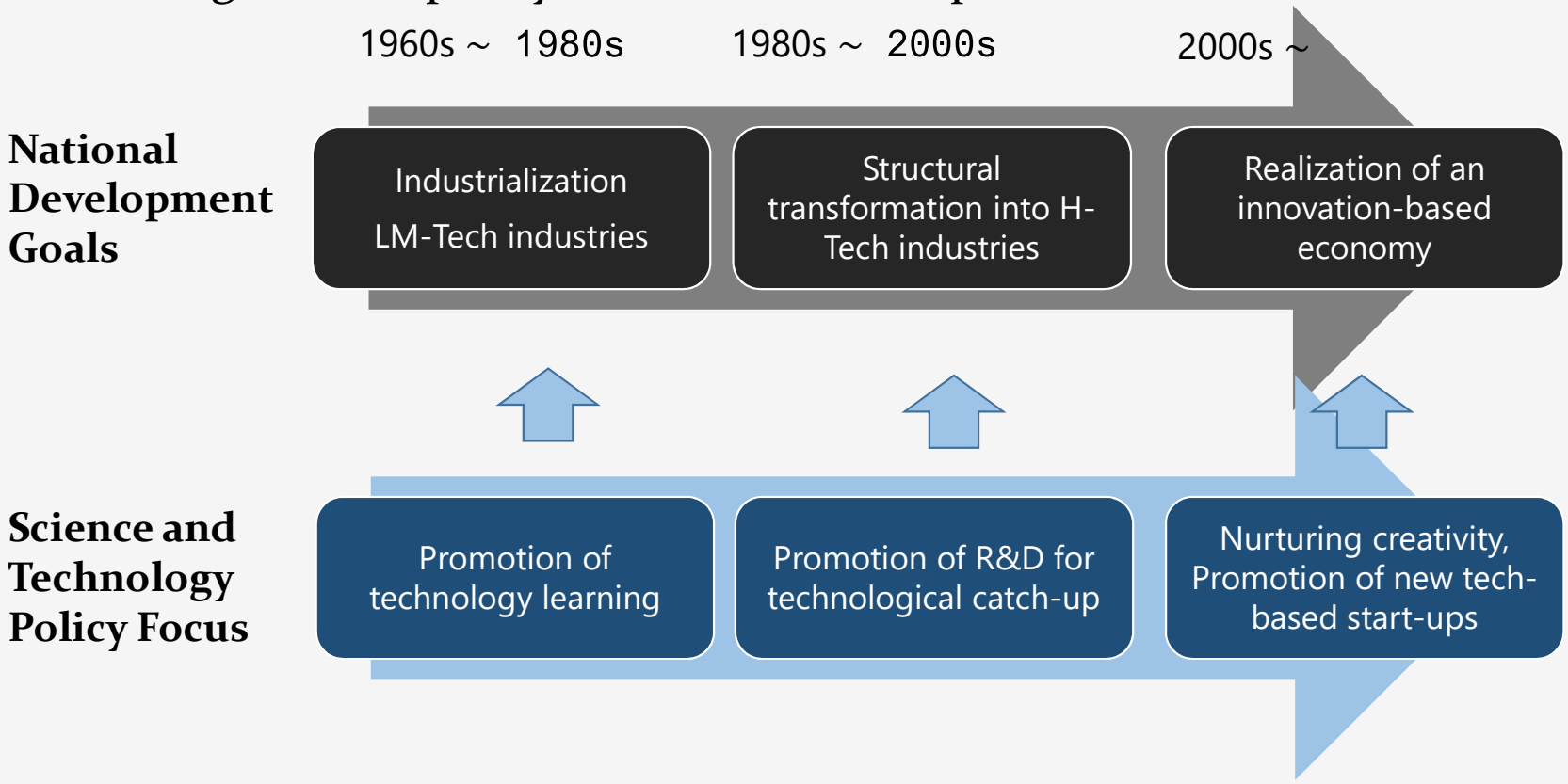
1. Learning by working with international and domestic experts (1960s)
   - Learning partly by working with international and domestic consultants – technical assistance programs of ODA providers
   - Policy training of government officials in advanced countries provided by ODA programs
2. Organizational apparatus: Creation of the Ministry of Science and Technology (MOST, 1967)
   - Creation of MOST by expanding the Technology Management Bureau of the Economic Planning Board, which already had policy-planning experiences.
   - TMB brought not only policy planning experiences but also 'development-oriented' culture to MOST
   - The EPB background benefitted MOST in several ways:
     1) Transfer of policy experiences and planning capacity
     2) Integrating S&T policy with national development goals,
     3) Easier access to resources (budgets)
     4) Most importantly, a broader perspectives on S&T policy.

3. Learning by working with government R&D institutes
   - Government officials acquired policy-making capacity by working with scientists and engineers of government R&D institutes who had industrial experiences in advanced countries.
   - For example, scientists and engineers at the KIST collaborated with government officials in designing policy plans for the development of strategic industries, such as steel, electronics, machineries, automobiles, chemicals, etc. (in the 1960s-1970s)
   - Interactions with the scientists and engineers helped government officials to understand technical issues involved in industrial development and develop new perspectives on the role of science and technology in economic development.
4. Personal abilities of government officials
   - Young elites in the 1960s, and even today, preferred government careers for diverse reasons – prestige, political opportunity, job stability, cultural tradition that places a higher value on government positions.
   - The contribution of the elite bureaucrats to the Korean development cannot be overestimated.

4. Political commitment

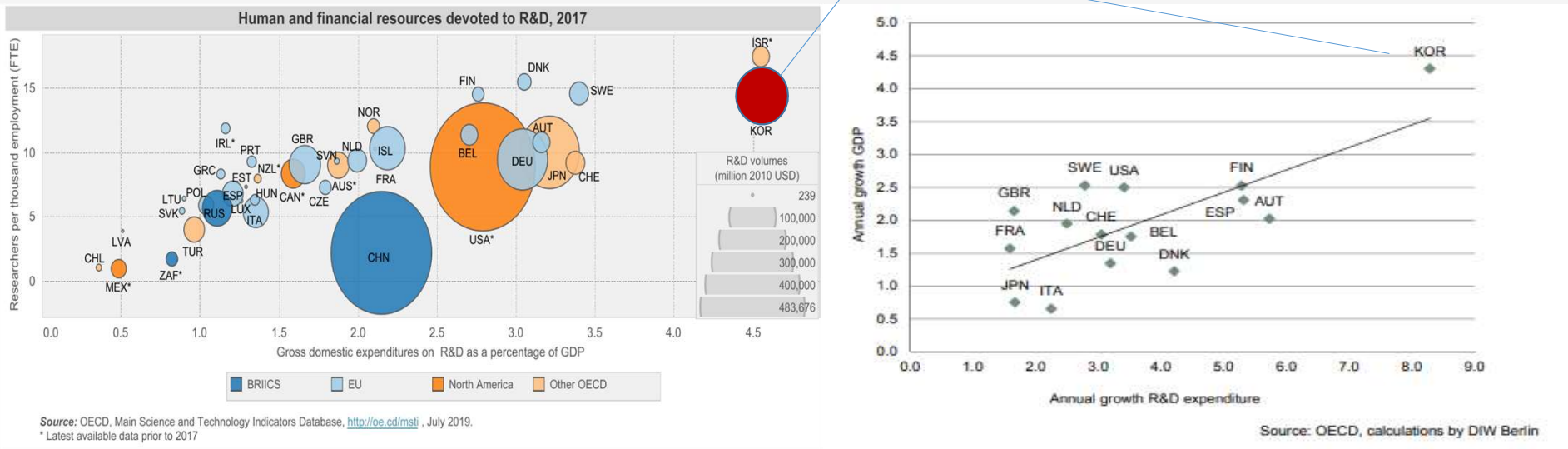
1. Korea has been able to implement the S&T policy programs in a consistent manner owing very much to the future-oriented resource allocation of the government:
   - 4.58 % of the government budgets for science and technology, or 1.2% of GDP (2020)
   - 14.2 % of the government budgets for education, or 3.7% of GDP (2020)
   - Investment in S&T has contributed to economic growth, which in turn has made further increases in R&D investment possible.
2. Strong support of the political leaders
   - The S&T-based development strategy was first initiated by the late President Park (1961-1978). The strategy played a critical role in industrializing Korea in a very short period of time.
   - The strategy has been maintained over the past fifty years regardless of the pollical orientation of the succeeding governments, mainly because of the strong consensus among the people of Korea on the role of science and technology in the national development.

- Linkage of S&T policy to national development



Achievements and issues

- **Government-led economic development based on S&T**: Transformation of Korea from one of the poorest agrarian society into a major player in R&D that achieved an unprecedented economic growth.



- **Issue:** the success seems to justify even unnecessary interventions of the government in the innovation processes.

Any lessons?

- The Korean experiences show that S&T policy capacity is key to the building of foundation for S&T development, particularly, in the early stage of development, when private sectors are not technologically prepared for industrial development.
  - Developing countries may take advantage of ODA in countries in upgrading policy capacity as Korea did in training government officials.
  - S&T information system and policy think tanks play a critical role in building analytical capacity of the government
  - Political leadership is critical in making policies work.
- But it is worth to note that government intervention may be highly effective in the early stage of development, but to sustain the effectiveness, the role of government has to be adjusted to the changing policy environment.

Thank you !

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