Medium-Term Innovation Strategy :
Structural transformation of Costa Rica's innovation system

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Development stages of Costa Rica

- Agro-based economy : until 1950s
  - Agricultural-based economic development
    - Economic system
    - Infrastructure
    - Major products : Coffee, Banana
  - The economy was fluctuating according to the prices of coffee and banana

☞ Attention to the industrialization, moving away from the agriculture

- ISI (import substitution industry) development stage : 1960s-70s
  - ISI development strategy : *Law on Protection and Industrial Development* in 1959
  - Target area : light industry
    - Major products : food & beverage, tobacco. Textile, wood, printing & publishing, etc.
    - Major export market : CACM
  - Policy instruments
    - Tariff and non-tariff barriers against imports from the third party countries
    - Removing trade barriers for CACM
    - Tax exemption for imported materials
    - Increase of supply of credit : Central American Bank for Economic Integration
  - Investment fund : foreign loans
  - GDP Share of manufacturing : 13.2% in 1960 → 22% in the end of 1970s
  - Export share of manufacturing : 2.4% in 1962 → 30% in 1977

- Stage of FDI-based development : since 1980s
  - Turnaround of economic policy towards liberalization
  - Protectionism was lifted up
  - Promoting exports : tax credit, tax exemption, flexible exchange rates system, etc.
  - Attracting FDI : CINDE in 1982
    - Inflows of FDI : about 2.1 million dollars in 2011
    - High-tech areas : Intel, HP, P&G, Baxter, IBM (more than 200)
    - Job creation : about 70,000
    - Export diversification
    - Entrepreneurial capability

☞ Shift from old economy to new economy due to successful FDI policy

☞ Attention to strategy of innovation driven economic growth

Some points on development stages

- Failure of ISI development, partly due to lacking a general / comprehensive plan with long-run vision
  - Light industry finds competitiveness from factor prices in general : creating a limitation for the development
  - Therefore, the development strategy required a long-term plan for upgrade of industrial structure ↔ technology-intensive
- Protectionism for ISI development reduced competitiveness of domestic industry; focusing CACM
  - Needed to bring competition to the domestic industry with developing export markets in the third party countries → an opportunity of knowledge transfer / dissemination.
  - The fundamental was too weak to overcome the crisis in early 1980s.
- Investment heavily depended on foreign sources, but not household savings and/or export earnings.
  - ISI development : foreign loans
  - FDI-based development : multinationals
  - Development of domestic industry : ?

CR innovation system : an assessment

- Industrial eco-system
  - Agriculture
  - Traditional industry
  - Domestic SMEs linked to FDI enterprises
  - FDI enterprises
- S&T system
  - Universities : research centers
  - Public research institutes
  - Non-profit (private) research organizations
- Interaction between innovation units
  - Government / FDI enterprises focus on HRD
  - Some informal interactions

☞ low STI capacity of innovation units and weak linkages

☞ Vicious circle : less developed (domestic) industry → less incentive for S&T development → less industrial innovation

☞ Industrialization stimulate the development of S&T system

KIS and its development strategy

- Structural changes over last half a century
  - Underdeveloped system → developed system (firm-centered innovation system)
  - Resource-based economy → knowledge-based economy
  - Industry-based innovation → S&T-based innovation
  - Factor-driven growth → Innovation-driven growth
- Strategies
  - Selecting and focusing : role of government → “governing the market”
  - Fast industrialization; continuous upgrade of industrial structure towards technology-intensive one → stimulating needs for STI and hence S&T system development
  - Continuous investment and build-up of S&T system

☞ Underlying disciplines : “competition and learning”

Policy suggestions

- Basic perspective
  - Balanced development of both industry and knowledge system
    - Development of domestic industry → stimulating the development of S&T system
  - Securing economic sustainability and reducing (relative) FDI-dependency in the long run
- By sectors
  - Firms
    - Increase learning (STI) capacity and competitiveness
  - Knowledge institutions
    - Target-oriented R&D
    - R&D management system
  - Government
    - Greater role / leadership / initiatives for development

☞ Medium-term innovation strategy → development of S&T system in line with industrialization

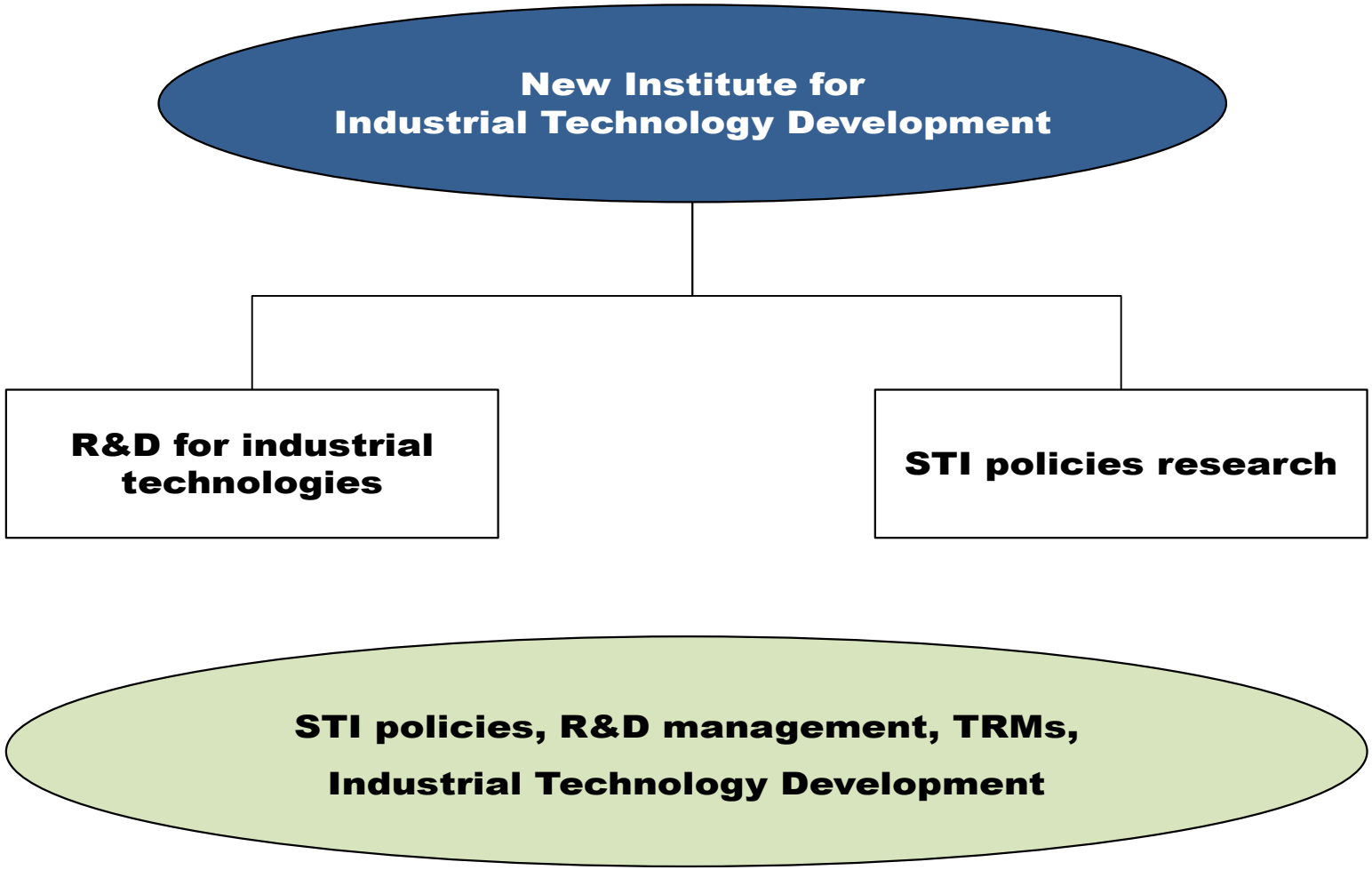
☞ “Consensus building” vs. “creating own strategic tools”

New R&D institute for development of industrial technology under MICITT

- The evolution of knowledge institutions in Costa Rica is being made based on various needs and demands. Each institution has its own objective. Therefore, if MICITT implement a program with those knowledge institutions for the purpose of economic development, their commitment is hardly expected in full capacity. A knowledge institute for industrial technology development should be newly established under MICITT. In addition, new institute may include the research unit for STI policy and an organization of R&D management. There are some examples in Korea for the benchmarking.

- The specialty R&D institute for the industrial technology development, if established, it will play a role as an implementation agency of MICITT policy for the STI purpose, including R&D, support for domestic SMEs, management of R&D, technology foresight, and planning, among others.

Basic Concepts



Industrial technology development

- Acquisition, application, and assimilation of advanced technologies for globally competitive SMEs of Costa Rica.
- The new institute :
  - Distribute new technology to SMEs
  - Support SMEs' technology, human resource and infrastructure
  - Improve technology to which SMEs are commonly vulnerable
  - Advance research in demand-driven industrial technology
- To recruit qualified R&D manpower, incentives may be necessary
  - A long-term plan for the recruitment of R&D manpower, and securement the R&D manpower
- Increase in R&D investment
  - Transparent and rational management of R&D budget
  - In parallel with establishment of new institute, the R&D management system should be implemented.
- STI policy research unit
  - Undertaking foresight regularly
  - Technology roadmaps (TRM) for industrial technology development

STI policy research

- As a think tank, the research unit for STI policy
  - Undertaking research and analyses on the issues pertaining to science, technology, and innovation in Costa Rica.
  - Including identification of issues in dealing with future challenges,
  - Suggestions of strategic options in STI development for the government and industries,
  - Provision of government agencies with policy ideas and suggestions for innovation promotion,
  - Creation/dissemination of data and information related to STI policy.

- The research unit for STI policy basically takes an approach of social sciences, but multi-disciplinary.

R&D management system

- R&D management
  - The whole cycle of R&D activity, from selecting the project to the final evaluation.
  - Technology foresight, planning, budget control, and evaluation, etc.
  - Rational approach in undertaking R&D
  - Transparency of resource allocation

- Target-oriented R&D projects for economic development
  - Sizable investment

- The core part of R&D management system
  - Selecting the project
  - Evaluating the final result
  - Continuity and consistency of R&D
    - Project selection based TRMs

S&T foresight for technology roadmaps (TRMs)

- Technology roadmaps (TRMs)
  - Priority-setting and technological development, which includes strategic information.
  - TRMs over next 10 years and revised regularly
  - Emerging technology, product, process, corresponding market information, and others

- S&T foresight
  - Looking into the longer-term future in a systematic way within a society
  - A number of methods for the foresight, but useful tool for consensus building
  - Best way to draw the collective wisdom ; the future of CR society

- The purpose of S&T foresight
  - Strategic and decision-making information
  - Society is always changing, and therefore the foresight has to be carried out regularly; maybe once for every four years at the government level.

Some considerations for new institute

- Vision and objectives
  - Development of vision and missions
  - Identification of objectives and formulation of strategy
  - Focus R&D areas of new institute
- Organizational framework
  - Legal status and funding system
  - Governance structure
  - Organizational structure
  - Functions and activities
- Management model for “plan-do-see” of R&D activities
  - Management principle
  - Decision-making body
  - Formulation of strategic planning and evaluation

  - Project management
  - Knowledge management system
  - Administration support
- Networking
  - Partnership with government
  - Interaction with other organizations
  - Interaction with industries/SMEs
  - Global partnership
- Human resource management system
  - Leadership
  - Role and qualifications of staff
  - Recruit system
  - Reward system
  - Career path management
- Infrastructure and others
  - Infrastructure
  - Conditions for location
  - Others


¡Muchas gracias!