



Korean STI Strategies and International Cooperation

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Talking Points

- Evolution of Korean STI Strategies for National Dev.
- Characteristics of Korean STI Strategies
- Role of Int'l Cooperation for Korean STI Dev.
- STI as a New ODA Strategy
- Collaboration with ASEAN Countries



Republic of Korea (South)

Political Map of the World, April 2000

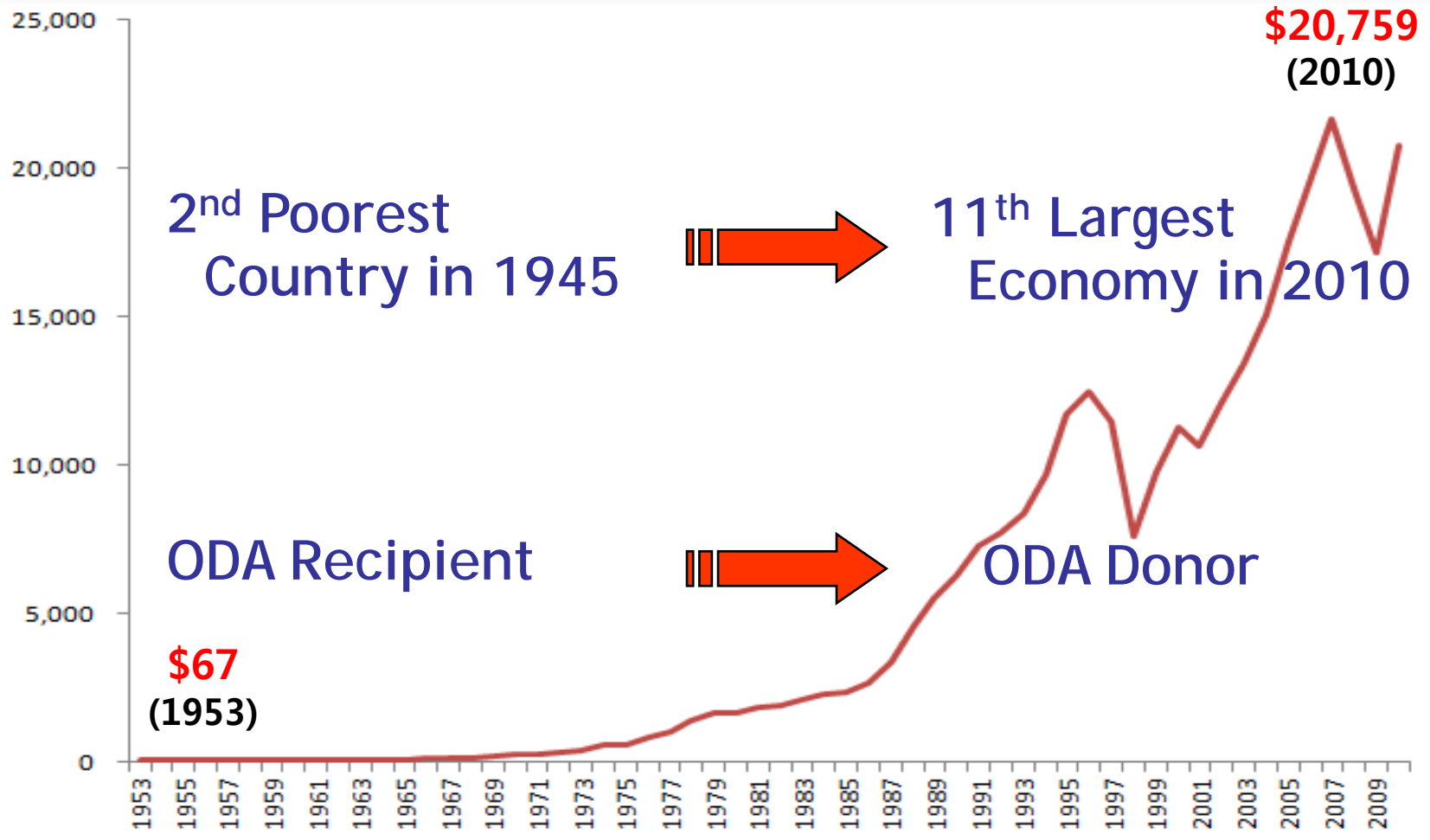
SOVEREIGN Independent state
Territory Disputed or area of special arrangement
UN-recognized State - recognized
Capital
Sea Level
Major cities
International boundaries



A Small Land with Scarce Resource



Korea's Economic Development, 1953-2010



Source: The Bank of Korea

- 1953-1970: Per Capita GNP (current US\$, 1975 base year)
- 1971-2010: Per Capita GNI (current US\$, 2005 base year)

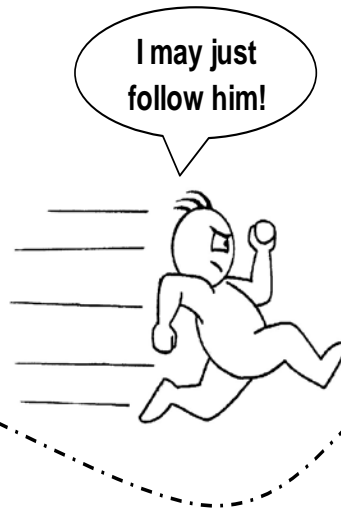
Evolution of Korean STI Strategies

STI Leadership

Institution Building



Catching-Up

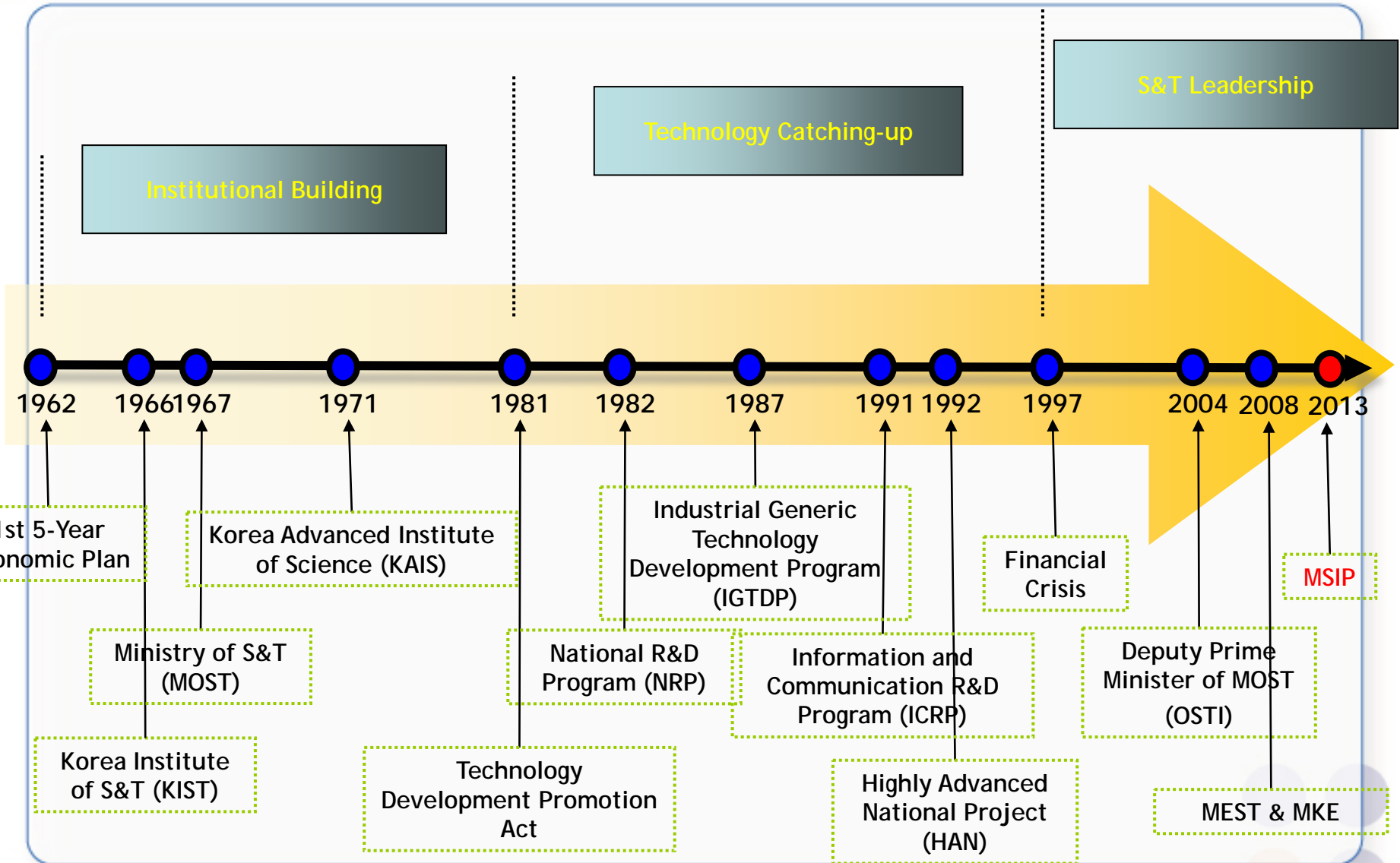


Where should I go?





Phases of Korean STI Policies





1960s

• Industrial Policies

- Import-Substitution Industries (Textiles, Plywood, etc.)
- Expand Export-oriented Light Industries (export subsidy, preferential financing)
- Five-Year Economic Plans
- From Agriculture to **Labor-intensive Light Manufacturing Industries**

• STI Policies

- Establish Scientific and Technological Infrastructure (e.g., **KIST**)
- Initiate S&T Education (e.g., **KAIS**)
- Promote Foreign Technology Imports
- Strategically Adjust to the Need for Economic Dev.
- Establishment of Ministry of S&T (**MOST**)



1970s

• Industrial Policies

- Expand **Heavy & Chemical Industries** (e.g., machinery, shipbuilding, chemicals, marine science, electronics, electricity)
- Shift Emphasis from **Capital Imports** to Technology Imports
- Strengthen Export-oriented Industrial Competitiveness
- Foster **Chaebols** (e.g., Samsung, Hyundai, LG)

• STI Policies

- Expand Technical Training
- Improve Institutional Mechanism for Adapting Imported Tech. (**GRIs**)
- Invite eagerly Korean Scientists trained **overseas**
- Promote Research Applicable to Industrial Needs
- Promote **Imports of Foreign Tech.** (imitation, reverse engineering, imports of capital goods)



1980s

• Industrial Policies

- **Economic Slowdown** / Trade Imbalance
- Declining Competitiveness in Labor-intensive Industries
- **Economic Liberalization**
- Transform Industrial Structure to Advanced and Balanced Form
- Expand **Technology-intensive Industries**
- Encourage Human Resource Development and Improve Productivity of Industries
- Promote **SMEs**

• STI Policies

- **Reluctant to TT** from Advanced Economies
- Pressure on Strong IPR
- Independent Innovation
- Develop and Acquire Top-level Scientists and Engineers
- Perform **National R&D Projects** Efficiently (e.g., NRP, IGTDP, AECTP, ICRP)
- Promote Industrial Technology Development
- Promote Collaborative R&D (**San-Hak-Yun**)



1990s

• Industrial Policies

- Promote Adjustment of Industrial Structure and Technical Innovation
- From Imbalanced to **Balanced Growth Strategy**
- Promote Efficient Use of Human and Other Resources
- Improve Information Network
- **Information Tech.** (e.g., Computer, Semiconductor)

• STI Policies

- **From Imitation to Indigenous Innovation**
- Realign **National R&D Projects**
- HAN Project (Long-term, Large-scale)
- Strengthen Demand-oriented Technology Development System (industry-neutral & Tech.-oriented)
- Internationalize R&D Systems and Information Networks
- Construct S&T Infrastructure
- **Basic Research at Universities**



2000s

• Industrial Policies

- Searching Sustainable Growth based on Tech. Innovation
- Select and Concentrate
- Differentiated Strategies for Major Industries, **Future Strategic Industries**, and Manufacturing-related Service Industries
- **Regional Development**
- **Entrepreneurships** (Venture Capital, NASDAQ)
- **Globalization** (FTAs with Chile, U.S., EU, China)

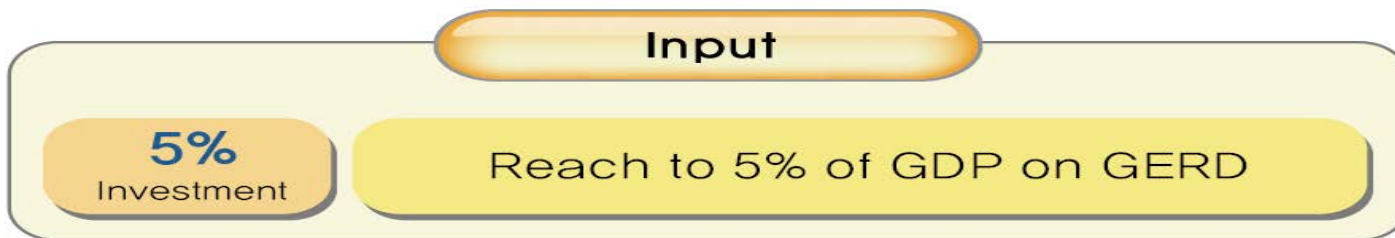
• STI Policies

- **New Growth Engines** (Bio, Nano, IT)
- Develop **Regional Innovation Clusters**
- Decentralization of R&D Authorities but Emphasis on **Coordination**
- Long-term Vision for S&T Development (Vision 2025)
- Five-Year S&T Principal Plan
- Efficiency of Gov. R&D Investments (**Evaluation** Emphasis)
- National Technology Road Map (NTRM)
- **Private Sector-led NIS**

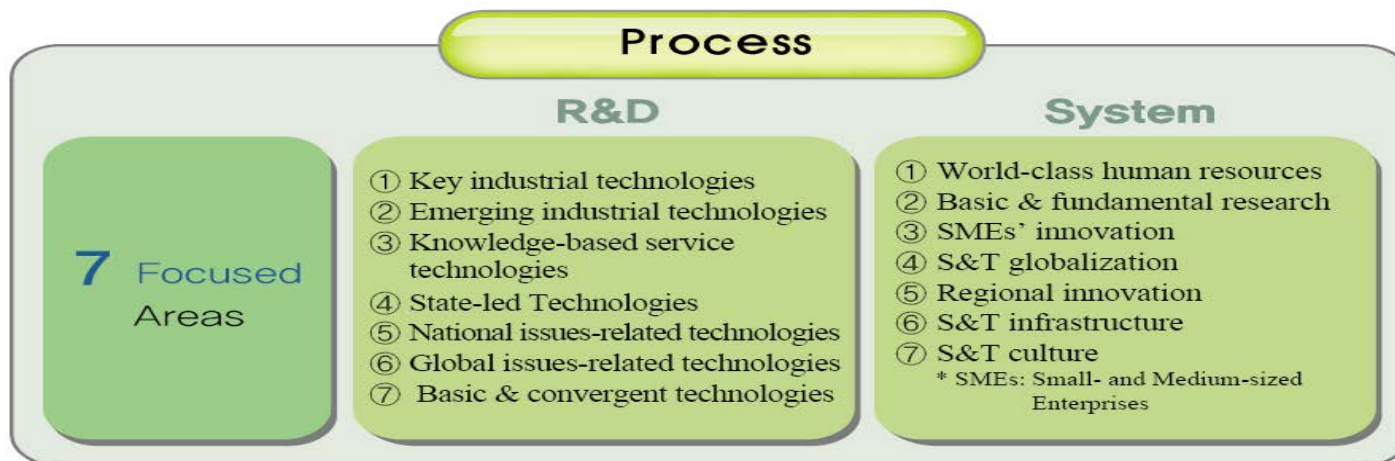


577 Initiative of Lee Administration (2008-2012)

5



7



7





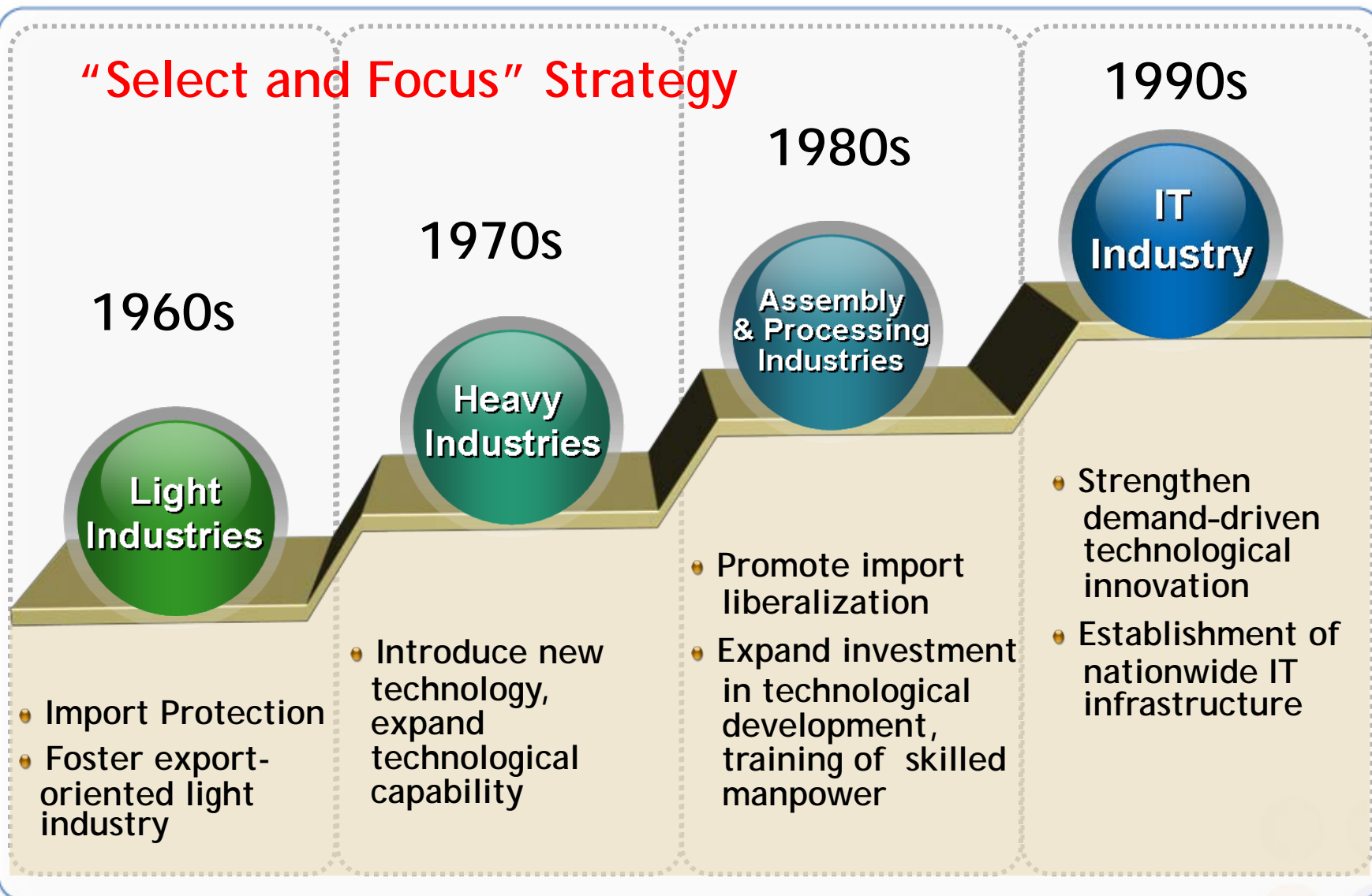
Creative Economy of Park Administration (2013~)

- **Creation of ecosystem that facilitates startups**
 - Break down the obstacles hindering startups and foray into the market, refurbish the intellectual property right system to ensure safe distribution of ideas and knowledge, and create the chance to take on the challenge even after a failure.
- **Support and cultivation of venture and SMEs**
 - Provide financial support and tax relief to help venture and SMBs evolve into global companies, and ensure large companies and SMBs to share the benefits of economic growth.
- **New industry & creation of market**
 - Create new products and services based on the convergence of knowledge and technology - the creative assets - with conventional industries, such as culture, health, agricultural and marine industries, and fully leverage S&T and IT to create future growth engines.
- **Development of global creative talents**
 - Develop creative talents who have challenging and entrepreneurial spirit, provide active support to ensure that those talents fully unfold their capabilities abroad, and deploy the professional manpower in the global arena with open-mindedness.
- **Expanding the capability of S&T and ICT**
 - Increase the investment to expand the ICT and S&T of Korea to an unmatched level in the world, and build the world's best internet and network environment to promote the exchange of idea and knowledge.
- **Creation of the inclusive creative economic culture**
 - Create a social environment that allows the public to express their imagination and ideas without restriction, provide opportunities for creating new value by using the public information, and achieve innovation in the operation of government in order to lay the groundwork for the public and the government to work together.



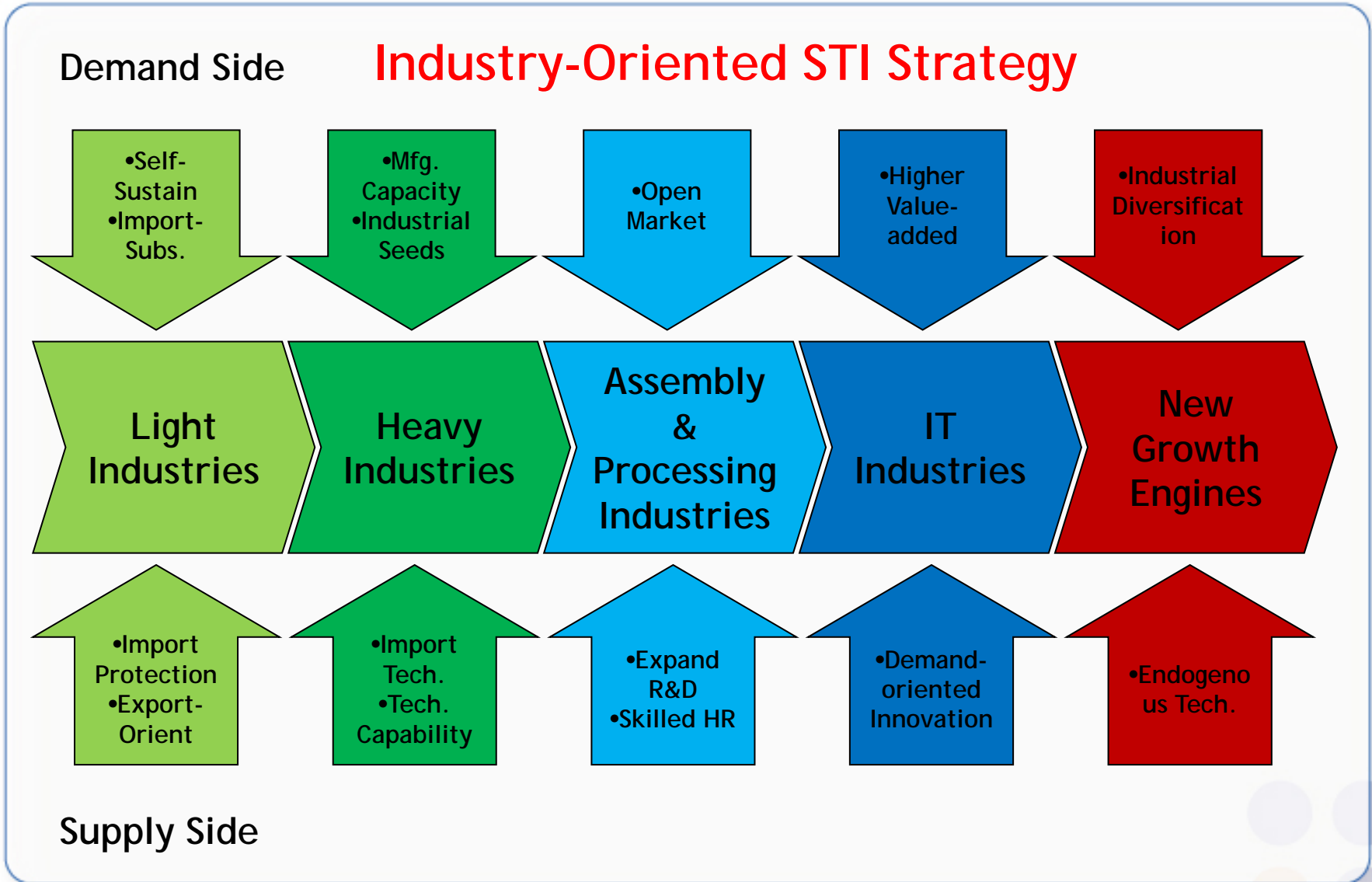
Korean Industrial Shifts

“Select and Focus” Strategy



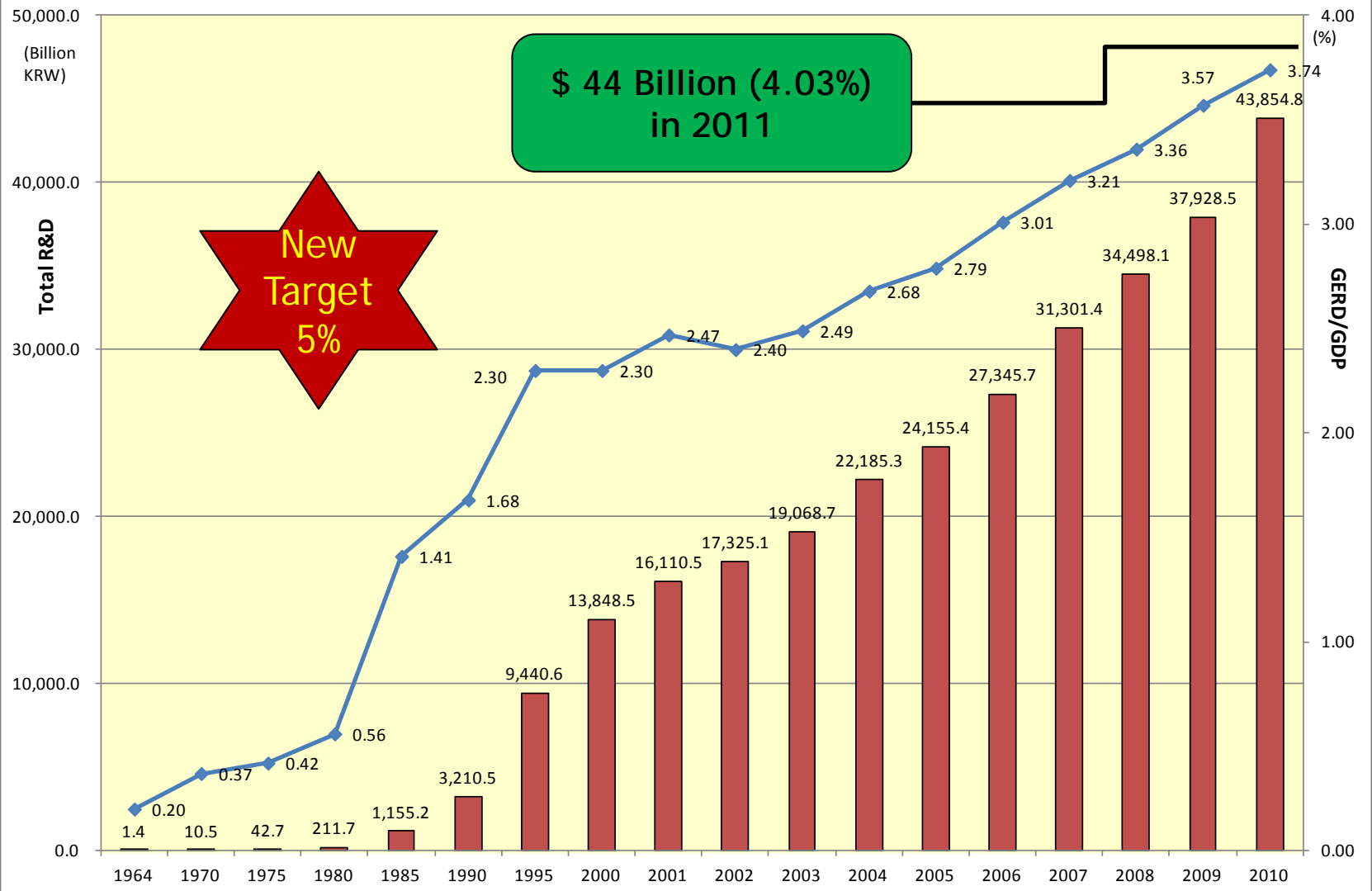


STI Meets Industrial Demands





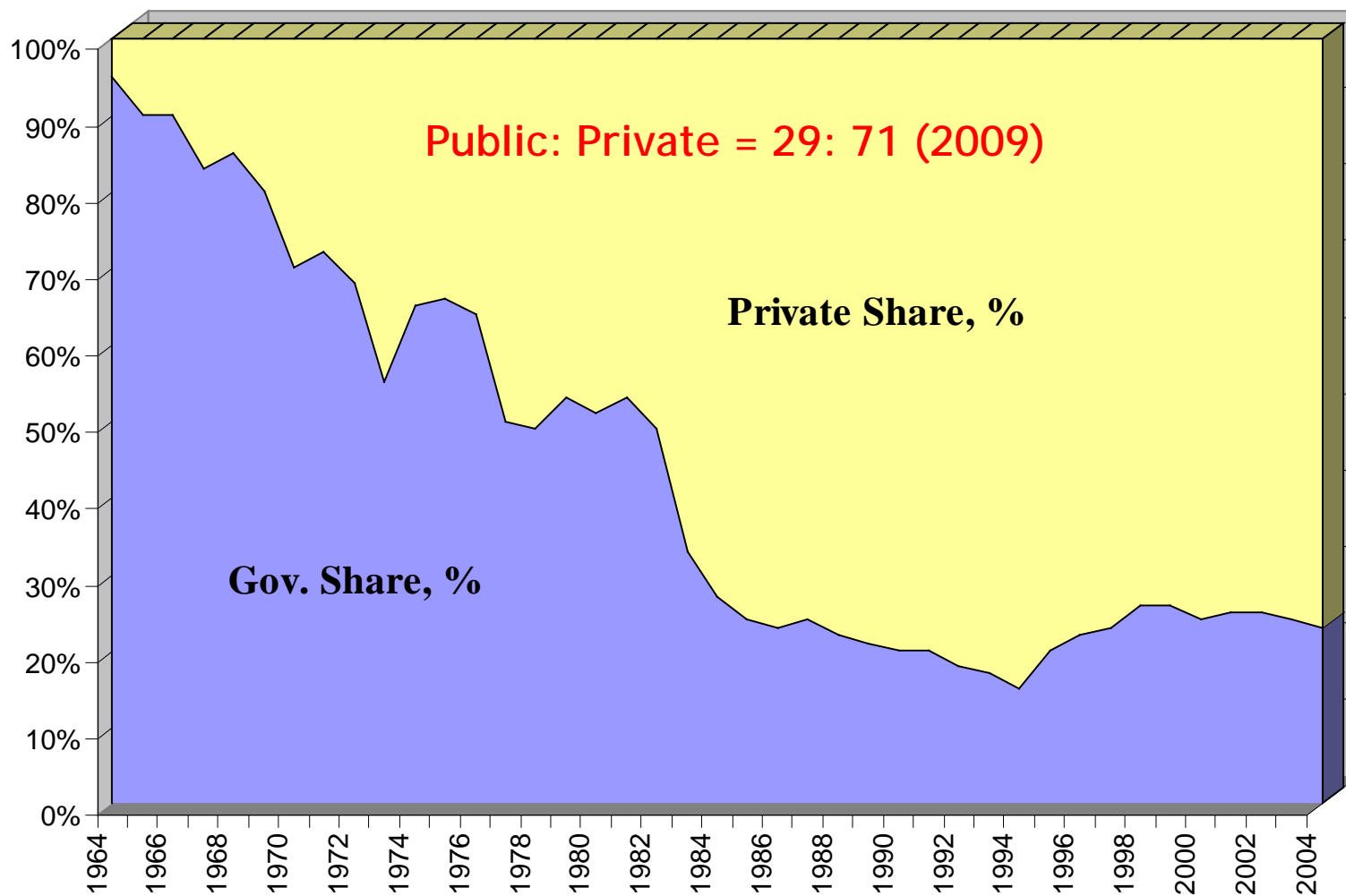
Trends of Total R&D Exp. and R&D/GDP in Korea





Trends of Public vs. Private R&D Investment in Korea

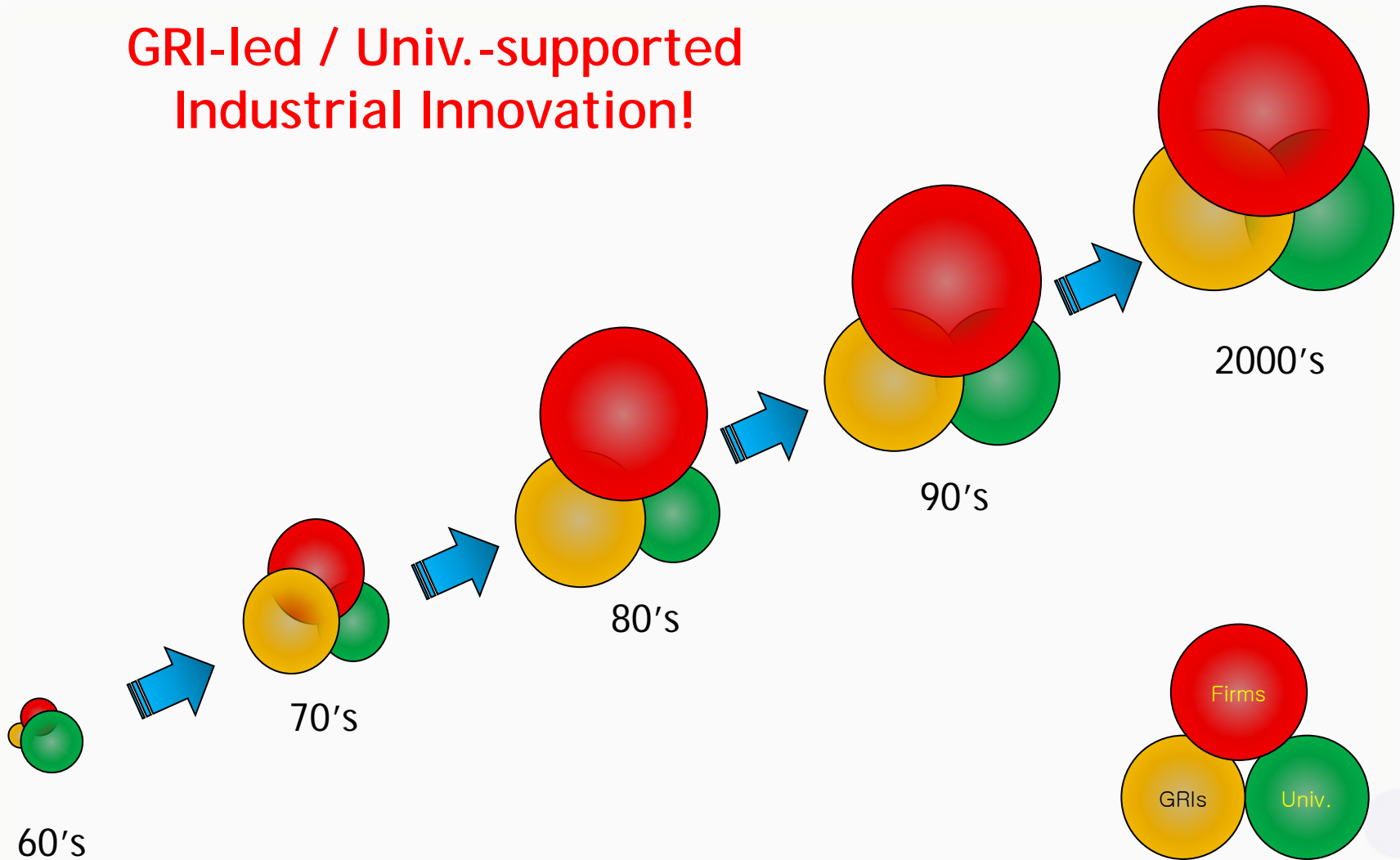
Market-Oriented !







Evolution of Korean Triple Helix

**GRI-led / Univ.-supported
Industrial Innovation!**





KIST: The First Korean GRI

- **Korea-US Summit in 1965**
 - Between then Presidents, Park Chung Hee and Lindon B. Johnson
 - 'Foundation of a research institute for Korea's Growth in industrial technology and applied science'
 - Under USAID Program
- **Models** <  Bell Laboratories **vs.**  Battelle >
 - Bell Lab: Research for Basic Science
 - **Battelle**: Industry-oriented Tech. Dev. for Catching-up
- **Growth**
 - 1966: 50 FTE & 200 M.KRW
 - 2010: 700 FTE & 250 B.KRW

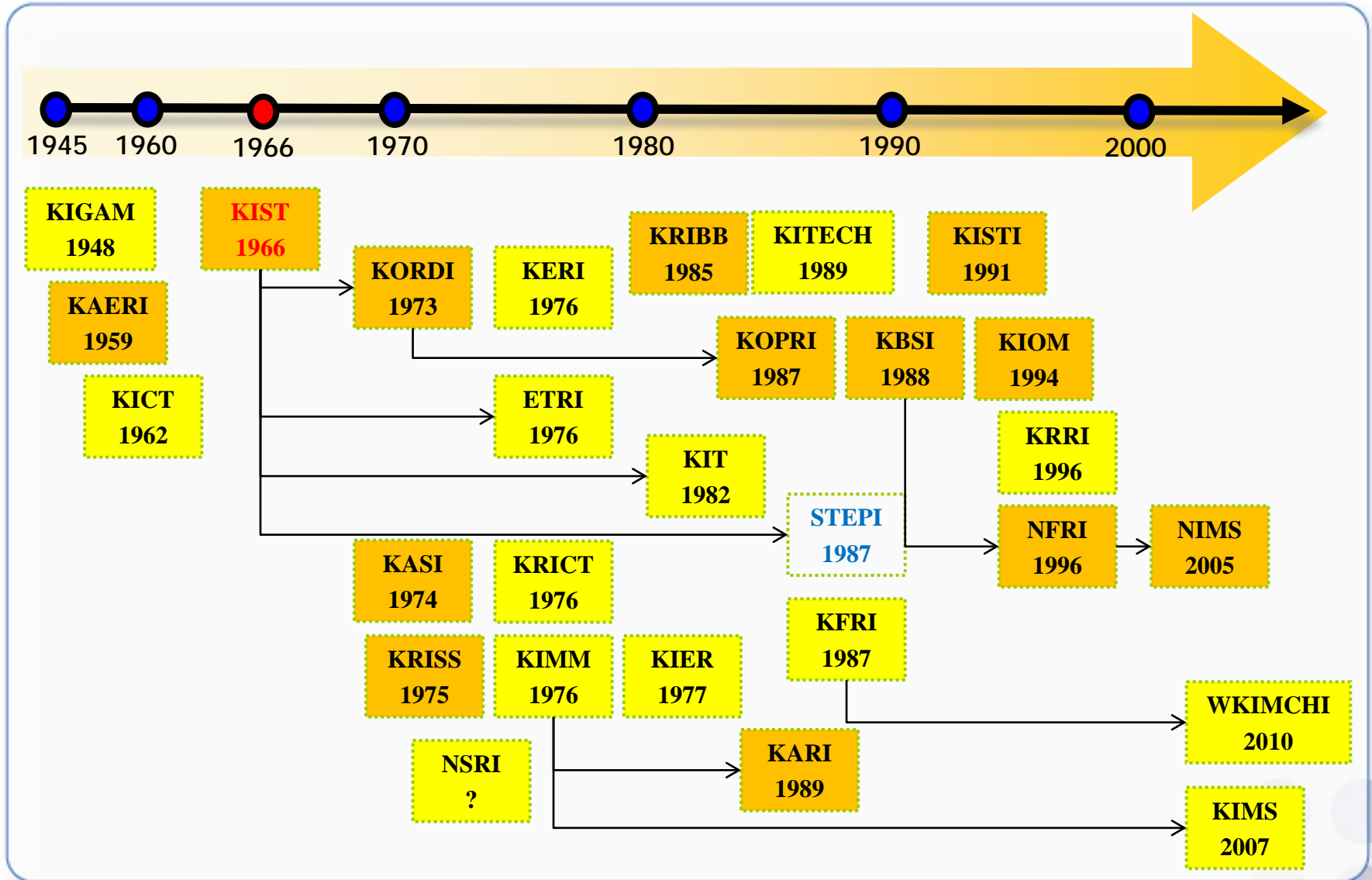


• Principles

- Close to Industries
- Operational Autonomy
- Stable Funding
- Transparency

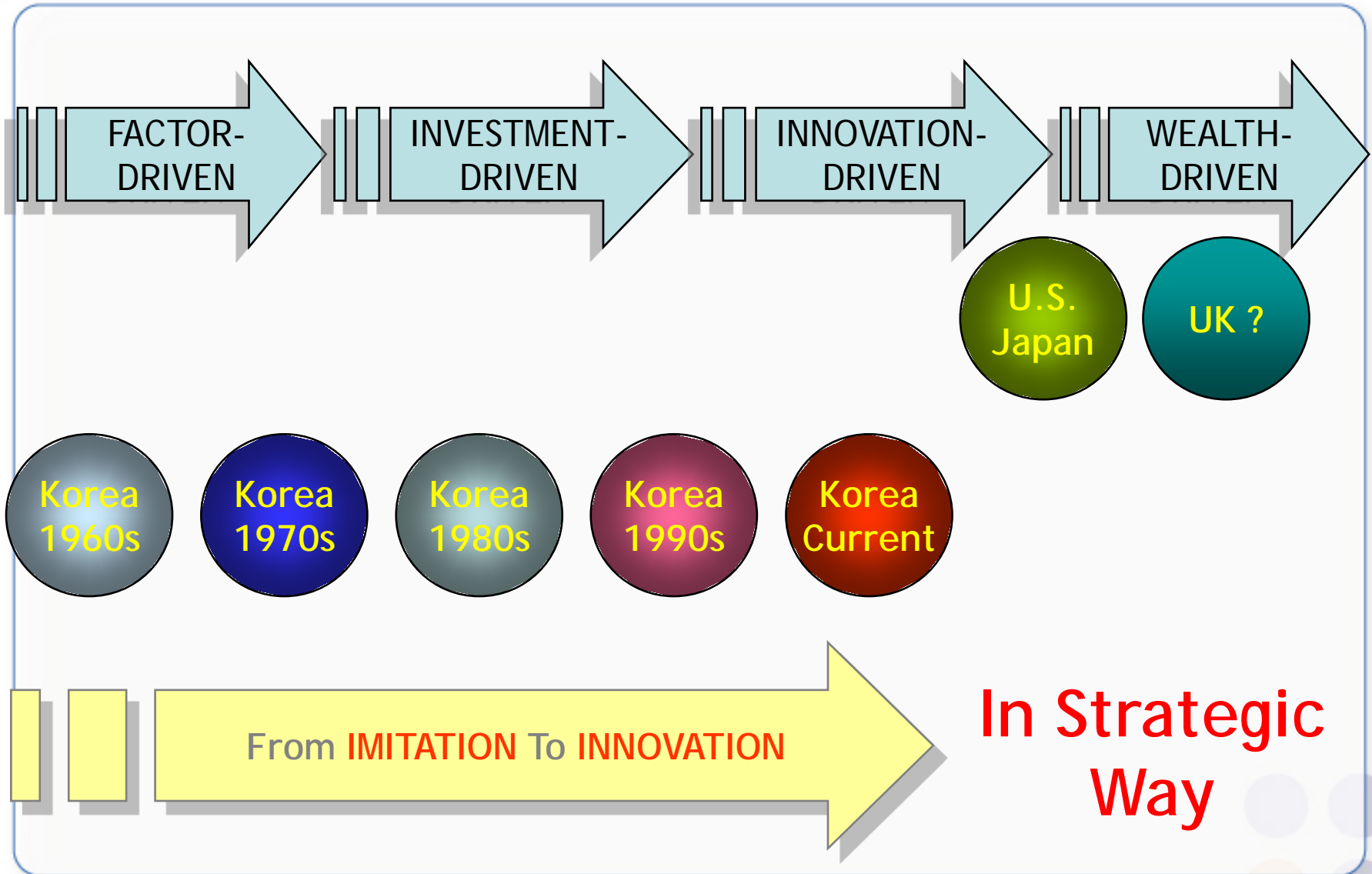


Evolution of Korean GRIs





How Has Korea Evolved?





Why International Cooperation in Korean STI?

- **Given Conditions**
 - Poor Resource Bases
 - Small Domestic Market
 - Lacking Capital and Technology
- **Korean Development Strategy**
 - No other Options but looking outward for Capital, Technology and Market
 - Utilizing the Opportunities International Linkages Offer

Source: Chung (2011)



60s-70s: For Capacity Building

- ODA Funds from US, UNESCO, UNDP, etc.
 - Essential to the survival of Korea as an independent nation
 - Critical in building capacity for development
- US technical assistance in the early stage was mainly used for HRD and institution building
 - KIST: Korea Institute of Science and Technology (1966)
 - KAIST: Korea Advanced Institute of S&T (1971)
- ODA Programs of UN Agencies 1960-70s
- Bilateral Aids from UK, Germany, Japan, etc.
- Repatriation of oversea scientists and engineers

Source: Chung (2011)



70s-80s: For Tech. Acquisition

- Outward-looking Development Strategy for technology required for industrialization
- Private industries responded to such a policy in a diverse way, depending on the nature of the industries:
 - Light industries: Learning through OEM (later progressed into ODM, OBM...)
 - Chemical industries: Learning by technical training based on turn-key base importation (ex, POSCO)
 - Machineries and Electronic industries: Learning by Formal Licensing (ex, LG)
- More rely on informal channels, which required much higher technological capabilities, which has been possible owing to rich pool of well-educated HR

Source: Chung (2011)



80s-90s: For Tech. Catching-up

- Increasingly reluctant to transfer new technologies to potential competitor, Korea
- Shift in S&T strategy from learning to developing
- Loosened the regulation of direct foreign investment and liberalized foreign licensing
- Launched the National R&D Program in 1982
- Took various measures to promote and facilitate private industrial R&D
- Launch International Joint R&D program in 1985
- Moving toward indigenous R&D (more than 20,000 industrial labs)
- Increasing new venture firms

Source: Chung (2011)



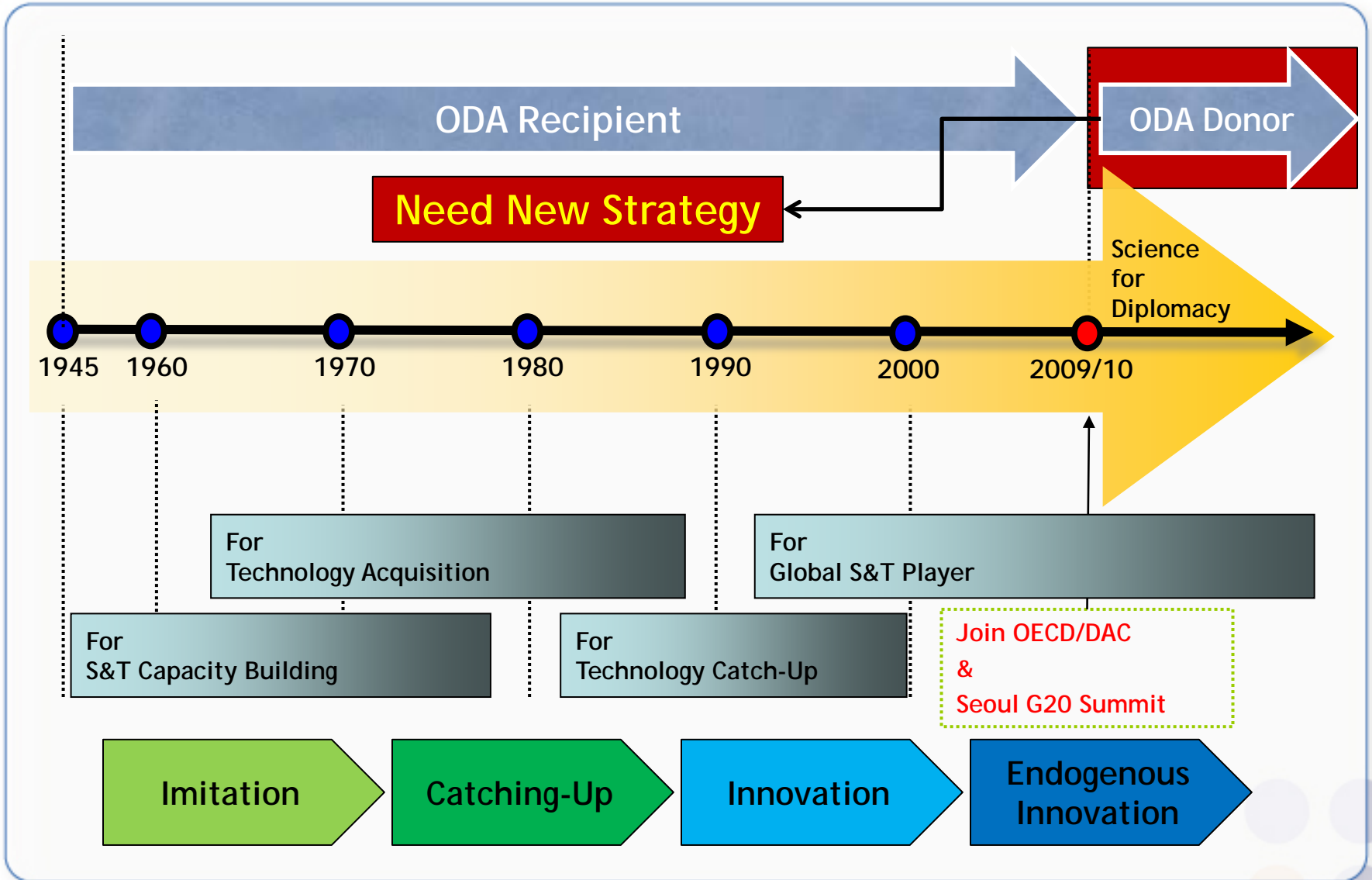
2000s~ : For a Global Player

- Expansion of international cooperative R&D
- Offshore R&D lab
- Supports for overseas R&D activities of private industries
- Expansion of international mutual R&D funds
- Attract R&D direct foreign investment
- Globalization of the R&D system
- Strengthen cooperation with developing countries
- Expansion of S&T ODA
- Sharing S&T development experiences
- Launching large scale international R&D program
- Global Frontier R&D Program: launched in 2010, \$20 million per year for ten years...

Source: Chung (2011)



Evolution of Korean International STI Cooperation





Changes in International STI Policies

	After WW II	1960s	1970s	1980s	1990s	2000s
Main Partners	Int'l Org. Adv. Countries	Adv. Countries Int'l Org.	Adv. Countries	Adv. Countries	Adv. Emerging Dev. Countries	Dev. Adv. Emerging Countries
Main Focus	Depend on ODA for Survival	Building STI Infra w/ ODA	Tech. Acquisition w/ ODA	Int'l Coop. for Tech. Catch-up	Int'l Coop. for Tech. Compet.	Tech. Compet. Assisting Dev.
ODA	Recipient	Recipient	Recipient	Start Aid	Expand Aid	Became Official Donor

Source: Jang et al. (2012)



STI as a New ODA Strategy

- **UN MDGs (Millennium Development Goals)**
 - Declare MDGs in 2000 UN General Meeting
 - Fight against World Poverty
 - Set New Direction for International Cooperation
- **Expanding ODA (Official Development Assistance)**
 - Korea Joined OECD/DAC (Development Assistance Committee) in Nov. 2009
 - Expanding ODA Volume(ODA/GNI): 0.15%(2010)->0.25%(2015)
 - Expanding the Ratio of Grant Aid: 64.5% -> 90%
- **Orientations of Korean ODA**
 - “Teach Fishing rather than Give Fishes out” => STI
 - Focus on **Self-sustaining Capacity Building** for Development
 - Integrate the Korea’s Development Experiences
 - As Part of Science Diplomacy

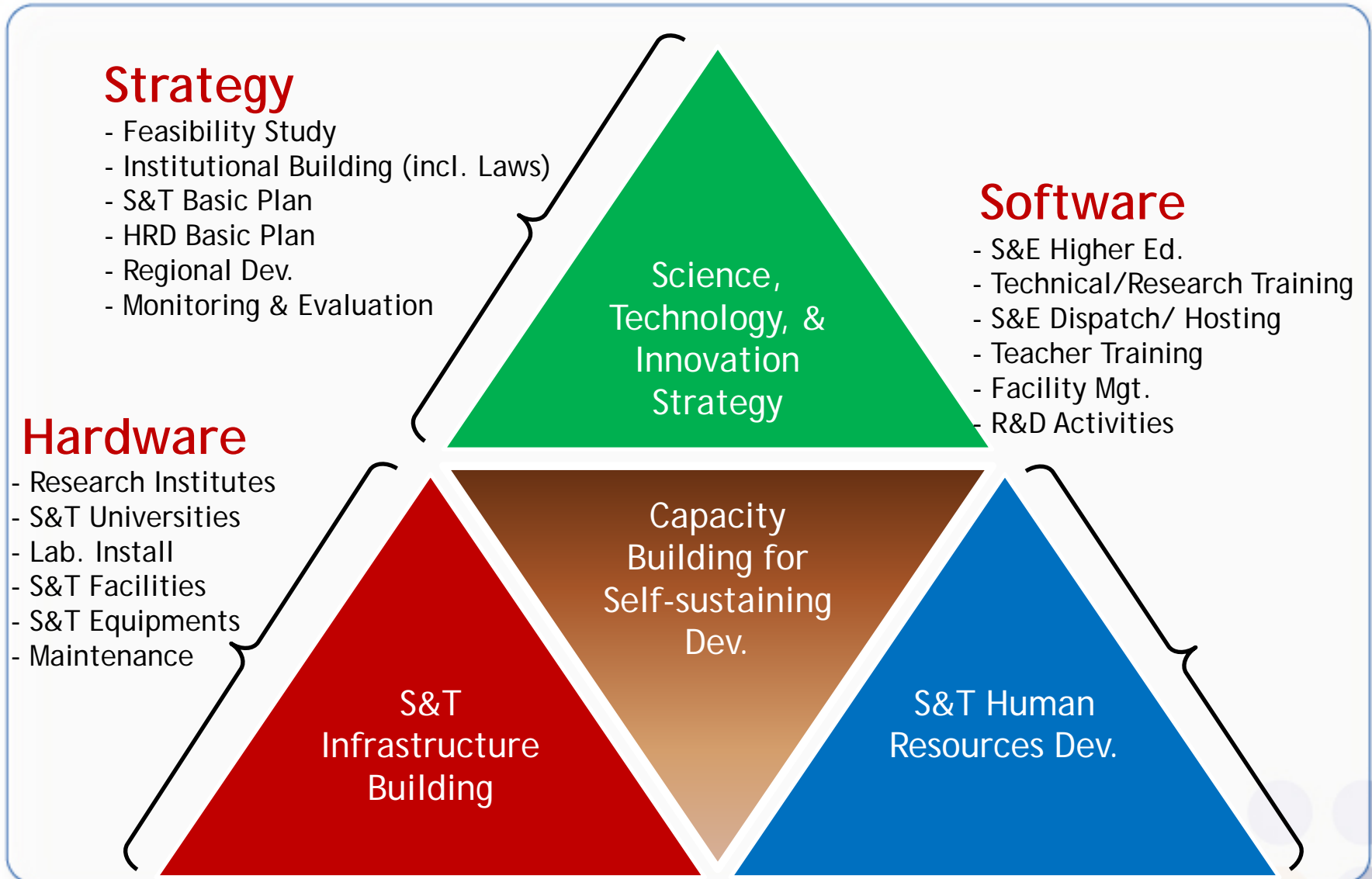


The Core is Self-Sustaining Capacity Building

- **The Core of the Success = Capacity Building**
 - Always focused on Self-sustaining Capacity Building
 - Learning, Absorbing and Internalizing Imported Tech.
 - Now focusing on Endogenous Innovation Capacities
- **Knowledge Sharing**
 - Foreign Aid helped Korean Development a lot
 - Became the only Country transformed from ODA Recipient to Donor Country by joining the OECD/DAC in Nov. 2009
 - Time to Share Rich Korean Experiences
- **Korean Strategy to Share Knowledge**
 - Focus on Self-sustaining Capacity Building for Development
 - “Teach Fishing rather than Give Fishes out” => STI
 - Integrate the Korea’s Development Experiences
 - As Part of Science Diplomacy



Core Components of Self-sustaining Capacity Building



Source: Jang et al. (2011)



An Example: V-KIST

- **Plan for Vietnamese version of KIST (V-KIST)**
 - Goal: Establishment of V-KIST
 - An Agenda at the Korea-Vietnam Summit (March 28, 2012)
 - Feasibility Study (2013)
 - Duration: 4 Years (2014-2017)
 - Budget & Support: 35 million USD supported by KOICA
 - PMC: KIST & Consortium
- **Core Components**
 - Master Plan for V-KIST (2014-2030)
 - 1st Phase of Construction (2014-2017)
 - Research Facilities and Instruments Support
 - Knowledge Transfer of Institute Management
 - Knowledge Transfer of Research and Research Operation
 - Education and Training of High-Caliber Researchers

ASEAN+3 (China, Japan, Korea)

- **ASEAN+3: The First Summit in December 1997**
- **ACGS: ASEAN+3 Centre for the Gifted in Science**
 - Korea established ACGS Program in 2009
- **Mission**
 - To improve and globalize education for the Gifted in Science
 - To strengthen cross-culture exchange among ASEAN+3 nations
 - To provide the environment and opportunities for students to learn the best science education
 - To contribute towards peace, green growth and humanity
- **Programs**
 - APT Junior Science Odyssey
 - Student Camp for the Gifted in Science
 - Teacher Workshop for the Gifted in Science
 - Board of Directors' Meeting



ASEAN-Korea

- **1991: Korea became a full ASEAN Dialogue Partner**
- **2005: ASEAN-ROK Plan of Action (POA)**
 - To implement the Joint Declaration on Comprehensive Cooperation Partnership
 - To promote exchange of information for strengthening S&T competitiveness and developing tech. mgt. and innovation to build the capabilities of S&T experts and officials in ASEAN
 - 85 projects implemented and 24 on-going projects since the implementation of POA
- **2010: The 13th ASEAN-ROK Summit**
 - Agreed to elevate the ASEAN-Korea dialogue relations from comprehensive cooperation to strategic partnership
 - To promote joint research and young generation scientists programs including the Gifted in Science

ASEAN-Korea Joint S&T Committee

Nov
2011

- Korea Suggested to formalize its cooperation with ASEAN COST through establishing ASEAN-ROK Joint S&T Committee

Dec
2011

- ASEAN-Korea Consultation Meeting on S&T Dec. 2011 in Jeju

Nov
2013

- The 1st Meeting of the ASEAN-ROK Joint S&T Committee (ASEAN-ROK JSTC)

Dec
2014

- ASEAN-ROK Special Summit will be held

- The 1st ASEAN-ROK JSTC: Suggested Development of Implementation Strategy for ASEAN STI Initiatives in the areas of Green, Food and Water Tech. to support new ASEAN Plan of Action on Science Technology and Innovation (APASTI 2015-2020)
- APASTI to be finalized in Aug. 2014 aligning with Krabi Initiatives and ASEAN market integration in focused areas of digital economy, food security, energy security, auto-mgt., biodiversity and life sciences



Thank You!

For Further Comments & Questions;

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