### **Korea's National Innovation System**

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# I. Background of Korea's NIS

# **Fast Economic Growth of Korea**



< Factor Input (labor & capital) – led Growth Model >

- Cheep labor, plenty human resources
- Export-oriented industrialization strategy
- Transition from labor-intensive to capital-intensive industry
- Very strong initiative of the government

# Limitation of Labor & Capital–led Growth Model



# **Changes & Challenges**

- 21st Century's knowledge-based economy
- Technology innovation is a new growth engine
  - : leap over the growth limit through factor input



### **Innovation-driven Growth and NIS**

Innovation-led growth

- Foster leading industries
- Create new technology industries
- Cultivate knowledge-based service industries



Technology innovation is conducive to innovation in all sectors of society as well as economic growth, and thus brings about systematic changes at the national level

Calls for establishing a new NIS

# **S&T Progress in Korea : Quantitative Growth**



# **Current Status of Korea's NIS**

#### **Strong Points**

- Accumulation of technology innovation experiences through large-scale nat'l programs (\*TDX, 4M DRAM, KTX, etc.)
- Establishment of world-level information infrastructure
- Possession of innovation potential through quantitative expansion

\*10,000 private research institutes, \*Graduates in S&T areas per 1,000 people: 2.2 (Japan: 1.2)

 Innovation of process technology improvement of technology import mechanism:
 develop world-level technology in selected areas
 \*DRAM, CDMA, TFT-LCD, etc.

#### Weak Points

 Lack of capability for producing world-level output
 \*Technology level for "the Korea Future

Strategy Technology 21" : <u>64.7%</u> of mostadvanced nations('05)

- Poor diffusion of innovation output and industrialization system
- Inactive cooperative network among industry, academia, and research institutes \*Private enterprises: use 97% of research budget for conducting their own research (independent development)
- Imbalance in demand and supply of human resources, poor base for fostering creative human resources

# **Paradigm Shift of NIS in Korea**

#### Major Directions for NIS

Catch-up mode of NIS	Five (5) Areas of Innovation		Creative mode of NIS
Imitative- & modifying- based system	Strengthen innovation capabilities of industry, academia & public research institutes	"Actor" innovation	Value creation- based system
	Produce and commercialize creative outputs from R&D	"Performance /diffusion" innovation	
Stand-alone & closed system	Strengthen collaboration with leading research organizations and companies Coordinate policies, budget, and programs efficiently and effectively	"System" innovation	Networked & Open system
Input-oriented & supply-side mode	Secure efficient R&D investment and supply of high-quality S&T manpower	"Input factor" innovation	Performance – centered & demand-oriented
	Create innovation-driven eco-system, including S&T culture	"Infrastructure" innovation	system

Strengthen the foundation of macro-economy based on the qualitative development of micro-economy through S&T, industry, and human resources

# II. Strategies for Establishing a New NIS

Vision

#### Establishing Innovation-driven Economic Structure & S&T-oriented Society



# **Actor Innovation**

**Strengthening Creative Innovation Capacity of Playing Actors** 







# **System Innovation**

Establish a Knowledge-Sharing Collaborative R&D Environment and Improve the Efficiency of an S&T Administrative System

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Establishment of Networks

- Facilitate industry-academiaresearch institute interactions
- Establish business-to-business tech development consortiums
- Provide foreign R&D institutions in Korea with assistance in HR training on the premise of recruitment.
- Attract excellent foreign R&D institutions

Advancing Planning - Coordination - Evaluation System

- Establish the Office of Science, Technology and Innovation (OSTI)
- Strengthen NSTC's function for Inter-ministerial coordination of S&T policies and budget
- Enact and enforce "R&D Performance Evaluation Act"
- Introduce "Feasibility Evaluation System" for large-scale R&D projects.

**Establish a user-friendly national S&T information system** 

# **Infrastructure Innovation**

### **S&T Development in harmony with Society**

#### **Policy / Institution**

- Create more Jobs in public areas
- Reduce compulsory period of military service for R&D personnel
- Expand the portion of government officials on the technical career track
- Strengthen the "Performance-reward" system

#### **Environment / Culture**

- Launch private-led science culture diffusion campaigns (Science Korea)
- Widen opinion leaders' understanding of S&T
- Establish a "Scientist Charter" and "Code of research ethics"
- Assess socio-cultural impact of newly emerging technologies



# **III. Institutional Reforms**







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### Establishment of Office of S&T Innovation (OSTI)

Redesign the Ministry of Science and Technology (MOST)

- Raise the status of the minister of MOST to deputy prime minister and vice chairman of the NSTC
- Establish the Office of Science and Technology Innovation (OSTI)
- Grant the right to allocate and coordinate the national R&D budget to the NSTC
- Transfer the jurisdiction over three(3)S&T-related research councils and nineteen(19) government research institutes to the NSTC

Reduce the scope of MOST's missions by transferring the jurisdiction over some of its fundamental research and application-related R&D functions to other relevant ministries.

Organize and facilitate S&T-related Ministers' meetings to discuss and coordinate responsibilities among different ministries regarding S&T innovation-related policies.

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# Establishment of Office of S&T Innovation (OSTI)

Consists of more members from other ministries and the private sector than those from MOST (total: 106)

- Recruited members from MOST, other ministries and the public sector in a 4:4:2 ratio.
- Enhanced impartiality, subjectivity and expertise in the execution of ST affairs.

Personnel exchanges with other ministries through employee rotation

Secure employee autonomy from original government agencies.

Recruit a superior workforce from the private sector through a public hiring notice

 Diversified employment methods such as dual position hires, contract employees and special hiring.

# IV. Korea Institute of S&T Evaluation Planning (KISTEP)

![](_page_26_Figure_0.jpeg)

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# V. Characteristics of the New NIS and Challenging Issues

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• Vitalization of Regional R&D

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### **Challenging Issues**

Appropriateness of investment portfolio of national R&D		
Present Situation (2005.%)	Future targets	

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Research Stage	Basic(23.0), Applied (24.8),Experimental (52.2)	Increase of basic research	
Research entity	Research institute (49.4), University & college(23.5), Companies(15.6)	Increase of university research	
6 Ts	IT (22.8), BT(!2.9), NT(5.1), ET(9.1)	Mitigation of imbalanced investment on IT	
Region	National capital region(43.4), Daejeon(23.7), etc(32.9)	Strengthening of local R&D	

#### **Globalization of S&T**

Productivity increase by 1% increase of R&D expenditure (Danaka, 2005)

□ Private R&D : 0.13% , □ Public R&D : 0.17%

□ Foreign R&D : 0.45%

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Foreign R&D proportion in Korea : 0.5%('04)

Encourage foreign R&D investment thru the promotion of FDI Strengthening policy measures to attract global R&D centers

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### **Challenging Issues**

Need to adopt differentiated national R&D strategies depending upon technology characteristics

	CDMA ('80~'90s)	FTTH('02~'06)
Technology characteristics	<ul> <li>Systematic technology</li> <li>Strongly exclusive to other technology</li> </ul>	<ul> <li>Modularized technology</li> <li>Not exclusive to other technology</li> <li>Convergence technology</li> </ul>
R&D performance	<ul> <li>Success in R&amp;D</li> <li>Market creation &amp; economical success</li> </ul>	<ul><li>Success in R&amp;D</li><li>Failure in creating market</li></ul>
Complexity of tech	nology and market	vious Failure in commercialization
Rapid growth of technology		amework of R&D

# **THANK YOU !**