



## Translational Researches in Korean Government Institutes



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- Korea Institute of Machinery & Metals, Vice President
- Ministry of Science & Technology Deputy Minister
- IITPA (President) , Robot Land President
- Dae Jeon Technopark President
- KIST Auditor, Board Member

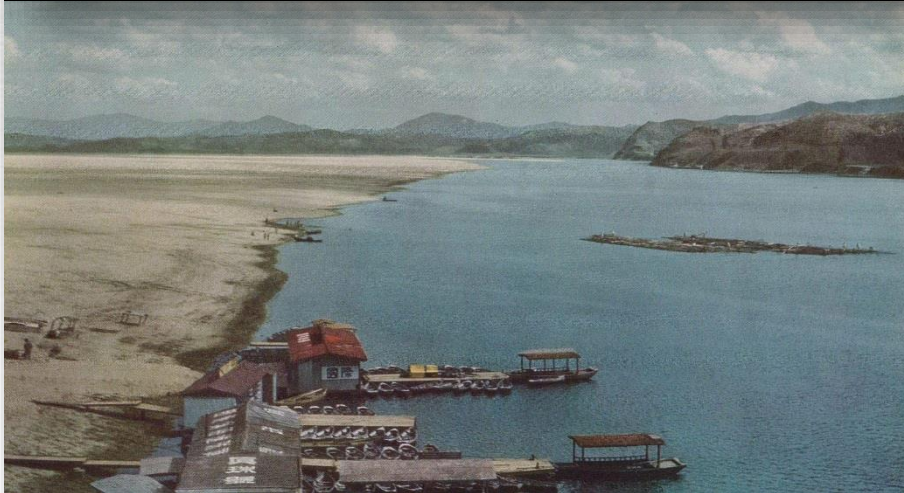
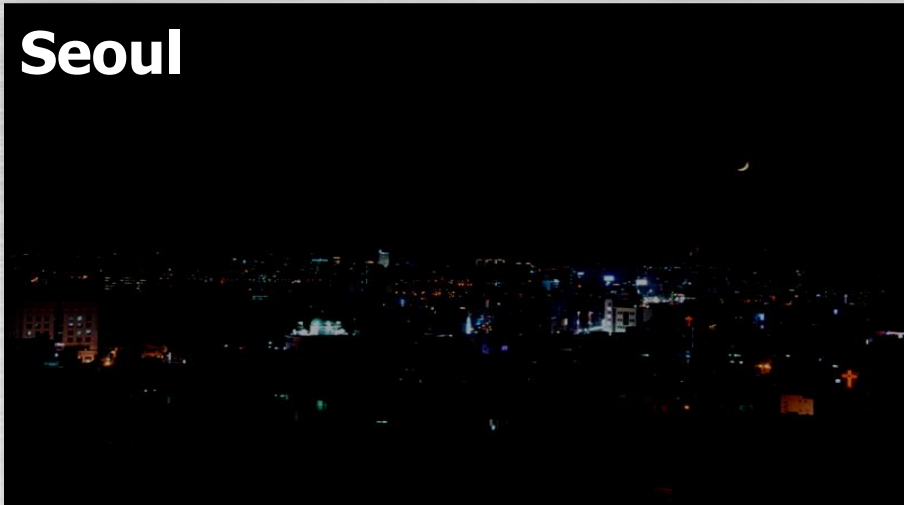


# During the last half century

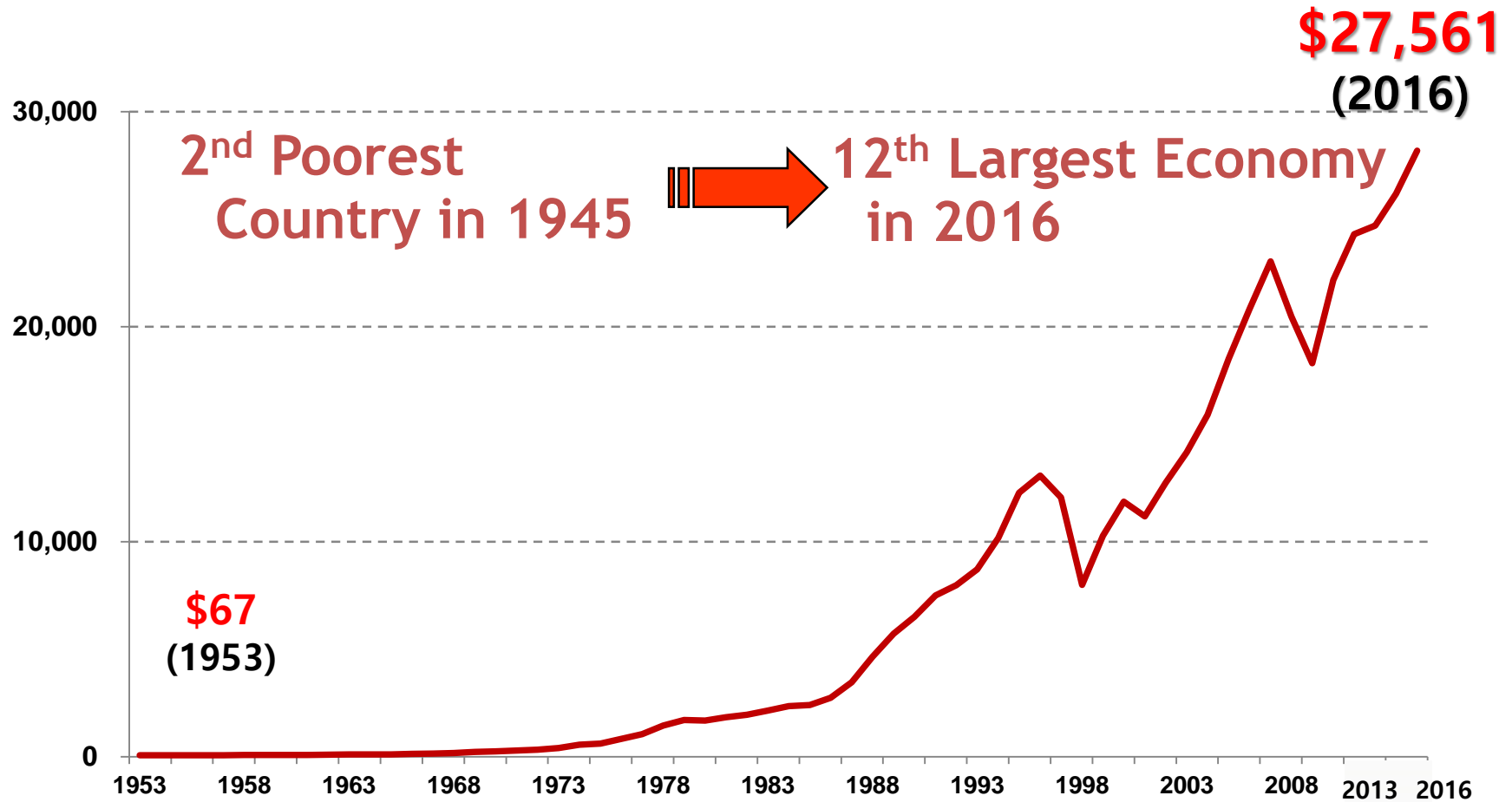
1966

2016

**Seoul**



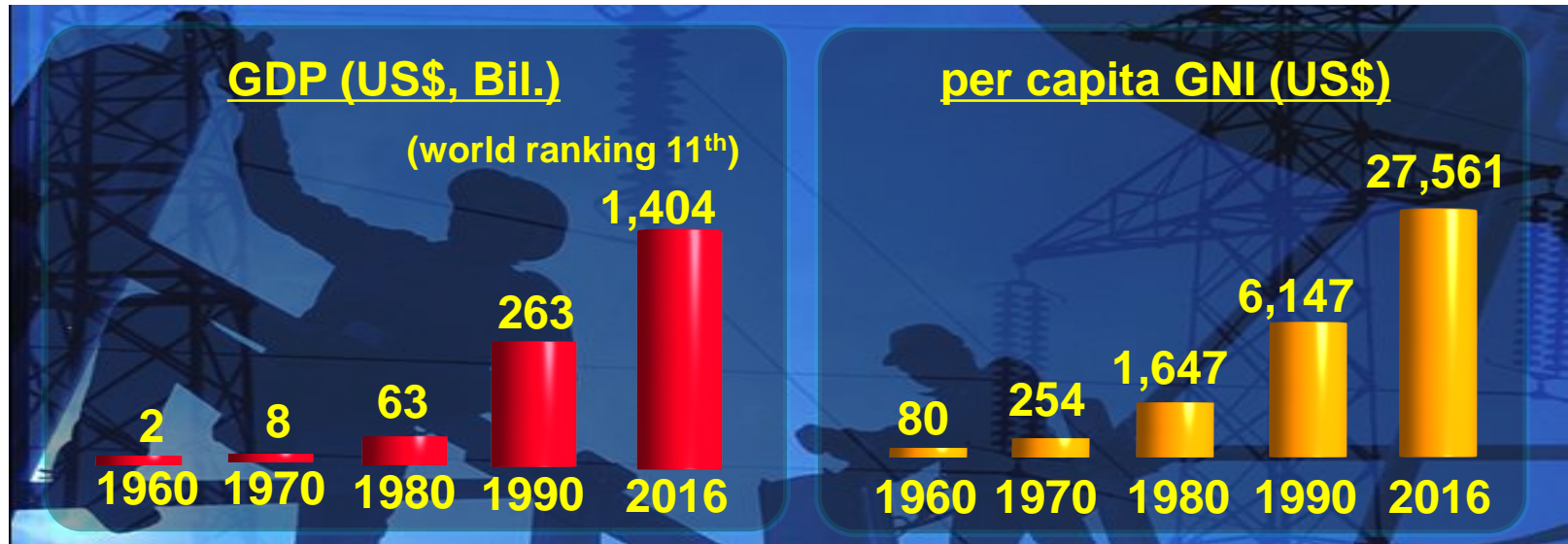
# Korea's Economic Development, 1953-2016



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)

# Remarkable Economic Growth in Korea



## Korean Science and Technology

- ❖ The world's 6th R&D investment to GDP : 4.23% (2015)  
(National R&D budget: about \$58.3 billion)
- ❖ No. of scientists and engineers: over 356,000
- ❖ No. of company research institutes : over 35,000



# In world market

Memory Chip 1st



67%

Samsung  
SK hynix

TFT-LCD 1st



47%

Samsung  
LG electronics

Shipbuilding 1st



35%

Hyundai  
STX

Mobile Phone 1st



35%

Samsung  
LG electronics

Petrochemicals 5th



5.5%

GS Caltex  
SK Energy

Automobile 5th



5.5%

Hyundai-KIA  
GM Daewoo

Steel 5th



4.2%

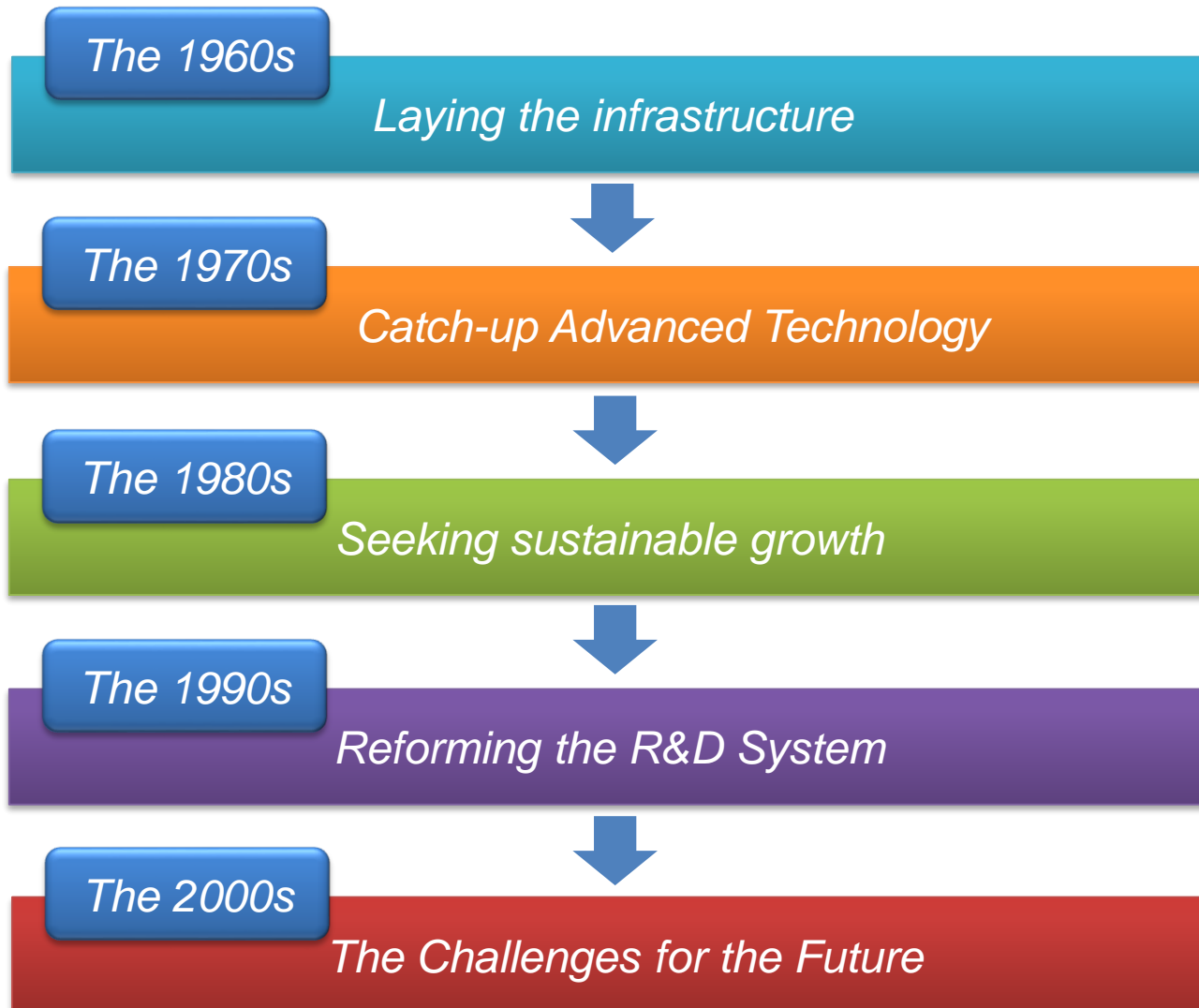
POSCO  
Hyundai

# World Best Korean



# Evolution of policies on Science and Technology

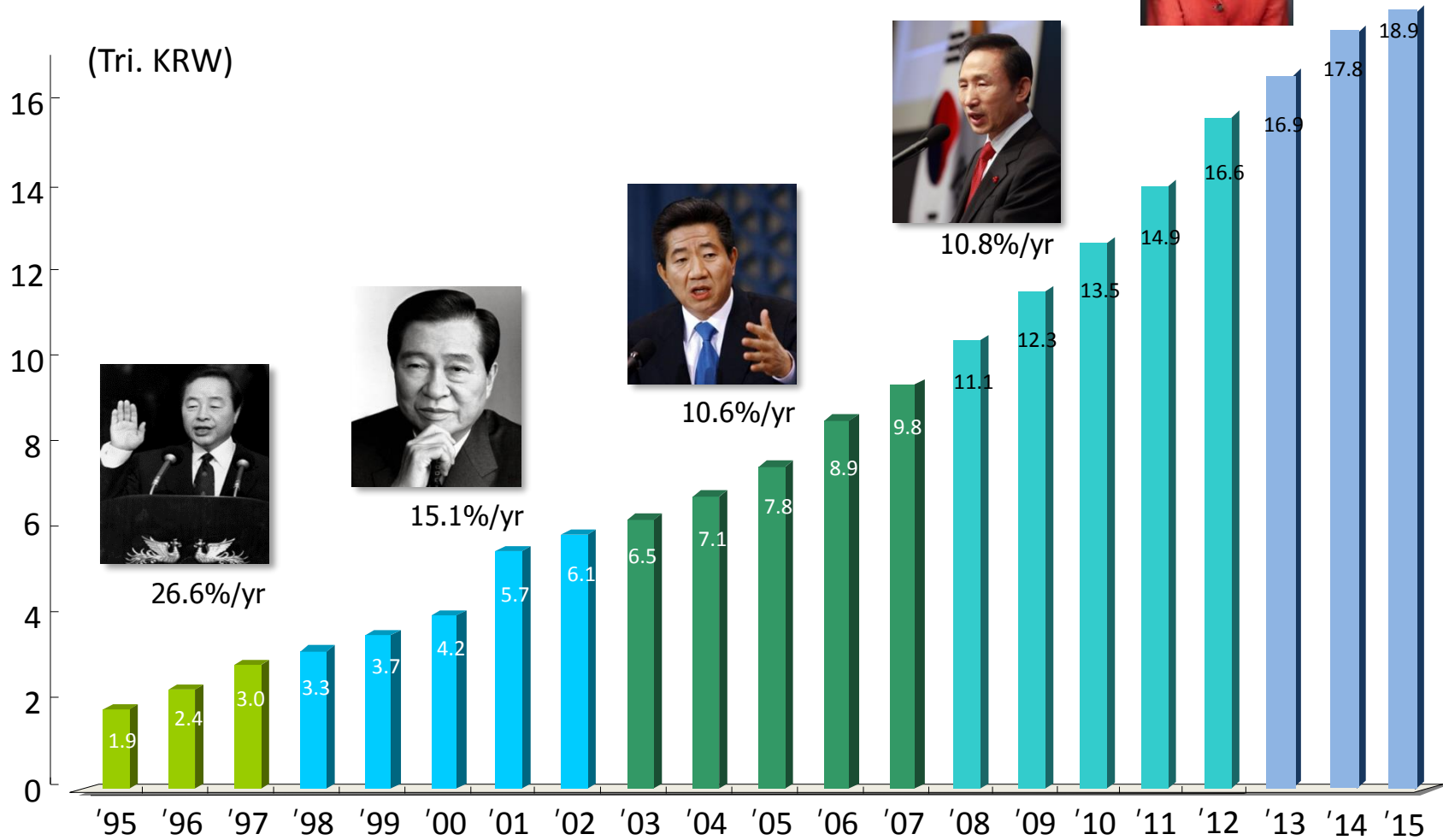
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# Consistent R&D Increase

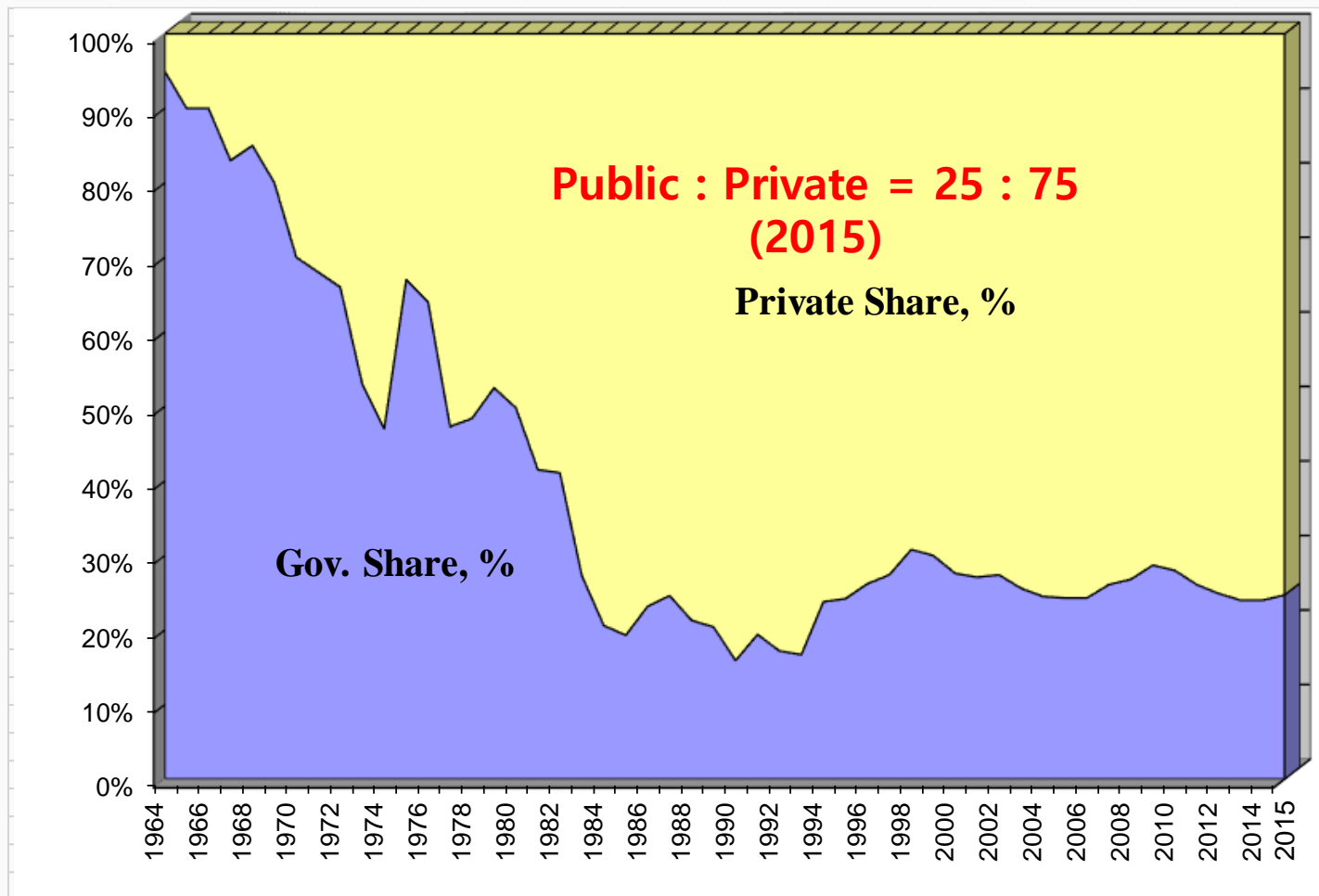
- Rapid increase in the R&D input
  - Almost 5% of government budget





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

## Public R&D: Promoter & Facilitator



# Unique Features of Korean R&D Policy

- 1) **GRI and Daedeok Science Town**
- 2) **Univ - GRI - Industry Collaboration**
- 3) **Building R&D Capability : Human resources**
- 4) **Establishment of Corporate-Led Innovation System**

# R&D Cluster in Korea: Daedeok Science Town

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## *Mission of Daedeok Science Town*

- To build a world-class city of “brains”
  - 27.8 km<sup>2</sup> / 38,000 researchers / 861 institutes
- To make research activities more effective through collaborative R&D projects
  - 21 GRIs + 43 Private RIs + 6 Univs + 762 Co.
- To facilitate human exchanges and joint research

### **1970's ~ 1980's**

Construction began on research institutes within the cluster



### **2000's**

A mature innovation cluster takes root.

### **1990's**

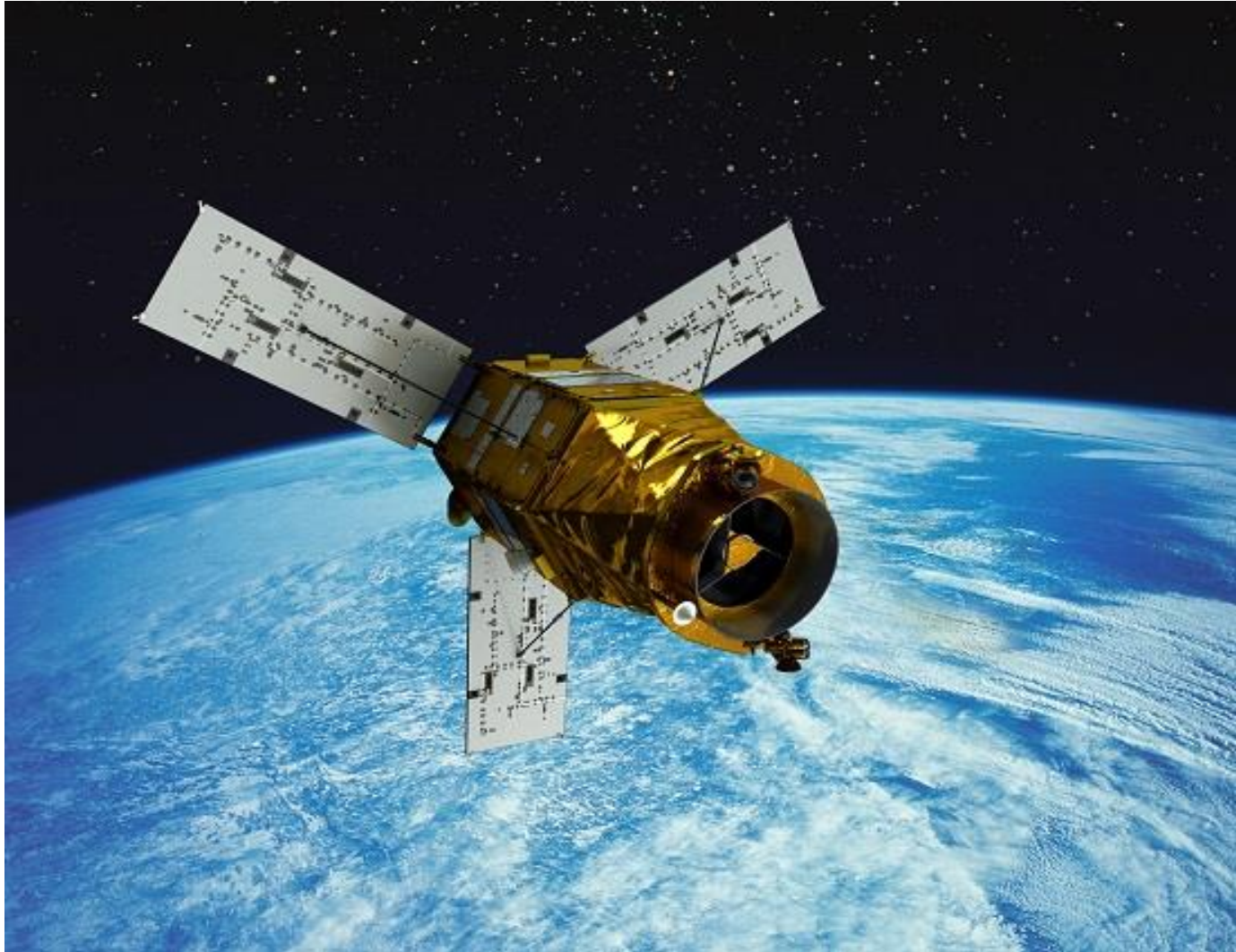
The creation of National Expertise in R&D



# Nuclear Power Plant



# Multi-Purpose Satellite



# Super Sonic Trainer





# Research Station at South Pole



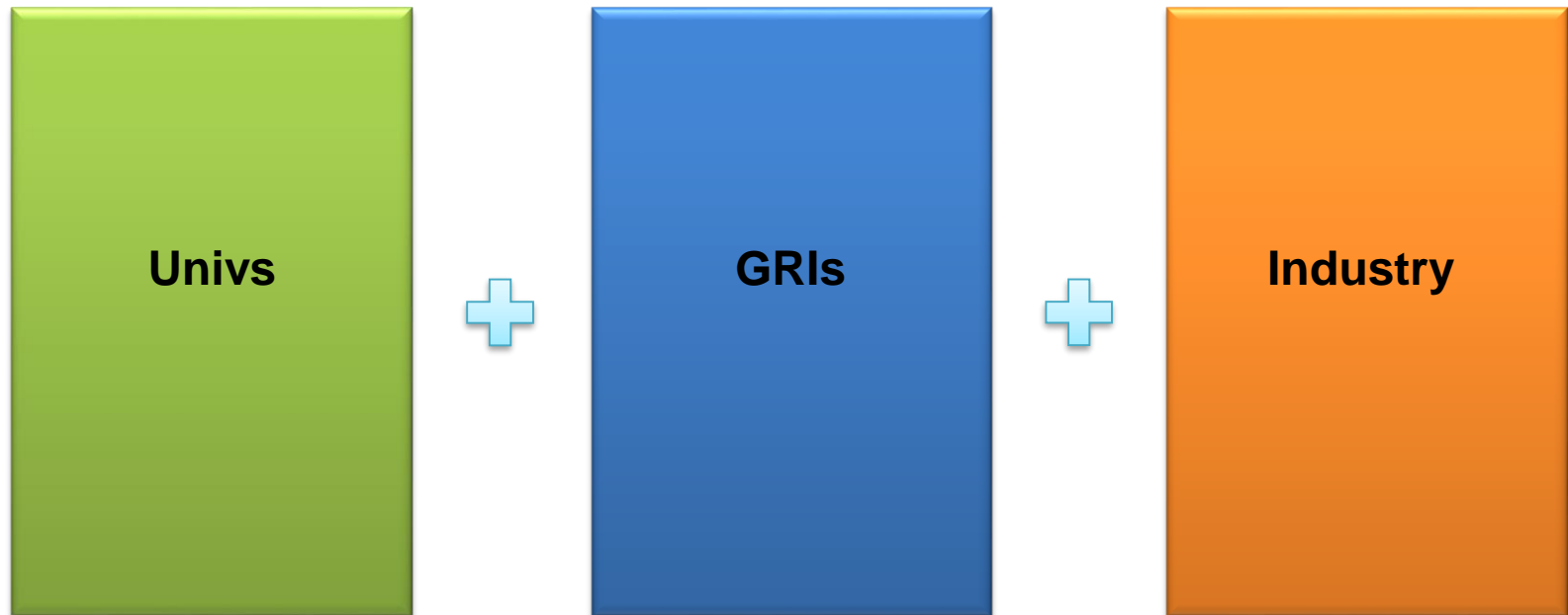


## Unique Features of R&D Policy:

- 1) GRIs and Daedeok Science Town
- 2) **Univ—GRIs-Industry Collaboration**
- 3) Building R&D Capability: Human resources
- 4) Establishment of Corporate-Led Innovation System

# University – Institute – Industry Collaboration System

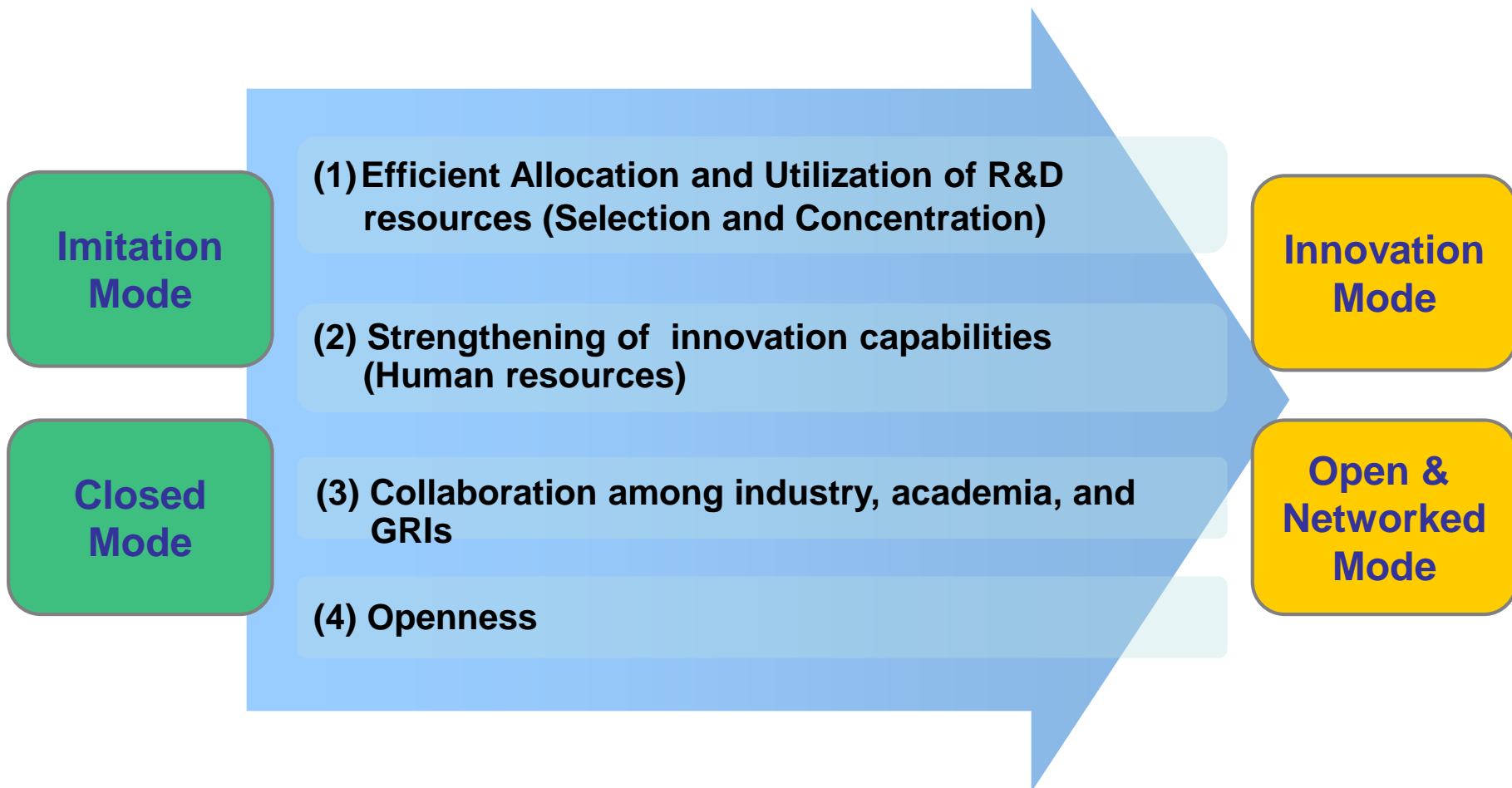
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# Launch of National R&D Program

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*To satisfy various needs of the state and society for technology development*



## Unique Features of R&D Policy:

- 1) GRIs and Daedeok Science Town
- 2) Univ—GRIs-Industry Collaboration
- 3) **Building R&D Capability: Human resources**
- 4) Establishment of Corporate-Led Innovation System



# Establishment of the KAIST

## *Korea Advanced Institute of Science and Technology (KAIST)*



### Mission (1971)

*“To satisfy the needs of Korean industry and Korean industrial establishments for highly trained and innovative specialists, rather than to add to the world’s store of basic knowledge”*

### Building a Reputation in Science

- The U.S higher science education assessment board, ABET, put KAIST graduate course within **10% of top U.S. college level** in 1992
- **No. 1 Asian college in science and technology** (Asiaweek, in 1999 and 2000)
- **37th in the world in technology field** and 82nd in the science field (The Times Higher Education report, in 2006)



## Unique Features of R&D Policy

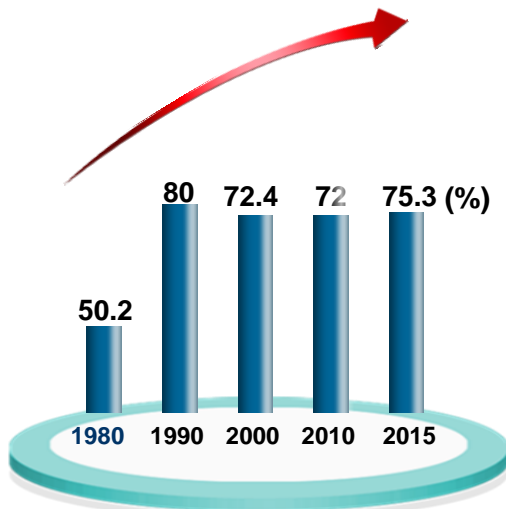
- 1) GRIs and Daedeok Science Town
- 2) Univ—GRIs-Industry Collaboration
- 3) Building R&D Capability: Human resources
- 4) **Establishment of Corporate-Led Innovation System**

# Industrial R&D Activities by Policy Incentives

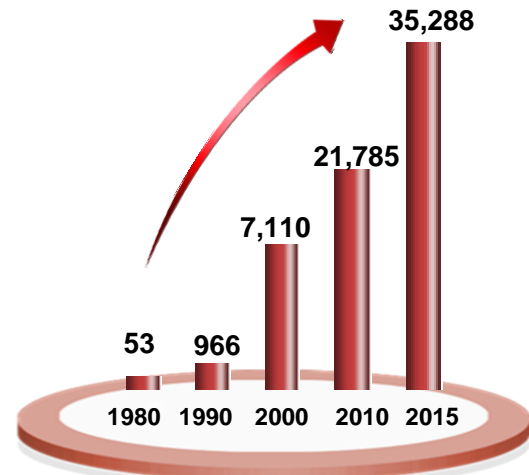
*Government established support systems for facilitating technology development in the private sector (1980s)*

- **Tax Support System for technology development**
  - tariff reduction for supplies for R&D, exemption of tax on samples for research
- **Financial incentive to stimulate R&D investments**
- **Exemption from military service for research personnel**

## ➤ Contribution of private sector to national R&D investment

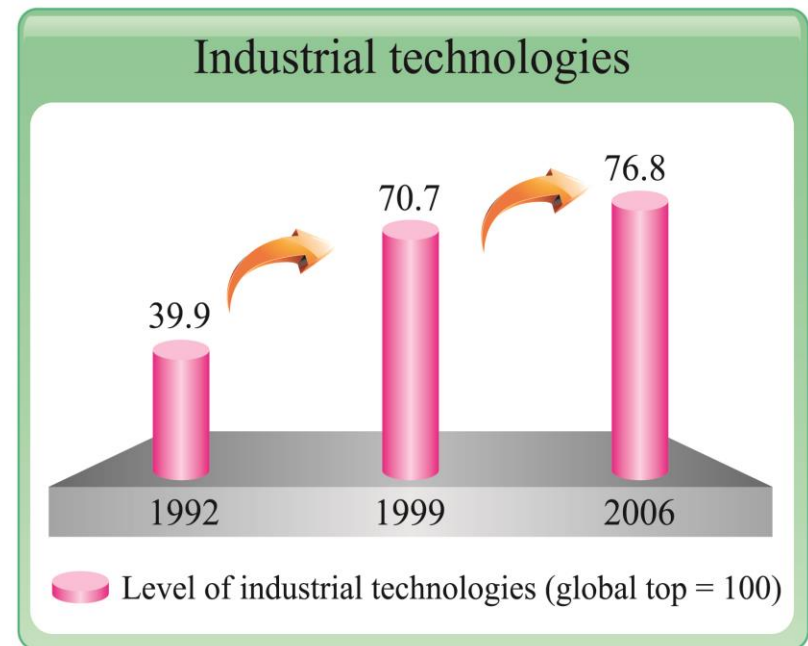
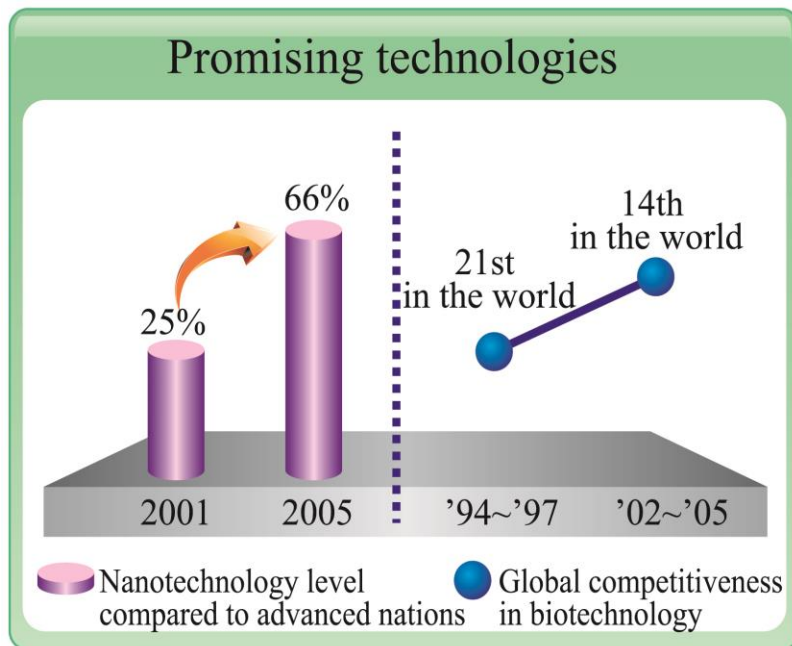


## ➤ Number of corporate R&D Centers



# Establishing Corporate-Led R&D System

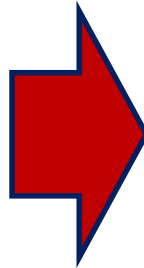
- **Private sector's R&D investment increased by 8.4 times since 1982**
  - \$2.7 billion(1982) → \$22.8 billion(2008)
- **The ratio of R&D expenditure to sales has steadily increased.**
  - Medical, Precision, Optical equipment & Watches Industry: 7.3%(2008)
  - Electronics Machinery(Semiconductor) Industry: 7.3%(2008)
  - Video-audio & Telecommunications Devices Industry: 6.3%(2008)





# New Motto

**Fast  
Follower**



**First  
Mover**

# Translational Process

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**1 Start-up by Scientists**

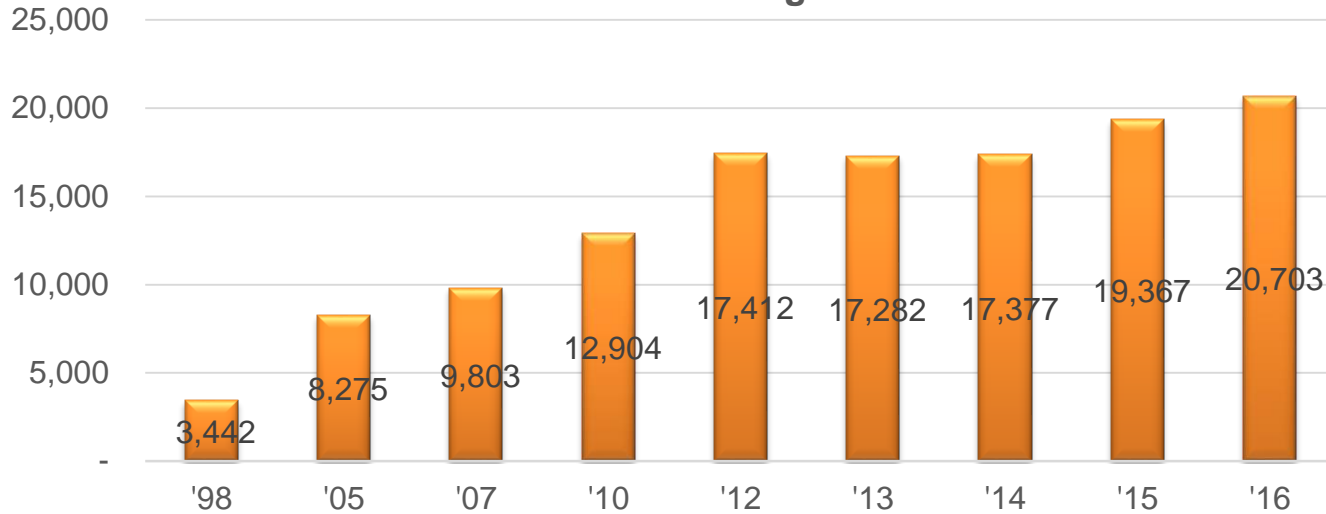
**2 Technology Transfer to Industry**

**3 Venture Incubation Centers in Campus**

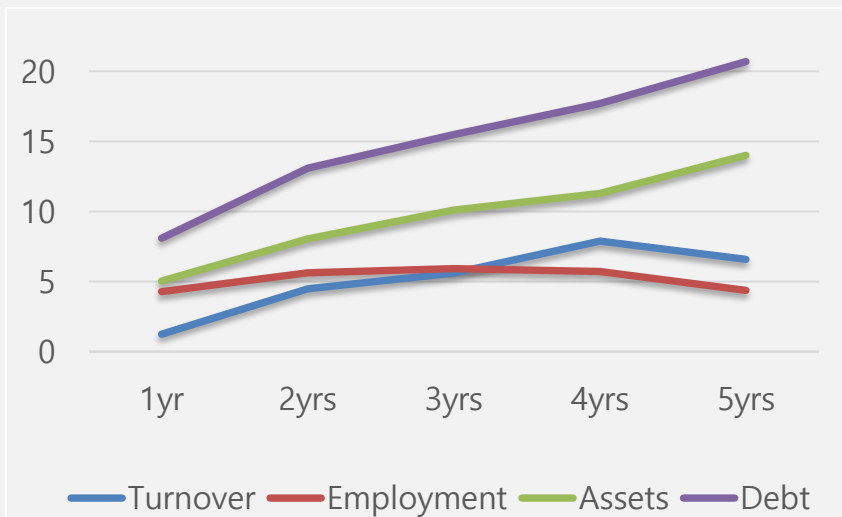
# KOSBIR: Korea Small Business Innovation Research Program

Hundred Million KRW

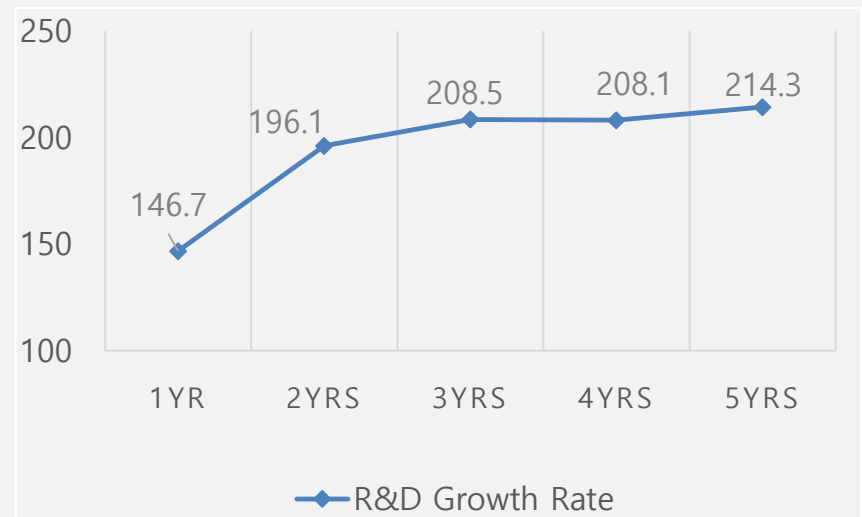
<KOSBIR Budget>



Growth Rate



Growth Rate



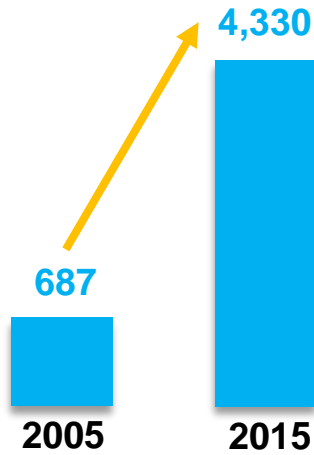
<The effect of KOSBIR on growth and innovation of Business / STEPI, 2017>

# Start-up by Scientists

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## No. of companies

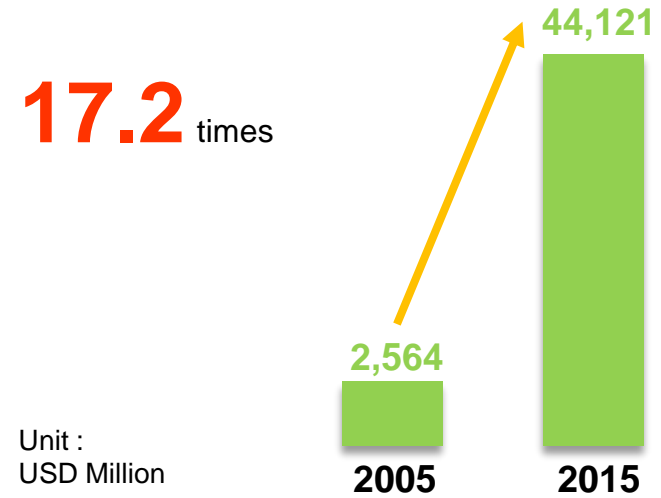
**6.3** times



Unit : ea

## Sales revenue

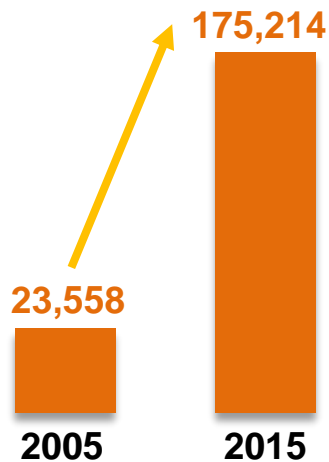
**17.2** times



Unit :  
USD Million

## Employment

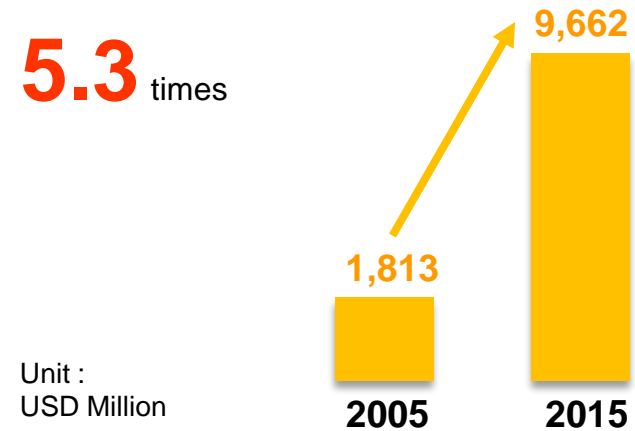
**7.4** times



Unit : person

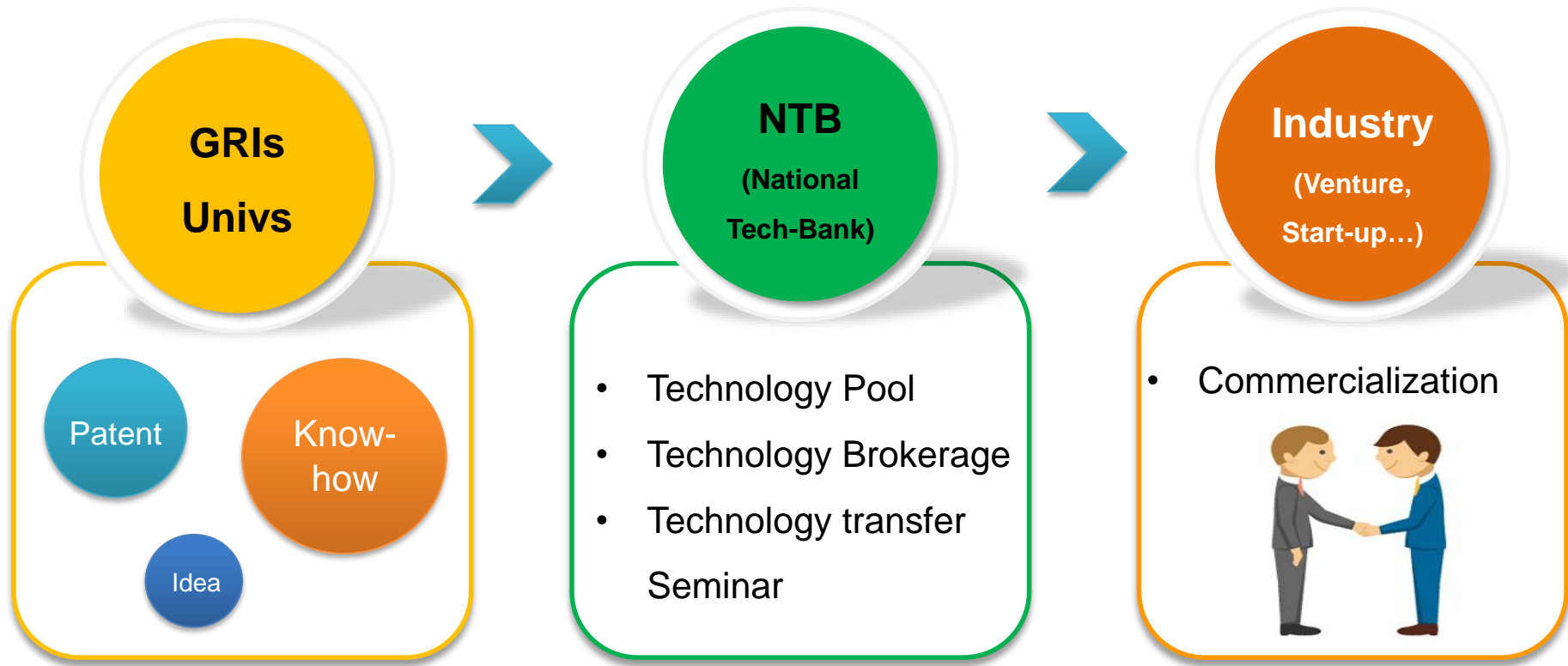
## Total R&D investment

**5.3** times

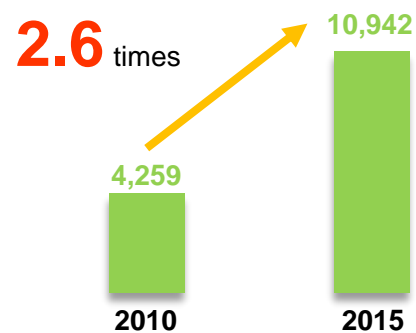


Unit :  
USD Million

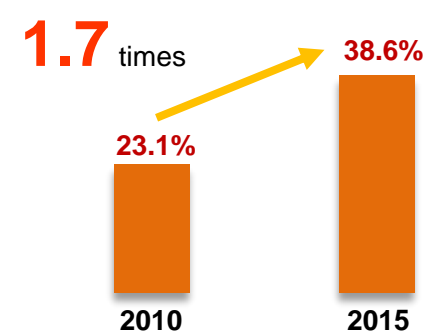
# Technology Transfer to Industry



Technology transfer case



Technology transfer rate



# Korea Techno-Venture Foundation



381  
USD Million

Sales  
revenue

3,540  
person

Employment

273 ea  
No. of  
Companies

EXIT  
Strategy

Listed on KOSDAQ : 2  
M&A : 3  
10 USD million  
Sales revenue : 7



*Thank You!*

