

The Evolution of National STI Policy

- Review of Korean Experiences -

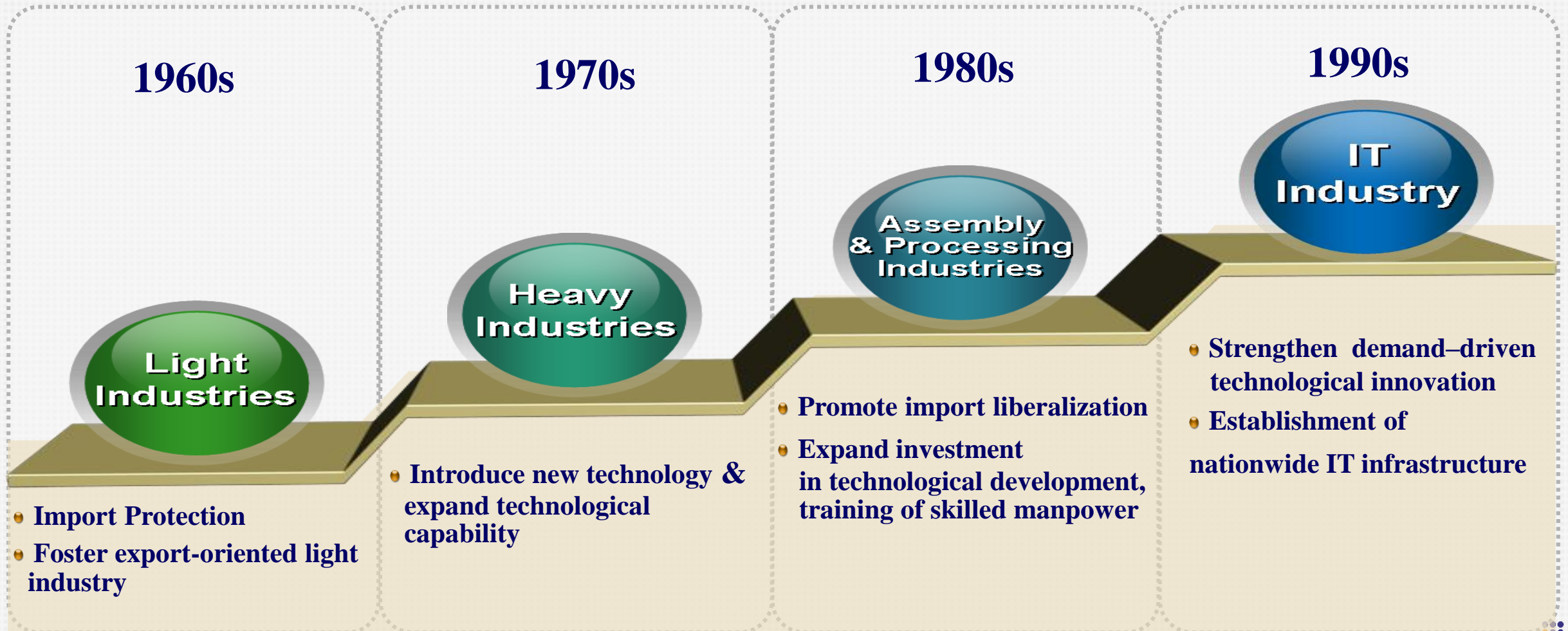
July 22nd 2020

UN ESCAP Webina Presentation

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Industrialization W/ S&T Development

“Select and Focus & Export-Oriented” Strategy



Innovation Strategy

1960s

1970s

1980s

1990s

2000s

Strategy

Catch-up

Innovation

S&T policy direction

Building R&D infrastructure

Developing technologies for key export industries

Promoting R&D

Developing technologies for high-tech industries

Enhancing technology innovation

Developing basic and fundamental technologies

Key industries

Primary goods

Light industry goods

Light & heavy industry goods

Heavy industry goods & electronic products

Electronic & cutting-edge products

Leading sector

Government-funded research institutes (GRIs)

Private enterprises, GRIs, Universities

Private enterprises, GRIs, Universities

Science & Technology Policy

- * The 5-year Technology Promotion Plan by EPB (1962)
 - Strategic foresight on tech. & human resource (demand & supply)
-

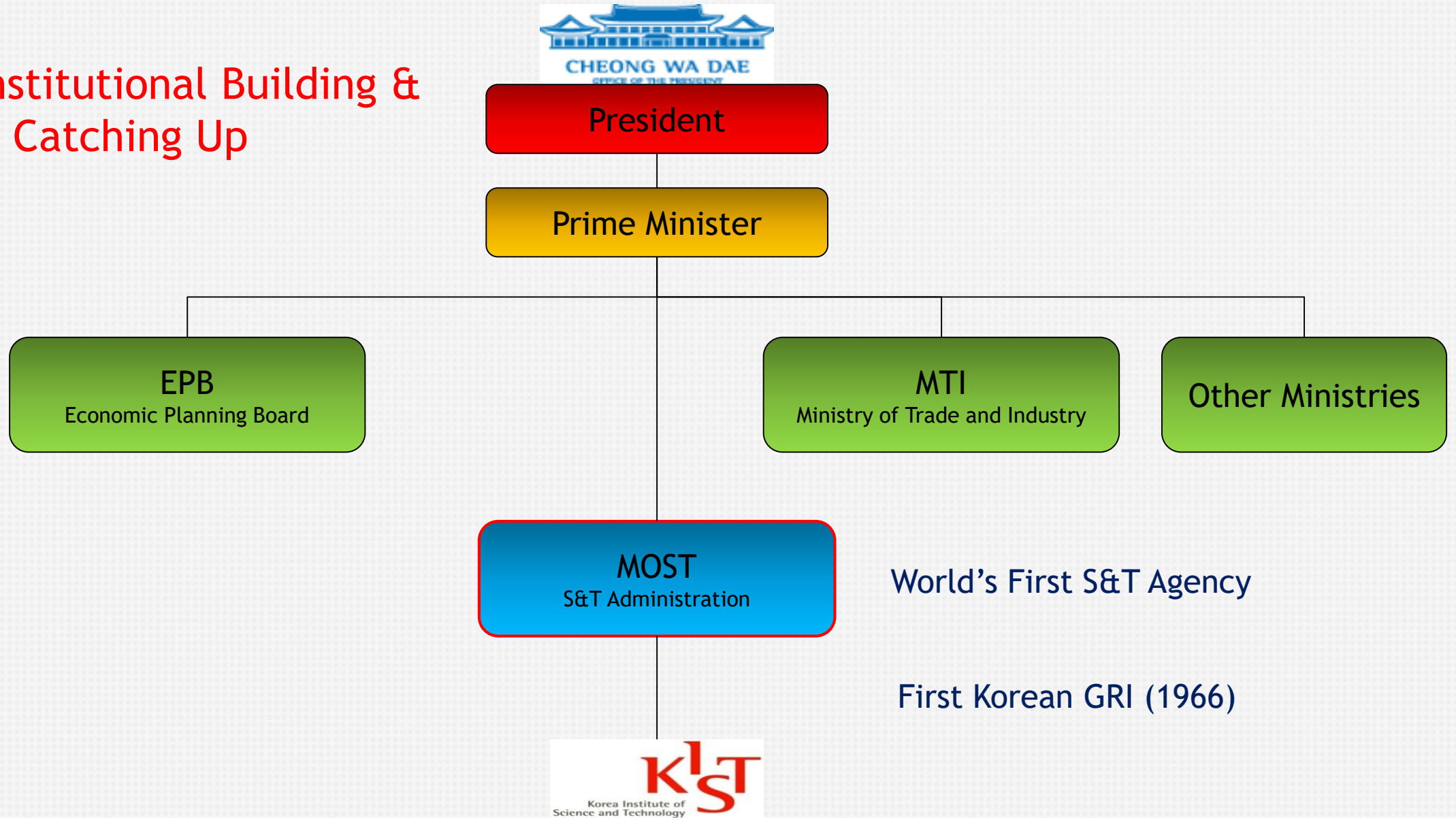
- * The Science & Technology Promotion Act (1967)
 - To provide legal foundation for STI activities
-

- * Long-term Master Plan for S&T Development (1967)
 - From 1967 to 1986
 - R&D/GNP up to 2.5% until 1986 (4.8% at 2019)
-

- * The Technology Development Promotion Act (1972)
 - To promote private R&D activities
-

- * The National R&D Program (1982)
 - To strengthen the bridge b/w the research & the industry
 - ^ Provide various financial incentives to the private sector
-

For Institutional Building & Tech. Catching Up



Institutional Building

Government Research Institutes (GRIs)

- * *GRIs rather than Universities until 1990s*
 - * **KIST (Korea Institute of Science & Technology)**
 - * **The first GRI in this context - KAERI (1959)**
-
- * **KIST (1966)**
 - *9 million USD investment in early 1960s*
 - **Applied technology rather than fundamental science**
 - * **Ministry of Science and Technology, MOST (1967)**
-
- * **DaeDeok Science Town (Innopolis) established in 1970s**
 - * **Research units under KIST became independent GRIs**
 - * **Currently 25 GRIs under the NST**
 - **Most of them are located at DaeDeok Science Park**

* Scholarship/Incentive Scheme



**Bio (1990s)
science/engineering**

* Medicine & Pharmacy



**Computer science
(1980s)**

* Electronic Engineering



**Chemical
engineering (1970s)**

* Mechanical Engineering



**KAIS (KAIST)
1972**

*S&T Specialized Higher-Education Program

🌀 For Technicians
* Meister System
- Technical HS
* Technical College

*** Industrial Complex (EPZ)**

- *Export Processing Zone (Guro & Gumi)*

*** Seoul R&D Complex**

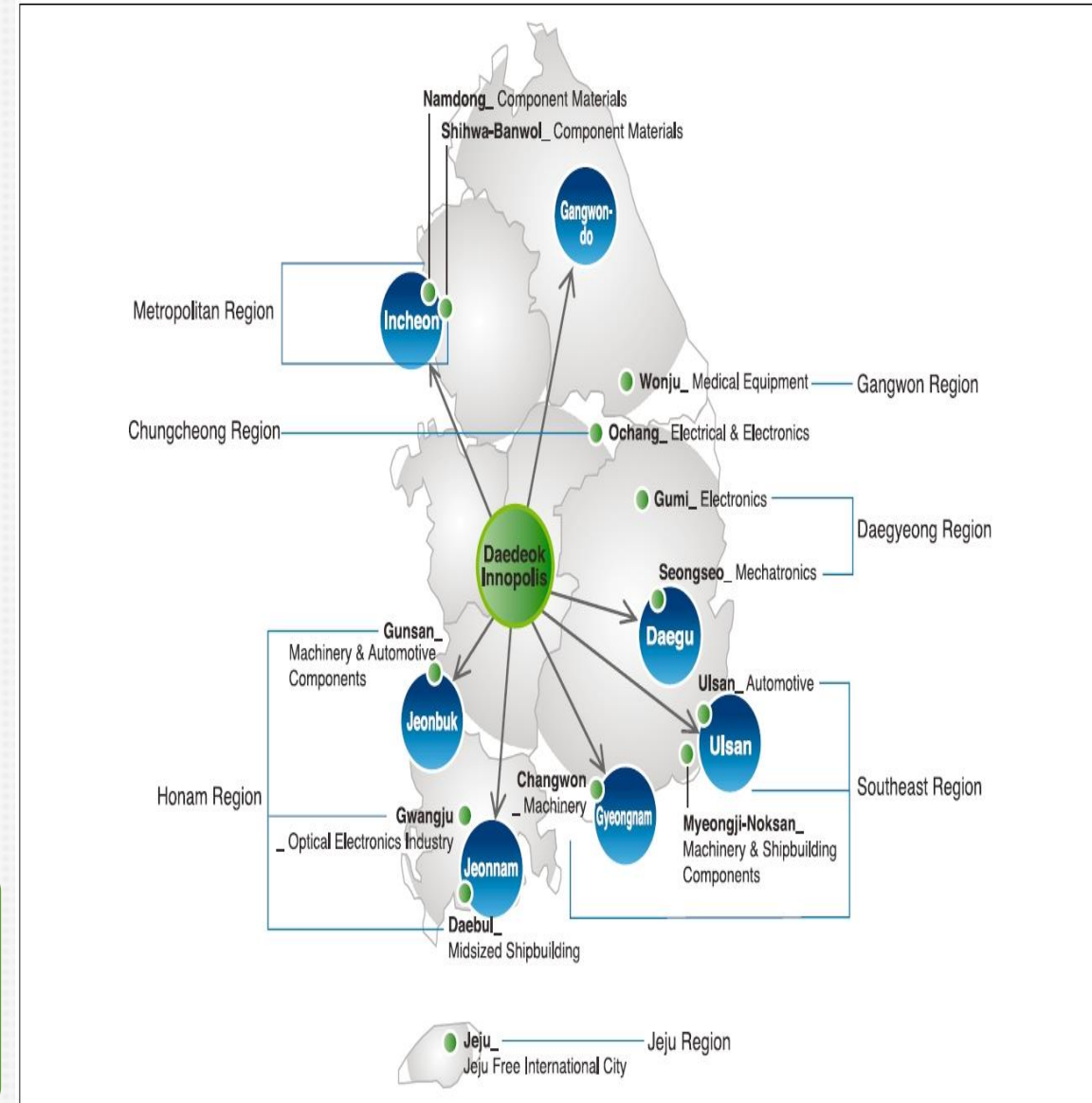
- *KIST, KDI, KORSTIC, KAIS, ADD, KAERI*

*** Daedeok Science Town**

- *Scientific research & tech. development*
- *Currently 25 GRIs*

*** Technopark**

- *Regional innovation via Triple-Helix*
- *Currently 18 technoparks*



Specific National R&D Programs

Initiated by MOST in 1982
Based on the Technology Development Promotion Law

**To develop
new promising
technologies
for future industry**

**To promote
R&D activities in
the private sector**

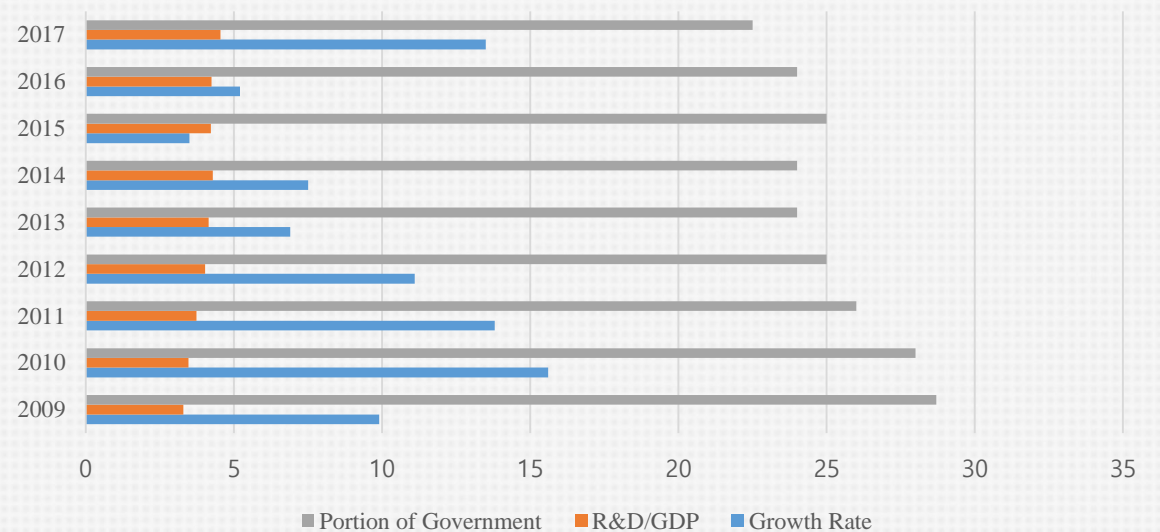
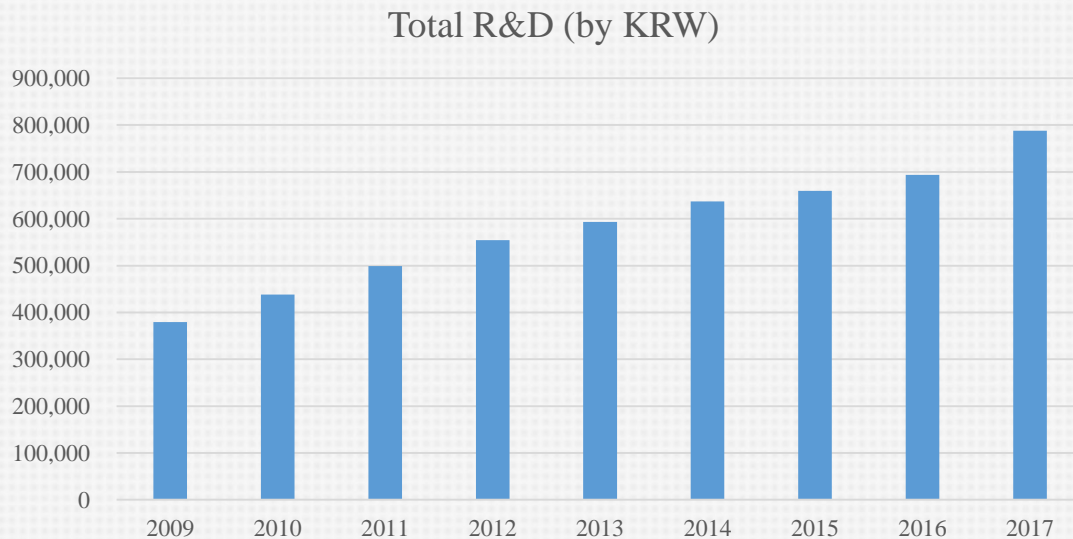
**To develop
technology for
the public sector**

**To improve
the efficiency of
national R&D
programs**

- **The Highly Advanced National Project (The HAN Project), 1992 : a large-scale R&D project with funding from government and industry**
 - **The Creative Research Initiative (CRI), 1997**
 - **The National Research Laboratory (NRL), 1999**
 - **Biotechnology Development Program, 2001**
 - **Global Frontier R&D Program, 2010**

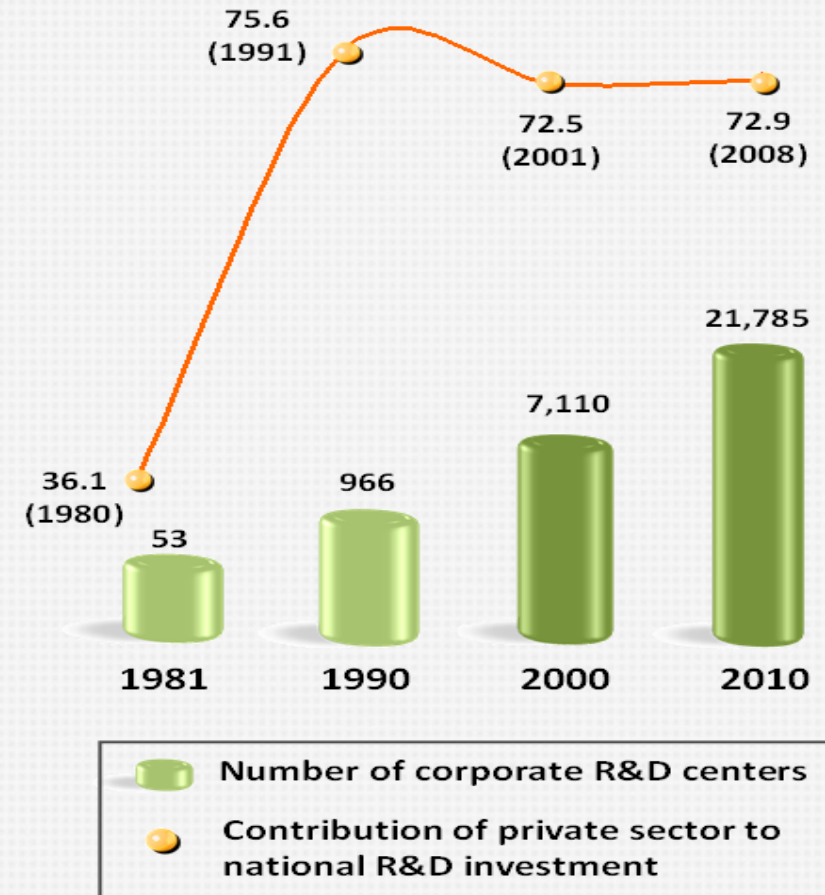
(100 million KRW)	2010	2011	2012	2013	2014	2015	2016	2017
Total R&D	438,548	498,904	554,501	593,009	637,341	659,594	694,055	787,892
Growth rate (%)	15.6	13.8	11.1	6.9	7.5	3.5	5.2	13.5
R&D/GDP (%)	3.47	3.74	4.03	4.15	4.29	4.22	<u>4.24</u>	<u>4.55</u>
% of Government	28	26	25	24	24	25	<u>24</u>	<u>22.5</u>

* More than 70 Billion USD in 2017



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
- Private sector's R&D investment increased by 8.4 times since 1982
 - \$2.7 billion (1982) → \$22.8 billion (2008)



1980 1989 1990 1998 1999 2003 2004 2008

Establishing self-supporting foundation

Localization of foreign equipment

- TDX Development
- Establishment of basic communication infra

Ensuring global competitiveness

Overseas original technology marketing

- CDMA first marketing
- Rapid growth of mobile communication

Overcoming economic crisis

Short period, technical R&D

- Global economic crisis
- Introduction of R&D competitive principle

Leading global market

Obtaining individual original technology

- IT 839 strategy
- Obtaining WiBro, DMB original technology



TDX



Mobile Phone



Mobile Service



High-Speed Internet



WiBro



DMB

(Source: KISDI)

Value-added

“Smiley Curve”



Product design

R & D

Material procurement

Parts procurement

Assembly

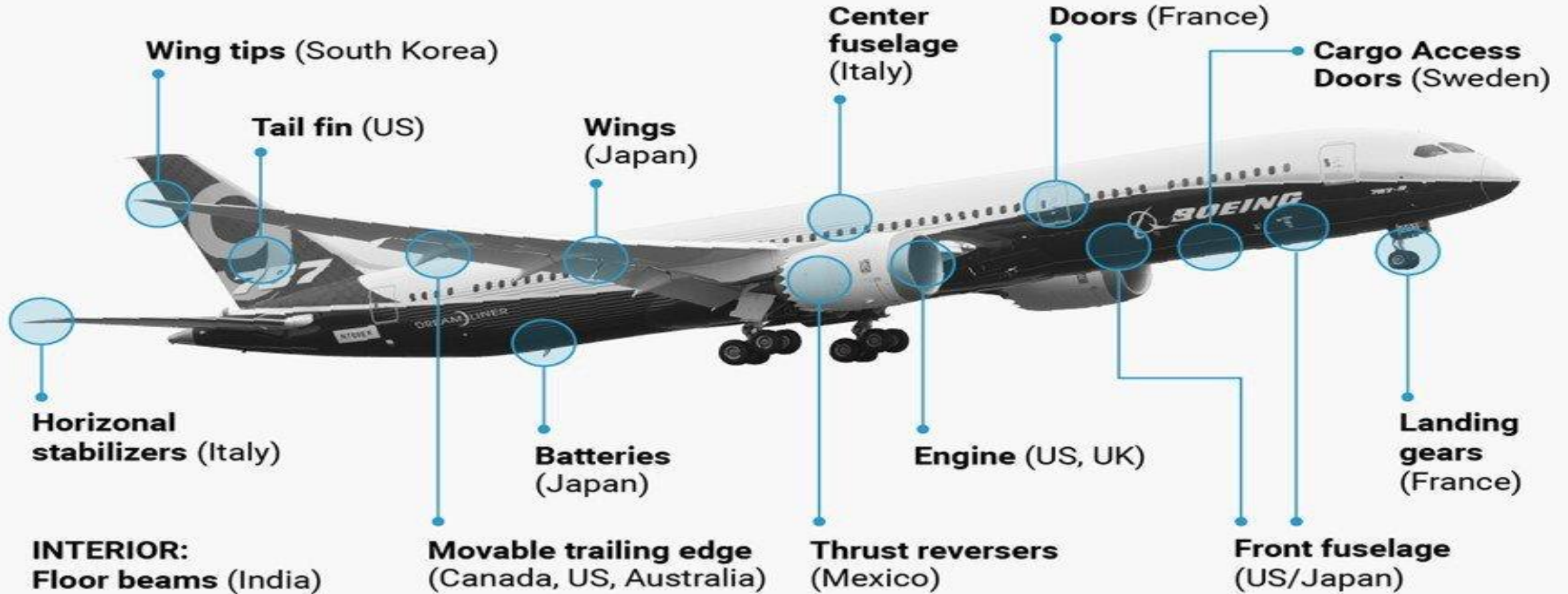
Distribution

Marketing

Customer services

Production process

THE GLOBAL ORIGINS OF THE BOEING DREAMLINER



SOURCE: Boeing; Reuters

BUSINESS INSIDER

The Last Missing Puzzle



People/Human Being



Social Value



Culture

儒教

Confucianism

Joseon Dynasty
(1392-1897)

Korean Empire
(1897-1910)

士 – Scholar/Bureaucrat/Politician

農 – Farmer (Foundation of Heaven/Earth)

工 – Manufacturer

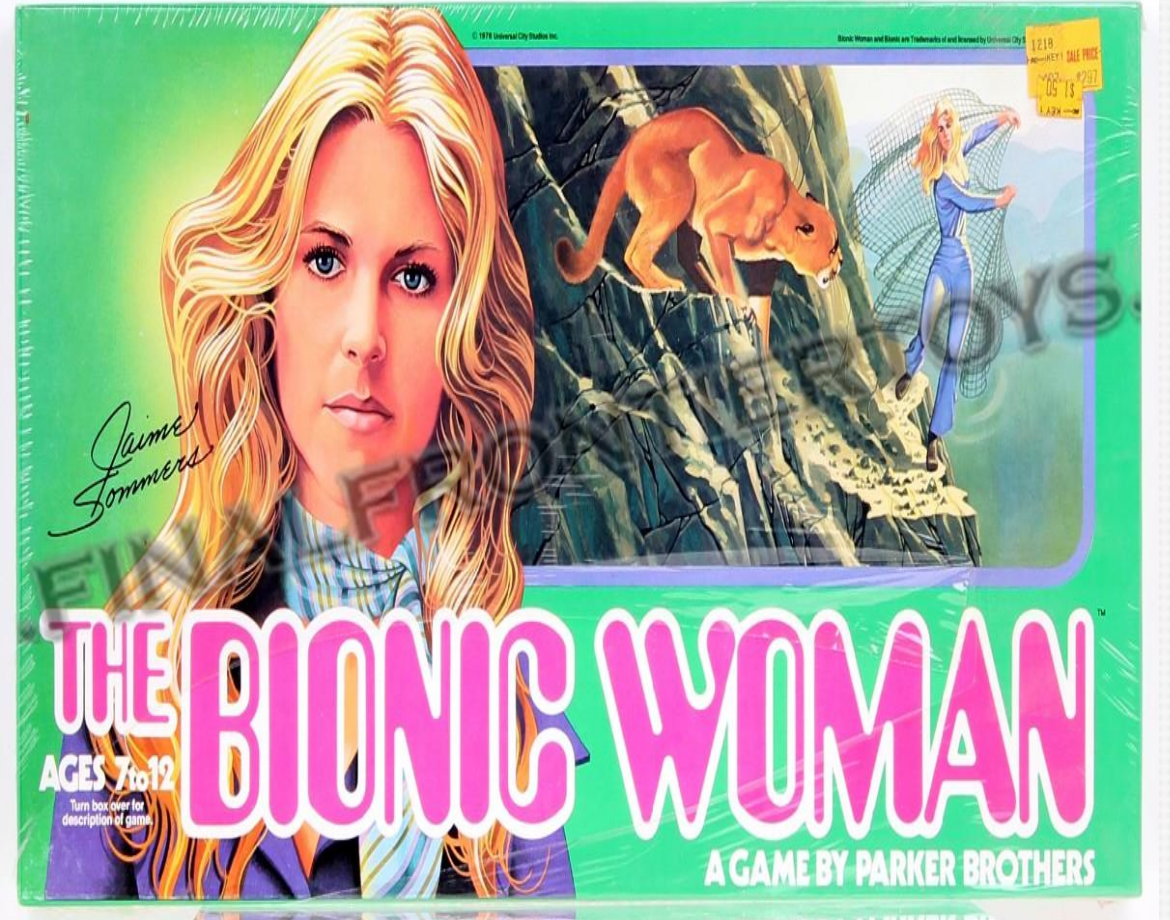
商 – Merchant



• *Robot Taekwon V*

- [South Korean animated film](#) released on July 24, 1976,
- Immediately becoming a hit in the late 1970s,
- Consequently inspired a string of sequels in following years.
- *Robot Taekwon V* was released in the US in a dubbed format under the name *Voltar the Invincible*.
- *Robot Taekwon V* became the first Korean film to receive full digital restoration treatment in 2005.

SF (Science Fiction) Drama





- Realized
 - Tablet computer,
 - Flip communicators
 - Voice interface computers (hello Siri)
 - Transparent aluminum
 - Bluetooth headsets (Uhura had one first)
 - Google Glass
 - GPS
 - Portable memory (from floppy disks to USB sticks)
 - Focused ultrasound technology
 - Automatic doors,
 - Big screen displays
 - Real-time universal translators
 - Teleconferencing
- Waiting for
 - Warp drive
 - Transporter (Beam Me Up)
 - Holodecks

* SF animation, film & drama inspired children in Korea (70s & 80s)

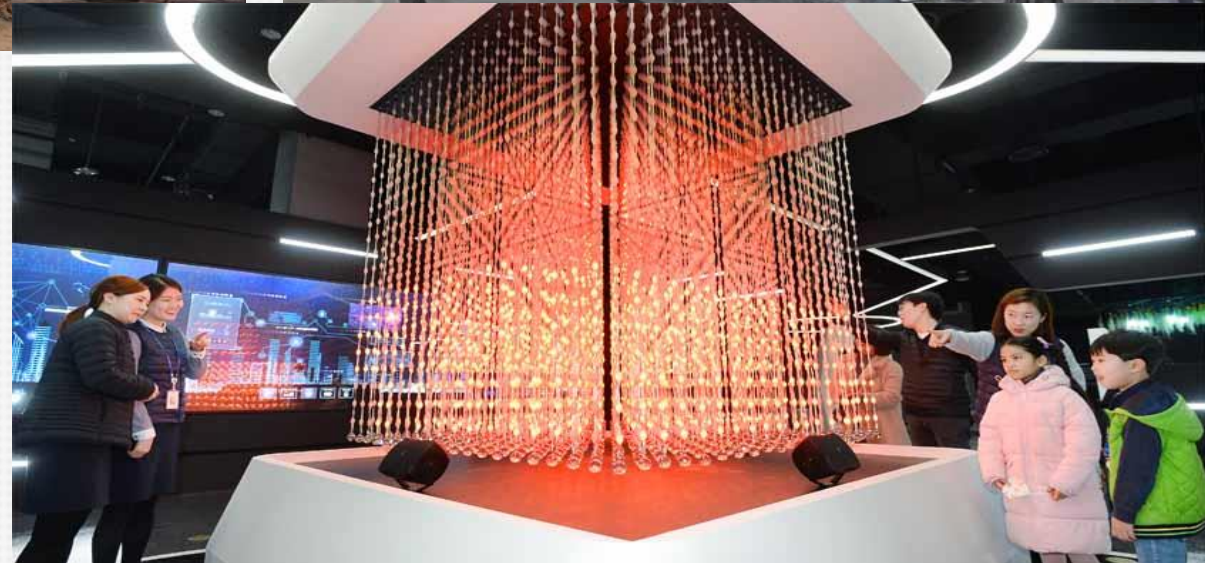
* They wanted to be excellent scientists and engineers in the future

* They wanted to make a space shuttle to travel to the Galaxy

National Science Museum

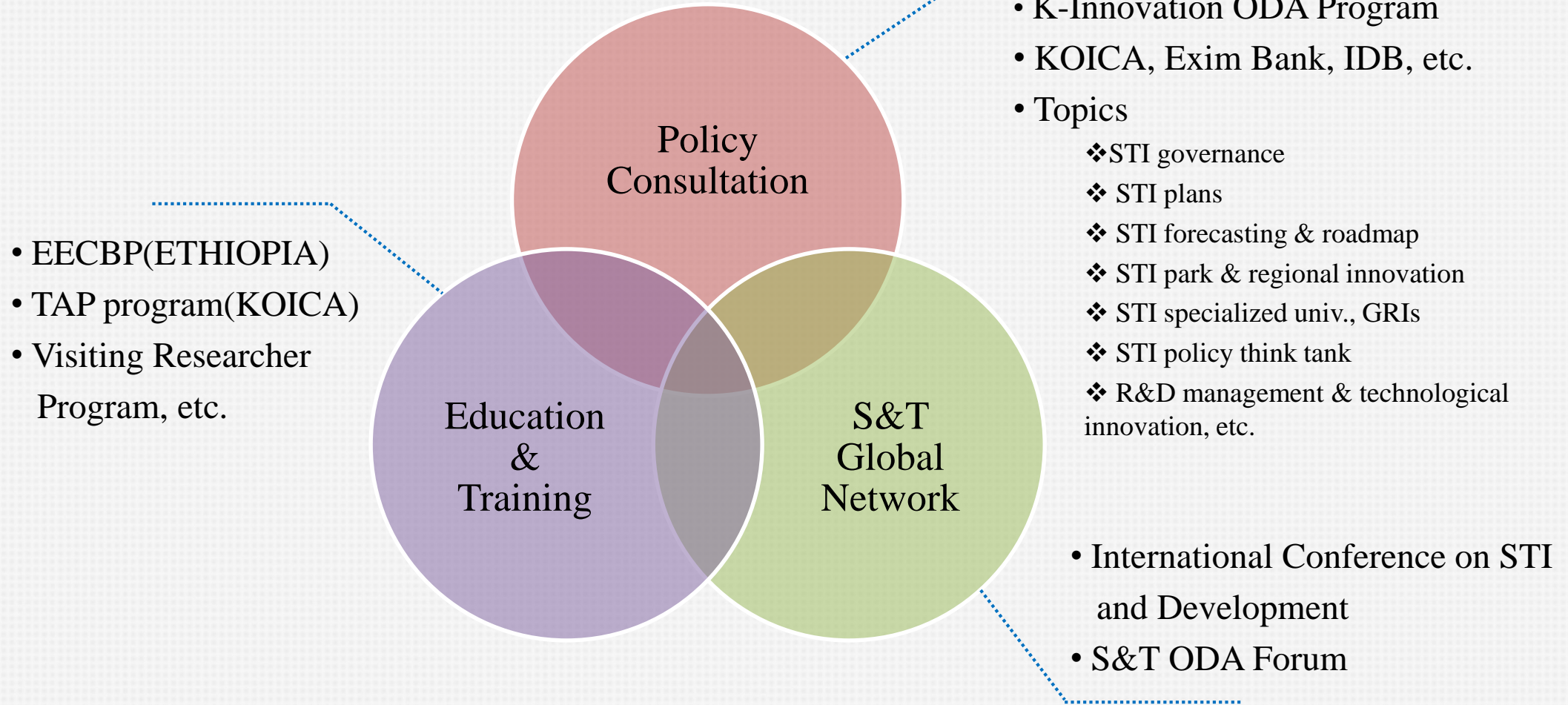


- NSM was introduced in 1949
- National Science Fair in 1949
- 128 Science Museum (2016)
 - National, Public & Private



Development Cooperation of STEPI

- STEPI – GRI under the supervision of Prime Minister’s Office Korea
- # 6 at 2019 Top Science and Technology Policy Think Tank Index Report by UPenn



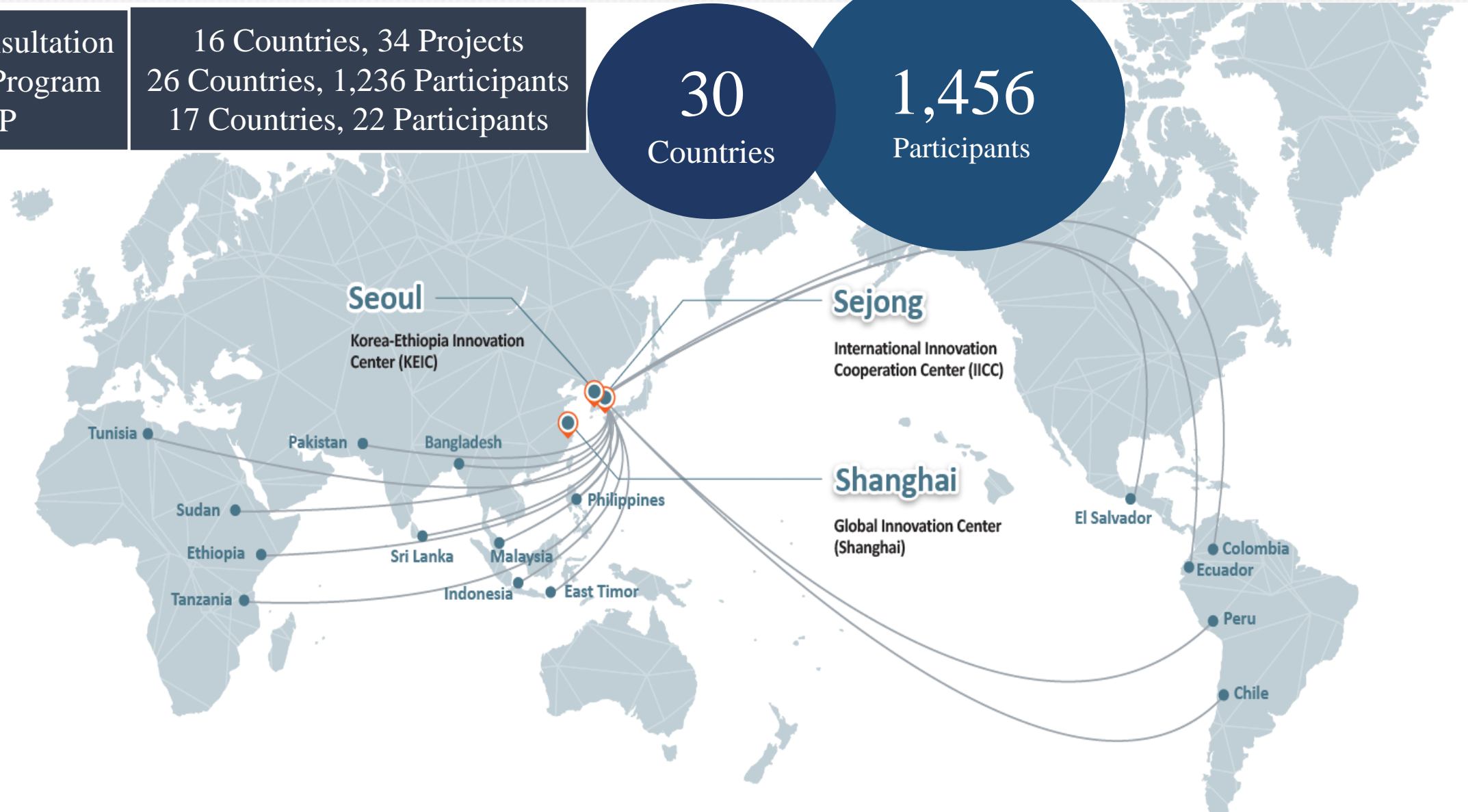
Achievements & Global Network (As of 2017)

Policy Consultation
Training Program
VRP

16 Countries, 34 Projects
26 Countries, 1,236 Participants
17 Countries, 22 Participants

30
Countries

1,456
Participants



Thank you!
감사합니다.