2026 ENERGY STORAGE SYSTEM WORKSHOP AND LEARNING VISIT

National System of Innovation in Korea and its Implications

From one of the world's poorest economies to a global STI leader — lessons for National Designated Entities across Africa, Latin America, and Asia-Pacific

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ROADMAP

Five Stops on Korea's Innovation Journey

01 **Korea's Development Journey**
From the poorest nation of the 1960s to a global R&D leader

02 **Why R&D-Intensive Growth?**
The strategic choices and conditions behind Korea’s path

03 **Anatomy of Korea's NSI**
Institutions, government roles, and human capital

04 **STI Governance & OECD Assessment**
How the system is coordinated — and where it must improve

05 **Implications for NDEs**
Transferable lessons for building national STI capacity

https://www.youtube.com/watch?v=gdLV1UKEs-Y

Presented by World Bank(until 4:04)

THE STARTING POINT

Korea, the Poorest Nation of the 1960s

$82

per-capita GNP, 1960s

More than 60% of employment relied on the agricultural sector — with almost no exploitable resource endowments.

CONSTRAINTS

Resource endowments: Almost nil

Capital accumulation: None — in fact negative

Technological capability: Very weak

Agricultural potential: Limited arable land, poor soil

Industrial base: Destroyed during the 1950–53 war

Geopolitics: Divided nation, Cold War frontline

ASSETS

Human resources
A large, under-utilized workforce with a strong desire for learning

Social structure
Homogeneous, closely knit society — easier to align behind a national goal

Political & economic attitude
Strong motivation for development and strong leadership

Source: Chung (2022), STI Policy toward an R&D-intensive Economy: Korean Experience, The Wonjung Institute

SIX DECADES LATER

Korea's Development at Present

From the poorest post-war economy to a global innovation leader

442×

GDP per capita growth

$82 (1960s) → $36,239 (2024, nominal)

#14

largest economy in the world

by nominal & PPP GDP, 2025

#4

Global Innovation Index 2025

up from #10 in 2023 — WIPO

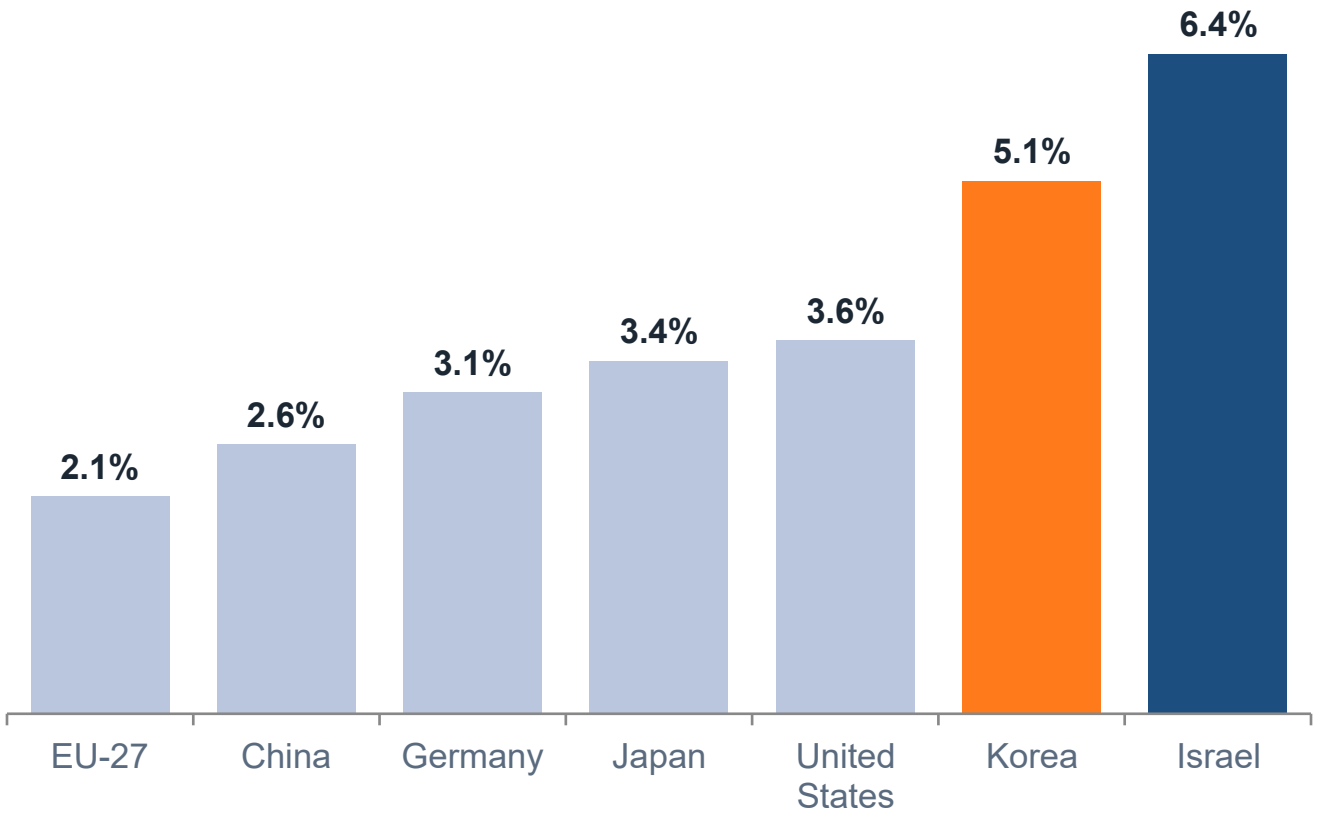
Top 5

most economically complex nation

Harvard Growth Lab, Atlas 2024

Sources: World Bank; IMF WEO (Oct 2025); WIPO Global Innovation Index 2025; Harvard Growth Lab, Atlas of Economic Complexity 10.0

Korea's R&D Intensity: World's 2nd Highest



₩131.05tn

total R&D spending, 2024 (+10.1% YoY)

5.13%

of GDP — surpassed 5% for the first time

78.8%

funded by the private sector

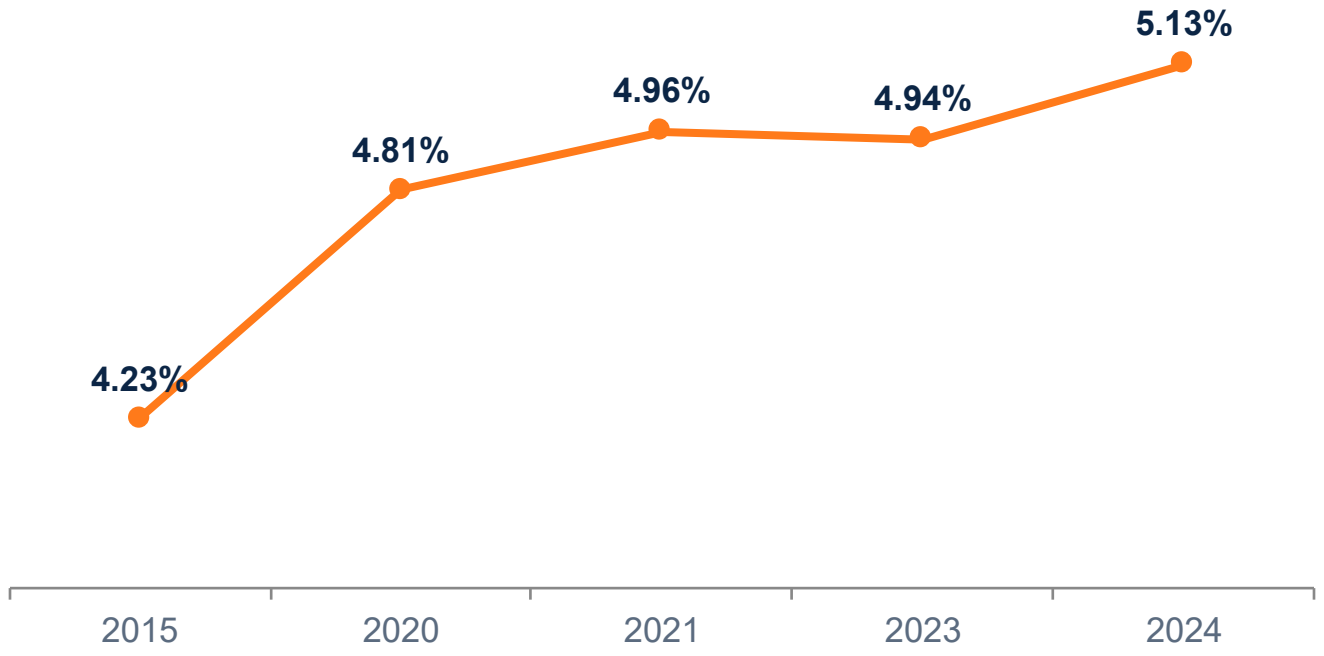
Gross domestic expenditure on R&D as % of GDP — latest available year (Korea: 2024; others: 2022–23)

Source: MSIT, 2024 R&D Activity Survey (Dec 2025); OECD; NSF NCSES

INNOVATION INPUTS

A Decade of Sustained R&D Growth

Korea's R&D intensity has climbed steadily for ten straight years — not a one-off spike



Gross domestic R&D expenditure as % of GDP, selected years

₩65.96tn → ₩131.05tn

total R&D spending nearly doubled, 2015–2024 (+98.7%)

4.23% → 5.13%

R&D intensity rose 0.90 percentage points of GDP

Top 2

Korea has ranked among the world's 2 most R&D-intensive economies throughout the decade

Source: MSIT, R&D Activity Survey (annual editions, 2015–2024)

Human Capital: Korea's Deepest Asset

In the 1960s, Korea’s greatest endowment was people — an under-utilized workforce with a strong desire for learning. Six decades of sustained investment in education and R&D turned that human capital into the world’s most research-intensive workforce.

17.6

researchers per 1,000 employed persons

World #1

9.8

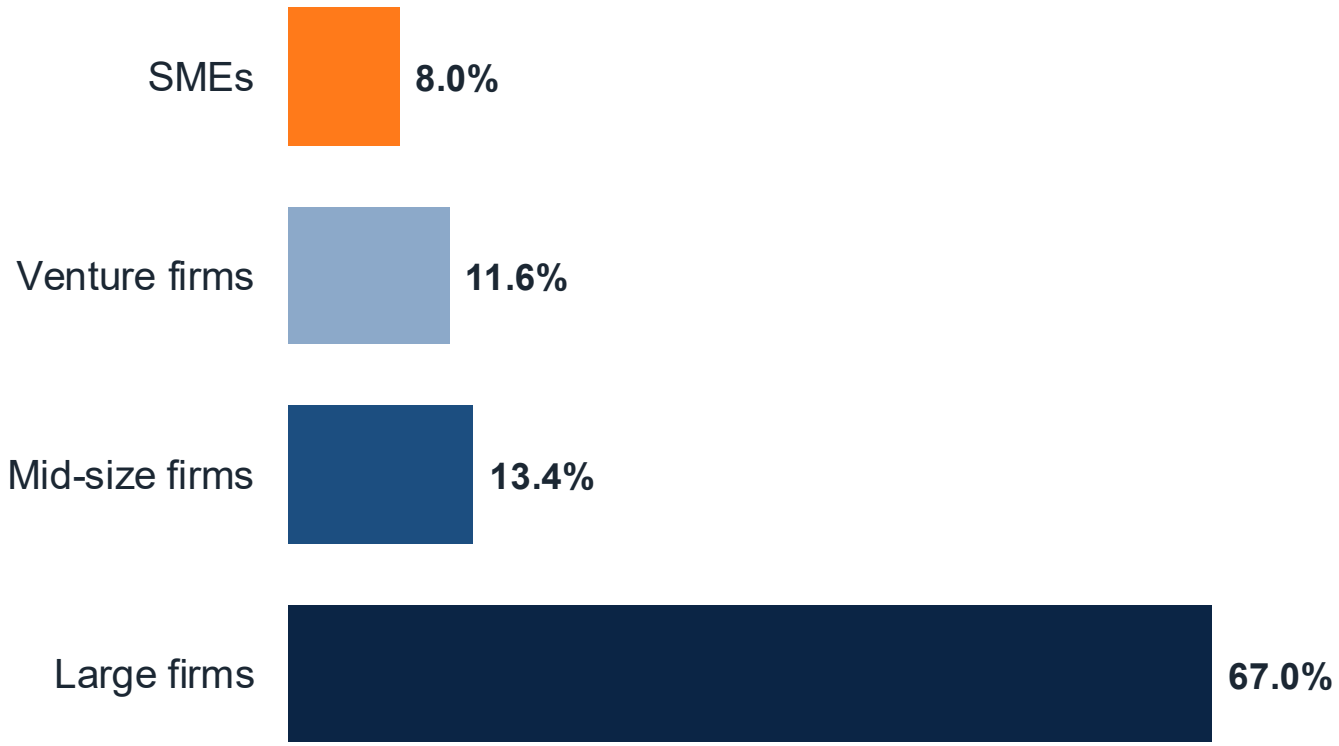
researchers per 1,000 population

World #1

Source: MSIT, 2024 R&D Activity Survey (Dec 2025)

A PERSISTENT IMBALANCE

R&D Remains Concentrated in Large Firms



The takeaway: large firms and chaebols still account for two-thirds of business R&D spending, while SMEs — despite being the majority of firms and employment — contribute just 8%. Diffusing innovation capacity to SMEs remains a top policy priority.

OECD (2023) recommendation: strengthen diffusion of innovative technologies to SMEs and bolster the global connectivity of start-ups.

Source: MSIT, 2024 R&D Activity Survey (Dec 2025)

What Determines a Nation's Development Strategy?

Endowments

The country's resource, capital, and human endowments

Leverage

How government and industry mobilize those endowments

Conditions

The prevailing social, political, and economic conditions

Why do countries choose different paths?

1. They differ in the resource endowments they can exploit for economic development
2. They differ in attitudes toward development — in motivation and desire for change
3. They differ in their capacity to initiate or manage change

Source: Chung (2022), STI Policy toward an R&D-intensive Economy: Korean Experience, The Wonjung Institute

Why Korea Chose an R&D-Intensive Growth Strategy

STEP 1

1960s constraint

Virtually no natural resources or agricultural potential — resource-based development was not an option.

STEP 2

FDI was not feasible

Strong public sentiment against foreign capital, and foreign investors wary of political and economic risk.

STEP 3

Capital vs. technology

Capital could be borrowed from international institutions — but technology required absorption and assimilation first.

STEP 4

From learning to R&D

A well-trained workforce let Korea absorb technology via licensing, OEM and turn-key plants — then, by the 1980s, shift to domestic R&D.

Since the 1980s: *Korea has pursued a development strategy based on "R&D and innovation backed up by human resources."*

Source: Chung (2022), STI Policy toward an R&D-intensive Economy: Korean Experience, The Wonjung Institute

What Does It Take for Innovation to Happen?

Two families of conditions must be in place — the pressure and demand that pulls innovation forward, and the capacity that makes it possible.

Pressure & Demand

- Exposure to competition
- Business opportunities
- Society's desire for change
- External threat
- Future orientation

Enabling Capacity

- Research manpower
- Financial resources
- Organizational systems
- Information systems
- Business environment & regulation
- Incentives, networks, risk-taking culture

Source: Chung (2022), STI Policy toward an R&D-intensive Economy: Korean Experience, The Wonjung Institute

Government's Role: The Orchestrator

Korea's government did not just fund R&D — it built the policy capacity to lead and orchestrate the whole STI system as a multi-role player.

Generator of Pressure & Demand

Promotes demand for innovation in the private sector through industrial development policy and incentives

Builder of STI Capacity

Public R&D capacity to acquire and assimilate foreign technology; educational institutions to meet rising skills demand

Promoter & Facilitator

Provides policy incentives that promote R&D and innovation activities across the private sector

Source: Chung (2022), STI Policy toward an R&D-intensive Economy: Korean Experience, The Wonjung Institute

Evolution of Korean STI Strategy, 1962–2026

Institutional Building | Technology Catching-Up | STI Leadership | AI & Global Leadership

1962
1st Five-Year Economic Plan

Korea's first national development plan — prioritized export-led industrialization.

1966
KIST Founded

The nation's first modern GRI, seeding Korea's technical research capacity.

1967
MOST Established

Ministry of Science and Technology created to coordinate national STI policy.

1971
Tech. Dev. Promotion Act

Legal foundation for tax incentives supporting private-sector R&D.

1982
National R&D Programs

Mission-oriented programs — including the HAN Project — targeted strategic technologies.

1997
Asian Financial Crisis

Triggered structural reforms and a renewed push toward innovation-led growth.

2004
Deputy PM-level MOST

Science ministry elevated to coordinate STI policy across all of government.

2017
MSIT Established

Merger creating today's Ministry of Science and ICT.

2024
R&D Tops 5% of GDP

R&D intensity surpassed 5% of GDP for the first time.

2026
AI 3-Strong Nation Push

National strategy to become one of the world's top 3 AI powers.

From institution-building to global leadership: Korea's STI governance has continuously evolved — most recently pushing toward AI as a national strategic priority while R&D intensity surpassed 5% of GDP for the first time in 2024.

Source: Jang (2017); MSIT (2025, 2026)

Four Institutional Players Behind Korea's NSI

EPB

Ministry of Economy

National development strategy — coordinating economic, industrial and STI policy with a “select and focus”, export-oriented approach.

MOST → MSIT

STI Policy, since 1967

Built and orchestrated STI institutions and players; now a Deputy Prime Minister–level ministry.

GRIs

Government Research Institutes

Semi-public, professionally run bodies — KIST (1966) and 26 spin-offs, plus 25 policy think-tanks.

Chaebols & Startups

Private Sector

Large conglomerates drove early commercialization; startups and ventures increasingly drive frontier innovation.

Source: STEPI research; MSIT organizational records

Human Capital & Industry–Academia–GRI Linkages

HR Pipeline for Industrial Needs

- Industrial high schools — skilled labor
- Technical colleges — technicians
- S&T-specialized magnet high schools — future talent

S&T-Specialized Research Universities

Top-tier research universities produce the talent pipeline for GRIs and industry:

KAIST • POSTECH (private) • GIST • DGIST • UNIST • UST

San (Industry) – Hak (University) – Yun (GRI) Cooperation

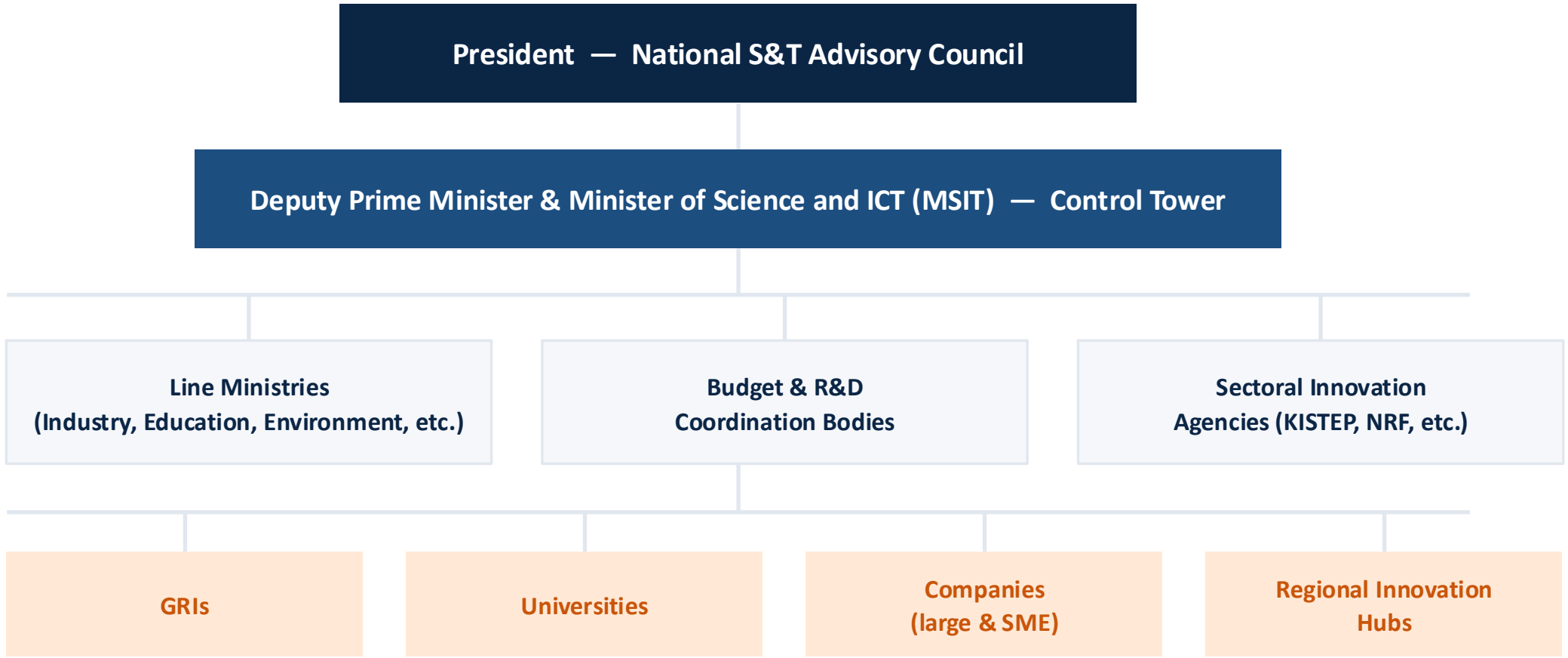
1980s	GRI-led cooperation as chaebols emerged
1990s	University-focused cooperation
2000s	Demand-oriented cooperation
2010s–	Cooperation encouraged around industrial demands

Diverse policy measures have promoted research collaboration across each phase — shifting from GRI-led, to university-led, to demand-driven models.

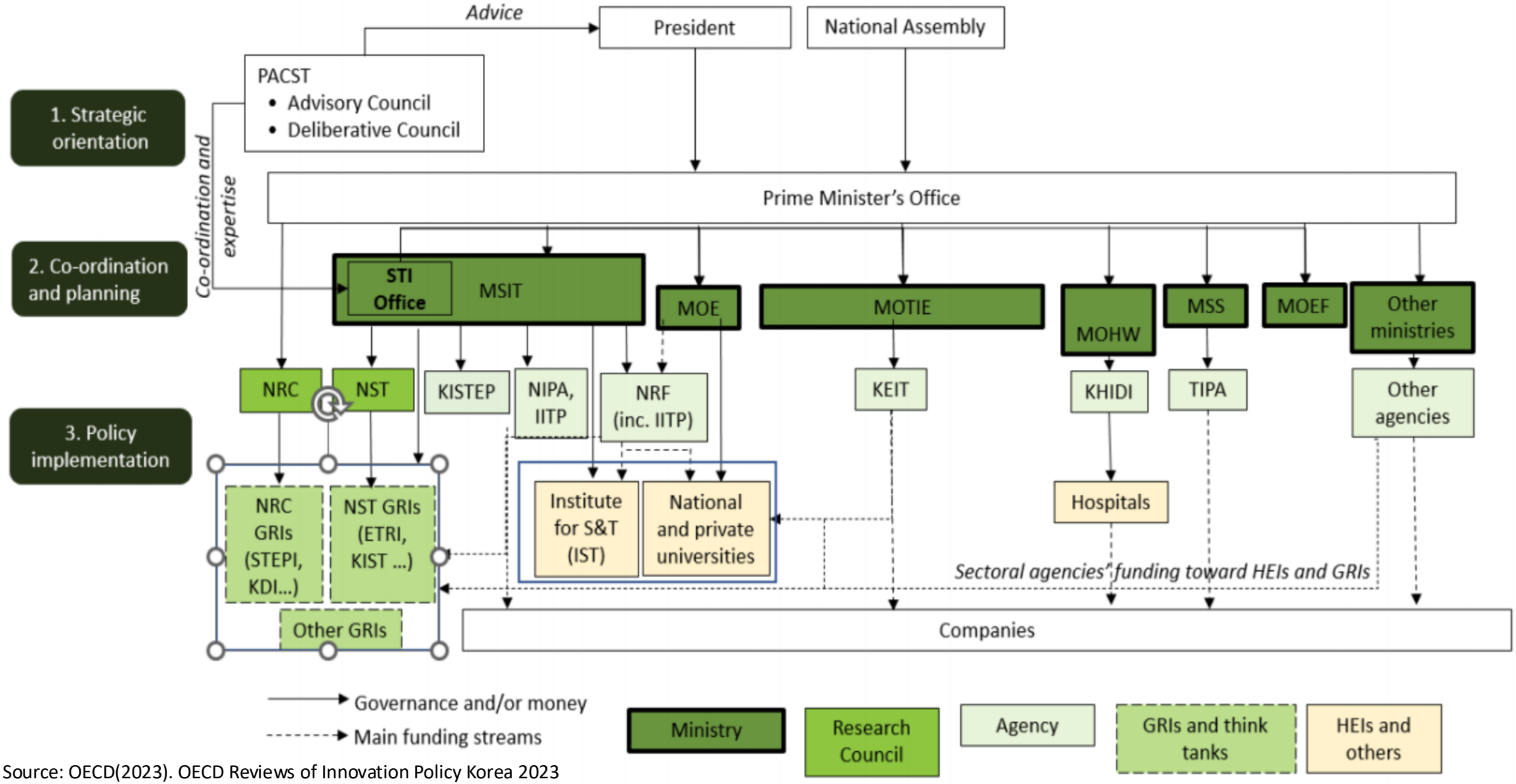
Source: STEPI research

Korea's STI Governance: A Whole-of-Government System

A strong foresight system — built on ambitious mid- to long-term plans coordinated from the top



Simplified representation for presentation purposes. Source: OECD (2023), OECD Reviews of Innovation Policy: Korea 2023



Source: OECD(2023). OECD Reviews of Innovation Policy Korea 2023

Key OECD Recommendations for Korea's NSI

I Promote cross-cutting strategy & foresight

- Need for a shared vision that brings together various long-term sectoral strategies to define the contribution of STI to Korean society
- The STI system to enable transitions and address societal challenges by adopting a whole-of-government approach, experimenting with mission-oriented policies, and ensuring continuity across government mandates
- Furthermore, the Korean STI system needs to further internationalise through projects, researcher mobility and participation in international research infrastructures

II Support business innovation

- The role of the services sector, particularly in fostering innovation in knowledge-intensive services, needs to be amplified
- Needs to strengthen diffusion of innovative technologies to SMEs and bolster the global connectivity of start-ups
-
- Reducing administrative burdens, developing skills, fostering co-operation with large businesses and academia, and implementing targeted support programmes

III Strengthen the research system

- To better serve Korea's needs in the post-catch-up era and amidst global transitions, the capabilities of universities and GRIs to conduct excellent research must be strengthened
- Promoting the autonomy of academic institutions, enhancing evaluation and assessment systems, tailoring the financing model of these institutions, promoting co-operation between GRIs and universities, and creating targeted programmes for high-risk, high reward research

Source: OECD (2023), OECD Reviews of Innovation Policy: Korea 2023 — the most recent edition of this review series

What This Means for Building National STI Capacity

Endowments aren’t destiny

Korea had almost no natural resources — its decisive asset was a deliberately developed, education-driven workforce.

Government as orchestrator

Coordinate demand, capacity-building and incentives together — not just fund research in isolation.

Absorb before you invent

Absorptive capacity — skilled people and institutions — determines whether transferred technology becomes lasting capability.

Build durable institutions

GRIs and university–industry linkages that outlast individual administrations sustain momentum over decades.

Link STI to national strategy

Treat technology policy — including climate technologies like energy storage — as core to national development, not a stand-alone silo.

Expect a long time horizon

Korea's transformation took over five decades of sustained, compounding investment — patience and continuity matter.

THANK YOU

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