

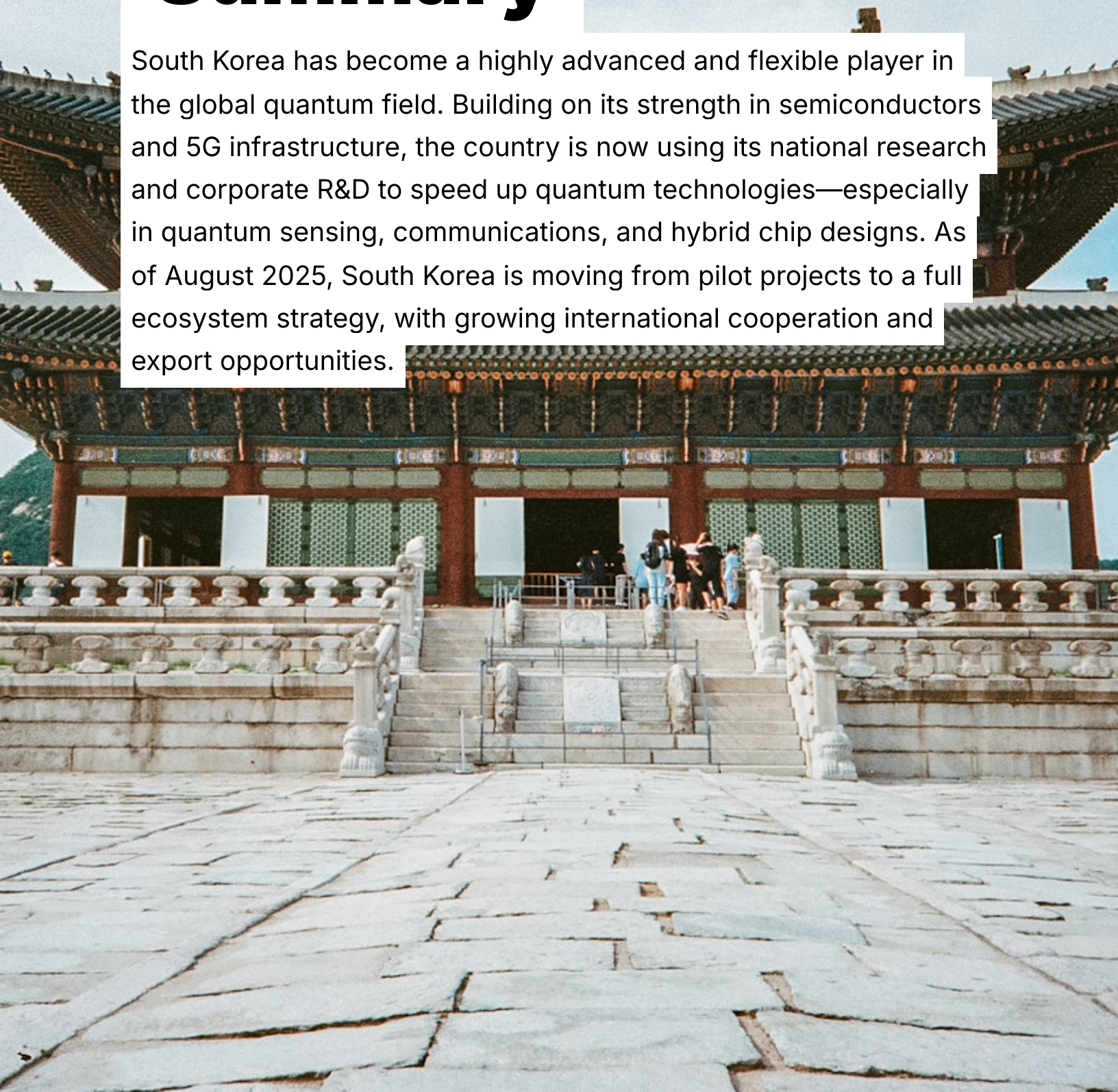
South Korea: State of Quantum – August 2025

***Precision, Policy, and Platform
Power in Asia's Semiconductor-
Quantum Nexus***



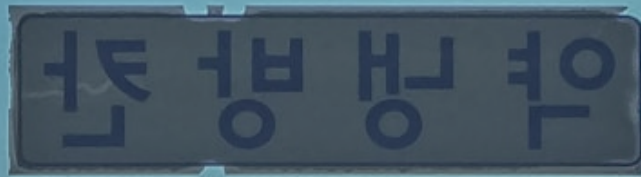
Executive Summary

South Korea has become a highly advanced and flexible player in the global quantum field. Building on its strength in semiconductors and 5G infrastructure, the country is now using its national research and corporate R&D to speed up quantum technologies—especially in quantum sensing, communications, and hybrid chip designs. As of August 2025, South Korea is moving from pilot projects to a full ecosystem strategy, with growing international cooperation and export opportunities.





National Strategy & Infrastructure



South Korea's quantum policy is guided by the **Ministry of Science and ICT**, with support from the **Korea Institute of Science and Technology (KIST)** and **ETRI (Electronics and Telecommunications Research Institute)**. Major parts of the national plan include:

- A **₩500 billion (approx. \$380 million USD)** national quantum initiative, launched in 2022 and scaled in 2024 to prioritize **quantum AI, sensors, and communication systems**
- **Quantum Korea 2030**, a strategic roadmap released in early 2025, outlines a phased approach to workforce development, national testbeds, and global commercialization.
- Construction of **K-QuIC** (Korea Quantum Information Center) in Daejeon, featuring South Korea's first national quantum testbed for communications and photonic integration

Infrastructure projects in 2025 include:

- A **nationwide quantum communication pilot** linking Seoul, Daejeon, and Busan, using both terrestrial fiber and satellite integration trials
- Quantum-enhanced **semiconductor research hubs** in partnership with Samsung and SK hynix, focused on hybrid classical/quantum chip design
- Early-stage development of **quantum sensor arrays** for use in autonomous vehicles, smart cities, and medical imaging



Public / Private Collaboration & Academic Firepower

South Korea's tech-forward industrial base is now channeling resources into quantum at both the corporate and academic levels:

- **Samsung Advanced Institute of Technology (SAIT)** is exploring quantum algorithms and quantum-enhanced memory
- **SK Telecom** is building secure quantum communication networks and collaborating on post-quantum cryptographic systems
- **LG Electronics** is investing in **quantum-inspired optimization** for smart factories and robotics





On the academic side:

- **KAIST, POSTECH, and Seoul National University** are leading in quantum materials, quantum chemistry, and algorithmic research
- The **Korea Research Institute of Standards and Science (KRISS)** plays a central role in quantum metrology and timekeeping.
- Strong partnerships with **KIST Europe** are helping link South Korean quantum science with European standards and projects.

International Relationships & Funding



South Korea's international approach is shaped by its trade-driven tech strategy and its positioning between US, EU, and Asia-Pacific ecosystems:

Key bilateral quantum research agreements are active with the **United States, Germany, and Singapore**

In 2025, South Korea joined the **Global Quantum Cooperation Forum (GQCF)**, aimed at aligning interoperability standards and talent pipelines.

Participates in **APAC quantum cybersecurity dialogues** alongside Japan, Australia, and Taiwan

In discussions to link with **EuroQCI-compatible architecture** through satellite relay partnerships by 2027

G7 Summit & Strategic Alignment

Though not a G7 member, South Korea was an invited observer at the 2025 **G7 Puglia Summit**, contributing insights into:

- **Quantum-augmented supply chains**
- **Standardized quantum-safe protocols** for transnational finance
- **5G/6G integration** with quantum encryption and sensing systems

The summit underscored South Korea's role as a critical semiconductor-quantum bridge between Asia and Europe.



Opportunities and Challenges

Opportunities

- Deep industrial experience in **advanced materials, fabrication, and telecom** accelerates hardware-focused quantum deployment
- Government-driven talent and testbed ecosystems are maturing rapidly.
- South Korea is well-positioned to **export secure quantum communications infrastructure** to Southeast Asia and beyond.



Challenges

- Fragmentation persists between **research institutions** and **commercial application** pipelines.
- Most startup activity remains early-stage—with **fewer scale-up success stories** than in the US or Europe.
- Balancing national security interests with international collaboration, as in the continuing quantum encryption, remains a sensitive issue.



Outlook for 2025 & Beyond

South Korea is prepared to become a **regional leader in applied quantum technologies**, particularly where quantum sensing meets smart cities, 5G/6G, and semiconductors. The upcoming phase involves moving from pilot projects to scalable platforms—mainly in defense, health, and autonomous mobility. A **Quantum Startup Growth Initiative** is set to launch in late 2025, aiming to double VC funding and establish three regional innovation clusters by 2027.



Final Reflection

South Korea's quantum strategy combines speed, structure, and strategic depth. It's not chasing breakthroughs just for attention — it's building quietly, stacking strength upon strength. In a field where many overpromise, South Korea is quietly developing a **quantum economy designed to last**. As of August 2025, it's clear: **South Korea isn't merely observing the global quantum race. It's building the infrastructure that the rest of the world may soon rely on.**

