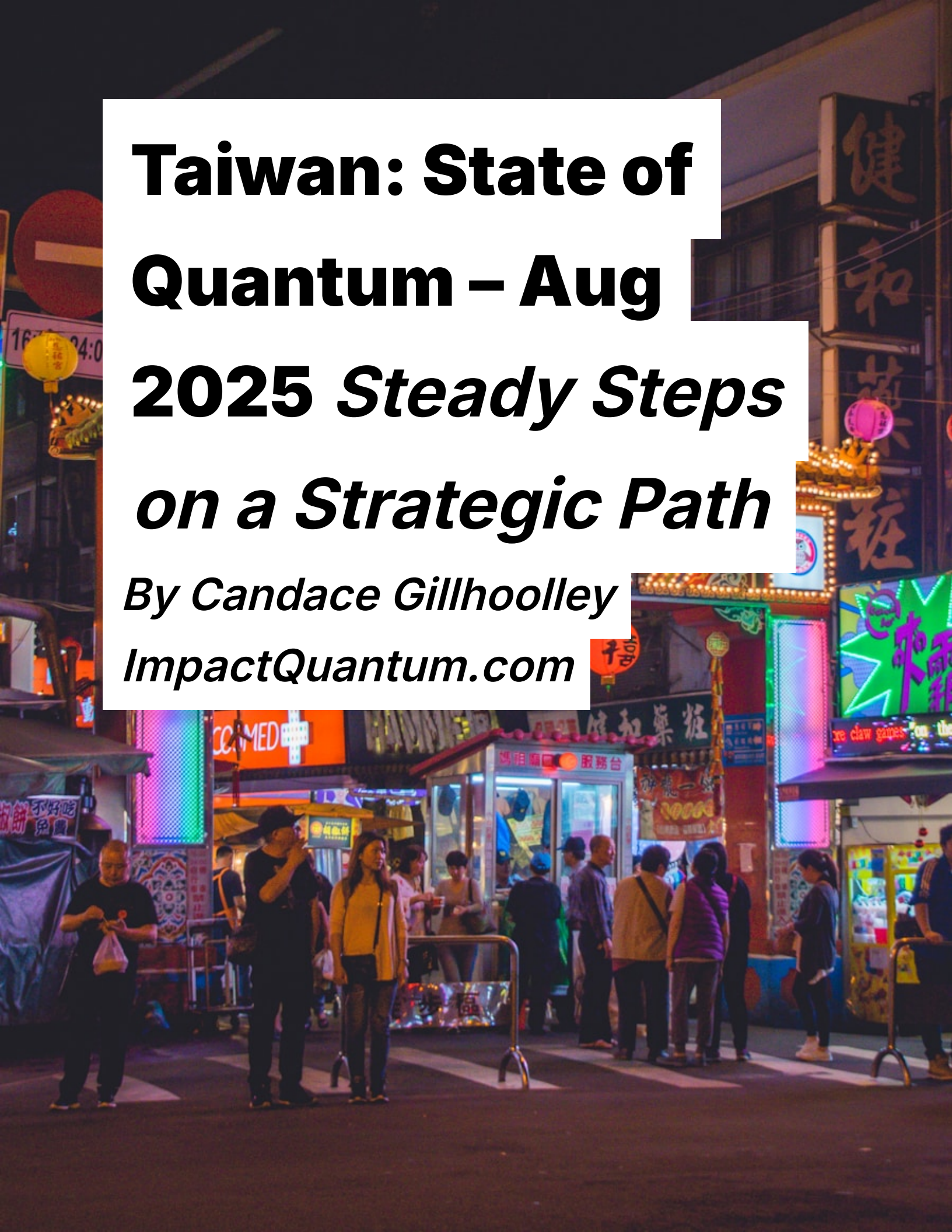




Taiwan: State of Quantum – Aug 2025 *Steady Steps on a Strategic Path*

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Executive Summary

Taiwan is applying its signature formula—**technical excellence, industrial alignment, and long-term strategic vision**—to the world of quantum computing. As of August 2025, it is neither chasing media buzz nor falling behind. Instead, it is embedding quantum into the heart of its scientific, digital, and geopolitical identity.

This isn't a race for Taiwan—it's an integration exercise. From semiconductors to secure communications, from cryogenics to curriculum, Taiwan is methodically building a **quantum-competent ecosystem** that reflects its real strengths: **trustworthy design, global collaboration, and scalable innovation**.



Building Before Broadcasting: Strategy & Infrastructure

Taiwan's progress is quiet but coordinated, shaped by government-industry-academia interplay:

Quantum education

Device prototyping

Cybersecurity resilience

ITRI and **TSMC** launched a **joint quantum device program**, prototyping cryogenic controllers and **quantum-grade semiconductor materials**, leveraging Taiwan's existing chip leadership.

Academia Sinica expanded quantum infrastructure with **two new dilution refrigerators**, boosting superconducting qubit R&D.

A **cross-ministerial task force** is running **quantum-safe cryptography pilots**, including **QKD experiments** between Hsinchu and Taipei.

High-performance computing centers at **NCKU** and **NTHU** integrated **quantum emulators** into their public clusters, increasing accessibility for university and SME researchers.

Brainpower Over Branding: Academia & Early Collaborations

Taiwan's university system is rapidly building quantum fluency across disciplines:

- **National Taiwan University (NTU)** launched the island's first **Master's in Quantum Science & Engineering**, blending physics, computing, and nano-fabrication.
- **NTU** and **NYCU** co-developed quantum computing curricula using **Qiskit** and **QuTiP**, with pedagogical support from **IBM's Asia-Pacific education initiative**.
- The **Taiwan AI Academy** introduced **AI-quantum crossover modules**, helping mid-career professionals in **semiconductors, biotech, and logistics** explore applied quantum scenarios.
- Taiwanese undergraduates placed in the finals of **QHack 2025** and **IBM Quantum Challenge**, showing emerging talent on the global stage.





Private-sector research is small but growing:

- **MediaTek** and **Realtek** are funding **quantum signal processing research**, aiming to reduce power consumption in edge devices.
- Taiwan's **cybersecurity firms** are testing **post-quantum cryptographic schemes**, ahead of NIST's expected standardization in 2026.
- Startups like **Quratech** (trapped-ion R&D) and **ChiQubit** (quantum sensors) are exploring hardware niches, with early traction in academic-commercial partnerships.

Global Ties, Local Roots: International Relationships

Taiwan is skillfully leveraging its **academic credibility** and **geopolitical relevance** to build out its quantum network:

- In 2024–25, it signed **R&D MOUs** with **RIKEN (Japan)** and **Fraunhofer (Germany)**, focusing on **photonic processors** and **quantum metrology**.
- Taiwanese researchers are collaborating with counterparts in **Australia, Israel**, and the **US** on:
- Quantum memory
- Topological qubits
- Quantum imaging systems





The G7 Shadow & Strategic Alignment

Though excluded from formal G7 forums, Taiwan remains deeply aligned with their principles and practices:

- The **National Security Council** now includes quantum in its **cyber defense roadmap**, with analysis from **US and Japanese think tanks**.
- Taiwanese technical delegates contribute to **informal G7-aligned quantum working groups**, especially around **supply chain ethics**, **open-source standards**, and **resilience frameworks**.

Taiwan's **Digital Diplomacy program** advocates for **open hardware**, **transparent software**, and **democratic tech ethics**, even in closed technical circles.

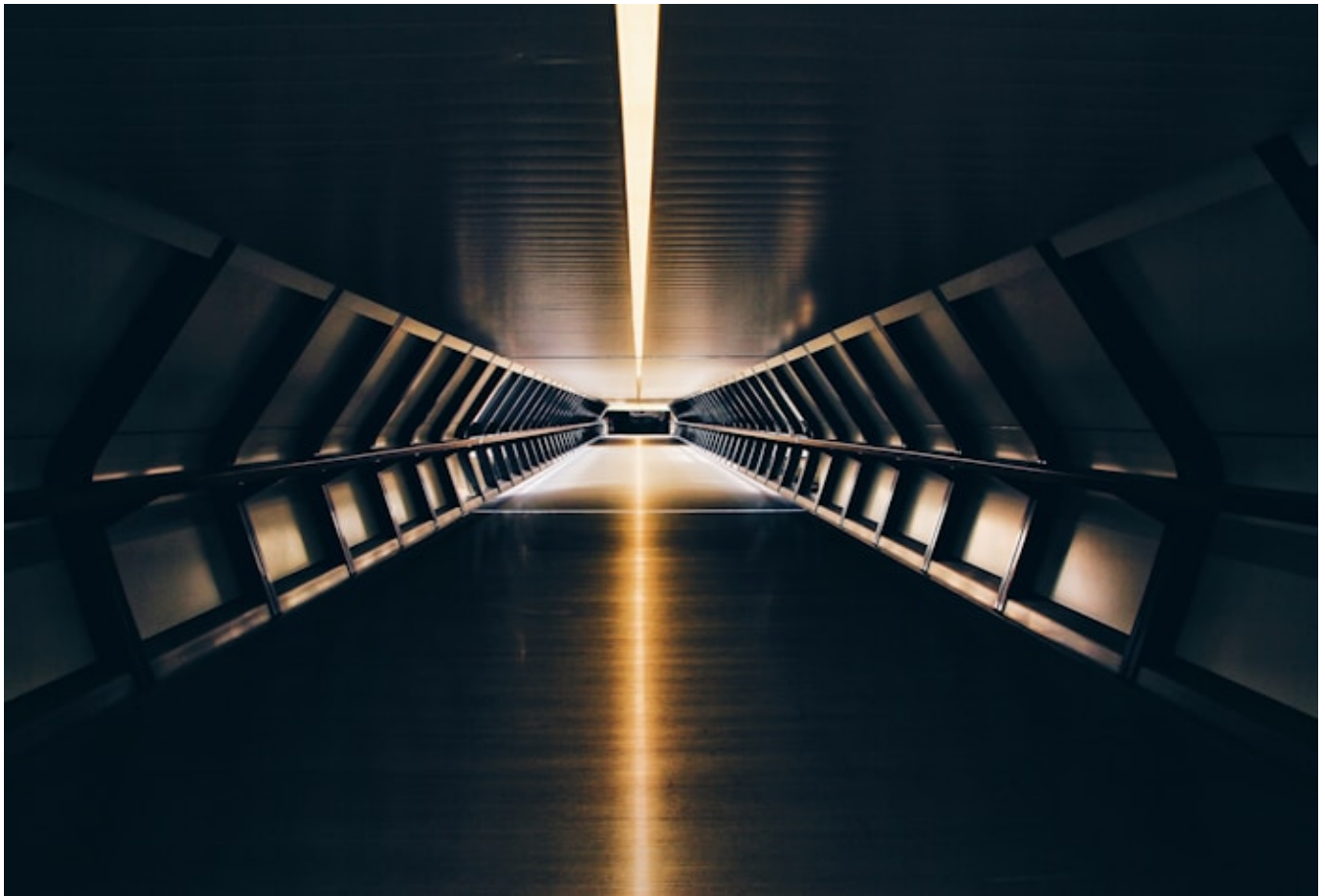
**Opportunities
Worth
Leaning Into**

What's Working

- **Chip-level innovation** (cryogenics, control ICs) sits naturally within Taiwan's semiconductor core.
- **Academic pipeline** is strengthening, from quantum coding bootcamps to formal graduate degrees.
- **Cross-sector experimentation** (finance, logistics, biotech) is underway, even without national hype.
- Public-access HPC clusters + strong broadband infrastructure = **equal access for researchers across disciplines.**

Strong regional collaboration gives Taiwan a **wider voice despite diplomatic limitations.**

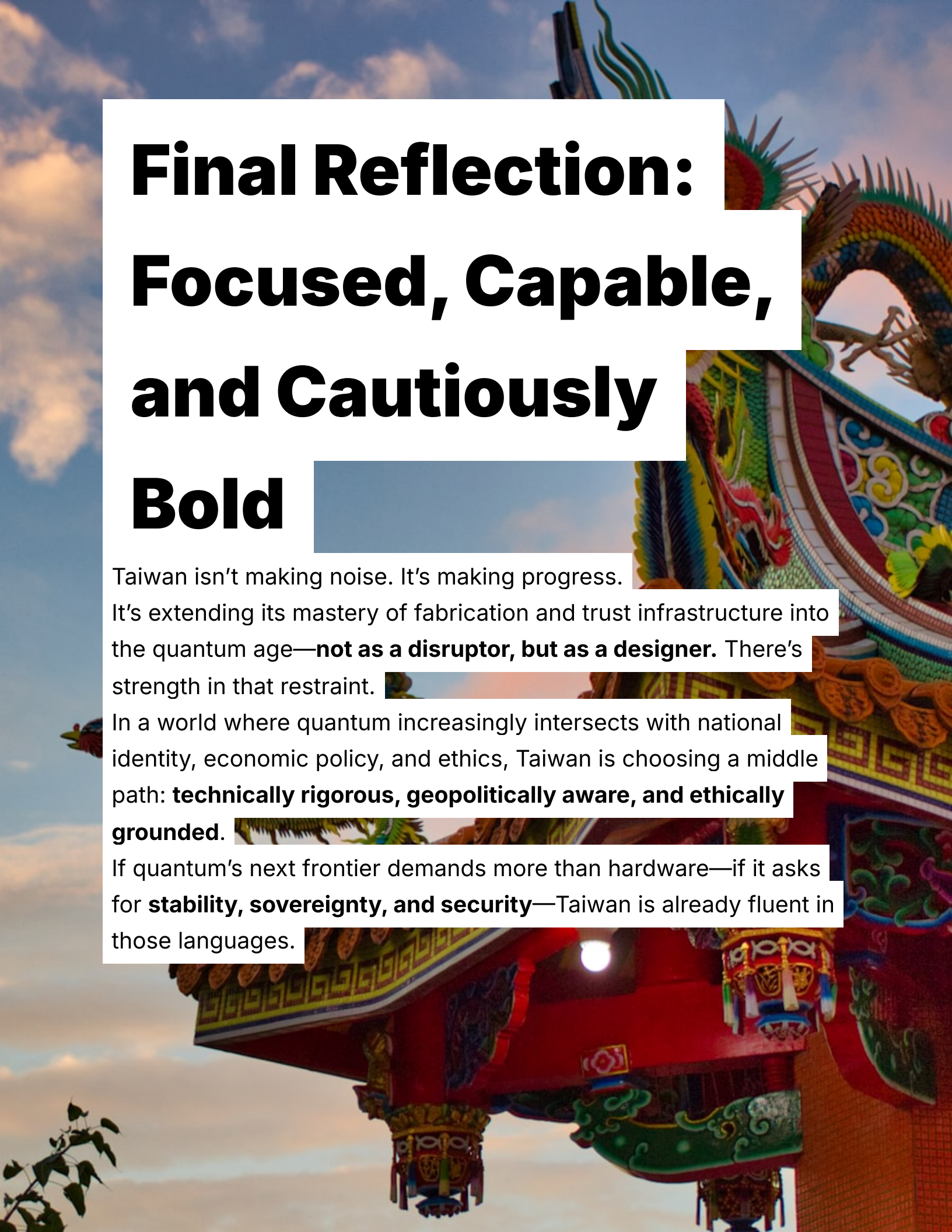




Looking Ahead: 2025–2030

Taiwan's strategy is **deliberate, layered, and future-conscious**. Taiwan's international identity could evolve from "tech adopter" to **quantum co-architect** in the Indo-Pacific, especially in **open-source governance** and **privacy-first innovation**.

- Expect a **second Quantum Technology Action Plan** by 2026, incorporating **commercialization paths, talent incentives, and national security updates**.
- By 2027, Taiwan may pilot a **Quantum Hardware Manufacturing Zone**.
- Digital literacy initiatives under the **Taiwan Digital Talent Program** may expand to include **quantum literacy for educators, civil servants, and SME tech teams**.



Final Reflection: Focused, Capable, and Cautiously Bold

Taiwan isn't making noise. It's making progress.

It's extending its mastery of fabrication and trust infrastructure into the quantum age—**not as a disruptor, but as a designer.** There's strength in that restraint.

In a world where quantum increasingly intersects with national identity, economic policy, and ethics, Taiwan is choosing a middle path: **technically rigorous, geopolitically aware, and ethically grounded.**

If quantum's next frontier demands more than hardware—if it asks for **stability, sovereignty, and security**—Taiwan is already fluent in those languages.