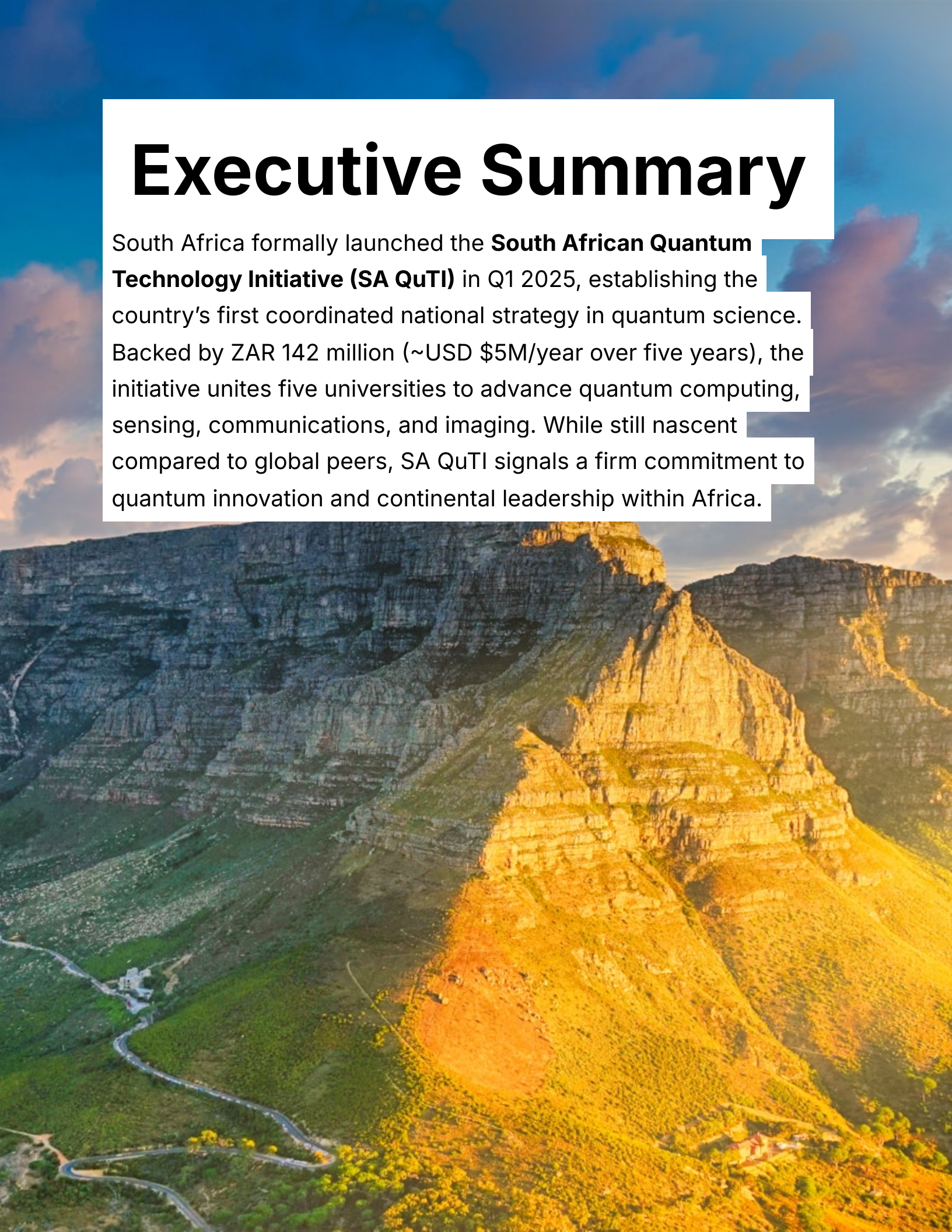
South Africa — Emerging Quantum Ecosystem with Continental Ambitions State of Quantum Computing – August 2025

Executive Summary

South Africa formally launched the **South African Quantum Technology Initiative (SA QuTI)** in Q1 2025, establishing the country's first coordinated national strategy in quantum science. Backed by ZAR 142 million (~USD $5M/year over five years), the initiative unites five universities to advance quantum computing, sensing, communications, and imaging. While still nascent compared to global peers, SA QuTI signals a firm commitment to quantum innovation and continental leadership within Africa.



National Strategy & Infrastructure

- **QuTI**, under the Department of Science, Technology and Innovation (DSTI), connects quantum efforts across:
  - Stellenbosch University
  - University of the Witwatersrand (Wits)
  - University of KwaZulu-Natal (UKZN)
  - University of Cape Town (UCT)
  - Sol Plaatje University
- **CHPC's "Lengau" supercomputer** in Cape Town remains a key asset for quantum simulation research.

Academic Firepower & Public-Private Collaboration

- **Prof. Francesco Petruccione (Stellenbosch)** and **Dr. Isaac Nape (Wits)** continue to lead quantum research and mentorship.
- The **Emerging Leader Programme** fosters the next generation of quantum scientists.
- Private sector engagement remains limited, but groundwork is being laid for commercial partnerships.

International Partnerships & Pan-African Integration

- While global bilateral quantum partnerships are limited, South Africa is advancing:
  - A **continent-wide initiative** led by UKZN to build **Africa's first indigenous quantum computer**, backed by German collaborators.
  - Regional collaboration for **quantum cloud access** and research distribution across African institutions.
- The government aligns with **OECD and IP guidelines** on responsible innovation, workforce inclusion, and data governance.

Opportunities

National coordination and university alignment under SA QuTI
Strong supercomputing foundation through CHPC
Relevance of quantum to regional challenges: health diagnostics, agri-tech, and finance
Ambitious goal of a **functional cloud-based quantum prototype by late 2026**

Challenges

Limited funding compared to global investments
Minimal startup and commercialization presence
Technical bottlenecks in local quantum hardware development
Fragmented private sector engagement

2025 Outlook & What's Ahead

- Continued rollout of research tracks in quantum communications, sensing, and algorithm design
- Expansion of the **African quantum cloud consortium** and pilot access for university research labs
- Growth of regional quantum literacy, infrastructure readiness, and international co-development opportunities

Final Reflection

South Africa’s August 2025 quantum landscape reflects a focused and future-aware strategy. With academic strength, HPC support, and emerging continental partnerships, SA QuTI lays a promising foundation for quantum leadership in Africa. Scaling funding, commercial participation, and prototype delivery will determine whether South Africa transitions from academic prominence to a catalyst for real-world quantum innovation across the Global South.