

Workshop A4

Activating Multilateral Governance

OQI Operational Launch
5 March 2024 | CERN, Geneva



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An initiative hosted by CERN, born at GESDA, supported by UBS

- 1. Round of introductions**
- 2. Implementation of OQI: what have we achieved so far?**
- 3. Quantum Diplomacy Serious Game**
- 4. Discussion on next steps of A4 on OQI 'Activating Multilateral Governance'**
- 5. Conclusions/Wrap up**



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Implementation of OQI
what we have achieved so far

OQI – what we have achieved so far

A roadmap for the 3-year pilot structured around 4 key areas

Traction achieved through the incubation

- ✓ Proof of concept and realizability
- ✓ Funding for 3 years pilot
- ✓ Governance



Activating multilateral governance for the SDGs

Providing a neutral forum to help shape multilateral governance of quantum computing for the SDGs



Access for all

Providing global, inclusive and equitable access to a pool of public and private quantum computers and simulators available via the cloud



Advancing capacity building

Developing educational tools to enable everyone around the world to contribute to the development of quantum computing and make the most of the technology.



Accelerating applications for humanity

Realising the full potential of quantum computing by accelerating the use cases geared towards achieving the SDGs, thanks to the combined force of researchers and developers, entrepreneurs, the United Nations, and large NGOs.

Hand-over of OQI to CERN

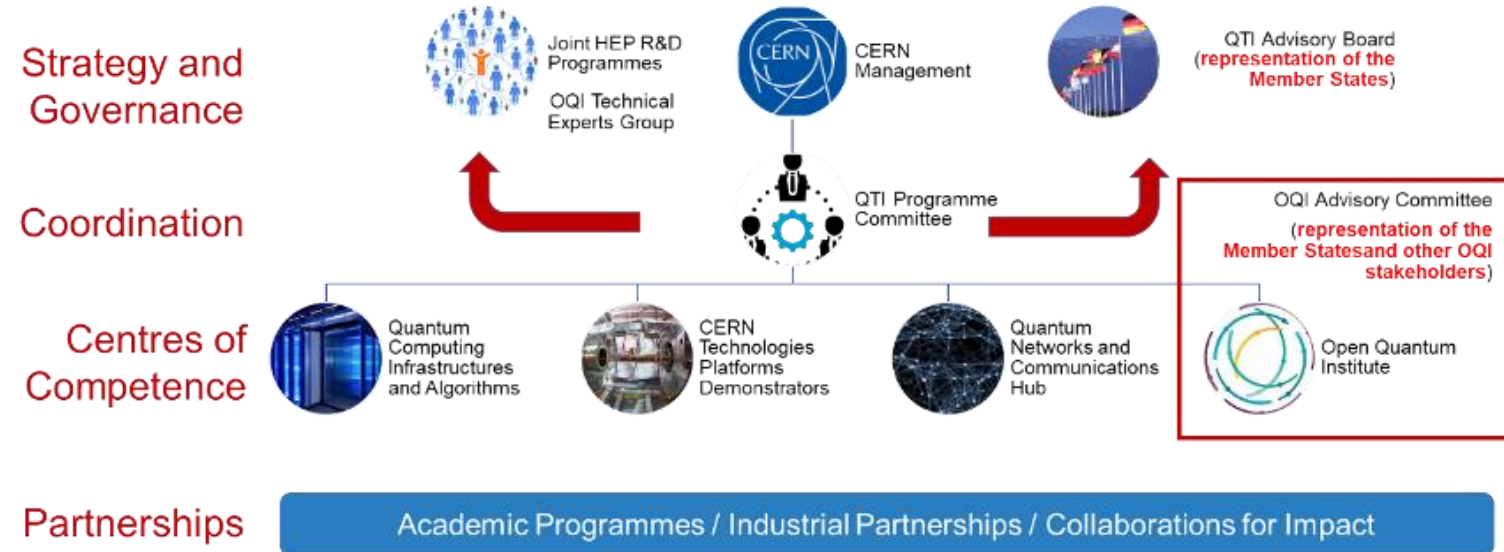
Overarching values and principles of CERN

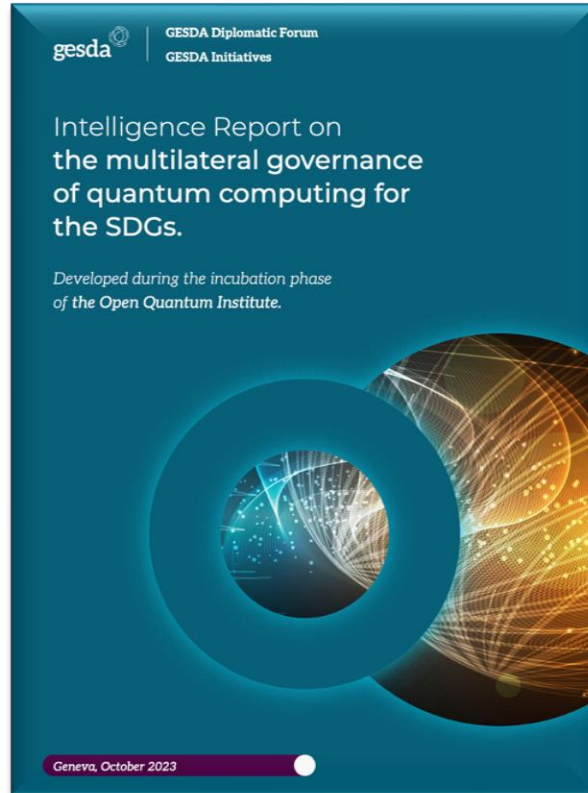
CERN's core values are: integrity, commitment, professionalism, creativity and diversity

CERN is committed to the advancement of science and the wide dissemination of knowledge by embracing and promoting practices making scientific research more open, collaborative, and responsive to societal changes

CERN's goals include:

- To be a politically neutral voice for science, advocating investment in fundamental research and evidence-based policy
- To train a new generation of scientists and engineers
- To inspire and nurture scientific awareness in all citizens





Intelligence Report developed through **informal discussions with 20+ permanent representations in Geneva** with input from community of practice (industry, academia and philanthropy)

- Digital divide
- SDG applications
- Security
- Environmental impact
- Standardization Incentives
- Human agency

- Usefulness and limitations of the Intelligence Report
- Opportunities for further dissemination
- Initial ideas for next steps



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Brainstorming

Quantum Diplomacy Serious Game

Quantum Diplomacy Serious Game

Setting the scene (1/3)

- The year is **2032** and large-scale **quantum computing has been achieved**
- Quantum computers are **capable of processing orders of magnitude more data, more quickly than conventional computers**, making them suited for complex, computationally-expensive tasks.
- Several nation states have **quantum computer systems operated by research institutions**, but the technology is still inaccessible for most. The **costs** of running these systems are still **too high for general commercial use**.
- An **intellectual property crisis** is currently unfolding. Researchers at **Bria National University (BNU)** have used their quantum computer to identify a **novel material for efficiently capturing greenhouse gas emissions**, which can be produced cheaply and at scale.
- As the impacts of climate change are being felt more keenly now than ever before, the BNU research has generated significant interest globally as there is significant potential to use this material to reduce the impact of greenhouse gases in the atmosphere faster than natural capture by oceans and forests. A **provisional patent** has been filed to protect the commercial opportunities for the material.
- The researchers at BNU have decided to **commercialise their findings by licensing** it to a local company – **Medormar Corporation** – who promised to implement the novel material for the betterment of society. However, Medormar is charging an extremely **high markup on** the cost of production, with pricing that is out of reach for many governments and corporations.
- Other nation states with quantum computing capabilities have called to **replicate the original research and reverse engineer** the material, arguing that if this can be done in jurisdictions where the patent does not apply, then there is no legal recourse for Medormar and the material can be made widely available at low cost for global public benefit.

Quantum Diplomacy Serious Game

Setting the scene (2/3)

- These arguments, initially made by small **NGOs and activists**, have gained popularity as the climate crisis worsens.
- Now the **World Meteorological Organisation (WMO) has issued a statement** that there is a moral imperative for such carbon-mitigating technology to be shared as a **Global Public Good**.
- The **WMO Secretary-General** has stated: "The door is open; the solutions to our current climate crisis are available. We must act now - collaboratively and cooperatively - for the benefit of all of humanity. If we cannot work together, then we must take the necessary actions to secure humanity's future."
- The potential **competition** that these proposals will likely create has become an issue of great concern for the government of Bria, not only because Medormar – which has benefited from public investment - stood to **capture the global market**, but also because access to the novel material could be used as **leverage by Bria** in international trade negotiations.
- **In response, the Bria government has placed significant export controls** on quantum computing-related products and services to limit the opportunity for others to replicate the material.
- As it happens, **Bria is not only a leader in quantum computing**. It is also the world's **largest producer of helium**, which in its liquid form is critical for cooling quantum computing systems.
- By preventing the export of helium, Bria has effectively reduced supply to protect its **'sovereignty innovation niche.'** This has sent the global price of helium skyrocketing, which in turn has significantly increased the cost of operating a quantum computer.

Quantum Diplomacy Serious Game

Setting the scene (3/3)

- QCS, a globally recognised consultancy firm in Bria, had been helping others build quantum computers overseas, but was forced to suspend their work when the Bria Minister for Foreign Affairs and Trade **designated quantum computing technology (including related services) as a “restricted good”**.
- This has **angered the government of Solte**, a small nation who had commissioned QCS to **help them build a small quantum** computer to support climate change modelling and identify which parts of the country need further investment in infrastructure resilience.
- In addition, overseas researchers who were part of collaborations with Bria National University now have also been **blocked from participating in any research** that uses the university’s quantum computing facility.
- The consequences of the Bria government’s actions to preserve its economic position are swift. The shortage has led to a **global setback in the development and application of quantum computing systems**, and with it, major constraints and delays in realising promising technological innovations to fight climate change.
- The topic has been discussed in multilateral forums like the United Nations, although there has been **no consensus reached**. Without a swift resolution to **the deadlock**, uptake of the novel material remains limited, and its impact on climate change is negligible.

How did we get here, to a (hypothetical) place where the potential of quantum computing has led to a significant power imbalance that works against the public interest?

Let's rewind...

An INGSA Case study produced for GESDA

Quantum Diplomacy Serious Game

Structure of the brainstorming

Step 1. Seeing the Future (5 minutes)

Participants are presented with **the world in 2032** scenario when large-scale quantum computing has been achieved and issues related to access to the technology are coming to the fore.

Step 2. Decisions today (30 minutes) – World Building

- Participants break into groups to rewind to the **BNU's International Symposium on Quantum Computing in March 2024** and discuss how to ensure that the core value of Common Good is upheld in quantum computing and its outputs.
- They are allocated a character to impersonate during this simulated International Symposium
- In this simplified version characters only include NGOs, government officials from Bria and other Quantum States, as well as representatives of multilateral organisations.
- Teams undertake an exercise exploring what decisions about principles and their application could be made to mitigate or avoid the 2032 scenario and to steer towards the preferred outcomes.

Step 3. Debriefing (20 minutes)

Participants return to plenary and discuss and unpack their conclusions, including:

- Influence of different actors in decisions (national, transnational, multilateral)
- Tensions, conflicts and competing interests
- Influence of structural conditions and how path-dependencies were addressed/redirected



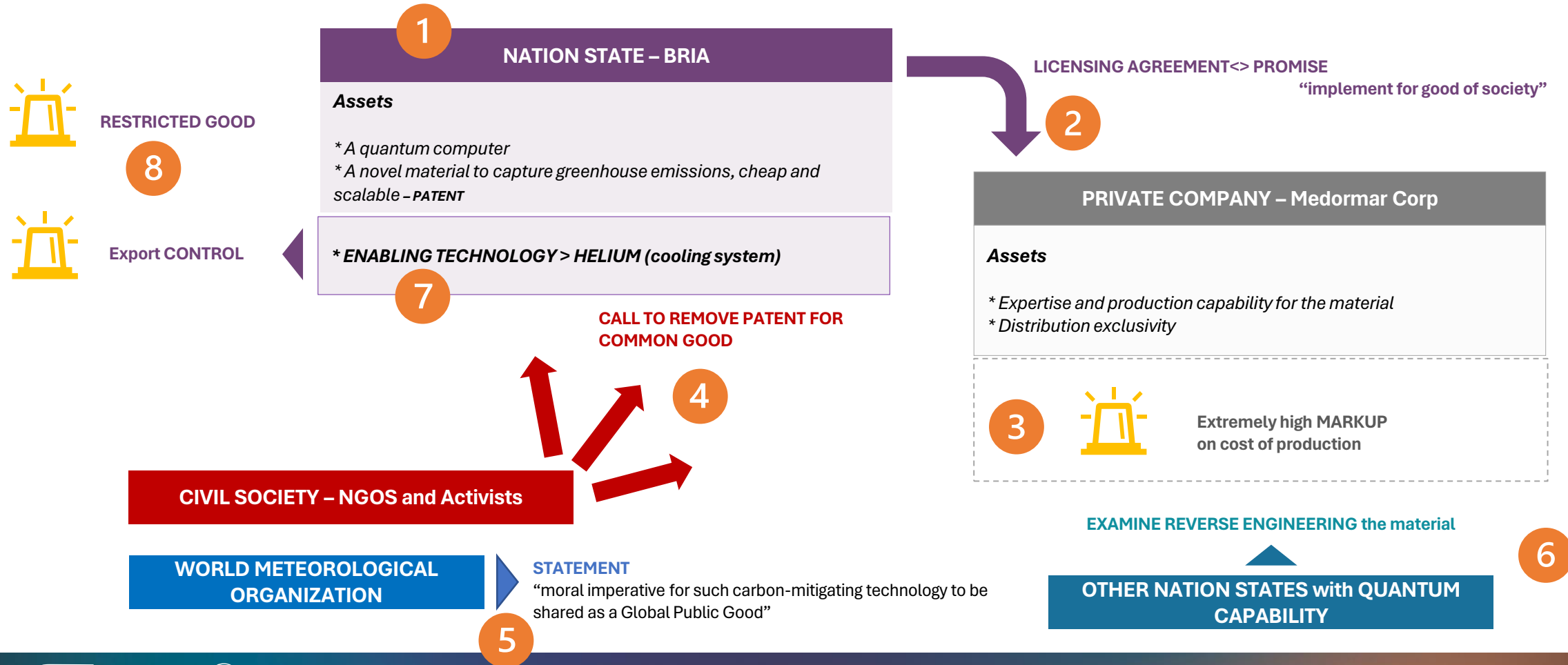
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Serious Game in motion

(30 min)

Quantum Diplomacy Serious Game Visualization card

Quantum computers can address complex computationally tasks, solving previously intractable problems.
A few nation states have quantum computer systems operated by research institutions,
 but the technology is still **inaccessible for most**





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Serious Game debriefing

(20 min)



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Conclusion and next steps



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Prompt guide

Scientific and cultural collaboration	<ul style="list-style-type: none">• ...••
Targeting Investment and Funding	<ul style="list-style-type: none">••••
IP rights and regulation	<ul style="list-style-type: none">••••
Hardware and Supply Chain Access	<ul style="list-style-type: none">••••
Building awareness and social licence	<ul style="list-style-type: none">••••
Capabilities building and workforce development	<ul style="list-style-type: none">••••
Other	<ul style="list-style-type: none">••••