

Welcome and introduction by Working Group E Chair, **Maarten Botterman**.

Maarten started by restating the focus of the Working Group (WG), which is to consider the necessity for all stakeholders to address opportunities and threats relating to emerging technologies such as artificial intelligence (AI), quantum computing, and further deployment of the Internet of Things (IoT) and blockchain. He emphasised the importance of getting a better understanding of that it takes to increased trust in such technologies as essential to taking advantage of their benefits whilst also preparing for the challenges they bring about.

Maarten also stressed the importance of incorporating the Global South into these conversations – digital Technologies don't stop at a country's border, and can benefit all, if we aim to make that happen. He provided a recap on the WG meeting held in Geneva earlier in the year, as part of the AI for Good summit at WSIS. He highlighted the following outcomes:

- Importance of regulation, as a way to balance Risk and a backstop against abuse.
- Focus on the opportunities of AI. Connecting to the Sustainable Development Goals (SDGs), he remarked the need to develop understanding on both challenges and opportunities, and to be inclusive in our approach if we are to address the SDGs, successfully;
- Finally, he stressed the need for a safe and secure adoption, making sure to involve all stakeholders in the conversation. He noted that in this AI can also help detect risks and attacks.

### Minutes

**Shohini Ghose**, of the Quantum Algorithms Institute (QAI), kickstarted the conversation by using the candle and lightbulb metaphor for the technological advantage that quantum computing provides over current computing. She insisted that there is a serious need for new infrastructure, new investment, and a platform for it, which is still unknown. She stated that we are at the point of understanding how it works but we do not know what the driving platforms for high performing computing is, what is the transistor.

She also explained that the primary application that is envisioned is decrypting and attacking but it is not entirely clear how all of it will relate to cybersecurity. She also confirmed that it is expected that quantum will be able to break current encryption standards in five to ten years.

Finally, she confirmed that there is nothing we can do to prevent all of this from happening. In her view, between now and the implementation of new standards, everything will be lost in that time window. She invited participants to create a sense of urgency that can create the necessary awareness to help make us safe.

**Timothy King** (ICTC) stressed the need to not frame quantum as something new, since quantum mechanics is something that has been with us for a while. He insisted that it is all about precision and the new quantum computing part of it

He also remarked how China's efforts on quantum key distribution, will make their systems virtually "unhackable". He also praised the recently released NIST standards for quantum, which should provide security for the current progress of quantum. However, he also confirmed that these standards have already been broken and stressed the need to adopt a hybrid approach, since hardware is not

ready in a lot of cases. He also focused on encryption hygiene as a whole and how we need to be more self-aware of our encryption standards and not just externalise them.

Finally, he focused on quantum sensors as a step forward in terms of detail. He explained that there is a new market coming up with more data. And these sensors will not only be a tool of evil but can also have positive impacts (e.g. reducing climate change emissions). He invited people not to panic like we did with AI. He also stated that the current investment on quantum is impressive, especially in the EU and the US. However, he indicated that China is far ahead, particularly in the quantum sensors space.

**Nicolás Fiumarelli** (IS) also stressed the importance of transitioning to the recent NIST standards. He explained how with current encryption, apps use a couple encryption mechanisms. However, with quantum these will be easily surpassed.

He explained that despite high-level encryption, what they will do is save the current encryption code and store it for when quantum computers are ready and can decrypt it. Finally, he also recommended a UNESCO paper on AI which analyses the intersection with other technologies and other fora.

**Juan Manuel Aguilar Antonio** (CISAN) brought the Latin American perspective to the table. He explained that in the region they are not developing capacities for emerging technologies at the same level as other counterparts. He indicated that some countries have published AI ethics and regulation policies but clarified that the issue is that many do not have the necessary resources to develop capacities.

Therefore, he believes there is a digital gap when it comes to emerging technologies, especially when it comes to more rural areas. In his opinion, this will be a serious issue, since we are not democratising technology and reflection in this sense is needed. Quantum in Latin America is far from being a reality, since other issues are prioritised. However, he stressed the need to address these issues to prevent this digital gap from increasing.

**Maarten** agreed with the need to address this inclusion gap and opened the floor to the speaker from OECD.

**Elizabeth Thomas-Raynaud** (OECD) highlighted the 2022 ministerial gathering within the OECD, which created a space for governments and experts to discuss on certain technology topics in order to upstream discussion. However, she pointed out that before going into regulation, it is important to host meetings such as the [Global Forum on Technology](#), which identified three priority technologies: quantum, synthetic biology and immersive technologies. They dealt with questions of economical and societal importance, discussed the technologies that are on the horizon and who is needed in the conversation to make it inclusive.

She also clarified that at the OECD they have previous experience, including AI principles and the OECD recommendation from 2019, and the subsequent development of resources to support their implementation.

She explained that for quantum, they put together experts from different countries and from academia and civil society in order to complete a report on quantum, which analysed its computing, sensing, and communication aspects. The report identifies policy opportunities and benefits, as well as

challenges and risks, also connecting them to the SDGs - all of it with a different approach from the current “scary prospects”.

Finally, she also referenced the four recent post-quantum standards from NIST and the importance of quantum key distribution (QKD). She also noted the challenges of implementing these standards, aside from software and hardware aspects, but in terms of the necessary skills. She also confirmed that QKD networks will not be within reach for many governments and that only fourteen have quantum strategies currently. All of this comes with dual use, since the military will focus on different uses which have geopolitical implications – and thus need further intergovernmental collaboration.

**Shohini** also stressed the importance of the discussion on the digital divide mentioned by Juan Manuel. She explained that recently there was a Quantum World Congress with one of its tracks focusing on sustainable development, but there was no presence from the Global South. She stressed the need to connect all decision-makers and allow them to get a seat at the table in these discussions.

**Maarten** continued the discussion and mentioned how emerging technologies are not taking the forefront of high-level discussions and asked panellists how to pitch it so the Global South can also be a part of the conversation and advance on these matters.

**Juan Manuel** responded and stated that if political leaders from these countries do not want to take part into such discussions, nothing happens. He expressed the need for this to change and to make them realise the implications of inaction in these areas.

**Nicolás** continued by stating that there are many open tools available. He believes that each country should be able to contribute according to its respective strengths. Perhaps you do not have the technology but have experts on the subject. He stressed the need for more open consultations and for involving civil society to bring these discussions to the multistakeholder level, which will allow us to better understand the threats.

**Timothy** pointed out to a recently published ecosystem report by QAI which explains how quantum is industrialised and identifies use cases. He also agreed that there is already a quantum divide and hoped that there will be open access to quantum so that everyone can have access. However, he fears that its potential will make it a closed area that will go under national security.

**Elizabeth** pointed out at the need to raise awareness and inclusiveness. She shared that in the discussion taking place within the OECD they are trying to make sure that happens. Perhaps not all stakeholders are at the same level in terms of knowledge but it is valuable for them to be in the room. She also called for more countries to join this expert group discussions. Finally, she confirmed that there are quantum readiness materials being developed but there is a need to work more with the international community.

**Shohini** stressed the need to incentivise countries with resources to share them with others and build capacity. She also focused on the importance of education and creating a global workforce to address the digital gap.

**Chris Buckridge** pointed out that the United Nations (building on an initiative out from UNESCO) had declared 2025 as the International Year of Quantum Science and Technology, and noted the opportunity this may offer for further developing collaboration relating to quantum technologies.

**Maarten** concluded provisionally that participants expressed an interest to further our common understanding of the opportunities and threats relating to quantum Technologies, and that in particular:

- This needed to happen in an inclusive way, ensuring all regions of the world are to benefit from quantum technologies, and should stand ready to mitigate the risks related to these technologies;
- Stakeholders from all regions of the world should be part of the conversation on “what is needed” and “what is possible”, regionally, as well as global;
- Quantum Technologies deployment “in full” may take another decade, yet preparations for embracing this should start today.

This Working Group could help develop an insight paper for stakeholders around the world (or specific insight papers for different stakeholders around the world, e.g. governments, businesses, research institutes, civil Society, etc.). Such insight paper are likely to evolve over time, both in *embracing new insights* and in *being more effective in communications* to specific stakeholders.

GFCE’s regional hubs could facilitate bringing in stakeholders from different regions, and/or host regional meetings.

*Last but not least: it will be important to consider emerging technologies “as a whole” as well as provide specific insights on each of them separately. In the end it is about the world benefiting from cyber Technologies, as a whole – and ensure achieving both societal benefits as enabling commercial opportunities.*