Quantum Technology Observatory for Policy and Society

Navigating the frontier of quantum technology with data-driven insights for policy and society

Quantum technology is recognised as a critical technology globally, attracting substantial attention from industry, academia, governments and civil society. In recent years, there have been significant advancements in the technology's capabilities, with cutting-edge research and development starting to yield practical solutions that could positively impact people's lives in areas such as life sciences, finance, aerospace, defence, energy and telecommunications. Yet the complexity, uncertainty and potential risks associated with the technology – for example, concerning the security of encrypted information in the future – demands proactive and informed policy responses. Building on our expertise in quantum technology policy research, RAND Europe is establishing a Quantum Technology Observatory for Policy and Society (QTOPS), an international policy research hub and forum dedicated to discovering, analysing and sharing quantum technology trends and data with the wider community. Through trusted, evidence-based insights and thought leadership, we aim to help stakeholders better understand the quantum technology policy landscape, foster its responsible development and tackle its broader implications for society and policymaking.

Our mission

We seek to empower decision makers and stakeholders to make informed choices, strengthen cooperation across the quantum technology ecosystem, and craft strategies and impact-focused insights that support the growth of quantum technology for societal and economic benefit. QTOPS will offer a comprehensive perspective on a range of quantum technology trends, as well as emerging ecosystem challenges, opportunities and uncertainties. Simply put, we aim to ensure that evidence is at the heart of decision making for the benefit of the quantum and wider emerging technology community.

What we do

QTOPS will actively identify, understand and monitor key quantum technology trends, serving as a data-driven tool to track and visualise progress in quantum technology. Through our proactive approach and research agenda, QTOPS aims to understand and anticipate quantum technology developments and prepare policymakers, researchers, industry leaders, investors, entrepreneurs and the public for their potential implications. By providing evidence-based analysis and structured insights, QTOPS will enable us to proactively engage with quantum technology stakeholders across the globe.

QTOPS will also focus on transforming complex datasets into intuitive visualisations, making quantum technology trends and information accessible and actionable. We want to ensure that our audiences can easily explore, interpret and engage with key quantum technology information and analysis. Furthermore, by combining qualitative insights with quantitative data, we aim to create a holistic view of the quantum technology ecosystem that can drive informed decision making.

Our areas of focus

Our research on quantum technology and its potential impacts is both proactive and focused, aiming to answer key questions relevant to policymakers and government representatives, business and industry leaders, entrepreneurs, researchers, and society at large. Initially, QTOPS is focusing on research and analysis related to quantum technology education, skills and workforce development. Over time, our efforts will expand to encompass broader topics of interest.

Education, skills and workforce development

Research and innovation leadership

Governance, ethics and responsible innovation

Applications, commercialisation and societal impact
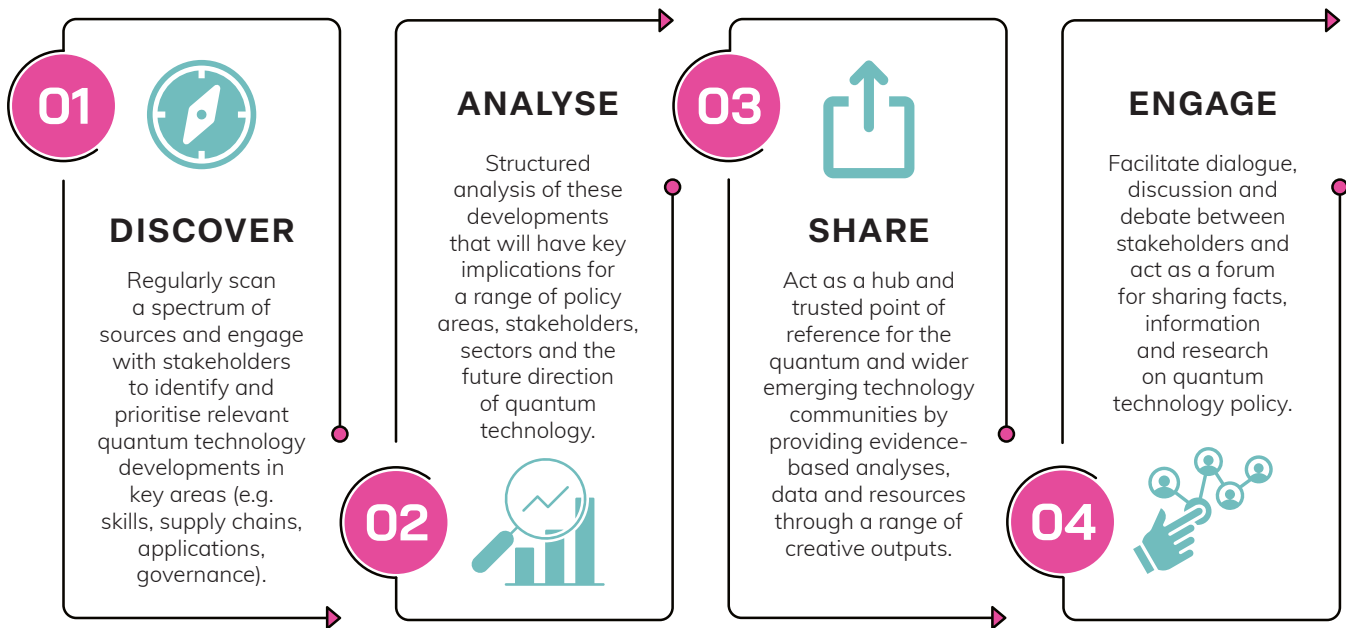
Security and privacy risks

Global cooperation

Infrastructure, access and supply chains

Conceptualisation of QTOPS

01

DISCOVER

Regularly scan a spectrum of sources and engage with stakeholders to identify and prioritise relevant quantum technology developments in key areas (e.g. skills, supply chains, applications, governance).

ANALYSE

Structured analysis of these developments that will have key implications for a range of policy areas, stakeholders, sectors and the future direction of quantum technology.

02

03

SHARE

Act as a hub and trusted point of reference for the quantum and wider emerging technology communities by providing evidence-based analyses, data and resources through a range of creative outputs.

ENGAGE

Facilitate dialogue, discussion and debate between stakeholders and act as a forum for sharing facts, information and research on quantum technology policy.

04

Our approach and methods

Our approach blends established, traditional research methods with advanced, state-of-the-art techniques to produce meaningful and impactful quantum technology policy research and analysis. Inspired by RAND Europe's **organisational values**, our commitment to **making a difference**, and building on our strong foundations of conducting high quality and objective **research and analysis**, we will leverage our topical and methodological expertise to support the quantum technology community. Our methods include literature reviews, interviews, focus groups, surveys, workshops, scientometrics, crowdsourcing, trend analysis, horizon scanning, roadmapping, future scenarios, serious gaming, web crawling, NLP techniques, LLM-based analysis, and data visualisation. In addition, we can apply insights from our expertise with other **emerging technologies** – including AI and biotechnology – and assess the consequences of their interplay with quantum technology. Our interdisciplinary expertise, drawn from across **RAND** and an extensive network of collaborators, allows us to form tailored teams that are well-equipped to tackle the complex research questions presented by quantum technology.

We will disseminate our findings through a variety of outputs, including reports, commentaries, briefings, interactive data visualisations and evidence submissions. We will also host a series of ongoing webinars, workshops and roundtables to contribute a non-partisan, objective perspective to broader community dialogue, debate and education efforts throughout the quantum technology community. In addition, we will engage with stakeholders from government, supranational organisations, academia, civil society, and both the public and private sectors to share practical insights.

Our track record

From skills and workforce development, supply chain management and international cooperation to public engagement, ethical governance and intersections with other technologies, our research provides actionable insights for stakeholders across the quantum ecosystem.

- » **Navigating skills and talent development for quantum technology**
- » **Applying quantum technologies to the life sciences**
- » **Quantum leap: Skills and supply chains for tomorrow's technology**
- » **The use of public engagement for technological innovation**
- » **Examining the global digital skills gap**
- » **Oversight of emerging science and technology: Learning from past and present efforts around the world**
- » **State-of-play and future trends on the development of oversight frameworks for emerging technologies**
- » **Implications of emerging technology for UK space regulation policy**

- » **Future uses of space out to 2050**
- » **An assessment of US-allied nations' industrial bases in quantum technology**
- » **Commercial and military applications and timelines for quantum technology**
- » **Preparing for post-quantum critical infrastructure**

Future analysis: why we should care about quantum technology; ensuring resilient and sustainable supply chains for quantum technology; bridging the quantum divide; emerging models of governance for quantum technology; learning lessons for responsible quantum technology development from AI; quantum as a dual-use technology; public engagement in quantum technology.

Get involved

QTOPS is a pilot initiative and is being designed to evolve based on interest and demand, with the flexibility to adapt to specific needs. Whether you're a policymaker, researcher, educator, technologist, business leader or interested citizen, QTOPS welcomes your voice. We are keen to partner with stakeholders and engage in discussions to shape the observatory's development and explore policy needs. For further information or to discuss opportunities for collaboration, please contact: **Salil Gunashekar** (QTOPS Director; Deputy Director of the Science and Emerging Technology Research Group), **Stella Harrison** (QTOPS Technical Lead; Senior Analyst in the Data Science Lab), and **Teodora Chis** (QTOPS Policy Lead; Senior Analyst in the Science and Emerging Technology Research Group) at **qtops@randeurope.org**.