

The Quantum Quarterly

Q1 2023

Welcome to the Quantum
Quarterly Review.

Here we cover the biggest
commercial news in the
quantum computing industry
over the last 3 months.

THE QUANTUM QUARTERLY

Early predictions for how the quantum technology industry would perform in the first quarter of 2023 painted a new year that was considerably subdued compared to the previous years. The sputtering economic climate and considerable global uncertainty offered dim hopes for robust funding of quantum companies. Meanwhile, the continuing challenges facing quantum engineers and scientists appeared to erect roadblocks to progress in necessary advances for the practical use of quantum technologies -- and in quantum computing for real-world problems, in particular.

Contrary to these well-founded speculations, private funding for quantum startups remains strong, while government funding, arguably, is heating up. Red flags -- specifically, compressing valuations and threats of delisting -- must be called out.

Although, there were no "breakthroughs" this quarter, we've seen steady advances back by a persistent group of researchers motivated and determined to create quantum-backed solutions for the good of science and society.

We will review some of these highlights in this quarterly report.



Click this icon throughout this press to see the full stories behind the brief

2022 was another strong year for investment into Quantum Computing...

What we saw in 2022




\$2.2 bn

New private capital flowing into quantum technology companies in 2022



73

New disclosed private funding rounds in 2022



> 40

New quantum technology companies established in 2022

What we have in store

66%² believe that private investment into quantum technology companies in 2023 will surpass 2022 with only a 21% concerned we will see a decline.

n = 230



■ Yes

■ About the same

■ No, but we will see investment

■ It's about to burst!

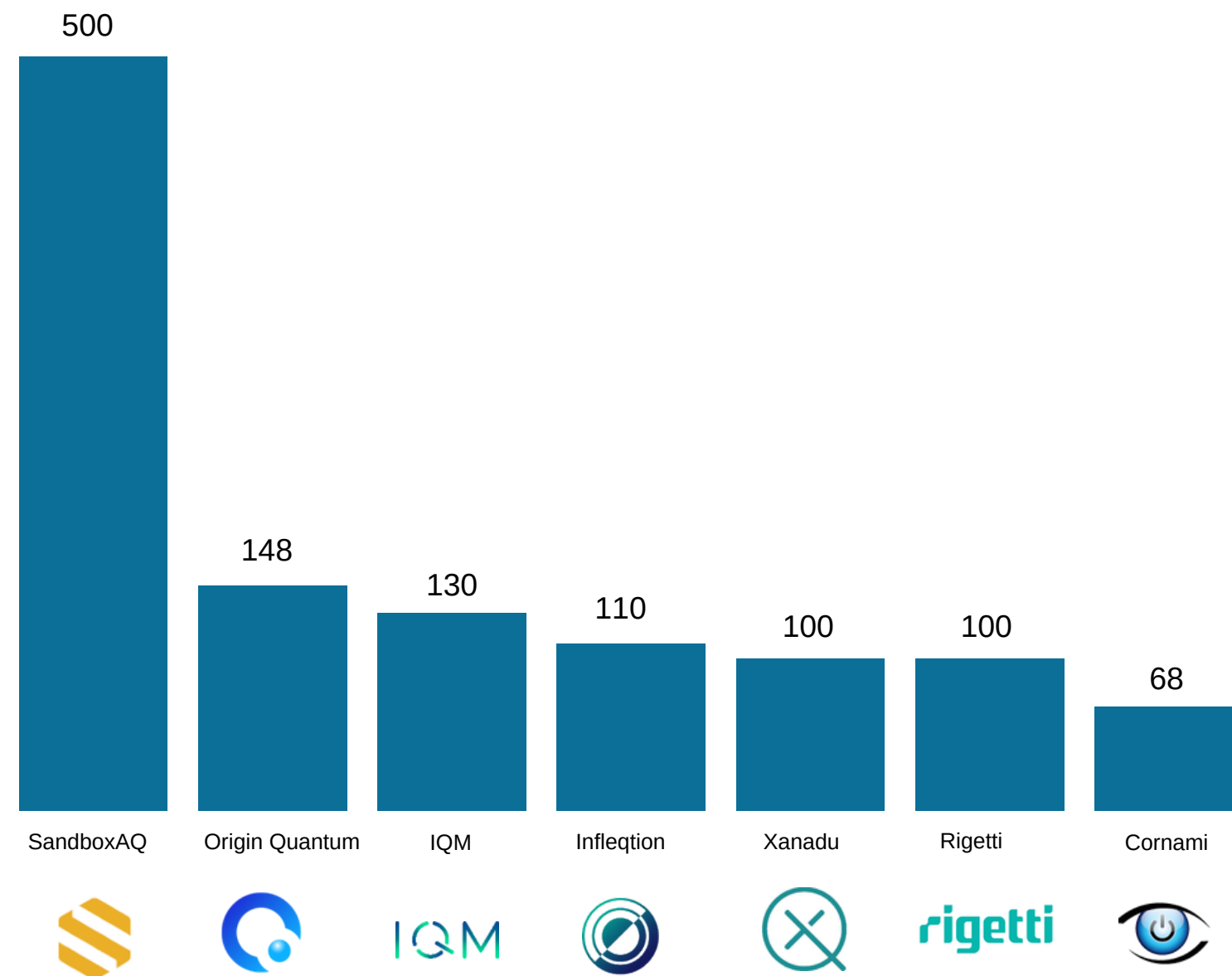
1. Excludes unknown raises and makes assumptions based on market rumours on Sandbox AQ raise

2. TQI followers on LinkedIn

Source: The Quantum Insider Intelligence Platform

...with some record round sizes

Total Investment in 2022; in \$ millions



Company	Segment	Description	Founded
SANDBOXAQ™	Software	Enterprise SaaS company delivering solutions at the nexus of quantum tech and AI. Focus on sensing, security and optimization.	2022
本源量子 ORIGIN QUANTUM	Quantum Computers	Provider of multiple Quantum Computing solutions.	2017
IQM	Quantum Computers	Developer of scalable hardware for universal quantum computers, focusing on superconducting technology.	2018
Infleqtion	Quantum Computers	Holding company for ColdQuanta (sell laser-cooled and ultra-cold atom enabled quantum technologies) and Super.Tech	2007
XANADU	Quantum Computers	Full-stack developer of quantum photonic processors and an open-source quantum software platform.	2016
rigetti SPAC ¹	Quantum Computers	California-based developer of hardware and software for quantum computers.	2007
CORNAMI Intelligent Computing	Quantum Comms & Security	Fabless semiconductor company developing quantum computing and Fully Homomorphic Encryption (FHE) solutions.	2012

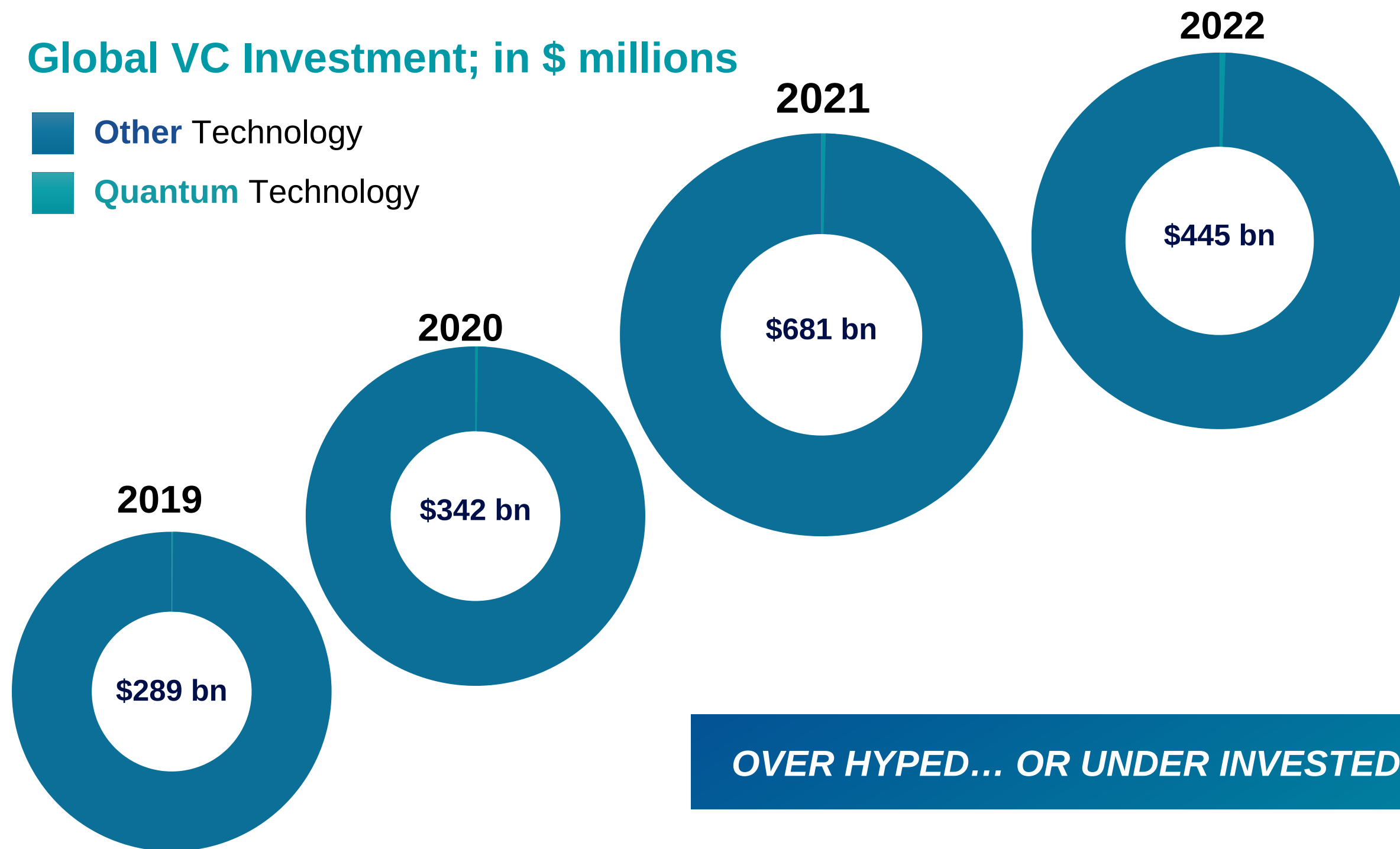
Source: *The Quantum Insider Intelligence Platform*

1. Funding net of SPAC redemptions

But quantum still represents only a small fraction of VC investment

Global VC Investment; in \$ billions

- Other Technology
- Quantum Technology



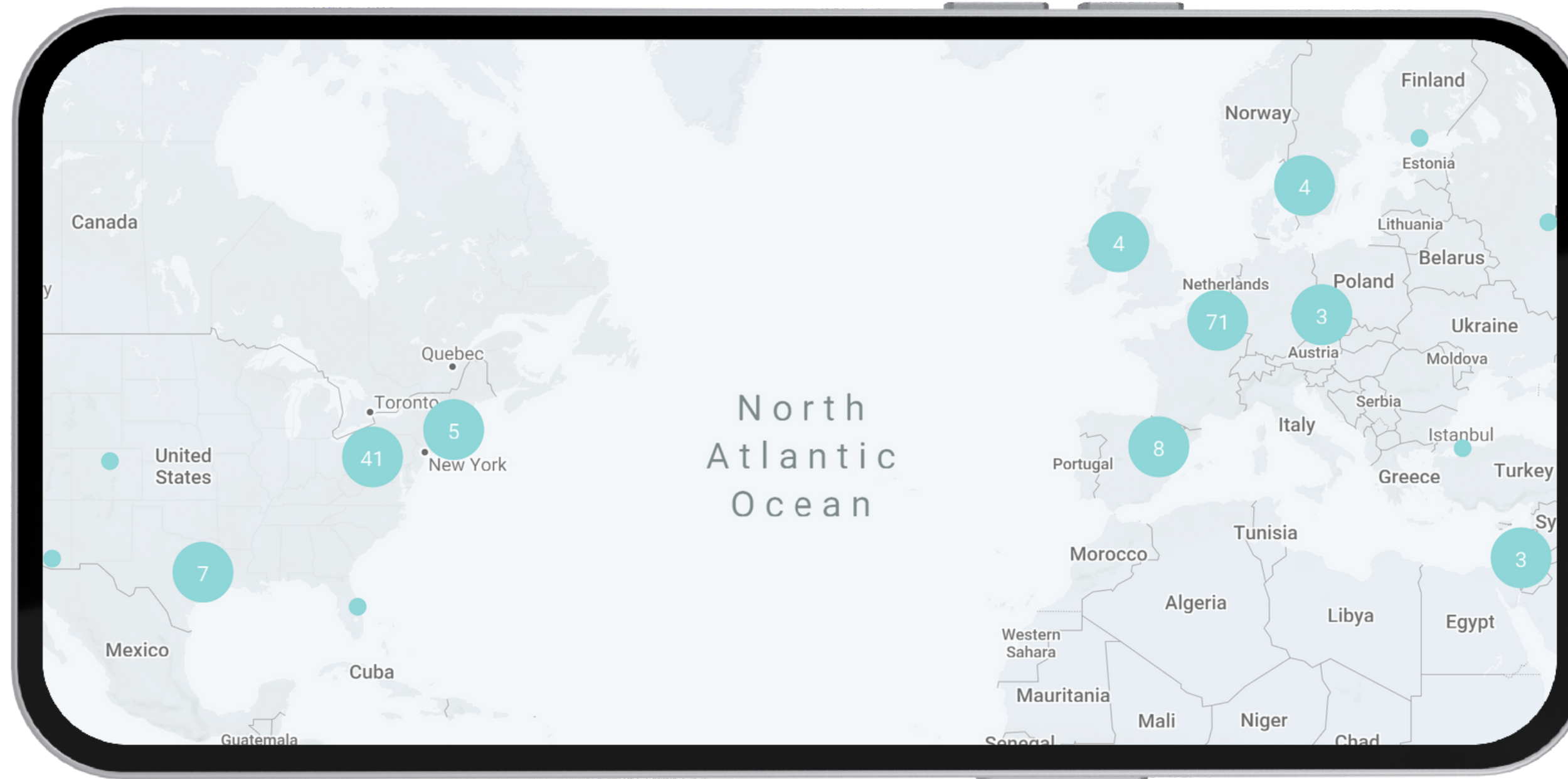
OVER HYPED... OR UNDER INVESTED?

Despite significant increase in activity over the past few years, quantum technology still represents under 1% of global Venture Capital investment.

- 2021 was a record year for VC globally according to Crunchbase, with over \$680 bn capital invested into early-stage companies (representing a 100% year-on-year increase).
- Quantum Technology start-up's also saw an all-time-high funding of over \$2.3bn.
- Activity in 2022 has remained significant though below prior year levels at \$445bn total VC funding and \$2.2bn quantum technology funding (representing a 35% and a 5% drop y-o-y, respectively).

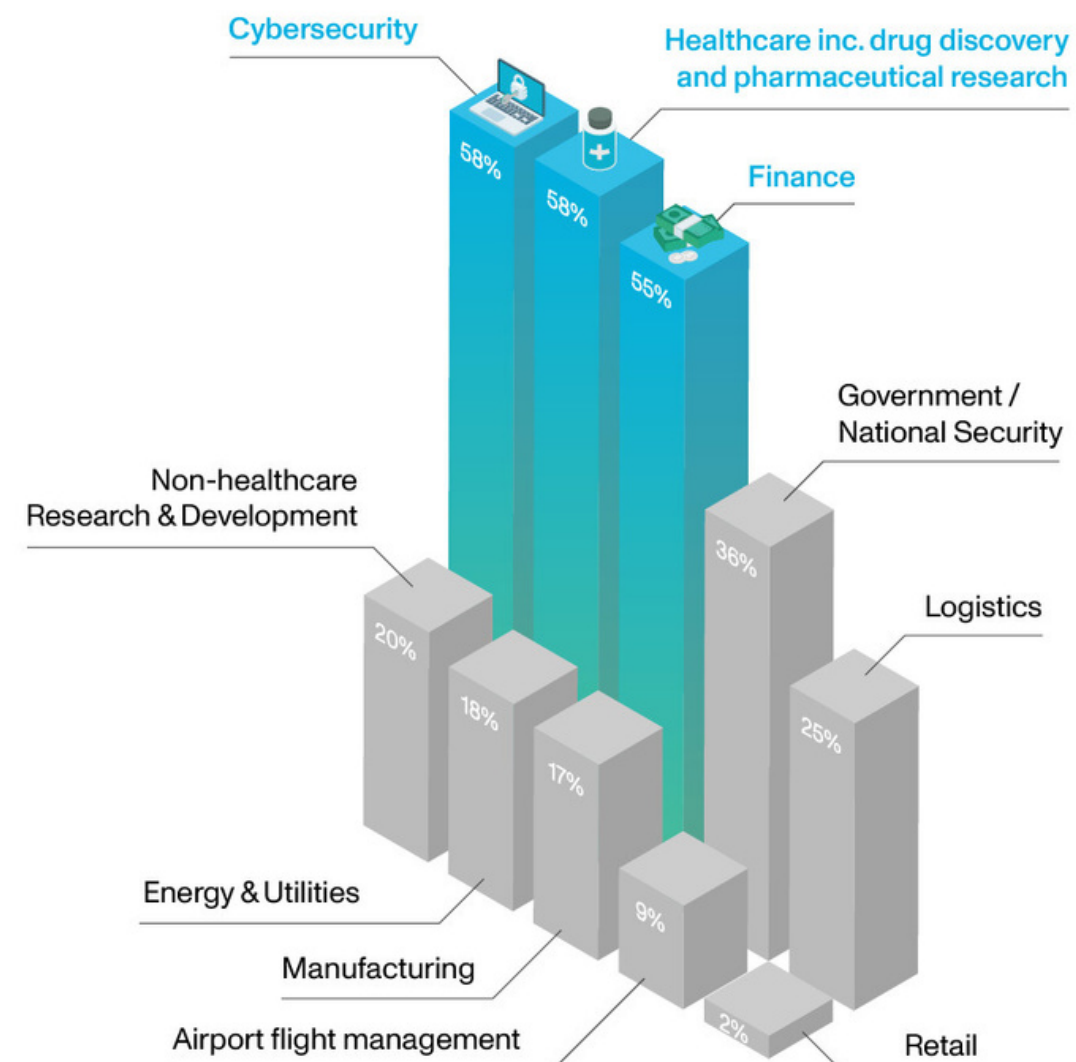
End users engaging with quantum...

>250 end users tracked in our platform globally



...with emerging consensus on relevant industries

Please select the top three sectors you think will be most affected by quantum computing



State of Quantum 2022 Report - IQM Quantum Computers, Open Ocean and Lakestar (n=174)

2023 is off to a good start...but valuations compressing



Companies	Primary Classification	Secondary Classification	Date	Country	City	Transaction Type	Region	Total \$
Strangeworks	Software	Development Toolkits	2023-03-21	United States	Austin	Series A	Americas	24,000,000
EFFECT Photonics	Hardware Components	Lights and Lasers	2023-03-11	Netherlands	Eindhoven	Series C	EMEA	39,789,072
QuantWare	Quantum Computers	Superconducting	2023-03-09	Netherlands	Delft	Seed	EMEA	6,360,000
QuantrolOx	Software	Firmware and Enablers	2023-03-07	United Kingdom	Oxford	Seed	EMEA	3,710,000
Quantum Motion	Quantum Computers	Silicon	2023-02-21	United Kingdom	London	Series B	EMEA	50,820,000
memq	Hardware Components	Other Hardware	2023-02-17	United States	Chicago	Seed	Americas	2,000,000
Quantum Brilliance	Quantum Computers	NV Diamond	2023-02-14	Australia	Canberra	Series A	APAC	18,000,000
Oxford Quantum Circuits	Quantum Computers	Superconducting	2023-02-03	United Kingdom	Shinfield	Other	EMEA	1,100,000
Q-CTRL	Software	Firmware and Enablers	2023-01-31	Australia	Sydney	Series B	APAC	27,400,000
TuringQ	Quantum Computers	Photonics	2023-01-29	China	Shanghai	Series A	APAC	50,000,000
PASQAL	Quantum Computers	Neutral Atoms	2023-01-24	France	Palaiseau	Series B	EMEA	109,000,000
Xanadu	Quantum Computers	Photonics	2023-01-23	Canada	Toronto	Other	Americas	30,000,000

+ a few more...!

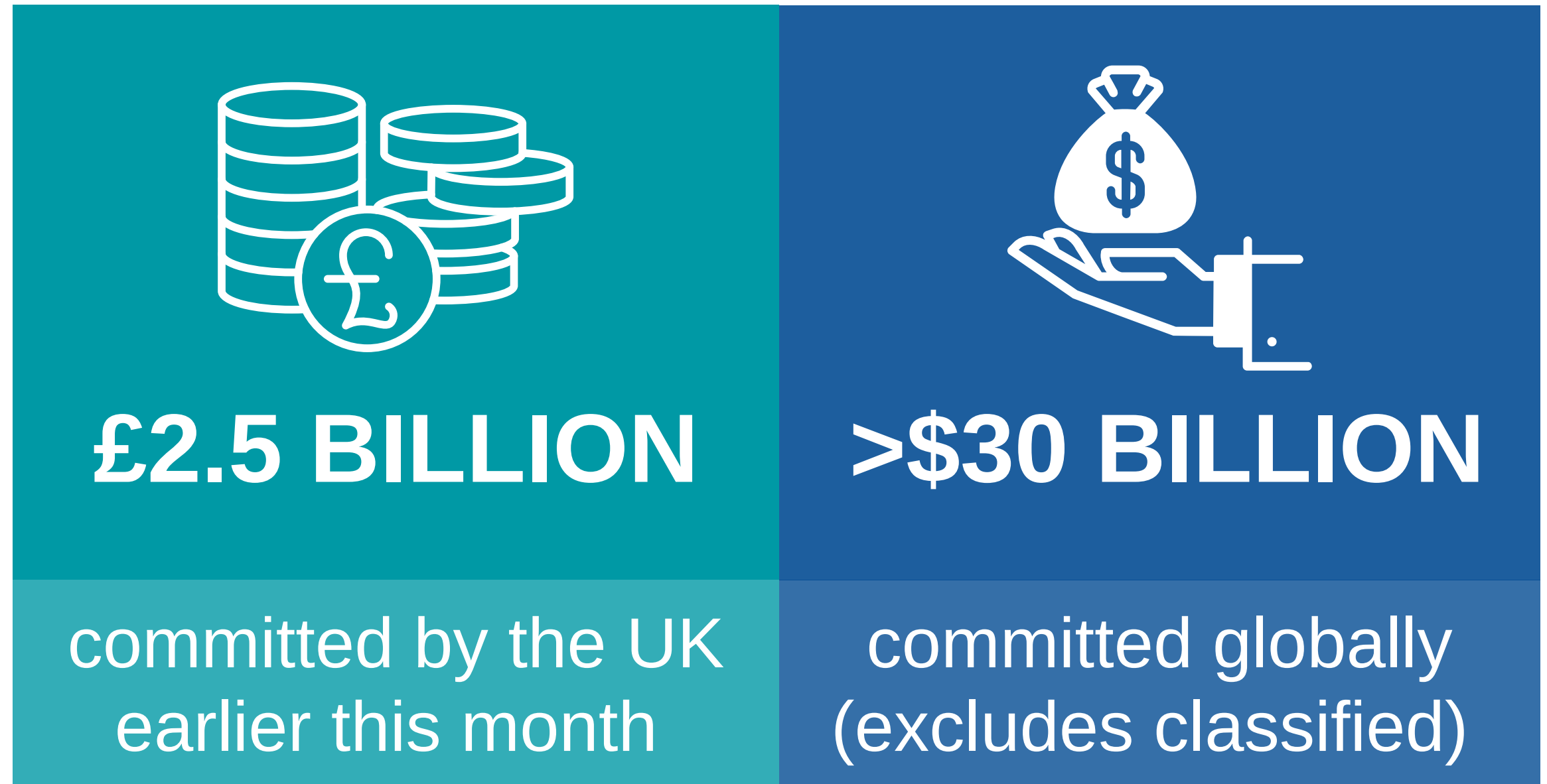
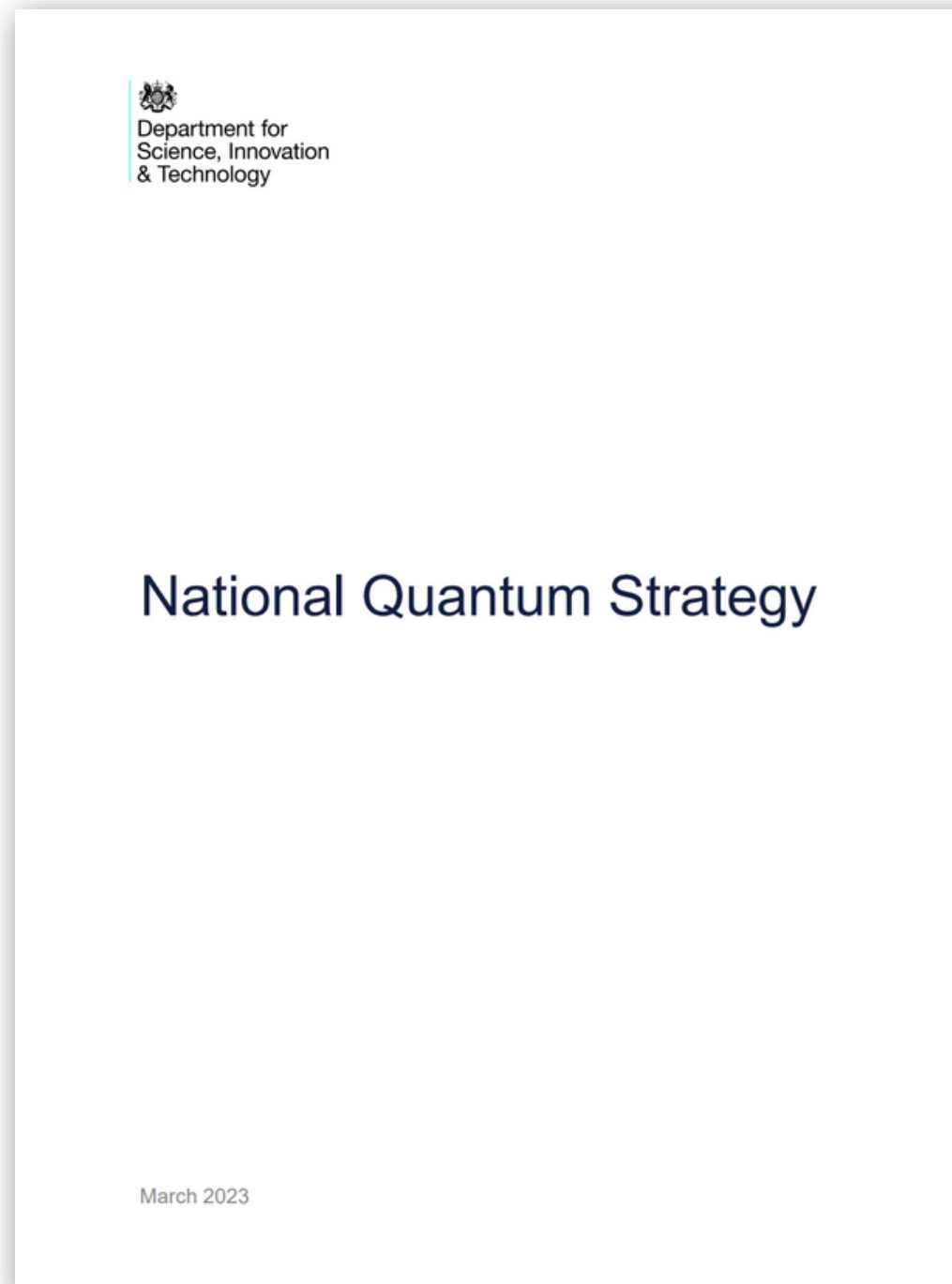
Just under \$500m raised to date in 2023

Quantum computing (QPU) companies getting most of the funding but with notable raises from software players

Valuations compressing across the board

Concerns brewing around general economic environment

National governments are doubling down on quantum



The world is increasingly paying attention to China...



USA



China

\$ Public Funding

~\$4bn+
excluding classified / military investments

~\$4-17bn+
excluding classified / military investments;
Incl. significant construction component

\$ Private Funding

\$3.7 bn+

\$255m+

Quantum startups

>310

>30

Quantum Investors

>320

>50

Patents

>64,000

>84,000

Example QC companies



Quantum Computers



Software



Hardware



Comms and Security




Other Quantum




...quantum, chips and cryptography becoming national security issues



 Administration Priorities The Record Brie

MAY 04, 2022

National Security Memorandum on Promoting United States Leadership in Quantum Computing While Mitigating Risks to Vulnerable Cryptographic Systems

 BRIEFING ROOM STATEMENTS AND RELEASES

NATIONAL SECURITY MEMORANDUM/NSM-10

MEMORANDUM FOR THE VICE PRESIDENT

THE SECRETARY OF STATE

 Administration Priorities The Record Br

AUGUST 09, 2022

FACT SHEET: CHIPS and Science Act Will Lower Costs, Create Jobs, Strengthen Supply Chains, and Counter China

 BRIEFING ROOM STATEMENTS AND RELEASES

In President Biden's first year in office, the Biden-Harris Administration has implemented an industrial strategy to revitalize domestic manufacturing, create good-paying American jobs, strengthen American supply chains, and accelerate the industries of the future. These policies have spurred an historic recovery in manufacturing, adding 642,000 manufacturing jobs since 2021. Companies are investing in America again, bringing good-paying

THE QUANTUM QUARTERLY

The Big News



UK PUSHES £2.5 BILLION PLAN FOR QUANTUM TECHNOLOGY; QUANTUM COMMUNITY REACTS



The UK budget includes an approximate £2.5 billion investment in quantum technologies, dubbed "The Plan for Quantum." The plan reflects both the vast potential of the technology, as well as the nation's desire to be a global leader in harnessing it. The effort received high praise -- with some caution -- from members of the UK's considerable quantum community.



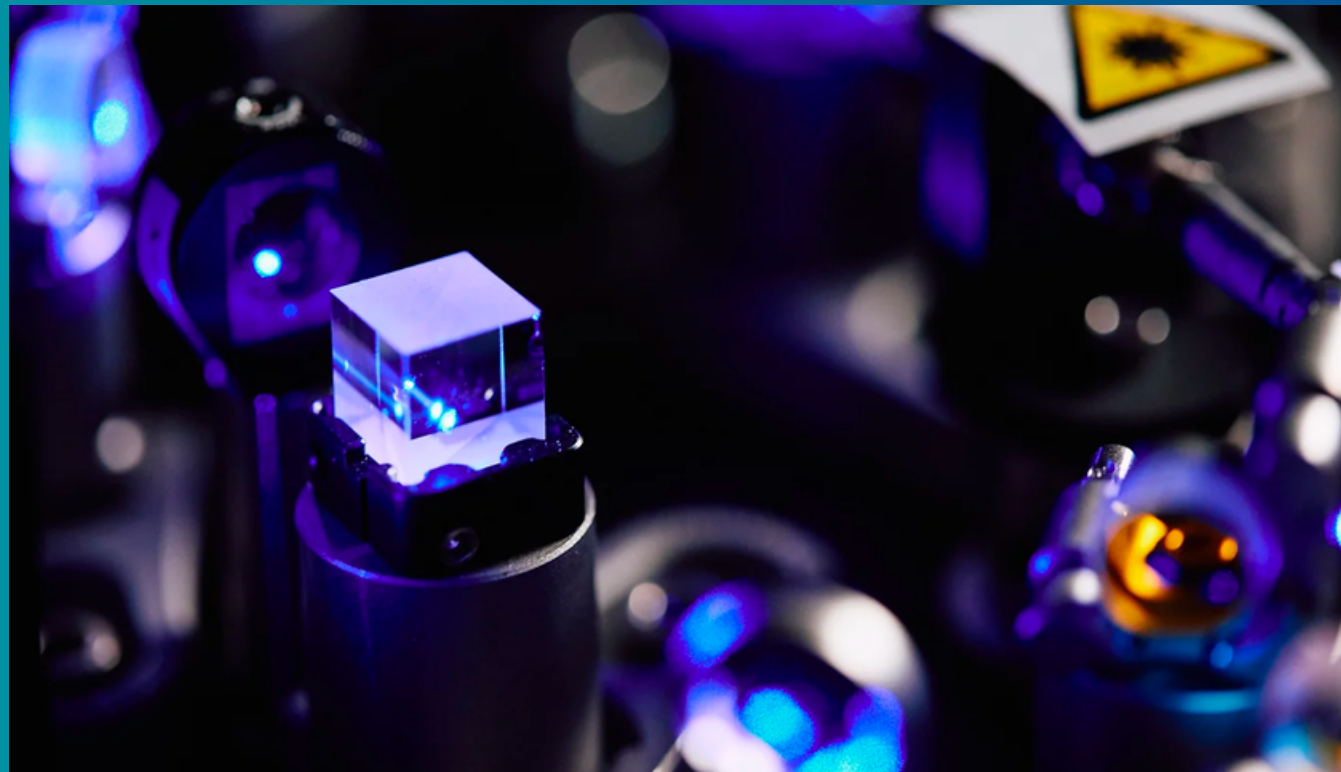
PASQAL RAISES €100 MILLION SERIES B FUNDING TO ADVANCE NEUTRAL ATOMS QUANTUM COMPUTING



PASQAL, a leader in neutral atoms quantum computing, today announced it secured a €100 million equity Series B raise led by new investor Temasek. Other new investors include the European Innovation Council (EIC) Fund, Wa'ed Ventures and Bpifrance, through its Large Venture Fund. Continuing investors include Quantonation, the Defense Innovation Fund, Daphni and Eni Next.



OXFORD IONICS RAISES £30 MILLION IN SERIES A



Oxford Ionics raised £30 million in Series A funding from some of the world's leading quantum and tech investors. The round was led by Oxford Science Enterprises and Braavos Investment Advisers. Lansdowne Partners, Prosus Ventures, 2xN, Torch Partners and Hermann Hauser (founder of chip giant ARM) also participated.



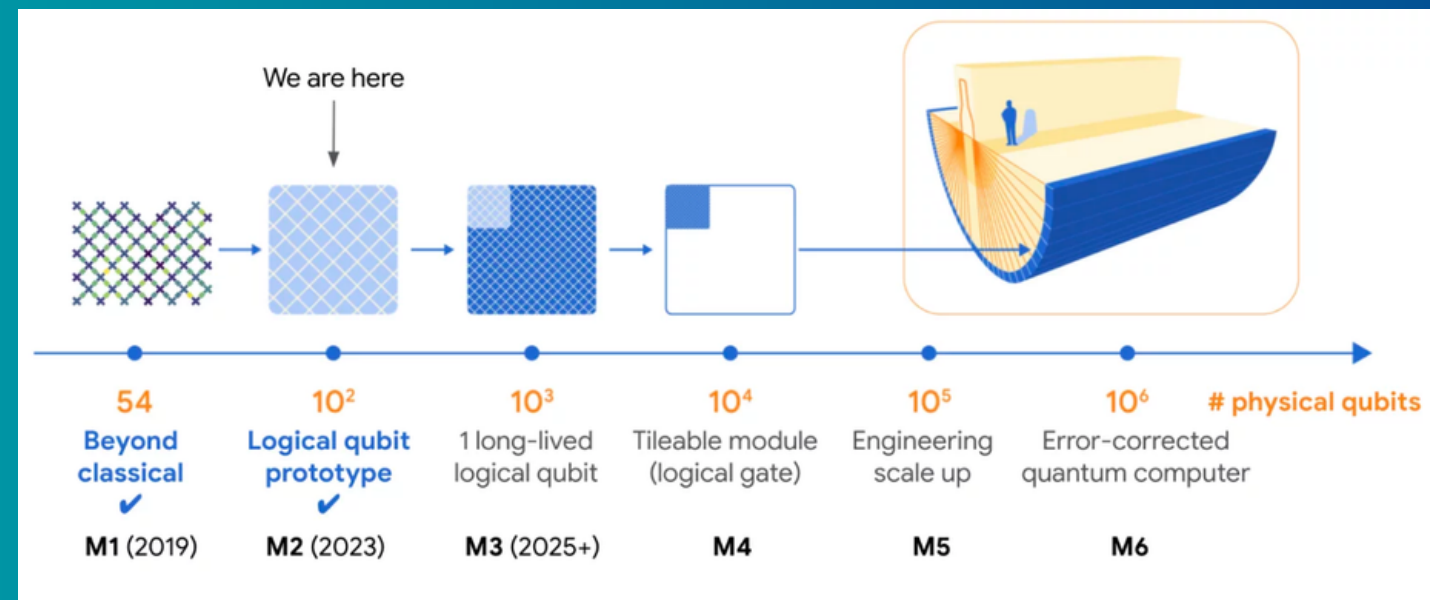
RESEARCH: QUANTUM COMPUTERS COULD HELP REDUCE CASCADING FINANCIAL CRASHES



A team of researchers from New York University and the University of Toronto, in what might be the most timely research discovery in recent times, report that quantum computers may play a role in developing effective strategies to mitigate systemic risk.



RESEARCH: GOOGLE QUANTUM AI RESEARCHERS HIT ERROR-CORRECTION MILESTONE



In a study published in Nature, the Google Quantum AI-Team team reported they created a prototype of a logical qubit, which is the basic unit of an error-corrected quantum computer. They used a particular error-correcting code called a surface code and scaling up the number of physical qubits used to build the logical qubit. By increasing the size of the code, the error rate of the logical qubit was reduced, showing that with careful mitigation of error sources, logical qubits necessary for a large-scale error-corrected quantum computer can be produced.



EXCLUSIVE: QUANTINUUM'S NEW CEO FOCUSED ON BUILDING PRACTICAL QUANTUM COMPUTERS



"That hunger of 'what's the next big thing,' never goes away. I have in intervals, asked myself 'what's the next big thing,' not just 'how can we maintain the current big thing, but what's the next bigger thing?"

Quantinuum's CEO - Rajeeb "Raj" Hazra



After decades at Intel and years working as an executive in the technology industry, Quantinuum's new CEO Rajeeb "Raj" Hazra is ready to lead a quantum business and he believes that Quantinuum will be the leader in developing quantum technologies that will create solutions for some of the world's biggest challenges.

"Where quantum is, that's where you'll find Quantinuum," said Hazra.



EXCLUSIVE: UK NATIONAL STRATEGY Q&A WITH ROGER MCKINLAY



“We want the UK to be the go-to place for quantum businesses, investors and global talent.” - Roger McKinlay of the UK National Quantum Technologies Programme.”

Roger McKinlay of the UK National Quantum Technologies Programme



The UK government has announced a £2.5 billion strategy to deliver a quantum-enabled economy by 2033. We caught up with Roger McKinlay of the UK National Quantum Technologies Programme.

THE QUANTUM QUARTERLY

About Us

About the Platform



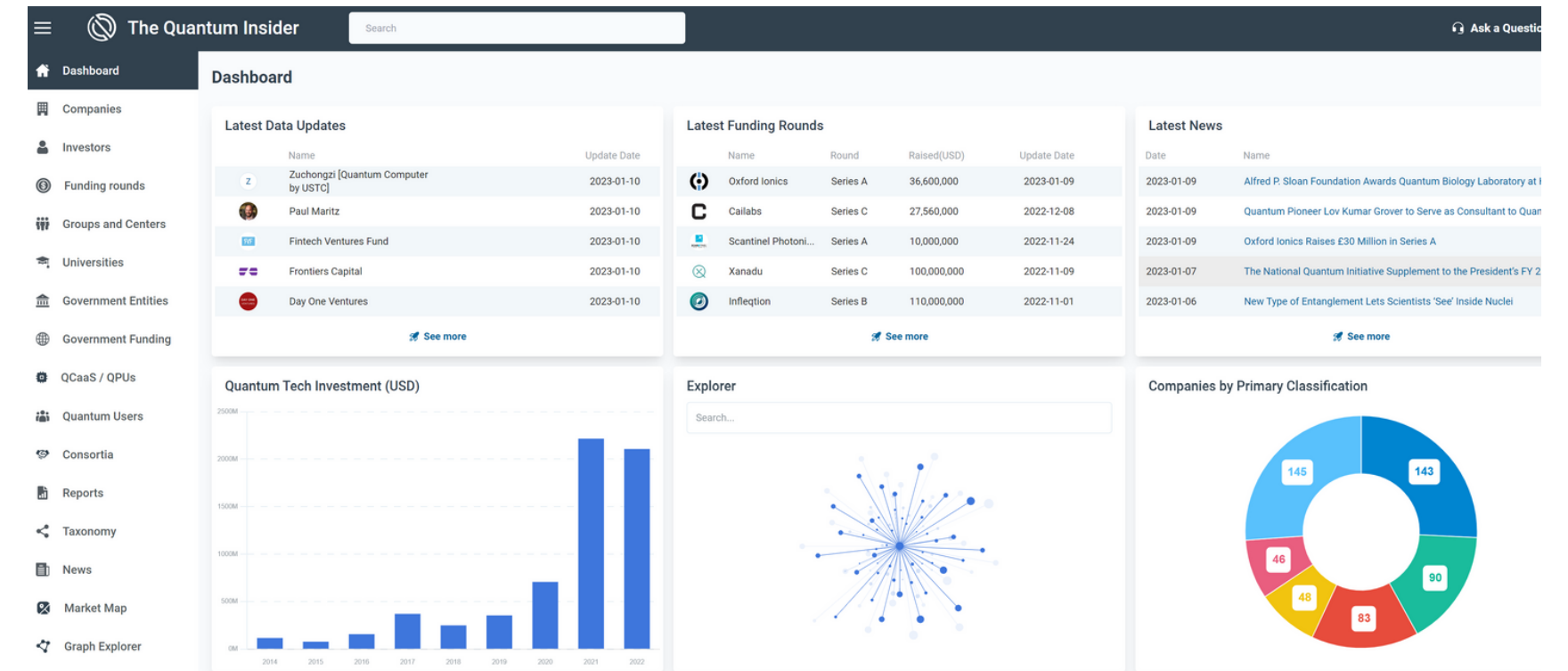
THE QUANTUM INTELLIGENCE PLATFORM

The leading provider of information, data, and insights on Quantum Technologies

OUR PLATFORM

The Quantum Insider collects and structures global data on quantum technologies and delivers this in a user-friendly platform.

Our platform helps investors, startups, corporations, accelerators, policy makers and governments gain a holistic overview of the quantum technology landscape.



Detailed data on companies, investors, academic groups, government institutions and more.



Proprietary taxonomy and customizable metadata.



Robust funding information that can be filtered by subsector and technology type.



Powerful visualization tools including our unique graph explorer and market mapping.

About the Platform



OUR FEATURES



CUSTOM TAXONOMY

We have applied our deep expertise in quantum technologies to carefully classify and segment all stakeholders across the ecosystem



ADVISORY

Our multidisciplinary team of experts help Start-ups, Multinational Corporations and Governments answer material questions and produce measurable value that is all underpinned by robust data



DUE DILIGENCE

Analyzing rapidly emerging technologies requires access to the latest and deepest information. Our platform provides you with myriad data points whether you need to source and evaluate investments, uncover competitive intelligence, or support your own products and services



MARKET INTELLIGENCE

The landscape of emerging technologies is constantly shifting. Our platform delivers deep analysis and reports, helping you to keep track of a complex, emerging industry and gain an edge over competitors



ECOSYSTEM

Our data covers more than companies and investors. We provide information on the wider quantum technology ecosystem including academic institutions, national labs and corporate end users



NEWS & MEDIA

News moves markets and changes industries. Get the latest industry news, reports and updates all powered by The Quantum Insider

OUR DATA



COMPANIES

900+ quantum technology companies (including computing, security, sensing, etc.)



INVESTORS

700+ investors who have been involved in quantum technology fundraises



FUNDING

500+ funding rounds since 2012



GROUPS & CENTRES

More than 400 groups / centres involved in quantum technology research



UNIVERSITIES

All universities involved in quantum technologies



GOV. ENTITIES

Over 30 national labs and list of government agencies



END USERS

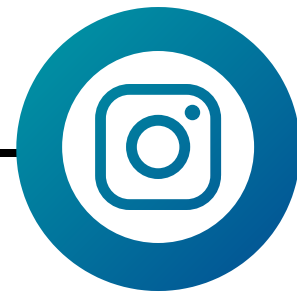
200+ end users of Quantum technology



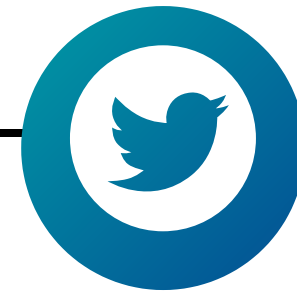
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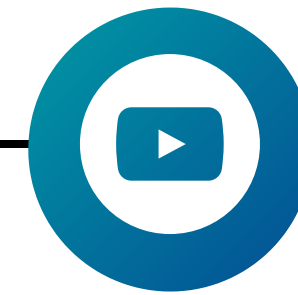
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