

**QUANTUM
TECHNOLOGIES**
Investment
Report

2023



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Introduction and foreword

The 2023 Quantum Technologies Investment Report is an annual report produced to outline the most significant funding trends in the quantum technologies market.

As quantum technologies grow in importance and find use in more and more practical applications, the quantum startup stage is getting wider. The huge potential of these technologies makes them an increasingly attractive target to invest in, visible in continuous investments made to support companies like that over the years.

The report shows insights into the investment landscape in the quantum technology field, investigating the main trends across different periods, geographies, and product focus. It allows actors interested in putting their funds into valuable companies to analyze the startup scene for an educated decision – What are other investors interested in? How much money is usually put into new companies? How does Europe compare to other global regions?

The report presents data collected in 2023.

By giving the investors an overview of the market, we want to support the engagement in the quantum sector. As Europe has the potential of being the world leader in these technologies, we need to make the investments informed and efficient. By giving the investors an overview of the market, we want to support the engagement in the quantum sector. The information presented could be also a guideline to young companies on their way towards private and public funding.

Let's dive into the quantum technology investment landscape together.

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Na Okraji 335/42
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Methodology

This report relies on a comprehensive collection of information primarily sourced from publicly available open platforms online. The validity and accuracy of the data have been verified by cross-referencing across multiple reputable information sources.

Prominent sources in this research include well-known platforms like The Quantum Insider, Crunchbase, and Infinity QD, among others. These platforms have been instrumental in providing valuable insights into the subject matter.

In instances where certain data is not publicly accessible, our team has accessed information from internal databases. Access to these databases involves subscription-based services, notably through resources such as AMIPLEXUS.

All numerical data and graphical representations featured in our analyses have been internally generated by our team of experts. The interpretations and insights presented in this report draw from the collective expertise of professionals associated with our quantum investment support activities.

The majority of graphs featured in the report highlight data concerning the number or amount of investments made in 2023. It's noteworthy to emphasize that the term "number of investments" denotes the quantity of investments made, whereas "amount" denotes the financial value of said investments.

Furthermore, even though thorough measures have been taken to minimize it, missing information may occur due to the reliance on publicly available sources. Considering the nature of the research, we remain confident that the minor missing details are unlikely to affect its overall findings and conclusions.



Key takeaways

The analysis made on the quantum startups that received private investment in 2023 revealed valuable insights and trends helpful for navigating the future of the industry. Here are some of the most notable findings.

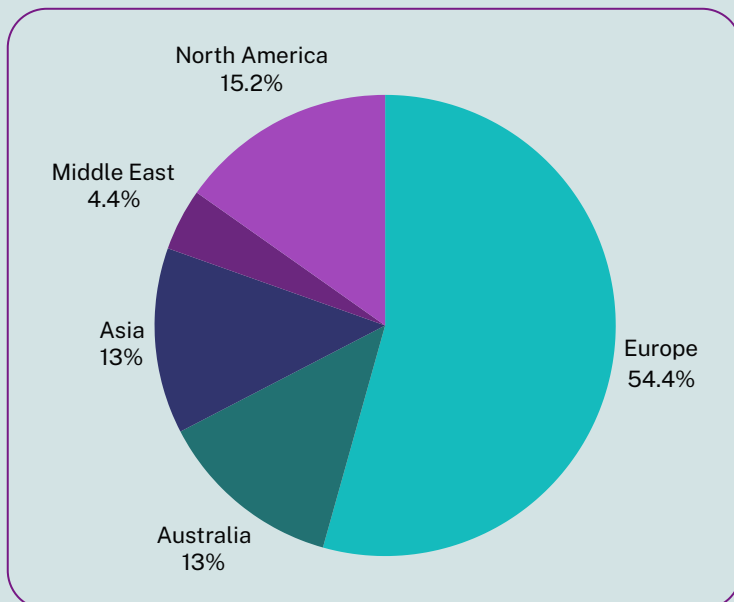
- 1.** Europe stands out for the notable prevalence of startups in the critical **pre-seed**, **seed**, and **round A** phases.
- 2.** In terms of technology, **silicon-based** qubits attract the highest private capital, with **neutral atoms** and **photonics-based** technologies following closely behind.
- 3.** **Quantum computing** emerges as the primary technology attracting the highest number of private deals, closely followed by **quantum communication**.
- 4.** The three most prevalent applications of the startups' products and services are within **pharmaceuticals**, **cybersecurity**, and **finance & banking**.



Geography and origin

Global investment leaders

More than **1/2** of global quantum investments in 2023 were made in European startups.



INVESTMENTS IN QUANTUM TECHNOLOGIES

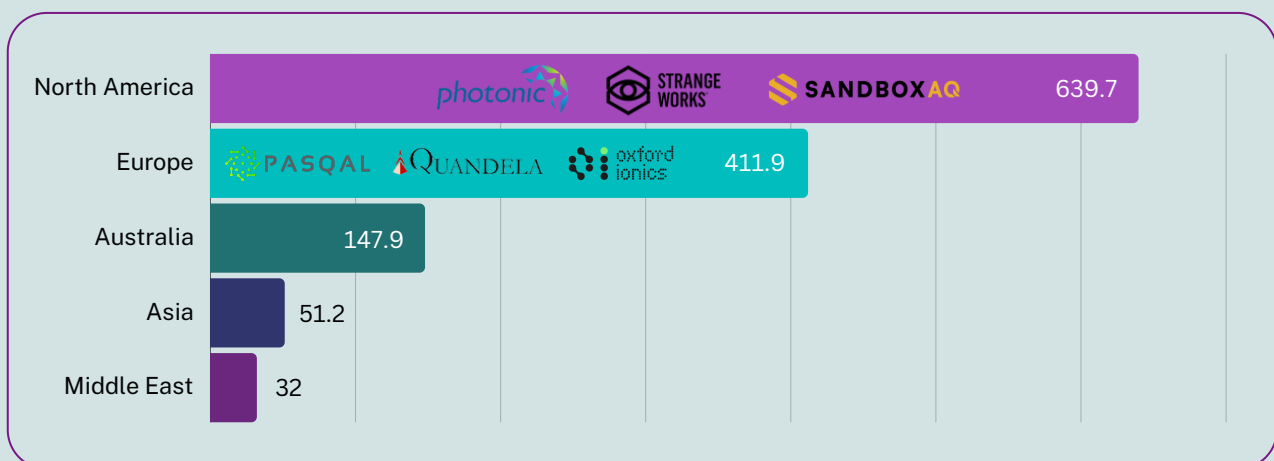
NUMBER BY THE STARTUP'S LOCATION
2023

Key insights

- Europe and North America have scored dominant positions in the field
- France, UK, Finland and The Netherlands have distinguished themselves through substantial investments in quantum technologies
- The main reason for Middle East's high score is Israel's growing tech startup scene and its active engagement in quantum technology field

INVESTMENTS IN QUANTUM TECHNOLOGIES

AMOUNT BY THE STARTUP'S LOCATION (\$MLN)
2023



The logos represent the companies that have received the most significant investments in 2023.

Expert says...

In North America, fewer companies were funded than in Europe, but the size of the investment rounds was larger. This represents probably deeper pockets from US investors and a slightly more mature marketplace.

Robert Harrison, Sonnenberg Harrison

Geography and origin

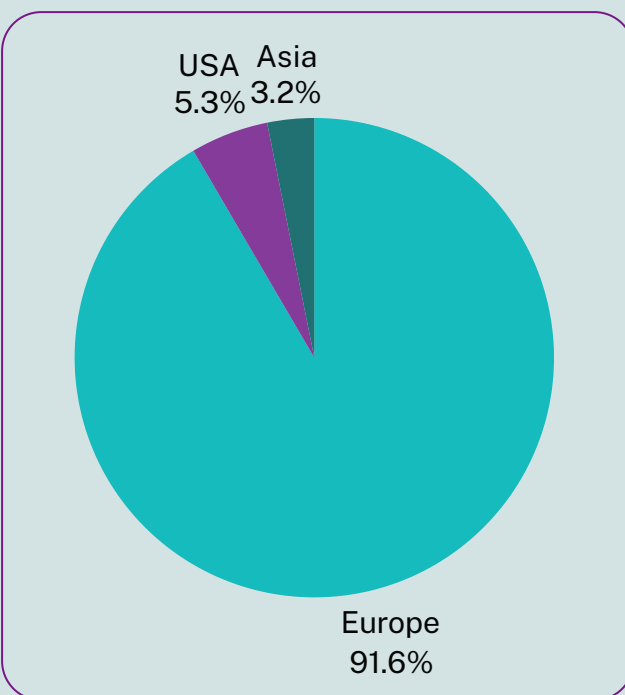
European startups' investment sources

WHO'S INVESTING IN EUROPEAN QUANTUM STARTUPS?

BY INVESTOR'S ORIGIN

2023

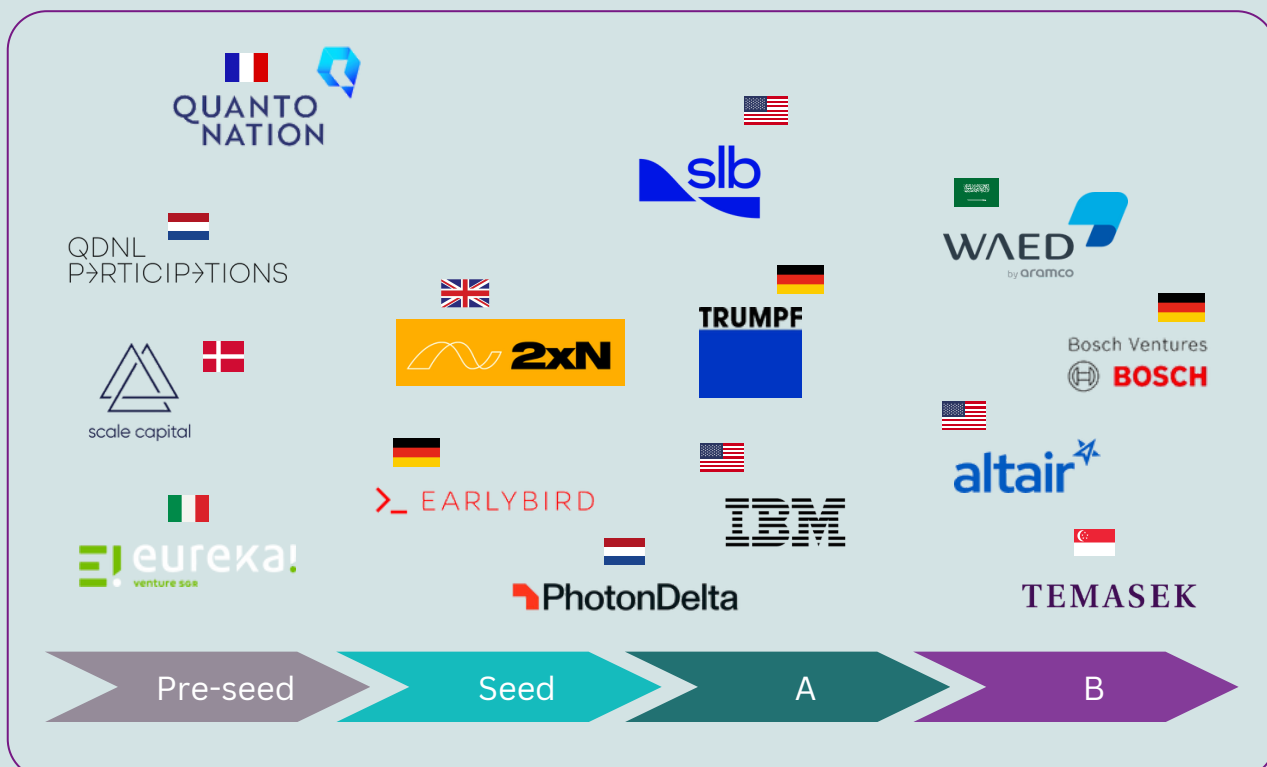
- European-based businesses are primarily supported by investors from within Europe, attracting minor investment from overseas
- European investors are the most active in supporting startups locally
- Series A sees the entry of American investors, and in series B, even Asian ones are engaged



The greater the maturity of the startup, the more support it gains from investors outside Europe.

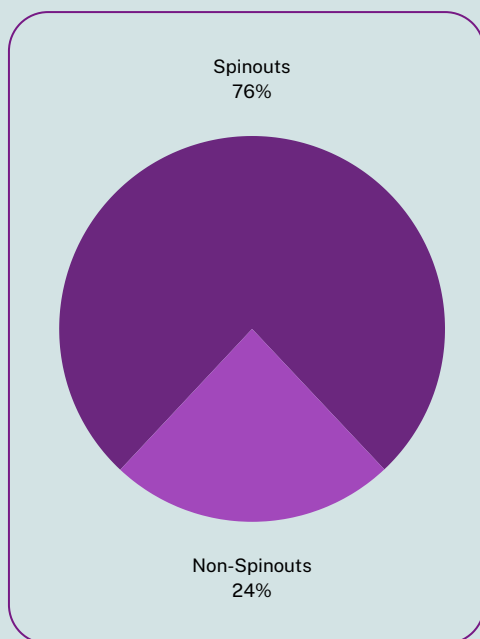
MAIN INVESTORS AND THEIR LOCATIONS PER SERIES

2023



Geography and origin

Startups born out of spinouts

NUMBER OF INVESTMENTS IN
QUANTUM TECHNOLOGIES
BY STARTUP ORIGINCOMPANIES THAT RECEIVED PRIVATE
INVESTMENT IN 2023

Key insights

- Most quantum technology startups are formed to commercialize their intellectual property developed in universities or research institutions into real-world products and services

Expert says...

University spinouts embody the fusion of academic excellence and business know-how. With robust intellectual property portfolios and access to top talent through academic affiliations, they're set up for success. By leveraging into expansive networks in research, industry, and funding, spinouts like PASQAL in quantum computing aren't just surviving — they're thriving, demonstrating their resilience and potential to revolutionize.

Audrey Durand, Institut d'Optique

76% of investments in Europe made in 2023 flowed into companies originating from **universities or research institutes**.

NUMBER OF EUROPEAN QUANTUM STARTUP SPINOUTS
BY COUNTRIES OF INSTITUTIONS

COMPANIES THAT RECEIVED PRIVATE INVESTMENT IN 2023

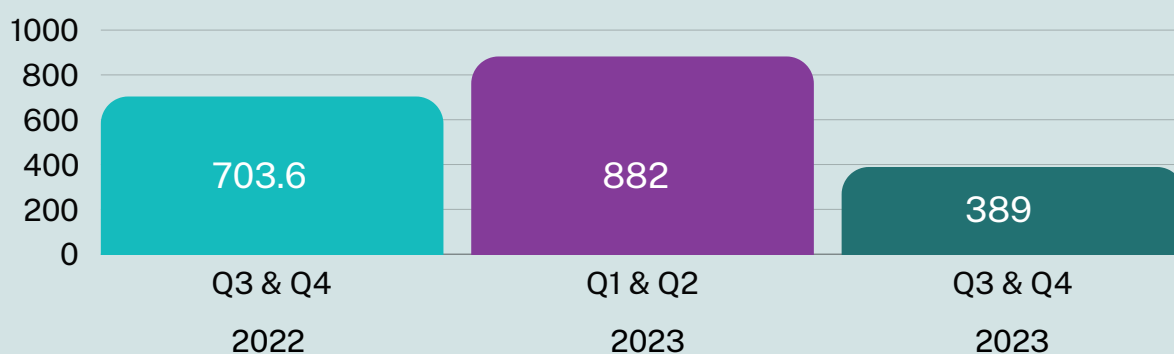


Geography and origin

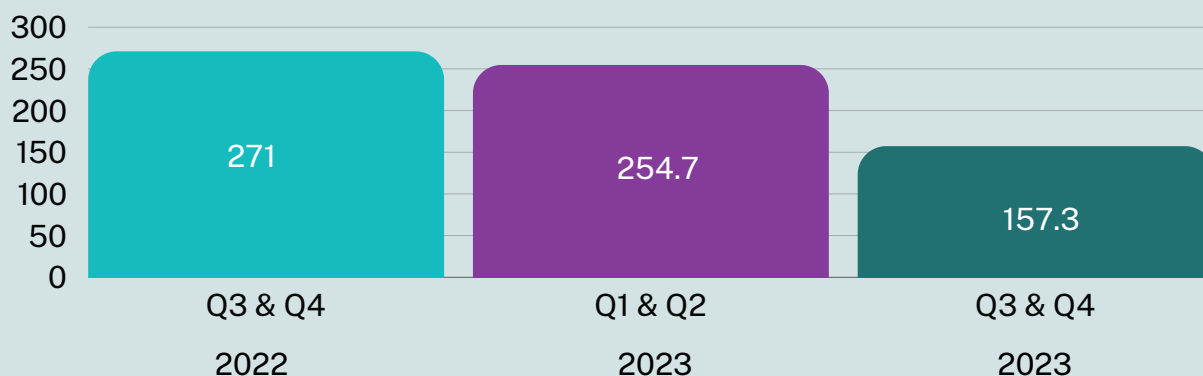
Investment autumn: in Europe vs global

There was a significant decrease in private venture capital flowing into quantum startups in 2023, representing a 50% decrease globally. The most substantial decline occurred in the United States, where investment numbers plummeted by approximately 80%.

TOTAL AMOUNT OF INVESTMENTS IN QUANTUM STARTUPS GLOBALLY (\$MLN)



TOTAL AMOUNT OF INVESTMENTS IN EUROPEAN QUANTUM STARTUPS BY QUARTERS (\$MLN)



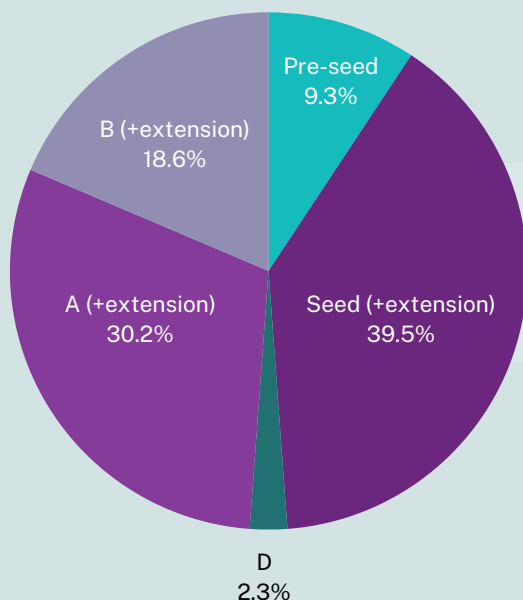
Expert says...

Despite a decrease in investment compared to 2022, Europe's quantum sector has proven to be resilient. This dip, though present, was milder than in other regions, showcasing the determination of European investors to navigate uncertainties with confidence.

Roman Pašek, AMIRES

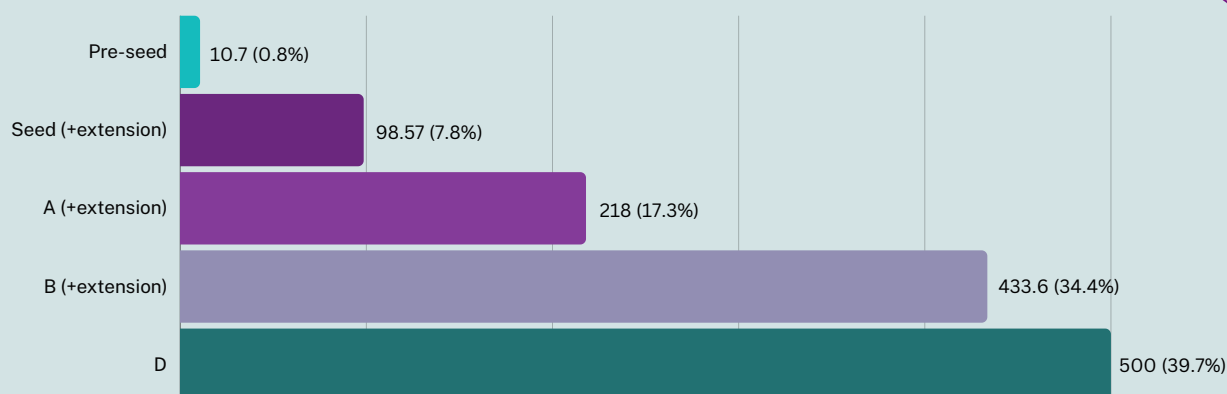
Deal type

Investments by investment series

NUMBER OF INVESTMENTS MADE IN QUANTUM STARTUPS IN 2023
GLOBALLY BY FUNDING ROUNDSAlmost
1/2of the reported total investments
in 2023 were made through **pre-seed** and **seed rounds**.

Key insights

- Pre-seed and Seed rounds, the early funding stages for startups, stood out, making up almost 50% of all investments
- Series A and their extensions collectively claimed over 30% of total investments, showing confidence in mature quantum ventures
- Series B and B extensions collectively captured 18.6% of investments
- Series D, though smaller in percentage (2.3%) held their ground, showcasing the significance of sustained support for an established quantum player

AMOUNT OF INVESTMENTS MADE IN QUANTUM STARTUPS IN 2023
GLOBALLY BY FUNDING ROUNDS (\$MLN)

Deal type

Participation in public funding programmes

AVERAGE AND MEDIAN NET CONTRIBUTION (€)
FROM PARTICIPATION IN EU PROGRAMMES, PER STARTUP

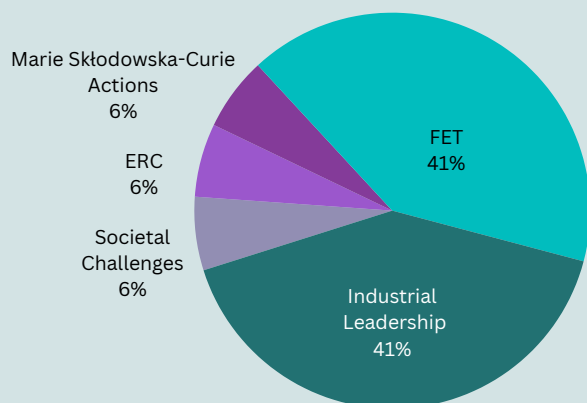
	HORIZON 2020	HORIZON EUROPE
AVERAGE	436 590	688 640
MEDIAN	212 850	333 210

Horizon 2020 (2014-2020) and Horizon Europe (2021-2027) are the EU's main research and innovation funding programs, aiming to enhance Europe's global competitiveness by supporting various research projects, including those in the quantum sector.

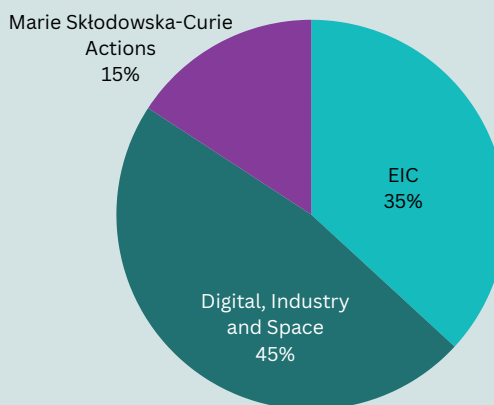
Key insights

- 22% of young European companies that secured private investment in 2023 have a history of contributions from major European public funds, collectively raising €23 MLN from Horizon 2020 and Horizon Europe programmes
- 52% of the projects identified fall under the newer Horizon Europe, still in the midst of its operational phase. More money is distributed to quantum startups than before, explained by the new programme's larger budget, but also by the growing interest in this kind of funding
- The funding amounts are also much higher. Under Horizon 2020 projects, startups received an average of €436,590 per project. Under Horizon Europe, this figure has risen, with companies now receiving an average of €688,640

HORIZON 2020



HORIZON EUROPE



Expert says...

Innovation in quantum technologies is capital-intensive. Consider, for example, the costs of manufacturing novel chips or using state-of-the-art cryogenic systems. The European Commission has provided a great help to fund the innovation ecosystem's development through collaborative projects. For SMEs, I consider the EIC accelerator grant a unique instrument that combines a substantial amount of funding with a high level of flexibility, required for a start-up in a fast-paced market.

Gabriele Bulgarini, TNO

Deal type

European companies to watch

These early-stage quantum technology companies in Europe have received pre-seed and seed funding in 2023.

From producing hardware to software, from quantum computing through communication to sensing, these startups are now equipped with resources to accelerate their research and development efforts.

EUROPEAN QUANTUM COMPANIES
THAT RECEIVED **PRE-SEED** OR **SEED** INVESTMENT
2023

PRE-SEED

Weling

MRS

Molecular
Quantum
Solutions

SemiQon™

Orange
Quantum
Systems

Planckian

SEED

Qubit
PHARMACEUTICALSKIPU
QuantumSparrow
Quantum

VeriQcloud

QUIX
QUANTUM

COLIBRI

Quantagonia

QUANSCIENT

QUANTUM DIAMONDS
SENSOR TECHNOLOGYiPRONICS
Programmable Photonics

QUANTUM

QuantrolOx

Let's monitor their progress in translating their funding into products - these are the players of the European future of quantum technologies!

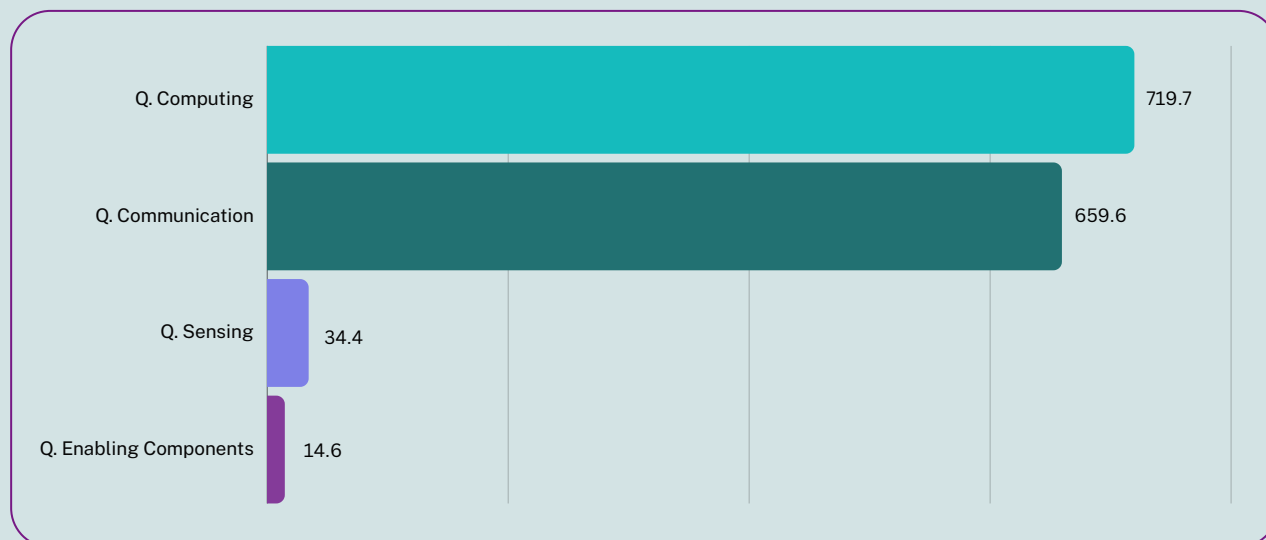
Product type

Technology domain

INVESTMENTS IN QUANTUM TECHNOLOGIES

AMOUNT BY TECHNOLOGY DOMAIN (\$MLN)

2023



Expert says...

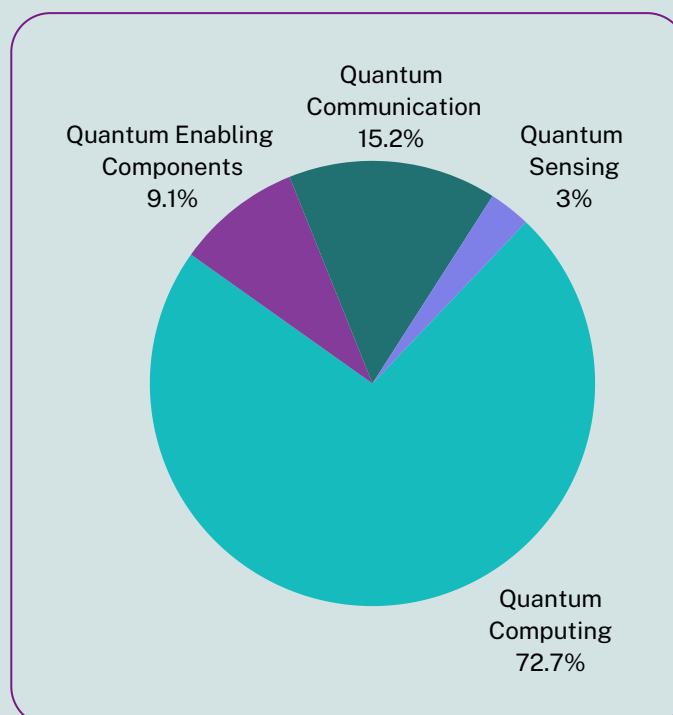
Despite quantum communication attracting a comparatively lower number of investments, the significant funding it has secured highlights its crucial role in shaping the future of secure and efficient information exchange. This difference in investment numbers underscores the recognition of quantum communication's potential impact, despite being in its early stages of development. Investors are keenly aware of the implications of secure quantum communication, given the massive quantities of data required to power AI systems and the rising value of data.

Audrey Durand, Institut d'Optique

INVESTMENTS IN QUANTUM TECHNOLOGIES

NUMBER BY TECHNOLOGY DOMAIN

2023



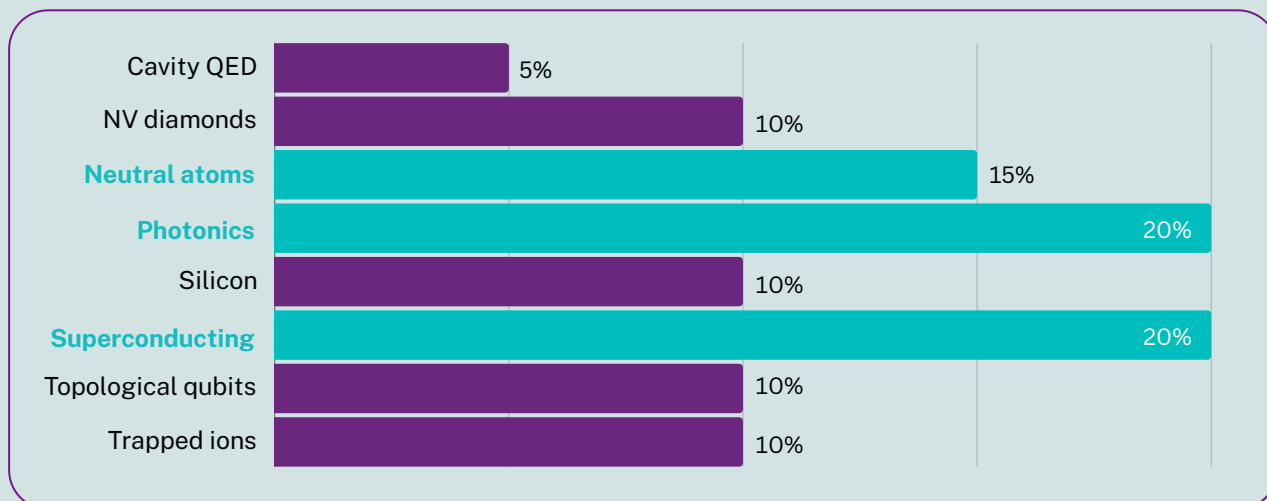
Product type

Quantum computing technologies

40% of the reported total investments in 2023 were made in startups focused on **photronics** and **superconducting**.

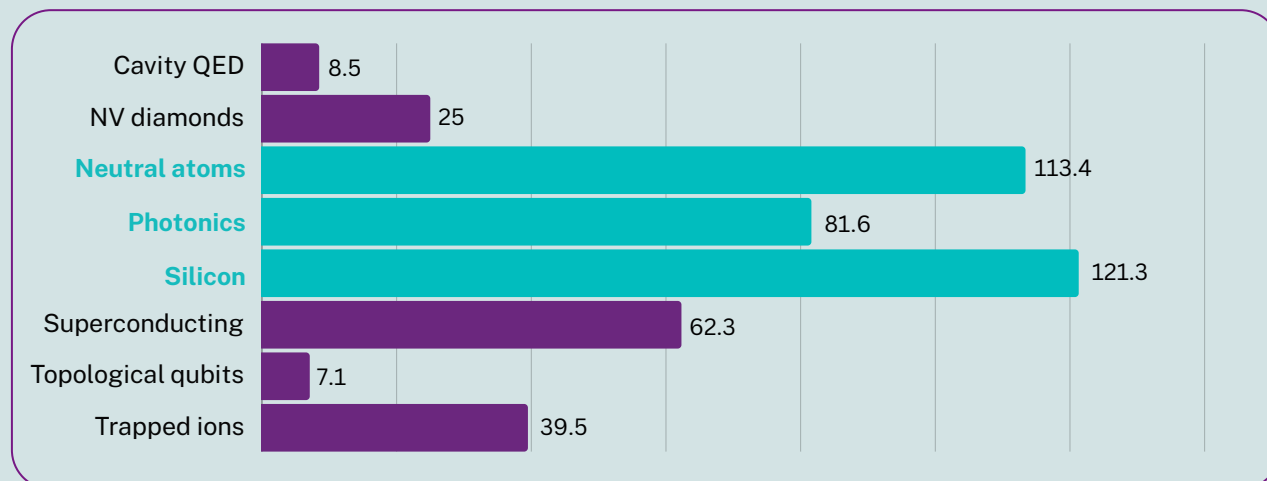
**NUMBER OF INVESTMENTS IN QUANTUM STARTUPS
BY THEIR HARDWARE'S QUBIT MODALITY**

2023



**AMOUNT OF INVESTMENTS IN QUANTUM STARTUPS
BY THEIR HARDWARE'S QUBIT MODALITY (\$MLN)**

2023



Expert says...

Photronics, neutral atoms and silicon-based technologies are well established in Europe and the physics is generally understood. So it's not surprising that investment into their quantum applications attracts substantial funds.

Robert Harrison, Sonnenberg Harrison

Product type

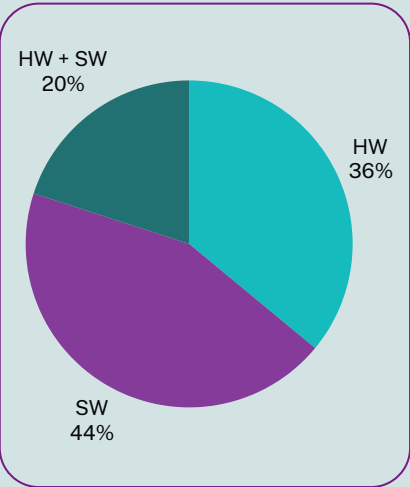
Category and industry

Where have investors been choosing to invest throughout the year?
We analyzed the investments made in various startups focused on quantum technologies in 2023 based on their focus - **hardware**, **software** or **hybrid** of both.

Many companies invest in startups integrating both hardware and software.

20%

of the investments were made in the startups combining these two, supporting their symbiotic relationship.



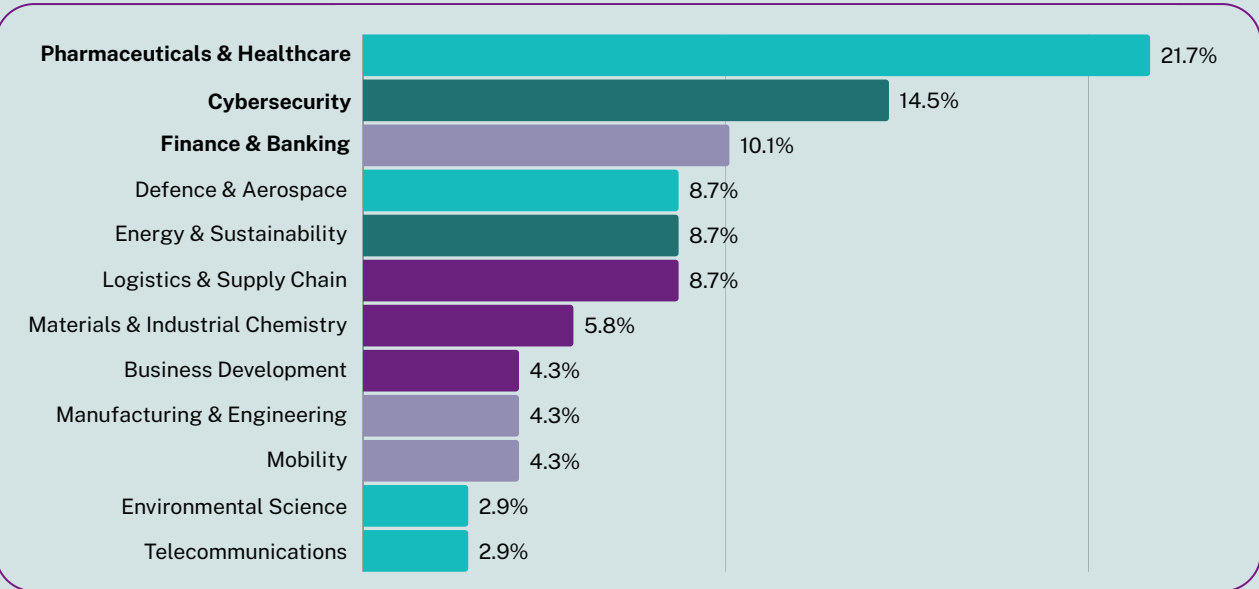
Key insights

- Almost half of the investments were secured by companies producing software products, highlighting the importance of services harnessing the full potential of quantum systems
- Investments solely in hardware followed with over one-third of the investments supporting the development of hardware processors
- While the number of software-focused startups is increasing faster than any other segment of the quantum computing value chain, it is quantum hardware that tends to collect the largest single investment deals

Quantum practicality is gaining traction in investments, emphasizing the need for practical applications and presenting stakeholders with real-world use cases, as investors look for tangible ways quantum technologies outperform classical computers. Amidst the diverse range of applications, certain industries have emerged as prime targets for startups that secured funding in 2023.

NUMBER OF INVESTMENTS BY INDUSTRY

2023



Investor profiles

One of our goals is to build relationships with investors and businesses to direct funding into promising companies best suit the investor profiles. By understanding the unique perspectives and criteria of each investor, we aim to facilitate meaningful partnerships that align with their objectives and contribute to the advancement of quantum companies.

To be featured in the forthcoming edition of the report, kindly reach out to us with your investment focus and relevant information.

The investors mentioned herein have not taken part in the creation or approval of the report's content. Therefore, they are not held responsible for the accuracy of the information presented.

**Tensor
Ventures**

www.tensor.ventures

Quantonation

www.quantonation.com

**Voima
Ventures**

www.voimaventures.com

HTGF

www.htgf.de

**Eureka!
Ventures**

www.eurekaventure.it

**Redstone
QAI Ventures**

www.redstone.vc

PhotonVentures

www.photonventures.vc

**Vigo
Ventures**

www.vigo.ventures

Investor profiles

INVESTOR PROFILE

Tensor.Ventures

TECHNOLOGY FOCUS

- Quantum Technologies
- Digital AI
- Computational Biotech
- Cybersecurity
- Future of Computing
- Spacetech
- Energy&Climate Tech
- Advanced Physics

BASE

- Pre-revenue
- Revenue

LOCATION

Europe, Global

LOOKING FOR

- Product market fit
- Team over maturity
- Uniqueness of the solution

SERIES

- Pre-seed
- Seed

AMOUNT

EUR 500K - 1.5 MLN

WEBSITE

www.tensor.ventures



QU-TEST & QU-PILOT

INVESTOR PROFILE

**QUANTO
NATION**



TECHNOLOGY FOCUS

- Quantum Technologies
- Deep Physics

BASE

- Pre-revenue
- Revenue

LOCATION

Global

LOOKING FOR

- Early-stage companies out of the best physics labs

SERIES

- Pre-seed
- Seed
- Round A
- Round B

AMOUNT

EUR 500K - 15 MLN

WEBSITE

www.quantonation.com



QU-TEST & QU-PILOT

Investor profiles

INVESTOR PROFILE



TECHNOLOGY FOCUS

- Green transformation
- Exponential health technologies
- Platform technologies (e.g. quantum computing and AI)

LOCATION

Europe, Nordics and Baltics

LOOKING FOR

- Disruptive innovations backed by science
- Founders & entrepreneurs with high ambition level and strong track record

SERIES

- Pre-seed
- Seed
- Early Series A

AMOUNT

EUR 500K - 2 MLN

BASE

- Pre-revenue
- Early revenue

WEBSITE

www.voimaventures.com



INVESTOR PROFILE



TECHNOLOGY FOCUS

- Sector agnostic

LOCATION

Germany, Europe

SERIES

- Pre-seed
- Seed

LOOKING FOR

- Strongly differentiated Tech-Start-Ups
- Scientific Breakthroughs
- Product-Market-Fit

AMOUNT

EUR 500K - 1 MLN

BASE

- Pre-revenue
- Revenue

WEBSITE

www.htgf.de



Investor profiles

INVESTOR PROFILE



TECHNOLOGY FOCUS

- Deep tech investments in energy, health and wellness, mobility and environment
- With innovation underpinned by advanced materials

BASE

- Pre-revenue
- Revenue

LOCATION

Italy, Europe

LOOKING FOR

- Dedicated and bold teams capable of bringing disruptive advanced materials innovations to global markets

SERIES

- Pre-seed
- Seed
- Round A
- Round B

AMOUNT

EUR 500K - 3 MLN

WEBSITE

www.eurekaventure.it



QU-TEST & QU-PILOT

INVESTOR PROFILE



TECHNOLOGY FOCUS

- Quantum Computing
- Quantum Communication
- Quantum Sensing
- Quantum-enhanced AI & ML

BASE

- Pre-revenue
- Revenue

LOCATION

Europe, Global

LOOKING FOR

- Technically excellent and balanced team
- Unique product
- Route to commercialization

SERIES

- Pre-seed
- Seed
- Round A

AMOUNT

EUR 500K - 2 MLN

WEBSITE

www.redstone.vc
www.qai-ventures.com



QU-TEST & QU-PILOT

Investor profiles

INVESTOR PROFILE

PHOTON
VENTURES

TECHNOLOGY FOCUS

- Integrated photonics solutions including quantum applications
- Data/Telecom, Medical/Healthcare, Engineering & Transport, Food & Agriculture

SERIES

- Seed
- Round A

AMOUNT

EUR 500 K - 5 MLN

BASE

- Pre-revenue
- Revenue

LOCATION

Europe

LOOKING FOR

- Applications with integrated photonics technology
- MVP ready
- Global market potential
- Complementary team

WEBSITE

www.photonventures.vc



QU-TEST & QU-PILOT

INVESTOR PROFILE

VIGO
VENTURES

TECHNOLOGY FOCUS

- Photonics
- Semiconductors
- Quantum Technologies

SERIES

- Pre-seed
- Seed

AMOUNT

Deal size with follow-on:
EUR 200K - 1.5 MLN
Growth follow-on PE
partner possibility:
up to EUR 10 MLN

BASE

- Pre-revenue
- Revenue

LOCATION

Europe, USA, Canada

LOOKING FOR

- First VC round
- Photonics (HW or HW+SW)
- IP driven
- TRL 4/5

WEBSITE

www.vigo.ventures



QU-TEST & QU-PILOT

Where does it lead us?

Now, armed with these findings, our commitment is to enhance and streamline the European quantum landscape. Our mission is clear: to propel the industry forward through strategic initiatives delineated across three essential steps:

01

Attract and connect

Attract and unite investors with publicly funded resources, forging connections between the worlds of public and private funding, recognizing their potential to complement each other.

02

Introduce

Introduce investor profiles to highlight businesses aligned with their specific focus and objectives. If you're an investor eager to connect with promising quantum startups and would like to be featured in our LinkedIn or upcoming report, please reach out to us.

03

Promote

Promote the upcoming Open Calls, where private companies can receive support from the Qu-Test and Qu-Pilot projects.

Be sure to follow our [website](#) and [LinkedIn](#) to not miss out on the Open Calls announcements.

- ✉ info@qu-test.eu
- ✉ info@qu-pilot.eu
- 🌐 www.qu-pilot.eu
- 🌐 www.qu-test.eu
- in [QU-TEST & QU-PILOT](#)



About Qu-Test and Qu-Pilot Projects



QU- TEST

The Qu-Test project aims to create a network of quantum technology testing and experimentation service providers across Europe. The project aims to upgrade, upscale and integrate the testing and experimentation infrastructures and associated processes for quantum technologies. The objective is to create open-access distributed testing and experimentation infrastructure to make quantum technology facilities and associated services available to clients in all 27 EU countries. The target is to validate the relevance of the testbed service offering and the robustness of the Single-Entry-Point processes through the implementation of industrial use cases.

1st Project kick-off in April 2023

Budget: 19 M€
Duration: 3.5 years
Coordinator: TNO (NL)

Project Coordinator
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Project Manager
Stefania Pavel
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QU- PILOT

The Qu-Pilot project aims to leverage existing piloting infrastructure across Europe to support the growing European quantum technology industry. The project seeks to establish RTO-driven pilot facilities that will be well-networked and interact with each other. The end goal is to accelerate the time-to-market of European industrial innovation in quantum technology and establish a trusted supply chain. Besides, Qu-Pilot envisions developing practical strategies in synergy with European academic and industrial players to provide the quantum ecosystem with a 'one-stop-shop' offering unique facilities, competencies and know-how available in Europe.

1st Project kick-off in April 2023

Budget: 19 M€
Duration: 3.5 years
Coordinator: VTT (FI)

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AMIRES, The Business Innovation Management Institute (ABIMI)

ABIMI specializes in the management of national and international research, development, and innovation projects, focusing on new materials, production processes, information technologies, healthcare, energy, and environmental sustainability. We offer consulting services to enhance the quality of life and competitiveness across Europe. We promote funding opportunities, disseminate information, organize events, and publish activities related to our core areas of expertise. Additionally, we offer storage and processing of data from research projects, along with research and development of innovative data acquisition, processing, and visualization methods to further improve quality of life and competitiveness in our regions of operation.

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Institut d'Optique

The Institut d'Optique is a state-approved private institution bringing together research, teaching, innovation, business creation, consulting, and industrial valorization. We transfer knowledge and develop science and technology with a focus on photonics, with complementary missions from education to research and innovation. We deliver high-level education through a master's degree in engineering and offer a research lab with academic and industrial partners, service platforms, and technology transfer assistance. The Institute hosts many joined R&D laboratories with industry and participate in creation of 2-4 start-ups per year in deep tech and photonics. We are coordinating the Naquidis quantum innovation hub, focusing on 3 pillars of quantum technology: sensing, computing, and information enabling technologies.

Audrey Durand

Hub Manager Naquidis Center

Sonnenberg Harrison

Sonnenberg Harrison is an internationally oriented, medium-sized intellectual property law firm, which advises clients from all parts of the world in matters of intellectual property rights and technology law from its locations in Europe. Providing sound legal advice is second nature to us, but first of all, we think in an entrepreneurial way. It is not about being right, but about ensuring the success of our clients. We pride ourselves on recommending legal strategies that serve the goals of the scientists and the entrepreneurs that we work with.

Robert Harrison

Partner & Patent Attorney