

Intrepid enterprises are bullish on quantum as a service ROI

Article

The trend: With about **\$30 billion** already spent on the effort, over **600** companies globally are racing to unlock the full commercial potential of quantum computing, according to Quantum Insider, per [The New Yorker](#).

Uncertainties about the technology's potential hasn't stopped public and private sector organizations from investing in quantum computers in their messier, intermediate current

stage.

- That's because patient, risk-tolerant enterprises are willing to deal with quantum computers' current error-prone state. They have been able to eke out increasing insights and performance gains in areas like cybersecurity, optimization problems, and simulations.
- These early adopters are expected to help push the **global quantum computer market to expand by 497% between 2022 and 2028**, per [Yahoo](#).

Who stands to gain? Machine learning (ML) researchers, the financial sector, supply chain managers, and those in the many fields that depend on computer modeling are currently the [top beneficiaries of quantum computers](#).

- Quantum computers are already having tangible results in cybersecurity and the development of cutting-edge materials and pharmaceuticals.
- Companies like **JP Morgan Chase**, [Ally Financial](#), **BMW**, **Toyota**, [Hyundai](#), **Airbus**, **Fujifilm**, **SoftBank Mobile**, **Vodafone Business**, and many others have grasped quantum's potential and have been hiring, partnering, and investing to build quantum capabilities.
- **There's robust interest among enterprises who are dreaming up new use cases for the technology to drive revenue and efficiency** and lower time to market to help them get a competitive edge over rivals.

Quantum computers are a double-edge sword for cybersecurity: One of the best current use cases for quantum computers is cybersecurity.

- [Mounting cyberattacks](#) globally are putting economic, social, and infrastructure systems at increasing risk of collapse, and governments and companies are opening their wallets for tech solutions to the problem.
- This bodes well for a quantum industry that's **making the strongest encryption keys against classical breaches available** to organizations like governments, financial and healthcare institutions, and those with sensitive intellectual property.

Yet as quantum computers become more powerful, they are getting closer to becoming a potentially catastrophic global cybersecurity threat.

- Groups like the US federal government and the [Cloud Security Alliance \(CSA\)](#) are ramping up to prepare for [Y2Q](#)—the day when a quantum computer breaks classical encryption

frameworks.

- Enterprises are concerned. **Half of 400 cybersecurity professionals surveyed by Deloitte said their organization is at risk from “harvest now, decrypt later” quantum attacks, per [Infosecurity](#).**

The AI-quantum feedback loop: The convergence of innovation in AI, high-performance computing, and quantum computers will likely be a crowning achievement of the Fourth Industrial Revolution.

- 2022 has witnessed an explosion of progress in ML and [generative AI](#) that could bring economic windfalls for many sectors.
- Yet many experts foresee that classical computing performance gains are approaching the limits of progress relative to cost and efficiency.

Quantum computers can process data faster. **This could make them an AI accelerator by speeding up unstructured search performance, which would be useful for enhancing tools like [ChatGPT](#).**

- Additionally, quantum computers are well-suited to transcending the limitations of natural language processing (NLP).
- “We’re devoted to the field of **quantum natural language processing (QNLP)**, said Quantinuum president and COO **Tony Uttley**. “Language itself is quantum native. Using quantum computers to understand how language is structured allows AI to infer meaning, whether it’s spoken languages or biological languages like RNA.”
- Quantum computers could amplify AI’s creative abilities and pave the way to achieving [artificial general intelligence \(AGI\)](#), while at the same time heightening [AI’s adversarial potential](#).

Quantum’s big HR problem: The sector suffers from a [lack of skilled quantum professionals](#) who have historically been those with advanced physics degrees.

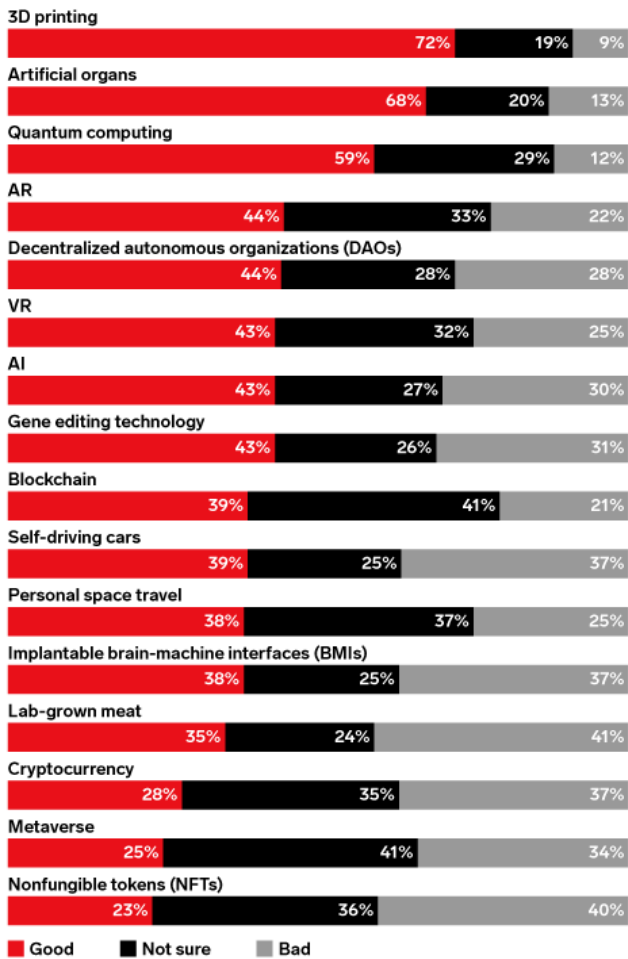
- Although engineers are entering the arena, some are finding that their lack of educational background in quantum mechanics is a barrier to understanding the technology.
- **Only one qualified candidate is available for every three quantum job openings, according to a [McKinsey](#) report.**

The outlook 2023 and beyond: It's difficult to predict how quickly the [commercial quantum computing industry](#) will expand.

- Over the next 18 months, expect more quantum computers to become commercially available via the cloud and a broader array of use cases to emerge.
- **The quantum as a service (QaaS) trend bodes well for public cloud providers and helps lower the barriers to entry into the field**, which will continue even after on-premises quantum computers become commercially available.
- Demand will likely become robust for hardware and software that integrate quantum and classical computers to help maximize quantum's current capabilities by offloading some of the work to classical machines, and vice versa.
- Despite a [possible recession in 2023](#), funding will continue to funnel into the sector.

US Adults Who Think Select Emerging Technologies Will Be Good vs. Bad for Society, April 2022

% of respondents



Note: ages 18+; numbers may not add up to 100% due to rounding
 Source: YouGov as cited in company blog, April 27, 2022

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