

QIR

Quantum
Index Report
2025

MIT INITIATIVE ON THE DIGITAL ECONOMY

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► Interactive website and public data

The Quantum Index Report 2025 is accompanied with interactive tools available on our website (qir.mit.edu) and we share our raw data with the community available to download from our website (qir.mit.edu/data).

In memory of Shawneric Hachey, whose unique talent and dedication shaped the way this project is presented today.



Center for Quantum Networks
A National Science Foundation Engineering Research Center



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▶ Team

Jonathan Ruane, Principal Investigator and Editor-in-Chief
MIT Sloan School of Management
MIT Initiative on the Digital Economy

Elif Kiesow, Senior Researcher and Project Manager
MIT Initiative on the Digital Economy

Johannes Galatsanos, Researcher
MIT Initiative on the Digital Economy

Carl Dukatz
Accenture

Edward Blomquist
Accenture

Prashant Shukla
Accenture



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6 | Workforce

The quantum technology sector faces a critical challenge in developing and maintaining a qualified workforce to support its continued advancement. Occupations often require a combination of theoretical knowledge and practical expertise, making it challenging for employers to find candidates with the right mix of skills and acumen.

Major nations understand that establishing and nurturing a critical mass of quantum talent is a priority and have responded by developing comprehensive strategies to address these needs. The United States has established the National Quantum Initiative¹ (NQI), which includes dedicated funding for quantum workforce development and coordinates efforts across academia, industry, and government sectors. Investment in NQI Act-authorized activities alone exceeded \$2.5 billion from 2019 to 2024.²

In addition to the NQI, the CHIPS and Science Act³ included specific provisions for better evaluating quantum workforce needs and initiatives to drive quantum curriculum development and leadership.

Similarly, many other countries such as Canada⁴ and Australia⁵ have launched national quantum strategies specifically emphasizing workforce expansion and talent development. These initiatives recognize that developing quantum expertise should not only focus on technical training, but that it also requires creating an entire ecosystem of quantum-savvy professionals who can bridge the gap between research and practice.

The “quantum-as-a-service model” is enabling wider access to quantum computing resources which supports relatively low cost experimentation and drives skills development in the area.

In 2025, the European Commission announced the Digital Europe work program for 2025-2027, which includes the establishment of a Quantum Digital Skills Academy with the aim of closing the talent gap and strengthening the pool of specialists. The indicative budget for the academy was announced as €10 million.⁶

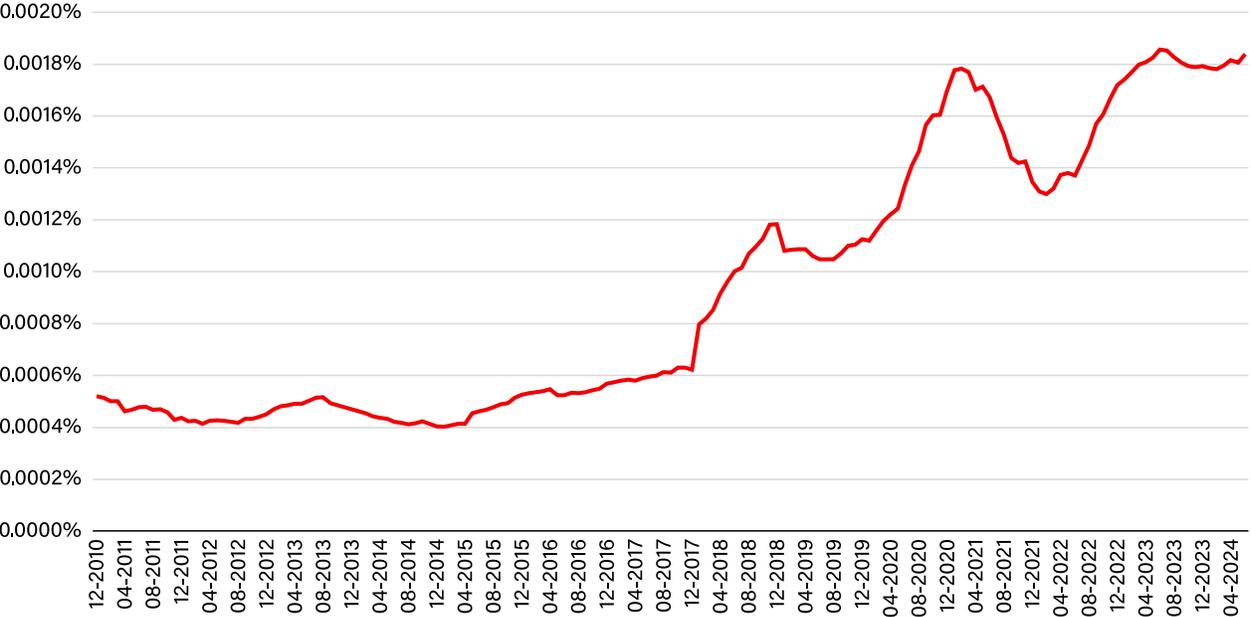
In recent years the United States has created more quantum job openings than can be filled⁷, with the variety of roles related to quantum expanding in academia, industry, national labs, and government. The opportunities range⁸ from highly specialized jobs (e.g. error correction scientist or quantum algorithm developer) to occupations requiring a range of skills, most of which are not quantum related (e.g. business development for quantum computing firms).

The educational infrastructure supporting this growth includes the establishment of quantum hubs at universities and research institutes, specialized training programs connecting business managers with leading quantum researchers, and integration of quantum education into existing academic frameworks. The “quantum-as-a-service model” is enabling wider access to quantum computing resources that supports relatively low-cost experimentation and drives skills development in the area.

6.1 | Quantum skills in job postings

▶ The US labor market has shown relatively steady growth in demand for quantum skills since 2018.

US job postings requiring “quantum” skills as share of total job postings, 2011 to mid-2024



Based on the Lightcast data on US job postings requiring “quantum” skills as a share of total job postings from 2011 to mid-2024, the share of quantum skills in job postings has grown almost three times.

The data shows three distinct phases in the evolution of quantum skills demand. The initial period from 2010 to 2017 was characterized by limited growth. This was followed by an acceleration beginning in 2018, when the share almost doubled over a two-year period. Since 2021, the growth has stabilized into a more moderate but consistent upward trend, with occasional fluctuations becoming more pronounced.

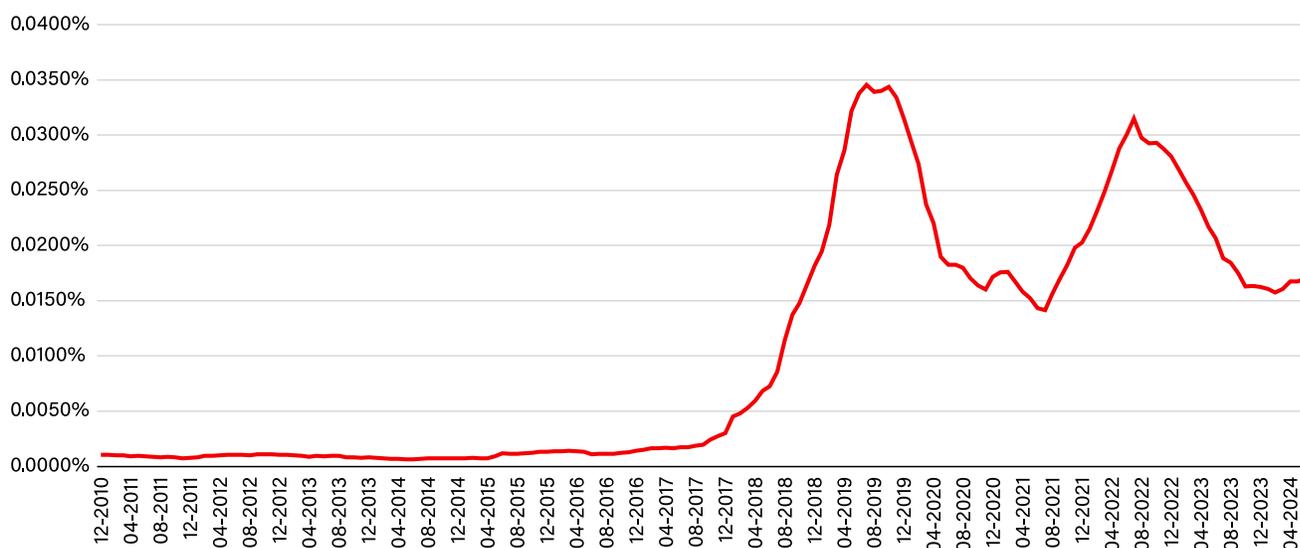
Seasonal patterns seem to emerge as a significant feature of the data, with consistent quarterly variations. The highest shares of quantum skills in job postings occur during the second and third quarters of each year, while the first and fourth quarters typically show lower shares. This seasonal amplitude suggests a regular cyclical pattern in hiring demand.

The peak growth rate occurred in 2020, and while rates have since moderated, the data shows consistent upward movement, indicating sustained growth in quantum skills demand. The overall trend demonstrates the increasing importance of quantum skills in the labor market.

6.2 | Quantum skills in job postings

- ▶ US job postings with mentions of "quantum" began to rise rapidly in 2018 before peaking in 2019. There is no evidence of sustained growth in quantum demand versus the overall labor market (which was very robust in 2021-2024).

US job postings with mentions of "quantum" as share of total job postings, 2011 to mid-2024



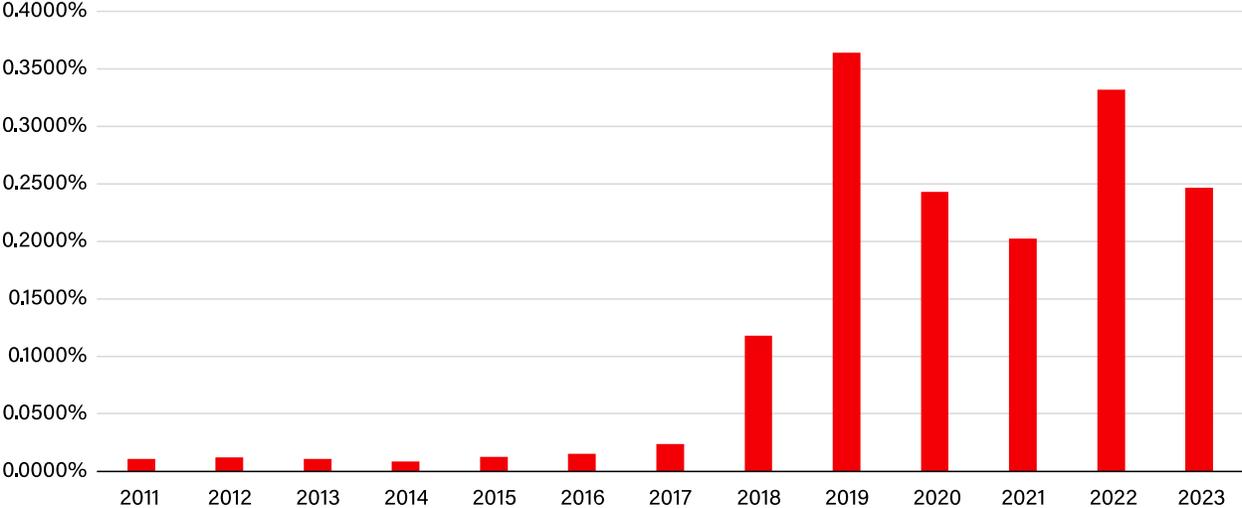
The Lightcast dataset of US job postings mentioning "quantum" spans from 2011 to mid-2024, encompassing monthly observations. The temporal pattern revealed three distinct phases in quantum workforce demand. Initially, from 2011 to 2017, the market showed remarkable stability. This early period demonstrated minimal volatility. However, beginning in 2018, the landscape underwent strong transformation, marked by increased growth that continued through 2019. During this period, quantum job postings reached their peak share in July 2019, representing a significant increase from the early period baseline.

More recently, from 2020 onward, the market has entered a phase of stabilization and moderate adjustment. While experiencing some decline from the 2019 peak, quantum-related job postings have maintained levels significantly higher than the pre-2018 era. Current figures have stabilized in the early months of 2024.

These monthly patterns suggest that quantum-related hiring typically peaks during summer months and follows a quarterly cycle with highest activity in Q3. However, it's important to note that while these trends exist, they are relatively modest compared to the overall growth trend in quantum job postings over time.

Throughout the entire period, despite fluctuations, the overall trajectory indicates sustained growth in quantum workforce demand—suggesting continued expansion in the field's employment opportunities.

US job postings share mentioning “quantum” by year, 2011-2023



6.3 | Future research

We aim to continue to track this data to generate insights into the ongoing trends with the aim of better informing the community on important workforce developments. The Lightcast data we gathered suggested the quantum skills library could benefit from ongoing updates as this is a dynamic field where new job descriptions and technical requirements are continuously added. Please reach out if you are interested in collaborating on skills libraries, new resources to monitor, or the creation of additional datasets internationally.

You can reach us at contact@qir.mit.edu.

► Footnotes

¹ 115th Congress, 'H.R.6227 - National Quantum Initiative Act' (21 December 2018) <<https://www.congress.gov/bill/115th-congress/house-bill/6227/text>> accessed 3 April 2025.

² National Science and Technology Council, 'National Quantum Initiative Supplement To The President's Fy 2025 Budget'

³ 117th Congress, 'H.R.4346 - 117th Congress (2021-2022): CHIPS and Science Act' (9 August 2022) <<https://www.congress.gov/bill/117th-congress/house-bill/4346>> accessed 14 November 2024.

⁴ Government of Canada, 'Canada's National Quantum Strategy' (Innovation, Science and Economic Development Canada 2025) <<https://ised-isde.canada.ca/site/national-quantum-strategy/en/national-quantum-strategy-roadmap-quantum-computing>> accessed 3 April 2025.

⁵ Department of Industry Science and Resources, 'National Quantum Strategy' (2023) Strategy or plan <<https://www.industry.gov.au/publications/national-quantum-strategy>> accessed 3 April 2025.

⁶ 'Commission to Invest €1.3 Billion in Artificial Intelligence, Cybersecurity and Digital Skills | Shaping Europe's Digital Future' <<https://digital-strategy.ec.europa.eu/en/news/commission-invest-eu13-billion-artificial-intelligence-cybersecurity-and-digital-skills>> accessed 3 April 2025.

⁷ National Science and Technology Council, 'Quantum Information Science And Technology Workforce Development National Strategic Plan' (2022).

⁸ Ciaran Hughes and others, 'Assessing the Needs of the Quantum Industry' (arXiv, 25 August 2021) <<http://arxiv.org/abs/2109.03601>> accessed 3 April 2025.

11 | Appendix

Chapter 6 | Workforce

This data was gathered by Accenture and sourced from Lightcast. Lightcast integrates economic, labor market, demographic, education, profile, and job posting data from dozens of government and private-sector sources, creating a comprehensive and current dataset that includes both published data and detailed estimates with full United States coverage. Further information on Lightcast data sources available [here](#).

The following keywords were used in our Lightcast database searches:

Quantum skills keywords: Quantum Gates, Heteronuclear Single Quantum Coherence Spectroscopy, Heteronuclear Multiple Quantum Coherence, Quantum Link, Quantum Mechanics/Molecular Mechanics (QM/MM), Quantum Point Contact, Quantum Phase Transition, Quantum Dynamics, Quantum Imaging, Quantum Technology, Superconducting Quantum Interference Device (SQUID), Amazon Quantum Ledger Database (QLDB), Quantum Cryptography, Quantum GIS (QGIS), Quantum Scalar Servers, Quantum Chemistry, Quantum Mechanics, Quantum Physics, Quantum Information Sciences, Quantum Computing, Quantum Dots, Quantum Information, Quantum ESPRESSO.

Quantum mentions keywords: quantum computer quantum computing quantum supremacy quantum entanglement quantum superposition quantum bit qubit topological qubit silicon spin qubit quantum advantage quantum simulation quantum machine learning quantum optimization quantum chemistry optical quantum computing gate model quantum computing photonic quantum computer quantum dots superconducting quantum computer trapped ion quantum computer quantum annealing quantum as a service quantum cloud post-quantum cryptography PQC quantum algorithm Shor's algorithm Grover's algorithm quantum encryption quantum research quantum use case

Chapter 7 | Education

The education data represented in the “Postgraduate Education” section was collected from the StudyPortals resource and presents the master’s degree programs that make a specific reference to “quantum” in the degree name found in the named resource.

Education enrollment data was collected from the publicly available data set “Current Term Enrollment Estimates” with the January 2025 updates of the NSC Research Center. The NSC states in their methodology for compiling the relevant dataset that the data is based on administrative data directly derived from college and university registrars. NSC declares that since the fall of 2021, “institutions actively submitting enrollment data to the Clearinghouse account for 97 percent of all enrollments at Title IV, degree-granting institutions in the US.”

The 2021 US Report “The Role of International Talent in Quantum Information Science” states that “the most QIST-relevant degree fields are physics, electrical engineering, and computer science” and explains that these domains were selected based on two criteria:



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245 First Street, Room E94-1521, Cambridge, MA 02142 USA

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