



Quantum talent: Trends in an emerging workforce

October 2025

Rosie Hood

Lead Data Scientist, EMEA

Version: October 2025

Quantum technology is undergoing a transition, moving from theory toward application. With the potential to unlock breakthroughs in fields such as AI and cybersecurity, talent is at the center of its progression. In this paper, we examine talent trends in this rapidly evolving field, defining what it means to be “quantum talent” and exploring the key skills and career pathways shaping this workforce.

Quantum talent is a nuanced workforce, made up of roles like quantum engineers, software engineers, researchers, and physicists, requiring a deep understanding of theoretical physical concepts as well as practical competencies. The quantum workforce is a network of high-performing regional hubs, but it remains small in absolute scale and is constrained by limited talent supply. While global demand for quantum skills peaked in 2022, demand remains strong in the largest talent hubs: the United States, Germany, the United Kingdom, India, and Canada.

Rosie Hood is the Lead Data Scientist for EMEA on LinkedIn's Economic Graph and Global Head of LinkedIn's Data for Impact program. She holds a PhD in Astrophysics and specializes in leveraging data to uncover insights on global labor markets, AI, and emerging technologies.

Introduction

Quantum technology is increasingly seen as the next major technological advancement, utilizing quantum mechanics to revolutionize our understanding and practical ambitions for computing, communications, and sensing.

Targeted government investment is driving innovation in quantum technology, with the emergence of national quantum strategies in many nations (for example, the United States' National Quantum Initiative Act). However, global investment in quantum technologies continues to exhibit sustained growth across both public and private sectors. Government funding globally rose by over \$3.1 billion in 2024 to reach an estimated \$44.5 billion, whilst private venture capital investment recorded its highest-ever level in 2024, close to \$2.6 billion¹.

Though quantum technologies serve multiple applications, the bulk of investment is concentrated on quantum computing hardware and software, for example, in the development of qubit

(quantum bit) systems². Quantum computing is still in the “Noisy Intermediate-Scale Quantum” phase, where machines typically have tens to a few 1000 qubits (note a typical laptop operates with billions of bits) and lack full error correction³, making them suitable only for exploratory algorithms. Cloud-based access from providers like IBM has opened these systems to researchers and businesses, while the industry works toward reliable fault-tolerant architectures with more stable qubits.

One milestone of success is “quantum supremacy”, where a quantum computer performs tasks that are infeasible for a classical computer. However, quantum computing is not intended to replace classical computing (in many use cases it is designed to work in tandem), instead its value lies in its potential to efficiently solve problems of greater complexity.

Were quantum supremacy to be reached for a task with practical and real-world utility – a feat not yet achieved – many applications become tangible, including AI. As AI continues to transform industries and occupations, quantum computing has the potential to

¹ Quantum Economic Development Consortium (QED-C). (2025). *State of the Quantum Industry 2025*. Quantum Consortium. <https://quantumconsortium.org/publications/stateofthequantumindustry2025/>

² A quantum computer makes use of qubits, rather than the bits used by a classical computer. Qubits exploit quantum phenomena to enable new classes of algorithm, which can solve certain problems more efficiently than is possible using a classical computer.

³ Qubits are fragile, even tiny environmental interactions can destroy the subtle quantum effects they rely on to perform efficient computation, and so, require error correction to maintain their state.

accelerate this progress through better pattern recognition, optimization, and faster model training, paving the way for a new generation of AI systems. In turn, quantum computing may also be expedited by AI's increasing capability. We can intuit AI adoption in quantum computing through skill sets: almost one in four members (21.6%) with a core¹ quantum skill has an AI skill. Conversely, 1.2% of members with an AI skill have a quantum skill, highlighting potential challenges to early adoption of quantum computing.

Aside from AI, another key application of quantum technology is quantum communications and cybersecurity, which will inevitably face new quantum threats as the field progresses (referred to as “Q-day”), driving the need for the development of quantum-resistant algorithms in communications. Cybersecurity is a substantial and growing field, making up 0.9% of members on LinkedIn. However, the share of cybersecurity professionals that hold a core quantum skill is just 0.2%.

With each milestone in quantum technology, there is also growing awareness: since 2022, we have seen a 160% rise in the share of members' posts on LinkedIn referring to quantum computing among recent technology advancements in the field of quantum

computing, such as [Microsoft's Majorana 1 chip](#). Despite this rising awareness and increased investment, without immediate efforts to grow and diversify the talent pool, this momentum could stall. This note explores talent trends in quantum technology, from defining what we mean by “quantum talent”, to the skills required by this workforce, and career pathways into this emerging field.

Quantum talent at a glance

To examine quantum technical talent, we consider a member's skills, identifying the skills most relevant to the field of quantum technology, as well as a member's employment in the field. In this section, we give an overview of the skills, occupations, and educational attainment of quantum talent, with a more comprehensive methodology included in the Appendix.

Skills

Quantum professionals require a diverse and highly specialized skill set spanning hardware, software, and systems integration. The exact set of skills varies by field, for example, quantum

¹ A core skill is highly specific and unique to an occupation, for example, “quantum computing” for a quantum engineer (defined further in the Appendix).

Table 1

The most added skills by a quantum engineer

Rank	Skill Name
1	Quantum Computing
2	Python (Programming Language)
3	Quantum Mechanics
4	Quantum Information
5	Data Analysis
6	Project Management
7	Qiskit
8	Research Skills
9	Engineering
10	Research and Development (R&D)
11	MATLAB
12	Machine Learning
13	Communication
14	Physics
15	Quantum Optics
16	Problem Solving
17	C++
18	Software Development
19	Cryogenics
20	Git

computing focuses on computation using qubits, whilst quantum communications aim for secure transmission of quantum information through optics-based systems.

Focusing on quantum computing as an example, this requires hardware expertise in developing and scaling qubit systems, which includes knowledge of control electronics, cryogenics, microwave/RF and laser systems, as well as materials science, microfabrication, and nanofabrication for quantum chip development.

In quantum software, professionals work on quantum software stacks (like Qiskit, an open-source framework for quantum computing), control systems (for example, for error correction), and quantum algorithms, requiring proficiency in programming as well as algorithm design and hardware-software integration. In quantum applications, focus is on proof-of-concept deployment and quantum simulation for scientific discovery. Together, these competencies form the backbone of a multidisciplinary workforce capable of advancing quantum technologies from lab to commercial deployment.

We define quantum skills that a member adds on LinkedIn as those that pertain to technical expertise and practical competencies required to design, develop, deploy, and maintain quantum systems. Table 1 outlines the most added skills by a quantum engineer on LinkedIn.

Table 2

The skills genome of a quantum engineer

Rank	Skill Name
1	Quantum Computing
2	Quantum Information
3	Quantum Mechanics
4	Qiskit
5	Quantum Optics
6	Python (Programming Language)
7	Cryogenics
8	Nanofabrication
9	Quantum Dots
10	Experimental Physics
11	Data Analysis
12	Physics
13	Microwave Engineering
14	Superconductors
15	Research and Development (R&D)
16	MATLAB
17	Research Skills
18	Engineering
19	Machine Learning
20	Atomic Physics

We see a combination of quantum theoretical skills ranking highest, such as quantum mechanics and quantum information, practical quantum skills

such as quantum computing and Qiskit, as well as broader technical competencies like Python, data analysis, and research skills. The skills profile suggests a nuanced profession requiring deep understanding of theoretical physical concepts as well as practical competencies.

We also analyze the skills genome¹, that is, the most characteristic skills of a quantum engineer. Where the distribution of top skills provides insight into how members perceive their own capabilities and the skills they commonly apply in day-to-day tasks, the skills genome examines which skills are most integral and distinctive to the role, shown ranked in Table 2.

The most characteristic skills of a quantum engineer include core quantum skills such as quantum computing, quantum information, quantum mechanics, Qiskit, quantum optics, quantum dots, and superconductors. We also see the importance of adjacent technical engineering skills such as cryogenics, nanofabrication, and microwave engineering, as well as adjacent knowledge skills like Physics.

¹ For any entity (for example, a given occupation, country or industry), a skills genome is an ordered list of the most characteristic skills of that entity, which are determined using a TF-IDF algorithm to demote ubiquitous skills and promote skills unique to an entity (defined further in the Appendix).

Table 3

The most common quantum occupations

Occupation	Share of members in a quantum occupation
Quantum Engineer	12.2%
Software Engineer	10.8%
Research Assistant	9.3%
Software Scientist	6.7%
Physicist	4.9%
Postdoctoral Researcher	3.1%
Machine Learning Researcher	2.5%
Physics Specialist	1.8%
Technology Specialist	1.8%
Machine Learning Specialist	1.8%

Occupations

The 10 most common occupations added by members in a quantum field are outlined in Table 3. Quantum engineer is the most common occupation making up 12.2% of members in a quantum occupation, followed closely by software engineer (10.8%).

Table 4

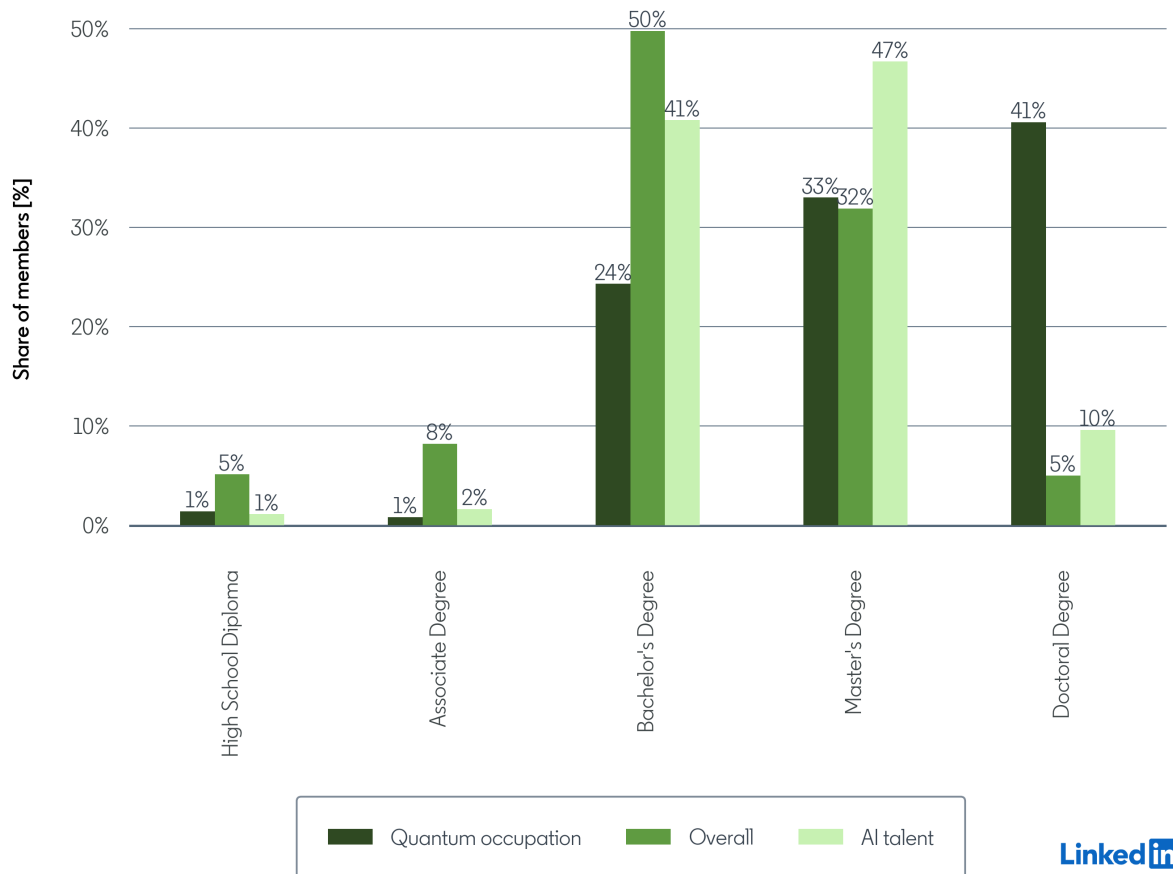
The most common fields of study of members in a quantum occupation

Degree	Share of members in a quantum occupation
Physics	26.3%
Computer Science	9.1%
Mathematics	3.6%
Electrical And Electronics Engineering	2.8%
Electrical Engineering	2.5%
Theoretical And Mathematical Physics	2.2%
Computer Engineering	2.1%
Chemistry	2.1%
Engineering Physics	2.0%
Mechanical Engineering	1.8%

Table 3 demonstrates a distinct amalgamation of professionals specializing in software, hardware, and research, the latter highlighting the experimental nature of the field and dependency on research skills and R&D (both commonly added skills in Table 1). In some respects, this echoes the development of AI.

Figure 1

The share of members by their highest educational attainment for members in a quantum occupation, AI talent, and members overall



Education

Quantum technology as a specialized field is also evident through the educational attainment of members, outlined in Figure 1. The majority of members in quantum occupations hold a doctoral degree (40.6% of members in a quantum occupation) as their highest qualification, followed by a master's degree (33.0%).

In contrast, a bachelor's degree is more commonly the highest level of educational attainment for the average member on LinkedIn, making up 49.8% of LinkedIn members. A master's degree is more common for a member considered as [AI talent](#), making up 46.7% of AI talent, followed closely by a bachelor's degree (40.8%).

The most popular field of study for members who are or have been employed in a quantum occupation is Physics, with over one in four members having studied Physics, followed by Computer Science, Mathematics, Electrical and Electronics Engineering, and Electrical Engineering (see Table 4). The top academic producers of members who are currently employed in a quantum occupation are Delft University of Technology, Technical University of Munich, ETH Zürich, University of Oxford, and Imperial

College London, highlighting Europe as a key leader in the education of graduates for quantum employment.

There are also over 25,000 members on LinkedIn who have obtained a degree in a quantum-focused field, that is, a degree that specializes in a quantum field, where the most popular fields of study are: Quantum Computing, Quantum Physics, Quantum Optics, Quantum Engineering, and Quantum Chemistry.

Figure 2

The share of members globally who are quantum talent

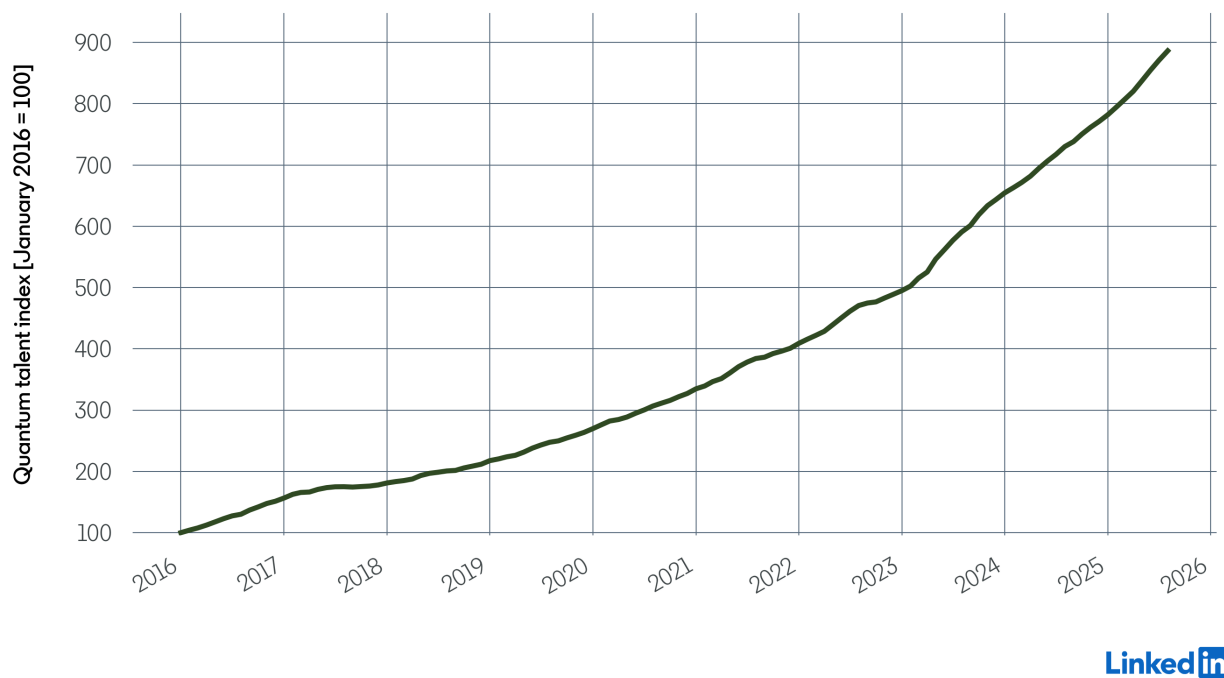
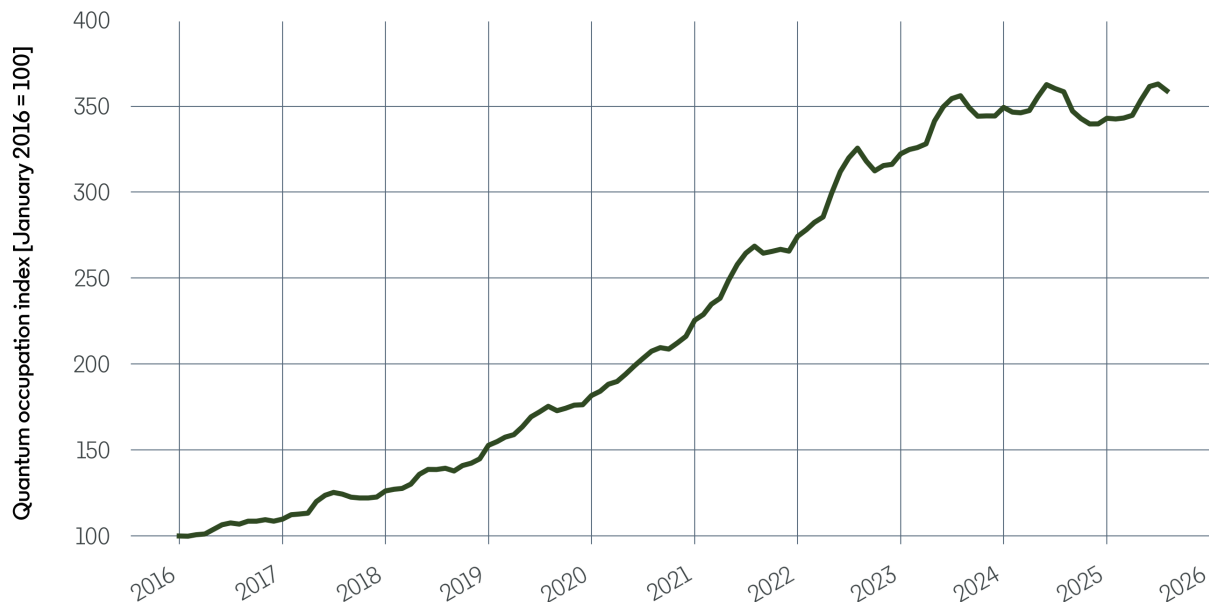


Figure 3

The share of members globally in a quantum occupation



LinkedIn

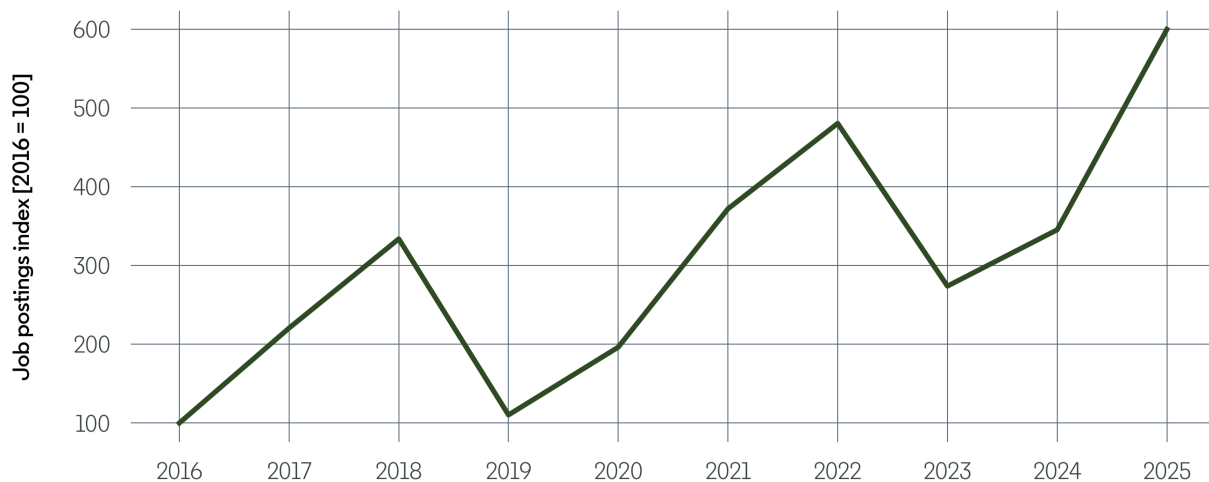
Emerging talent trends

In this section, we analyze two segments of talent: the first, referred to as “quantum talent”, includes members who are currently or formerly employed in quantum occupations and/or possess at least two core quantum skills. The second is a subset of this group: a small, but growing, workforce comprising only those employed in quantum occupations. This provides insight into the wider quantum ecosystem as well as emerging trends in the current quantum workforce.

Figure 2 shows the share of members with quantum talent globally indexed to January 2016. Figure 3 shows the share of members globally employed in a quantum occupation indexed to January 2016. Though we see growth in both series, the share of members globally in quantum occupations (Figure 3) has been plateauing since 2023 despite an increase in members adding quantum skills shown by the growth in Figure 2. This suggests that although members have the skills required to be employed in a quantum occupation, the growth of the global quantum workforce is not keeping pace. After 2023, the share of workforce in a quantum occupation has remained stable, averaging at an index of 350.

Figure 4

The share of quantum computing job postings



LinkedIn

The share of job postings on LinkedIn requiring a core quantum skill has grown by 58% since 2016, with a compound annual growth rate of 5%. Focusing on quantum computing job postings (as shown in Figure 4 indexed to 2016), we see the effects of strong investment in the sector, with the share of quantum computing job postings up 500% since 2016, with a compound annual growth rate of 22%.

The demand for quantum computing professionals peaked in 2022, which likely contributed to the rise and then plateauing in members employed in a quantum occupation observed from 2023 onwards (in Figure 3); 2023 also saw a

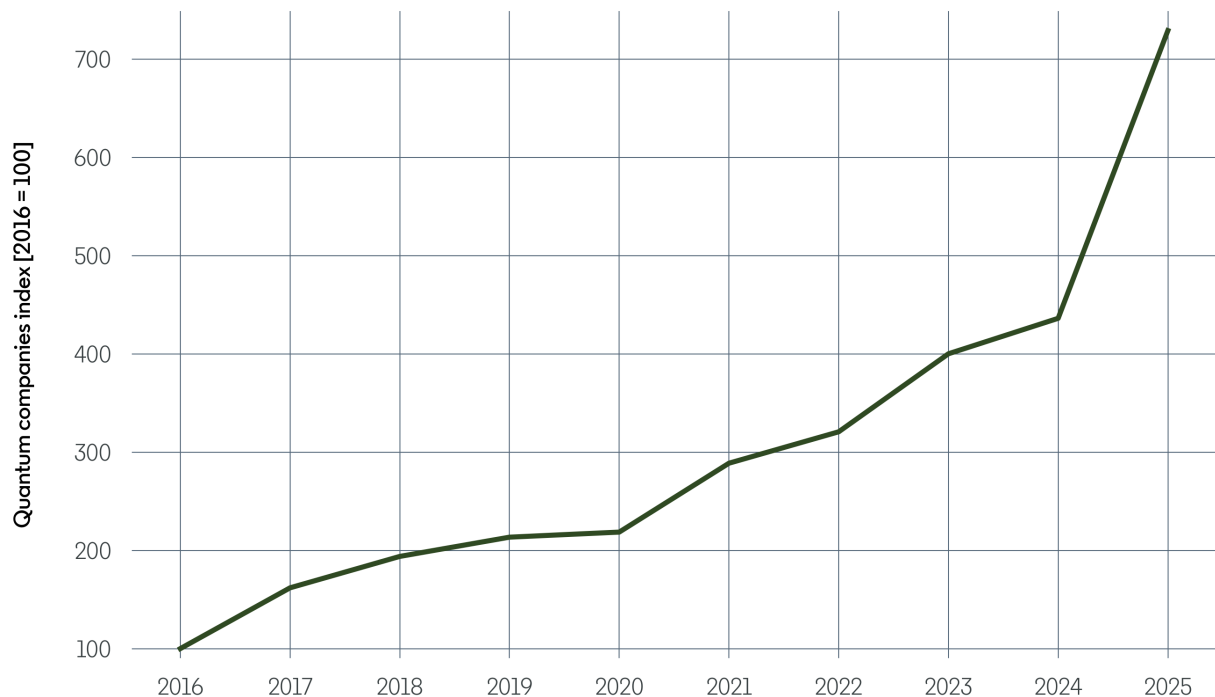
significant drop in private venture capital investment⁶.

Despite this turbulence in job postings, demand remains high; in 2025 so far, the share of quantum computing job postings has increased by 74% since 2024, driven by growth in the United States (up 152%) and Singapore (up 85%). The growth in the share of members employed in quantum roles has expanded at half the global job postings rate, with a 34% increase. Members that are quantum talent – a wider talent pool including members that were formerly in a quantum occupation or have at least two core quantum skills – are keeping better pace with demand, with the share up 62% since 2024.

⁶ Quantum Economic Development Consortium (QED-C). (2025). State of the Quantum Industry 2025. Quantum Consortium. <https://quantumconsortium.org/publications/stateofthequantumindustry2025/>

Figure 5

The share of quantum computing companies founded each year



LinkedIn

A competitive outlook for companies

Despite this plateauing of global quantum employment, the impact of increasing investment can be seen through the number of companies founded each year that relate to quantum computing⁷, as shown in Figure 5 indexed to 2016. In 2025 so far, the share of companies founded that are related to quantum computing has grown by 67% since 2024.

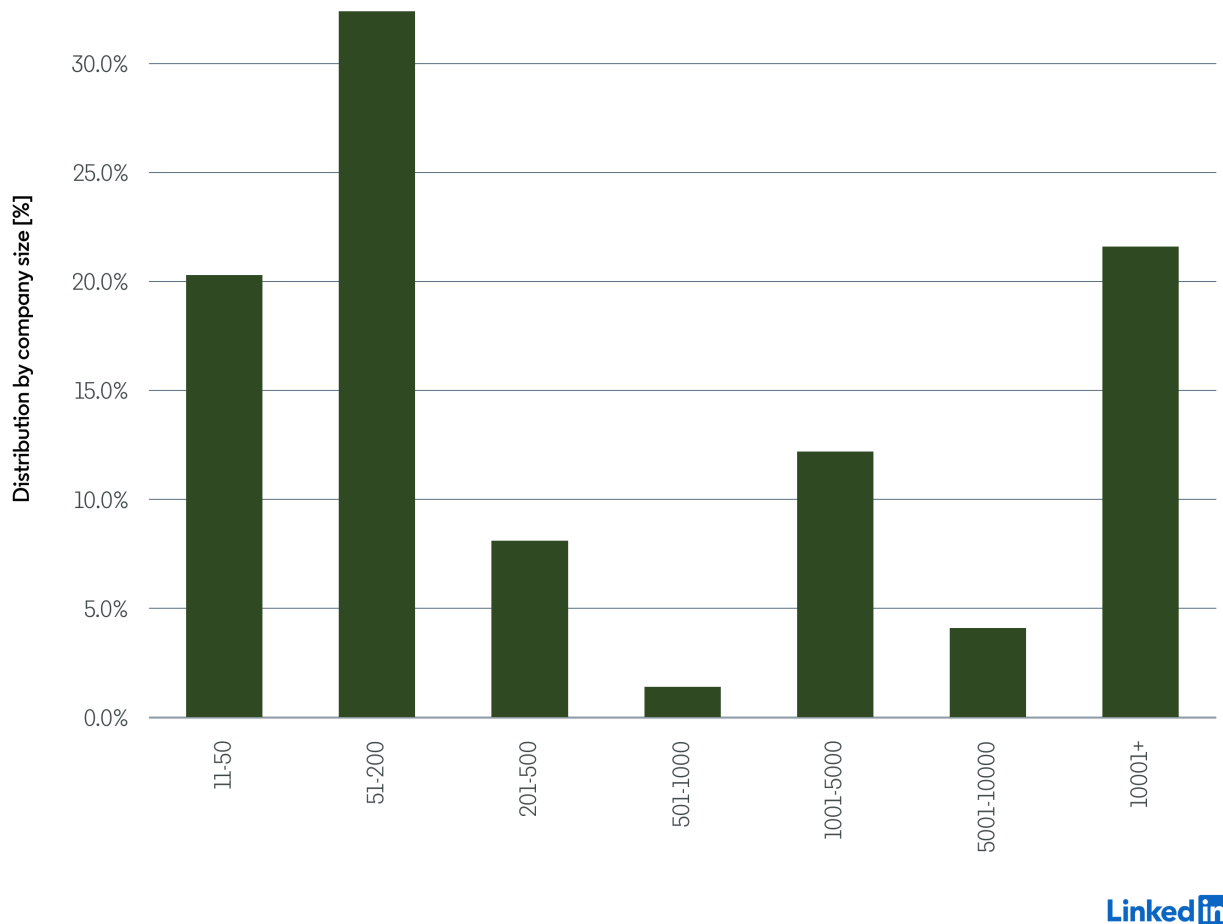
Globally, the largest employers of members that are currently in a quantum occupation are IBM and Microsoft, showcasing tech's investment in quantum computing as a practical enterprise.

Figure 6 shows the workforce size of quantum companies by share. The most common company size is made up of 51-200 employees, suggesting advanced start-ups that are in the process of scaling. Examples of these companies include Rigetti Computing in the United States and Xanadu in Canada.

⁷ Identified by the company description provided by their LinkedIn company page.

Figure 6

The share of quantum companies by size of company workforce

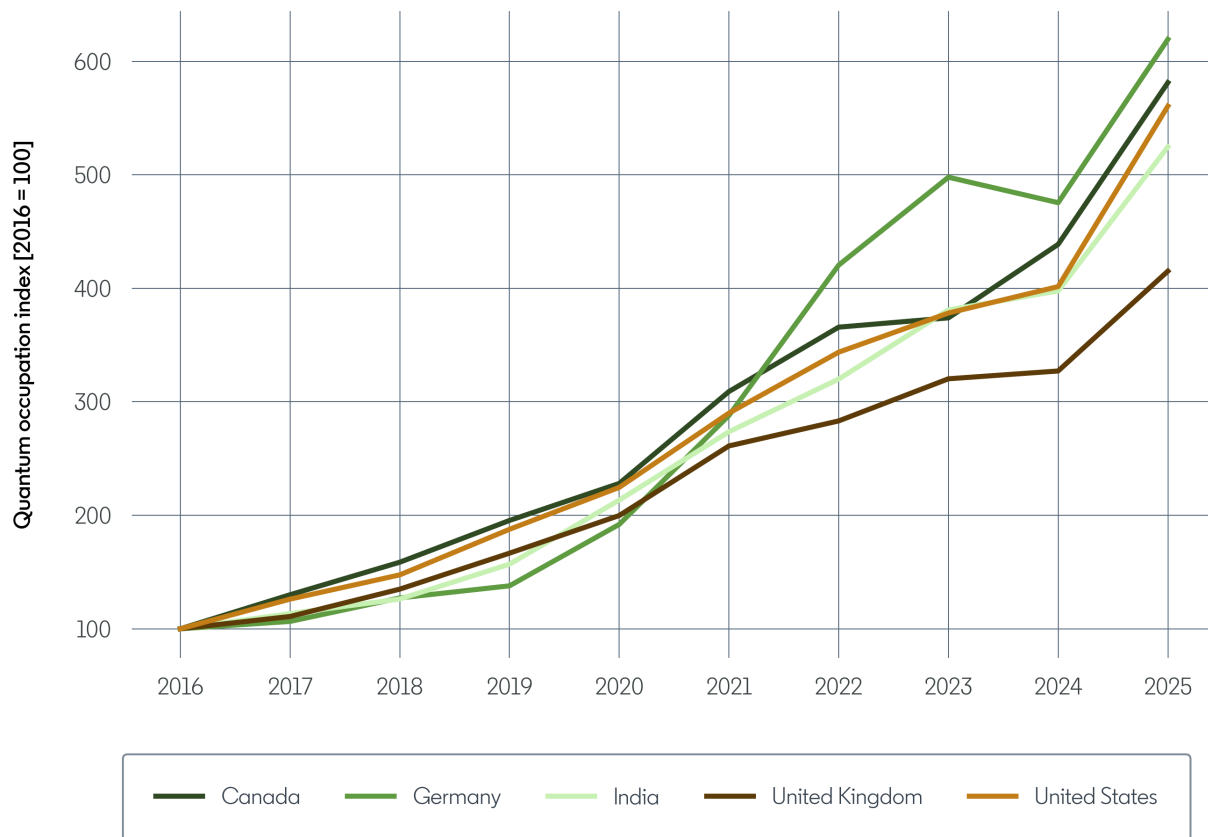


Large companies, with 10,001+ employees, hold the second largest share (21.6%), closely followed by start-ups with 1-50 employees (20.3%). This is suggestive of a competitive and evolving outlook for companies working in quantum, with contributions from larger companies, new companies entering the market, and start-ups scaling successfully.

Analyzing the distribution of members in a quantum occupation across industries, we are also beginning to see signs of quantum's viability in sectors it is likely to impact once further developed. One example is financial services, where 1.8% of members in a quantum occupation are currently employed.

Figure 7

The share of members in a quantum occupation by country



LinkedIn

The largest quantum workforces are in the US, Germany, and the UK

Countries with the largest quantum workforces have experienced significant growth in 2025, unlike the global trend shown in Figure 3. This suggests that quantum technology is confined to a small number of countries; indeed, the five largest workforces by country make up

almost two thirds of the global workforce. Focusing on the five largest quantum workforces (shown in Figure 7, indexed to 2016 for each country) – Canada, Germany, India, the United Kingdom, and the United States – the share of members in a quantum occupation has grown by 32% on average since 2024.

Table 5 outlines the top 10 countries ranked by the distribution of members that are employed in a quantum occupation in 2025.

Table 5

Top 10 countries by the distribution of members in a quantum occupation

	Distribution of members in a quantum occupation	Distribution of members who are quantum talent
United States	34.5%	28.0%
Germany	8.7%	8.4%
United Kingdom	8.6%	7.1%
India	7.0%	13.7%
Canada	5.5%	4.4%
France	4.8%	5.0%
Spain	3.6%	3.2%
Netherlands	3.2%	2.0%
Australia	3.0%	1.9%
Italy	2.0%	2.2%

Table 6

Top 10 cities by the distribution of members in a quantum occupation

	Distribution of members in a quantum occupation	Distribution of members who are quantum talent
New York City	5.9%	4.5%
San Francisco Bay Area	4.2%	3.9%
Washington D.C.	3.6%	2.8%
Paris	3.5%	3.4%
Los Angeles	3.3%	2.4%
Munich	3.2%	2.6%
London	3.1%	2.9%
Boston	2.7%	2.4%
Seattle	2.4%	1.5%
Toronto	2.0%	1.4%

The United States leads with 34.5% of the global share of members in a quantum occupation, followed by Germany (8.7%) and the United Kingdom (8.6%). As we detailed earlier, the top academic producers of talent are European, in contrast to the United States' lead as a destination for a career in quantum.

Table 6 outlines the top 10 cities ranked by the distribution of members in a quantum occupation. Cities in the United States make up over half of the top 10, with New York City leading with a 5.9% share. European cities are also attracting talent, with Paris holding 3.5% of the share, closely followed by Munich (3.2%) and London (3.1%). There is a strong link between university programs and industry, as the Technical University of Munich and Imperial College London both rank high in academic producers of members employed in a quantum occupation.

Thus, we find that quantum labor demand is concentrated in a few regional hubs, with most roles found in research institutions, scaling start-ups, and Big Tech. Despite its relatively small size, the field shows strong demand, marked by rising job postings, a limited pool of qualified experts, and significant company growth potential. However, this strength is largely structural, driven by long-term expectations, as quantum roles remain rare and require deep expertise.

Career pathways into quantum

In 2024, 6.8x more members started a role in a quantum occupation than left a quantum occupation. Though 30.1% of members that transitioned to a new quantum occupation role were already in a quantum occupation, the majority of members that transitioned to a quantum occupation came from postdoctoral positions, making up over a third of transitions (34.1%) and another 17.1% came from research assistant roles. This highlights academia as a feeder into industry. 18.7% of transitions also came from software engineers. Despite this inflow, the field of quantum technology has reached a significant bottleneck: there is not enough talent employed to keep pace with demand, nor is there enough talent that could re-enter the field or has core quantum skills, our wider definition of quantum talent.

One key factor in expanding the quantum talent pool is increasing the representation of women. Currently, 78.2% of members that are in a quantum occupation are men, and 79.6% of members who have quantum talent are men. We also observe a conversion barrier between a member studying quantum and pursuing a career in quantum. If we consider the most popular degree amongst quantum talent, Physics, only 0.05% of Physics degree holders enter a quantum occupation after

finishing their degree. Software engineering roles, for example, are a more popular option, with 6% of Physics degree holders entering into the role as their first position. Moreover, the level of educational attainment may present a further barrier, as almost all members employed in a quantum occupation hold a master's degree or higher.

Educational attainment aside, we have seen that many members have quantum skills (as listed in Table 2) and this is growing (see Figure 2). If we cast a wider skills net to consider a third talent segment of “quantum-ready” talent, that is, members that have at least five quantum-related skills, we can meet this demand, with quantum-ready talent making up 0.1% of members on LinkedIn (discussed further in the Appendix).

The focus must therefore be on attracting this quantum-ready talent, that has invested in upskilling in quantum skills. The majority of this talent is employed in related occupations like software engineer (5.4% of the share), research assistant (5.0%), teaching assistant (3.3%), data scientist (2.6%), and data analyst (2.1%). We can also consider a quantum-ready talent segment as a “quantum-literate” workforce, similar to how we regard AI literacy. This talent segment is not only positioned to transition into quantum occupations but will also be key to early quantum adoption in industry.

Quantum AI

Quantum has parallels with AI: both signify transformative shifts in problem-solving approaches, demand highly interdisciplinary expertise, and are in evolving stages of commercialization – AI being more mature while quantum is emerging with growing real-world potential.

The intersection of quantum computing and AI holds significant potential. When combined, quantum computing could accelerate AI by solving optimization problems faster, enhancing training of large models, and enabling better pattern recognition. Conversely, AI can help optimize quantum hardware design and algorithm development. Together, quantum and AI represent a powerful synergy that could revolutionize areas like cybersecurity, finance, and even AI-driven scientific research.

We can see AI adoption in quantum technology through skill sets: almost one in four members (21.6%) with a core quantum skill have an AI skill. However, only 1.2% of members with an AI skill have a quantum skill, highlighting potential barriers to early adoption of quantum computing in AI. We also see “artificial intelligence” entering job titles of members working in quantum occupations, up 8% since 2024 and 22% since 2023.

Conclusion

Quantum technology is in a transition period: with increased demonstrations of its capability, its potential to revolutionize industries like cybersecurity and AI is becoming tangible. However, it remains a highly specialized and niche field, limited to a small number of regional hubs, with most roles concentrated in research institutions, scaling start-ups, and Big Tech.

Quantum research requires specialized infrastructure and expertise, which naturally attracts clustering around universities and tech hubs. However, this localization limits access for skilled individuals elsewhere and makes the ecosystem vulnerable to local disruptions (for example, from reduced private investment or government policy changes). Governments and industry need to incentivize the development of quantum talent and infrastructure across multiple regions through grants, regional innovation centers, and remote training programs.

More still, quantum is reaching a significant bottleneck: there is not enough talent employed to keep pace with demand, nor is there enough talent being attracted into the field, where members starting new roles in quantum typically come from the field itself or from academia. One approach is to foster strong public-private-academic collaboration to promote shared resources, mentorship, and coordinated workforce development to accelerate quantum research and adoption. Another approach is to expand education and training pathways to diversify and future-proof the quantum workforce.

Quantum occupations require a diverse range of skill sets and are often cross-disciplinary, such that multiple entry paths can be developed to upskill professionals. To ensure its future success, we need to focus on career pathways into quantum – whether this be from increasing representation or breaking down barriers in educational attainment – and upskilling professionals to not only realize a career in quantum, but to prepare for its early adoption in their industries.

Appendix

Data & Privacy

This body of work represents the world seen through LinkedIn data, drawn from the anonymized and aggregated profile information of LinkedIn's 1.2+ billion members globally. As such, it is influenced by how members choose to use the platform, which can vary based on professional, social, and regional culture, as well as overall site availability and accessibility.

In publishing these insights from LinkedIn's Economic Graph, we want to provide accurate statistics while ensuring our members' privacy. As a result, all data show aggregated information for the corresponding period following strict data quality thresholds that prevent disclosing any information about specific individuals.

Methodology

Defining quantum skills

We consider quantum skills as skills that pertain to technical expertise and practical competencies required to design, develop, deploy, and maintain quantum systems. To curate a list of

quantum skills we analyzed the most characteristic skills added by members who are or have been a quantum engineer, that is, a “skills genome”. For any entity (for example, a given occupation, country or industry), a skills genome is an ordered list of the most characteristic skills of that entity, which are determined using a TF-IDF algorithm to demote ubiquitous skills that add little information about that specific entity (e.g. Microsoft Word) and promote skills unique to that specific entity (e.g., Quantum Optics). We restricted our skills genome to technical talent, that is, members that are in a research, engineering or IT functional area, where a functional area is a broad grouping of job titles.

Table A1, like Table 2, outlines the top 20 most characteristic skills of a quantum engineer, also adding a classification of “skill depth”. Skill depth refers to “core” skills that are more unique to an occupation, and therefore more likely to rank high in a skills genome, and “adjacent” skills that members in other occupations are also likely to have. For example, we classify Python as an adjacent skill due to its use by, say, data scientists, whilst we classify Qiskit as a core skill, as a Python-based software for working with quantum computers.

Table A1

The skills genome of a quantum engineer, with skill depth

Rank	Skill Name	Skill Depth
1	Quantum Computing	Core
2	Quantum Information	Core
3	Quantum Mechanics	Core
4	Qiskit	Core
5	Quantum Optics	Core
6	Python	Adjacent
7	Cryogenics	Adjacent
8	Nanofabrication	Adjacent
9	Quantum Dots	Core
10	Experimental Physics	Adjacent
11	Data Analysis	Adjacent
12	Physics	Adjacent
13	Microwave Engineering	Adjacent
14	Superconductors	Core
15	Research and Development	Adjacent
16	MATLAB	Adjacent
17	Research Skills	Adjacent
18	Engineering	Adjacent
19	Machine Learning	Adjacent
20	Atomic Physics	Adjacent

We see skills that we expect to be core skills, that is, unique to a quantum engineer occupation, have been promoted, with the top five skills as quantum computing, quantum information, quantum mechanics, Qiskit, and quantum optics. We also see the increased importance of

adjacent technical engineering skills such as cryogenics, nanofabrication, microwave engineering, and what is a closely related field, superconductors. We title the skills in Table 2 (also in Table A1) as “quantum skills”.

Defining quantum occupations

Quantum engineer is a standardized occupation in LinkedIn’s occupation taxonomy, where we normalize the free text field of a member’s job title to map to a standardized occupation taxonomy. There are several occupations in the field of quantum that can be standardized to common occupations in LinkedIn’s taxonomy, for example, quantum software engineer maps to software engineer, quantum computing physicist maps to physicist, and applied quantum scientist maps to scientist. This provides normalization to what can be a noisy field in our data and allows us to understand how members may transition between fields or seniority levels yet remain in the same occupation.

To extract these standardized occupations as they relate to quantum, we use the free text field of a member’s job title and restrict it to research, engineering, and information technology functional areas.

Table A2

The most common occupations of members with ≥ 5 quantum skills

Occupation	Share of members with ≥ 5 quantum skills
Software Engineer	5.4%
Research Assistant	5.0%
Teaching Assistant	3.3%
Data Scientist	2.6%
Data Analyst	2.1%
Postdoctoral Researcher	1.7%
Project Manager	1.3%
Professor	1.1%
Teacher	1.0%
Lecturer	0.9%

A definition for quantum talent

When defining talent segments, we consider a skills component as well as a member's occupation, that is, a member can also be AI engineering talent if they are not employed in an AI occupation but apply AI engineering skills in their role. An example is a financial analyst or quant, who is likely to use AI engineering skills, like machine learning or time series forecasting, but is not in an AI engineering role. Table A2 recreates Table 3, the most common quantum occupations held by members, with members that have at

least five skills listed in our skills genome of a quantum engineer in Table A1 (also, Table 2), that is, "quantum skills".

Table A2 demonstrates a large variation in the share, as we see this talent segment spread between many occupations. We also see a bias towards academia, making up six of the most common occupations, and increases in the share of members for occupations that may have a large overlap of characteristics skills with our skills genome for a quantum engineer (such as programming or research skills) including data scientist and data analyst.

Instead of quantum talent, we can consider this adjacent talent to working in quantum or "quantum-ready talent", that is, members that hold many of the skills required by a quantum engineer, and so are likely candidates to transition into a career in quantum. We therefore define quantum-ready talent as any member that:

Has at least five quantum skills (that are core and/or adjacent)

If we focus on core quantum skills from our skills genome, like quantum computing, quantum information, quantum mechanics, Qiskit, and analyze members that have at least two core quantum skills, we still see a bias towards academia, but we have filtered occupations which were likely unrelated to quantum, like Data Analyst (see Table A3).

Table A3

The most common occupations of members with ≥ 2 core quantum skills

Occupation	Share of members with ≥ 2 core quantum skills
Research Assistant	9.53%
Teaching Assistant	6.85%
Software Engineer	6.73%
Postdoctoral Researcher	6.58%
Professor	2.35%
Data Scientist	1.97%
Teacher	1.96%
Lecturer	1.57%
Physicist	1.50%
Co-Founder	1.49%

We therefore come to our definition of quantum talent as any member that:

Is employed or has been previously employed in a quantum occupation and/or has at least two core quantum skills, e.g., “quantum mechanics”

Table A4 outlines the most common occupations for quantum talent. This list comprises three expected disciplines in quantum technology: programming, engineering, and academia.

Table A4

The most common occupations of “quantum talent”

Occupation	Share of quantum talent
Research Assistant	7.9%
Software Engineer	6.2%
Teaching Assistant	5.3%
Postdoctoral Researcher	5.3%
Professor	1.8%
Physicist	1.7%
Data Scientist	1.6%
Teacher	1.6%
Quantum Engineer	1.4%
Co-Founder	1.3%

We also consider one other talent segment: members employed in a quantum occupation. This allows us to analyze the current state of the quantum workforce.

Key Definitions

Quantum skills. Skills that pertain to technical expertise and practical competencies required to design, develop, deploy, and maintain quantum systems.

Skills genome. For any entity (for example, a given occupation, country or industry), a skills genome is an ordered list of the most characteristic skills of that entity, which are determined using a TF-IDF algorithm to demote ubiquitous skills that add little information about that specific entity (e.g. Microsoft Word) and promote skills unique to that specific entity (e.g., Quantum Optics).

Skill depth. The singularity of the skill to a given occupation. Composed of two categories: “core” skills that are more unique to an occupation, and therefore more likely to rank high in a skills genome, and “adjacent” skills that members in other occupations are also likely to have. For example, we classify Python as an adjacent skill due to its use by, say, data scientists, whilst we classify Qiskit as a core skill, as a Python-based software for working with quantum computers.

Core skill. A skill that is highly specific and unique to a given occupation, meaning it is strongly associated with and primarily used by people in that job role. Because it is less widely shared across other occupations, it is considered a distinguishing or defining capability for that occupation.

Adjacent skill. A skill that is relevant and useful for an occupation but is also commonly found in many other occupations. These skills are not unique to a specific job and therefore do not strongly differentiate that role from others.

Quantum occupation. A quantum engineer or an occupation in a quantum field that is in research, engineering or information technology functional areas. To extract standardized occupations as they relate to quantum, we use the free text field of a member’s job title.

Quantum talent. Members that are employed or have been previously employed in a quantum occupation and/or have at least two core quantum skills, e.g., “Quantum Mechanics”.

Quantum-ready talent. Members that hold at least five quantum skills (that are core and/or adjacent).