

INNOVATION BRIEF

Quantum Readiness

Your strategic edge for unmatched
operational resilience



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Summary

- Quantum isn't theoretical; it's already reshaping the competitive landscape.
- Quantum readiness can unlock new revenue streams, strategic partnerships, and next-gen customer engagement.
- Potential alone isn't a strategy; without C-suite leadership, quantum remains a buzzword.
- With executive vision, quantum becomes a differentiator and a source of long-term advantage.
- Delays are costly, and early movers are already building momentum. Waiting means following, not leading.



Imagine someone told you there was a technology in development that can discover new materials and medicines, analyze and act on the most complex systems from global climate models to supply chains, dramatically speed up AI machine learning, and solve problems that currently would take computers thousands of years. Would you sit on this information and wait to see what happens? Would you pause while others start exploring what this technology means for their businesses? This is not a hypothetical scenario; it is today's reality. And it's not AI, super intelligence, or science fiction, it's quantum computing.

Quantum computing is set to achieve

everything described above and more, and sooner than we may think. Taking a completely different approach to classical computing, quantum will become a fundamental tool in solving computational problems that were previously impossible. The question is, are you prepared for a technological revolution that could redefine your industry, or will you be left behind? When generative AI took over the headlines in 2022, most companies were forced to react. With quantum, there's runway. But now's the time for business leaders to get ready.

The quantum revolution is underway. In a TIME Magazine article titled "The Quantum Era,"

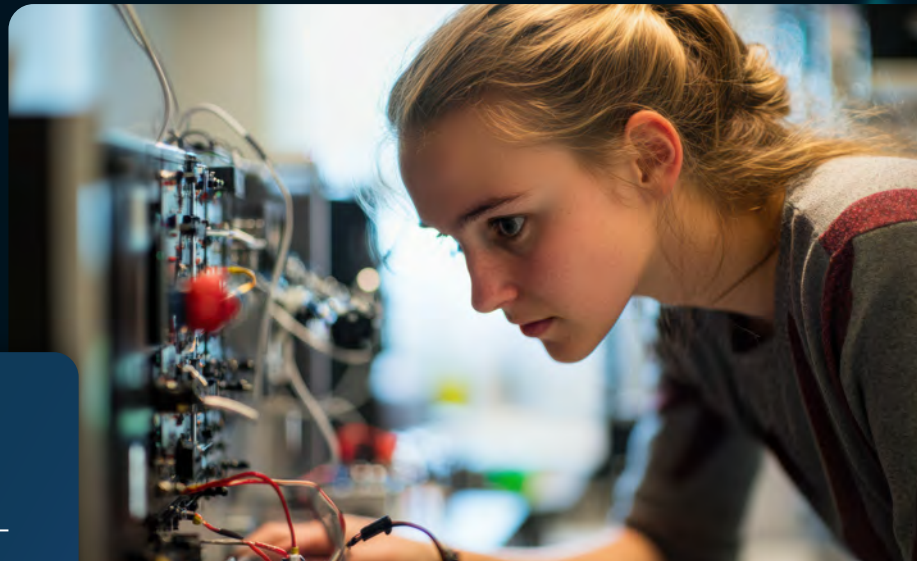
authors Vimal Kapur and Rajeeb Hazra noted that “the quantum train is leaving the station,” but “you will not see a quantum computer for sale at Best Buy or a revolutionary app.”¹ Instead, “the transformation will happen behind the

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The quantum revolution is underway.

scenes, embedded in the foundational systems of science, logistics, healthcare, and finance.”² They argue there will not be a breakthrough “launch moment” for quantum but instead “performance breakthroughs, solved problems, and enduring value creation.”³ Quantum computing won’t arrive overnight or in a watershed moment, but that doesn’t make the technology any less transformative, which is exactly why it’s time to start preparing.

Advancements in quantum computing are already accelerating, with technology leaders and venture capitalists investing in quantum technology and companies. Governments, including China, Germany, the UK, and the U.S., are funding public investments. Universities are introducing quantum engineering programs, and developers are starting to shape the quantum ecosystem.



The challenges aren’t insignificant, however. Companies are already grappling with artificial intelligence’s rapid evolution; they are developing AI playbooks to guide investments as well as operational and business transformation in order to maximize opportunities. While companies must continue developing their AI maturity, they also need a plan for the coming quantum revolution.

Quantum represents an entirely new scientific capacity, and businesses don’t yet have the playbook for how to best prepare. This Innovation Brief serves as a quantum readiness guide to steer strategies and investments according to the best practices that are starting to take shape. By staying informed and proactive, business leaders can navigate the quantum revolution early and effectively, ensuring their organizations remain competitive in this emerging landscape at every step.

Quantum readiness isn’t a luxury; it must be a C-Suite imperative.

Why quantum readiness matters

Quantum isn't just a new chapter in the series of technology revolutions; it's an entirely new story, requiring an entirely new playbook. With every headline that marks its progress, quantum computing is quietly but profoundly rewriting the rules of enterprise strategy because it challenges the fundamental assumptions that today's businesses operate on, including speed, scale, and optimization. Unlike classical computing, quantum computing

enable new territories of computing compared to existing classical computing.”⁴ Unlike classical computers that process bits as 0s or 1s, quantum computers use qubits, which can exist in multiple states simultaneously thanks to superposition and entanglement. This means quantum systems can explore countless possibilities at once, solving problems that would take today's supercomputers millennia. While early benchmarks focused on 50 to 100 qubits, the new frontier is 1 million.

Microsoft's Majorana 1 processor, for example, is designed to scale to 1 million qubits on a single chip using topological qubits—ushering in a new era of fault-tolerant, utility-scale quantum computing.⁵



processes information in exponentially more powerful ways, enabling breakthroughs that are currently impossible. This will change the trajectory of business.

Quantum computing is “a new computing paradigm leveraging the laws of quantum mechanics to provide significant performance improvement for certain applications and

Fundamentally, quantum is a radically different approach to computing, processing, and outcomes. That's why quantum computing goes so far beyond efficiency and traditional approaches focused on 10% incrementalism and cost take-out. As a result, quantum

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This isn't incremental change—it's transformative, exponential, and uncharted.



demands attention from every corner of the C-suite because it will enable solutions to problems that were previously computationally incalculable. From supply chain optimization to financial modeling, from mining and science to drug discovery, quantum algorithms are capable of processing countless possible combinations and complex connections in a fraction of the time it would take today's systems.

The significance of quantum computing is difficult to fathom while we're still navigating AI's potential impact on business transformation. While artificial intelligence has introduced automation at scale and predictive and generative capabilities, quantum computing is unlocking entirely new classes of algorithms that can enhance or even replace traditional AI in certain domains. Quantum-enhanced machine learning, for example, promises breakthroughs in pattern recognition, classification, and optimization at unprecedented levels of scale and scope.

This isn't incremental change—it's transformative, exponential, and uncharted. But what does that mean for business? At 1,000+ qubits, we'll see breakthroughs in logistics, finance, and materials science.

- **Logistics:** Imagine a global shipping company optimizing thousands of delivery routes in real time, factoring in weather, fuel costs, and customs delays. What once took hours of approximation now resolves in seconds, saving millions in operational costs.

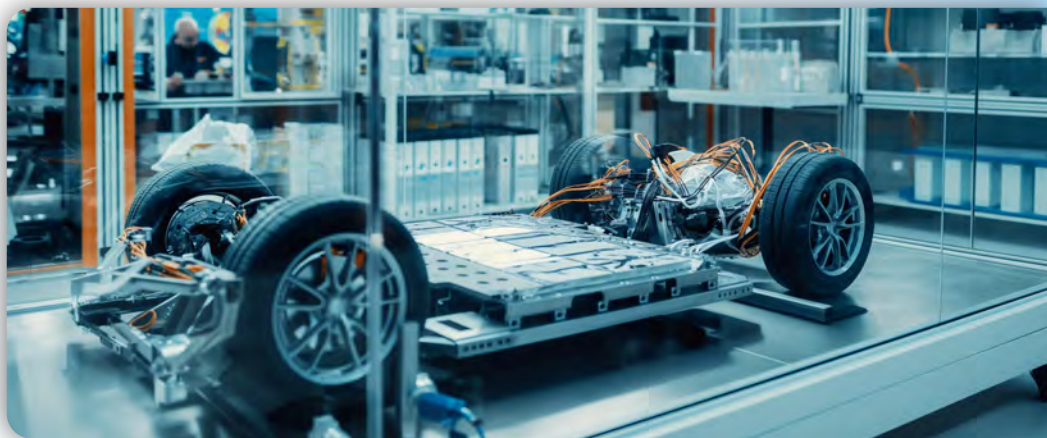
- **Finance:** Portfolio managers simulate thousands of market scenarios simultaneously to hedge risk with unprecedented precision. Fraud detection systems evolve from reactive to predictive, flagging anomalies before they occur.
- **Materials science:** R&D teams simulate new battery chemistries or lightweight alloys without needing a lab. Product cycles shrink from years to months, accelerating innovation in electric vehicles, aerospace, and beyond.

At 10,000–100,000 qubits, quantum systems could simulate complex molecules, optimize global supply chains, bolster defense systems, and crack encryption protocols.

- **Molecular simulation:** Pharma companies simulate drug interactions at atomic precision, collapsing drug discovery timelines from 10 years to 18 months with fewer failed trials.
- **Global supply chains:** Enterprises model entire supply networks across continents, currencies, and constraints to anticipate disruptions and auto-adjust sourcing strategies in real time.
- **Defense systems:** Governments deploy quantum-enhanced threat modeling to simulate adversarial strategies, optimize satellite constellations, and secure communications with quantum key distribution.

- **Cryptography:** Classical encryption begins to fall. Organizations must transition to post-quantum cryptography (PQC) to protect sensitive data from future decryption threats.

At 1 million qubits, quantum systems will be able to solve problems that are not possible today (i.e., modeling climate systems in real time, accelerating AI training, or discovering



new pharmaceuticals in days instead of years).

- **Climate modeling:** Real-time, high-resolution simulations of Earth's climate systems enable hyper-local forecasting, disaster prevention, and geoengineering scenario planning.
- **AI acceleration:** Quantum-enhanced AI models train in hours instead of weeks. Agentic systems evolve from reactive assistants to proactive collaborators capable of abstract reasoning and multimodal synthesis.
- **Pharmaceuticals:** Entire drug pipelines from compound discovery to clinical trial simulation are compressed into days.



Personalized medicine becomes a reality, with treatments tailored to your genome and real-time biomarkers.

- **National security:** Quantum-secure networks and entanglement-based communication protocols become the backbone of critical infrastructure, immune to interception or tampering.

The upside? Unmatched operational resilience, new revenue models, and a first-mover advantage in markets that don't yet exist. The risk? Falling behind as competitors build quantum-ready strategies today.

Quantum computing is not a topic to delay. It is a strategic issue that cuts the enterprise in ways that most don't fully grasp, and that's the opportunity. Those who explore its implications and potential early will futureproof their

organizations and create an enterprise moat that protects and shapes the next frontier of competitiveness. Here are a few companies taking the lead on quantum readiness:

- JPMorgan is collaborating with Argonne National Lab to test quantum algorithms for portfolio optimization—an area where classical methods struggle due to the sheer complexity of variables and constraints like risk, liquidity, and compliance.⁶ Quantum systems, leveraging superposition and entanglement, can evaluate countless portfolio configurations simultaneously, enabling faster, more precise optimization even in volatile markets.
- BMW is exploring quantum chemistry for lighter materials and battery innovation.⁷ Quantum computers can model electron

behavior and molecular bonding directly, enabling BMW to simulate new battery chemistries and lightweight composites with far greater accuracy and speed. This could lead to electric vehicles with longer range, faster charging, and reduced weight—without years of trial and error in the lab.

- Deloitte is exploring quantum computing for advanced fraud detection and smart factory design. It's also partnering with SandboxAQ to address emerging risks, particularly the threat quantum poses to public key cryptography.⁸ As mentioned earlier, governments are investing billions. The question is no longer if quantum will matter, but when your organization will be ready.

Quantum isn't just faster computing; it's a new paradigm. It doesn't replace classical systems; it complements them by solving problems that were previously out of reach. Whether it's optimizing trillion-dollar portfolios, simulating molecules for life-saving drugs, or securing national secrets, quantum is already reshaping the competitive landscape.





Every role across the C-suite can contribute to quantum readiness

A breakdown of C-suite quantum readiness roles and responsibilities

Strategists to reimagine competitive advantage by solving previously impossible or inconceivable tasks

- How? By leveraging quantum capabilities to model, simulate, and optimize scenarios that were once computationally infeasible.

Transformation leads to ignite innovation

- How? By embedding quantum thinking into digital transformation roadmaps, enabling breakthroughs in speed, scale, and security.

Cyber leaders to safeguard what classical encryption can't

- How? By adopting post-quantum cryptography (PQC) standards and preparing infrastructure for quantum-resilient security.

HR execs to develop best practices and upskill a future-ready workforce

- How? By identifying quantum-adjacent roles, creating learning pathways for new and existing employees, and fostering a culture of continuous quantum AI innovation.

Chief technology officers to reshape the tech roadmap

- How? By integrating quantum-readiness into architecture decisions, vendor strategies, and R&D investments.

Chief financial officers to fund the leap

- How? By aligning capital allocation with long-term quantum ROI potential and de-risking early-stage investments through partnerships and pilots.

Partner leads to forge new alliances

- How? By co-innovating with academia, startups, and ecosystem players to accelerate quantum adoption and capability building.

Compliance officers to ensure data requirements are being met

- How? By proactively aligning with current/upcoming National Institute of Standards and Technology (NIST) post-quantum cryptography (PQC) standards and updating data governance frameworks for quantum-era threats.

Risk officers to assess quantum's ability to completely reshape enterprise risk

- How? By modeling new threat vectors and resilience strategies in a post-quantum world.



Marketing and communications leaders to position the company's strategy around quantum

- How? By crafting narratives that demystify quantum, highlight leadership, and inspire stakeholder confidence.



Chief innovation officers to orchestrate quantum experimentation and pilot programs

- How? By identifying high-impact use cases, aligning innovation investments with quantum-readiness milestones, and piloting hybrid quantum-classical workflows for logistics optimization and fraud detection.

Product leaders to reimagine offerings for quantum-era customer needs

- How? By embedding quantum-inspired capabilities into roadmaps and exploring new value propositions through simulation, optimization, and secure data handling; and by integrating quantum-inspired algorithms into R&D cycles to simulate molecular structures or materials faster than classical methods.

Chief data officers to prepare data architectures for quantum-scale analytics

- How? By ensuring data integrity, provenance, and readiness for quantum-enhanced AI and machine learning models. This includes exploring quantum-safe data lakes and federated learning environments.

Legal and policy leaders to anticipate regulatory shifts

- How? By shaping internal governance frameworks that align with emerging quantum export controls, IP protections, and ethical deployment standards.

Sustainability officers to explore quantum's role in environmental, social, and governance (ESG) goals

- How? By modeling climate risk, optimizing energy grids, and accelerating materials



discovery for greener operations. Use quantum computing to simulate carbon capture materials, optimize energy grid distribution, or model climate risk scenarios with greater accuracy and speed.

AI/machine learning leads to integrate quantum-inspired algorithms

- How? By piloting hybrid classical-quantum workflows that enhance model performance and reduce training time. Develop agentic systems that use quantum backends for specific tasks like feature selection or optimization.

Field sales and go-to-market leaders to translate quantum strategy into customer value

- How? By equipping teams with less technical/more impactful messaging and vertical-specific use cases—like quantum-safe infrastructure for financial services or quantum-enhanced drug discovery for life sciences—to drive customer engagement and differentiation.

Experience designers to shape the human interface across classical and quantum systems

- How? By ensuring seamless, intuitive interactions across hybrid environments, redefine the definition of hybrid by

delivering the experiences across classical and quantum computing. One way to accomplish this is to prototype interfaces that visualize quantum uncertainty or enable drag-and-drop quantum workflows in low-code/q-code environments.



The current quantum readiness landscape

Quantum excitement is surging, reflected in soaring valuations across the sector. But the C-suite must adopt a longer-term lens, especially around post-quantum cryptography (PQC) and quantum innovation. While quantum optimization and the race for quantum advantage dominate headlines, the immediate priority is PQC: replacing vulnerable algorithms before quantum computers become a real threat.

Imagine if leaders had been prepared for OpenAI's ChatGPT moment. Today, as investor interest spikes—evidenced by an estimated 70% year-over-year gain in the Defiance Quantum ETF⁹—executives must shift focus toward safeguarding customer data and designing workflows that bridge classical and quantum systems.

Moving beyond the killer use case discovery to planning for quantum readiness and quantum optimization can serve the C-suite well and help drive brand reputation, rather than watch it fade due to inaction.

For many executives, the absence of a “killer use case” has stalled momentum. Executives are trained to prioritize initiatives with clear ROI. Quantum's timelines, technical complexity, and evolving standards make it harder to forecast

returns. Without that “killer use case,” it feels safer to wait, especially when budgets are tight or innovation is already stretched. However, today's hesitation should not be seen as a sign that quantum lacks value. Instead, it signals that how quantum value is understood and communicated needs to evolve. The organizations that win in this space won't be the ones who waited for the perfect use case; they'll be the ones who built readiness while others hesitated.

While quantum computing efforts have largely been driven by academics, businesses, and other entities in North America, the U.S.



government committed \$1.8 billion to accelerate quantum research through the National Quantum Initiative Act.¹⁰ This pales in comparison to China, which is investing \$10 billion into its National Laboratory for Quantum Information Sciences.¹¹ The European Union's

Quantum Flagship program is a €1 billion initiative dedicated to strengthening Europe's position in quantum computing.¹² These investments are an important step, but quantum readiness must move beyond research to actual immediate, practical applications.

In late spring, IonQ announced a definitive agreement to acquire Oxford Ionics for \$1.075 billion.¹³ A move of this magnitude may pave the



way to further M&A activity and drive valuations higher, another reason for the C-suite to pay closer attention to the space sooner rather than later. Just look at the premium seen in Bitcoin today from just a few years ago as an example of the opportunity if only executives saw where Bitcoin was going.

Some companies are charting a path forward with quantum. Telefónica, for example, is "taking advantage of the opportunities arising from quantum computing, to strengthen the protection

of the company's networks and systems, as well as those of its customers, identifying the most appropriate tools and processes to reinforce their security and neutralize risks through its services."¹⁴ Through the launch of its Quantum Center of Excellence (CoE), the company is embedding quantum strategy into its core operations. This CoE is designed to coordinate innovation across the business, from cybersecurity and communications to simulation and sensing technologies.¹⁵

Specifically, Telefónica is adopting a crypto-agility strategy, enabling its systems to rapidly respond to quantum-era threats by protecting keys, certificates, and sensitive data. This includes deploying post-quantum cryptographic protocols and making these capabilities available to customers as part of its service offerings.

This proactive stance mirrors similar investments by companies like IBM, Google, Microsoft, Deloitte, and EY, but Telefónica's emphasis on customer-facing security services and network-level quantum integration sets it apart. As governments introduce stricter guardrails and increase funding for quantum infrastructure, Telefónica's early moves position it as a model for how enterprises can lead, not follow, into the quantum future.

Quantum readiness considerations

As widespread quantum use and applications

become a nearer-term possibility, businesses must prioritize quantum readiness for two primary reasons: 1) to ensure their business's integrity and safety against quantum threats, and 2) to capitalize on the tremendous business opportunities quantum technology will unlock.

a. Quantum applications

Quantum computing isn't just a scientific breakthrough; it's a

optimizing portfolios in real time, even during volatile conditions.

- Pharmaceutical and life sciences companies can simulate molecular

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According to Deloitte, the total quantum computing market is projected to grow at a compound annual growth rate (CAGR) of 56.0%, reaching nearly \$65 billion by 2030.¹⁶

strategic inflection point. For forward-looking enterprises, preparing now means unlocking entirely new sources of value across industries.

Imagine a world where:

- Financial institutions can simulate thousands of market scenarios in parallel,



interactions at atomic precision, accelerating drug discovery from years to weeks while delivering hyper-personalized medicine.

- Supply chain and logistics leaders can optimize global networks in seconds, accounting for weather, tariffs, and real-time demand.
- Defense and intelligence agencies can model complex threat scenarios, secure communications with quantum encryption, and build resilient infrastructure against next-gen cyber threats.



- AI teams can supercharge model training using quantum-enhanced algorithms, enabling more autonomous, agentic systems that reason, adapt, and act with greater complexity and speed.

According to Deloitte, the total quantum computing market is projected to grow at a compound annual growth rate (CAGR) of 56.0%, reaching nearly \$65 billion by 2030.¹⁶

By grasping how qubits function and their potential applications, organizations can develop effective strategies and use cases for quantum technologies that can disrupt traditional business models by delivering quicker, more precise solutions and creating new opportunities for innovation.

b. Quantum safety

As we raise the importance of quantum readiness, the need to focus on quantum safety can't be overlooked. Quantum computers are already breaking traditional encryption methods, posing a threat to sensitive data and critical infrastructure.¹⁷

Therefore, while AI remains a critical part of modern corporate strategy, integrating quantum-safe technologies to protect against these quantum threats while maintaining seamless operation with existing infrastructure is crucial for business leaders. Companies that fail to adapt could face significant security threats in a post-quantum computing market. This could derail customer trust.

According to Gartner^{®18}, "Yet by 2029,

advances in quantum computing will make asymmetric cryptography unsafe and by 2034 fully breakable.”¹⁹ Thus, the C-suite would be well-served to prioritize the protection of customer data.

Various government entities are already taking security steps. In August 2024, the United States’ National Institute of Standards and Technology (NIST) released encryption standards designed to defend against future quantum attacks.²⁰ This pivotal move by NIST, coupled with the U.S. federal government's plan to migrate to post-quantum cryptography (PQC), provides essential guardrails for enterprises to become quantum-ready.²¹

Likewise, in May of 2025, the Dubai Electronic Security Center (DESC) launched the PQC Guideline focused on preparing “Dubai’s digital infrastructure to counter emerging quantum-based threats.”²²

Outside of government-tailored quantum initiatives, quantum regulatory oversight from the financial services industry is also rising. The U.S. Securities and Exchange Commission (SEC), for example, is developing a framework to enhance cybersecurity risk disclosures, which includes addressing the potential impact of quantum computing on cybersecurity.²³ This could pave the way for listed companies to soon disclose PQC readiness as part of broader SEC cybersecurity disclosure

requirements.

The PQC transition, which will develop cryptographic systems that are secure against both quantum and classical computers, is set



to redefine problem-solving, optimization, and security across industries. At the same time, the transition will address customer concerns about post-quantum encryption vulnerabilities and offer a more quantum-safe enterprise environment that also brings more responsible AI to many sectors. Pursuing quantum security is a vital enterprise imperative and opportunity.

Quantum advancements are pressuring businesses to comply with strict regulations and tackle urgent cybersecurity threats. This situation underscores the necessity of a quantum readiness playbook for today's C-suite executives.



A quantum readiness playbook

Given the growing need for quantum readiness, here are some ways the C-suite can take immediate action to prepare:

1. Appoint a quantum leader and create a quantum readiness task force.

Quantum touches nearly every domain (security, data, R&D, and compliance), making coordination essential. A dedicated leader ensures alignment across functions, while a task force can identify high-impact use cases, run pilots, and champion internal education to build quantum fluency. Appointing a quantum

innovation lead—someone who understands business trends and can spark cross-functional interest, surface strategic initiatives, and engage senior leadership—helps break down silos, accelerate readiness, and embed quantum into corporate strategy.

2. Establish a quantum Center of Excellence (CoE).

A quantum CoE can create a “quantum boomerang effect” that helps executives become more future-ready. It can help identify credible use cases, build in-house expertise, and attract partners, talent, and investors. A CoE can also help assess risks and prepare defenses or applications early, fostering a

robust ecosystem through collaboration with startups, academia, and national labs. This proactive approach will position your organization ahead of competitors and make business operations more future-ready.

Moreover, a CoE can attract scarce quantum talent and build cross-functional teams that integrate domain experts, data scientists, and quantum researchers. It will serve as a hub for collaboration with startups, academia, and national labs, fostering a robust ecosystem.

To shareholders, partners, and employees, a quantum CoE signals your commitment to emerging technologies, strategic leadership, and a vision that extends beyond upcoming quarterly earnings. This demonstrates your dedication to fostering an innovation culture and maintaining a competitive edge in the rapidly evolving technological landscape that can yield new business models and intellectual property development.

3. Develop a quantum readiness and literacy initiative.

Building a strong foundation in quantum literacy and talent is essential for the successful adoption of quantum technologies. This involves educating your workforce about the basics of quantum computing, its potential applications, and the current state of the technology. Investing in training/certificate programs, workshops, and collaborations with academic institutions can help develop the necessary skills and knowledge within your organization. Additionally, establishing a

cross-company quantum task force and attracting as well as retaining top quantum talent will be critical to staying ahead in this rapidly evolving field.

Embracing quantum technology must be grounded in foundational education, training, and cross-disciplinary collaboration. Public-private partnerships and talent mobility programs will be essential for developing expertise and unlocking synergies between quantum computing and classical AI models, ensuring enterprises are prepared for a quantum future.

4. Create a use case exploration roadmap.

To effectively harness the potential of quantum computing, it's crucial to identify and prioritize the most relevant quantum capabilities that align with your organization's goals and technology roadmaps. This involves understanding the specific problems that quantum computing can solve better than classical computing, such as optimization, cryptography, and complex simulations. By focusing on these key areas, the C-suite can ensure that your quantum initiatives are both impactful and aligned with your strategic objectives.

The C-suite must move beyond general awareness and toward intentional prioritization. This begins with identifying the quantum capabilities—such as optimization, cryptography, and complex simulation—that directly align with your organization's strategic goals and technology roadmap.

Quantum computing isn't a one-size-fits-all solution. Its value lies in solving problems that are computationally intractable for classical systems. For example:

- **Optimization:** Quantum algorithms can dramatically improve supply chain efficiency, portfolio management, and resource allocation—areas where even marginal gains translate into significant financial impact.
- **Cryptography:** As quantum systems evolve, they will render current encryption methods obsolete. Preparing now with post-quantum cryptography ensures business continuity and regulatory compliance.
- **Simulation:** Quantum systems can model molecular interactions, materials, and financial systems with unprecedented accuracy, accelerating innovation in R&D-heavy sectors like pharma, energy, and aerospace.

By focusing on these high-impact domains, executives can ensure that quantum initiatives are not just exploratory but strategically grounded. This means:

- Prioritizing use cases that offer measurable ROI or risk mitigation.
- Aligning quantum pilots with existing digital transformation efforts.

- Building internal readiness through education, partnerships, and talent development.

Ultimately, quantum readiness is not a technical milestone—it's a leadership imperative. Organizations that act now will shape the standards, ecosystems, and competitive dynamics of the quantum era. Those who wait risk being disrupted by it.



5. Engage in the quantum ecosystem and form strategic partnerships.

The quantum ecosystem is a rapidly evolving network of technology providers, academic institutions, startups, government agencies, and industry consortia working together to advance quantum science and its commercial applications.

The quantum ecosystem is more than a collection of vendors; it is a strategic enabler. It accelerates innovation by pooling R&D resources and sharing breakthroughs across academia, startups, and enterprise labs. It de-risks adoption through shared standards, pilot programs, and regulatory guidance. It

builds talent pipelines through academic partnerships and workforce development. And it shapes policy and governance to ensure responsible, secure, and equitable deployment. Perhaps most importantly, it creates market momentum by aligning incentives across public and private sectors.

Engaging with this ecosystem isn't optional for the C-suite; it's essential. Strategic partnerships and targeted investments are the fastest path to quantum readiness, helping your organization stay ahead of disruption and lead in a rapidly evolving landscape.

6. Develop a quantum governance framework.

As quantum technologies move from research labs into enterprise environments, organizations must ensure that innovation is not only accelerated but also responsibly managed. A well-structured governance framework provides the foundation for this by aligning quantum initiatives with enterprise strategy, managing emerging risks, and ensuring ethical deployment.

This framework should define clear ownership and decision rights across key functions (R&D, cybersecurity, compliance, legal, and partnerships) so that quantum efforts are coordinated rather than siloed. It should also establish ethical guardrails to guide responsible experimentation, particularly in the areas of quantum cryptography, AI acceleration, and data privacy.

Importantly, quantum governance must be

dynamic. As quantum capabilities evolve from early-stage pilots to production-grade systems, the framework must scale with them. This includes updating policies, revisiting risk models, and adapting controls to new threat vectors and regulatory expectations.

For the C-suite, this is about more than oversight; it's about enabling agility with accountability. A strong governance model ensures that as your organization explores quantum's potential, it does so with transparency, trust, and strategic clarity. It becomes the connective tissue between innovation and impact, helping you lead with confidence in a rapidly changing technological landscape.

7. Harden security for the quantum future.

To start crypto-agility assessments or the ability to quickly and seamlessly switch between different cryptographic algorithms and protocols without disrupting the system's operations, first map out all the places where



cryptography is used within your organization, including data at rest, in transit, and in use. Next, evaluate the current cryptographic algorithms, protocols, and key management practices, identifying any legacy systems that may be outdated or vulnerable. Conduct a risk assessment to evaluate the sensitivity of the data, the potential impact of cryptographic failures, and the likelihood of attacks. Finally, develop a crypto-agility plan that outlines the transition to more secure cryptographic methods, including timelines, resource requirements, and potential operational impacts. Begin transitioning to post-quantum cryptography (PQC) standards like those already proposed by NIST.



Prioritize systems and data that are most at risk, focusing on transitioning these critical areas first. Develop a detailed transition plan that includes timelines, resource allocation, and potential impacts. Implement PQC algorithms in a controlled environment to test their

effectiveness and refine your plan based on the results. Finally, gradually roll out PQC algorithms across your organization, starting with the most critical systems, and ensure all stakeholders are trained and prepared for the transition.

Even though the transition to post-quantum cryptography is starting before a cryptographically relevant quantum computer has been built, there is a pressing threat that the C-suite must digest and prepare for. Encrypted data remains at risk because of the "harvest now, decrypt later" threat, where adversaries collect encrypted data now with the goal of decrypting it once quantum technology matures.

As quantum computing advances, it poses significant challenges to current cryptographic methods. Spinning up a focus on quantum security takes time. In fact, NIST notes that "the journey from algorithm standardization to full integration into information systems can take 10 to 20 years."²⁴ Since sensitive data often retains its value for many years, starting the transition to post-quantum cryptography now is critical to preventing these future breaches. This threat model is one of the main reasons why the transition to post-quantum cryptography is urgent.

8. Work with vendors and partners to future-ready digital infrastructure.

Future-ready infrastructure is not just about upgrading hardware or migrating to the cloud; it's about proactively building a resilient, secure, and adaptable foundation that can evolve with



emerging technologies like quantum computing, AI, and post-quantum cryptography. It's a strategic posture that ensures your organization can absorb disruption, scale innovation, and maintain trust in an increasingly complex digital landscape. This readiness requires more than technical upgrades; it demands foresight, cross-functional alignment, and proactive investment. It's about preparing your enterprise to not only withstand the next wave of technological change, but to lead it.

To future-ready your digital infrastructure, engage with vendors and partners to understand their plans for supporting future technologies like quantum computing and advanced cryptographic methods, ensuring they maintain security and compliance standards. Invest in flexible and scalable solutions, such as multi-cloud and hybrid cloud

architectures, to adapt to future changes without significant disruption. Implement robust security measures, including advanced encryption, continuous monitoring, and threat detection. Build a knowledgeable team and provide ongoing training to handle emerging technologies and security threats. Regularly review and update your infrastructure to incorporate the latest advancements and proactively address potential vulnerabilities.

To lead (not lag) in the quantum era, organizations must embed quantum readiness into the fabric of enterprise strategy. In a landscape where disruption is inevitable, proactive leadership that helps drive quantum readiness across the entire organization will be the differentiator.

Conclusion

Quantum readiness is about preparing for a future where quantum computing will redefine the technological landscape. By understanding and embracing this shift now, businesses can more tangibly demonstrate how they are evolving their focus on operational resiliency and ensure they are not only secure but also at the forefront of innovation and crypto agility.

In a world where trust, transformation, and technological edge define market winners, preparing for quantum is no longer optional. It signals to customers, partners, and regulators that your organization is future-focused, secure, and resilient. This isn't about optics—it's about owning the next era of innovation.

Quantum is no longer a distant horizon; it's a strategic frontier. From cybersecurity and finance to pharma, logistics, and AI, quantum is poised to reshape the foundations of industry. The sectors that act now will define the next decade of innovation.

For the C-suite, this is more than a technology shift—it's a leadership moment. Now is the moment for the C-suite to lead by prioritizing quantum readiness, unlocking transformational value, and setting the pace for the quantum economy.

The organizations that prioritize quantum readiness today will not only adapt to the future but also own it.



Endnotes

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