

Hey! What's New? 2025-4

Quantum Computing: The Next Frontier

Robert Seiner writes in a recent issue of *The Data Administration Newsletter*, that “quantum computing is not just an incremental advancement over classical computing — it represents a paradigm shift. Unlike traditional computers that rely on binary bits (ones and zeros), quantum computers use quantum bits, or qubits, which can exist in multiple states simultaneously through something called superposition. This allows quantum computers to process vast amounts of data and solve problems exponentially faster than their classical counterparts which utilize linear programming.”

He adds, however, that the shift to quantum computing isn't just about faster processing, “it's about fundamentally rethinking how we approach problem solving. This new paradigm requires organizations to prepare not just technologically, but also operationally, culturally, and ethically. Governance will play a key role in ensuring that this transition is both effective and responsible.”

In the financial sector, Seiner notes, “quantum computing offers unparalleled opportunities to enhance risk modeling, fraud detection and portfolio optimization. The ability to analyze vast datasets in real-time can transform decision making and provide a significant competitive advantage. However, this power also raises questions about fairness, transparency and ethical considerations in financial applications.”

According to Seiner, “the differences between quantum and classical computing extend beyond speed and scale. Quantum computing operates on principles like superposition and entanglement, which defy conventional logic. These concepts enable quantum systems to process and analyze data in ways that are probabilistic rather than deterministic.”

This shift presents unique challenges for organizations, he points out. “Traditional governance frameworks are built around deterministic systems where processes and outcomes are predictable. Quantum computing's inherent uncertainty makes it harder to establish clear accountability, validate results and manage risks. Without proper governance, organizations risk losing control over the integrity and reliability of quantum-driven decisions.”

Quantum computing also requires a different approach to collaboration, says Seiner. “It demands multidisciplinary teams that include not only quantum scientists, but also ethicists, data governance professionals and domain experts. Governance must account for this complexity, ensuring that quantum initiatives are transparent, ethical and aligned with organizational goals.”

Quantum computing introduces significant governance challenges that organizations must address proactively, Seiner writes. “Data security is a key concern, as quantum capabilities threaten to render current encryption methods obsolete. Organizations must rethink how they protect sensitive information in a quantum-enabled world.”

He believes that compliance will also become more complex. “As quantum computing evolves, regulators are likely to introduce new standards to manage its ethical and operational risks.

Organizations that fail to anticipate these changes may face significant disruptions. Governance frameworks need to be flexible and adaptive to stay ahead of regulatory requirements.”

Finally, accountability takes on new dimensions with quantum computing. “Who is responsible for decisions made by quantum algorithms, especially when outcomes are probabilistic? Governance must provide clear frameworks for decision making, bias management and ethical oversight, ensuring that quantum computing serves organizational and societal interests.”

Ultimately, Seiner concludes, “preparing for Quantum Governance is not just about mitigating risks — it’s about seizing opportunities. Organizations that integrate governance into their quantum strategies will be better equipped to leverage this transformative technology responsibly and effectively.”

The question is not whether Q Governance will be necessary, he points out, “it’s how soon organizations will realize the need to start. By acting now, organizations can lay the groundwork for a future where quantum computing delivers its full potential while upholding the values of accountability, transparency and trust.”

For much more, see [All in the Data: Too Soon for Q Governance? – TDAN.com](#).