

David Weldon of CIO.com in discussion with Arthur Tisi, Co-founder of BaseForge

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What is the Year of Quantum Computing All About?

The United Nations has designated 2025 as the Year of Quantum Science and Technology. What do you believe is the significance of this designation?

Trends and events don't always follow a linear timeline. While the "year of" phrase can be a fun way to discuss potential developments, we need to maintain realistic expectations and avoid setting ourselves up for disappointment. Quantum computing is poised to revolutionize the future. However, the growth curve is not linear. Quantum technologies are expected to revolutionize industries, from medicine and pharmaceuticals to materials science and artificial intelligence. The Year of Quantum Science could act as a catalyst for breakthroughs and investments. I am most excited about industrial revolutions in medicine and pharmaceuticals as well as materials science and AI. I see it starting as a hybrid approach.

What would you expect to be the messages of such a campaign to be?

There would likely be efforts to make quantum science more approachable and understandable, explaining what quantum computing means for everyday life in simple terms. "Quantum for Everyone" might be a tagline. The campaign will promote how advancements in quantum require international cooperation, similar to climate change showing that breakthroughs in this field could benefit the entire world, impacting industries - not just a few nations or corporations. The messaging needs to be – this comes with lots of challenges still, it can be a catalyst for helping solve previously insurmountable problems. Global challenges come with hard work and alignment around IP, National Security, and of course regulation, especially around ethics. But no doubt it could have a huge impact on things like drug discovery, setting aside the bureaucracy within government agencies.

Where are we currently with quantum computing research and development?

I would like to first say that many people try to compare the growth in AI to Quantum Computing as a way of calculating the timing of growth in each. While AI started as software-driven, quantum computing is hardware-dependent, and that requires a very different approach to create stable qubits. There is a physical complexity in quantum computer development that is different

from how AI was developed. I had an opportunity to speak to Peter Shor at MIT and he saw error correction and algorithm efficiency as challenges to commercial scale. I think that remains an area of needed focus. So we are still in the (noisy) NISQ era, and it is great that there is government, academic, and company investment but there is still a fair amount to accomplish before there is expansive commercial adoption and that includes that resources are expensive,

talent is limited and the learning curve is tough. The smartest people in this field believe we are a decade off, more or less, from advancements in Quantum chemistry and optimization and a bit longer for fault tolerance that will then open the floodgates.

Where do you expect us to be in a couple of years' time, and what would any advances likely mean?

I kind of answered this in the prior question (sorry) – but advances = adoption

When do you expect that organizations might truly be able to benefit from quantum technology, and what would the benefits likely be?

Well, we are, as I mentioned, some time away from pervasive adoption in other than hybrid quantum but I am excited to see challenges solved around logistics, complex financial modeling, cryptography, and security. I am especially excited about drug discovery, particularly around protein, molecular, and gene modeling that will transform bespoke drug modeling. Imagine patients with a gene mutation that makes them resistant to certain cancer treatments... a quantum computer could analyze their genetic profile, test the efficacy of various treatment options virtually, and design a drug that precisely targets their tumor cells. Right now “standardized” drug cocktails are not nearly efficacious enough.

Why should IT pros take an interest in these developments, and how are advances in quantum technology likely to impact the IT workforce?

The reasons are one and the same to me and as a former CIO and CTO, I have long believed that IT executives have their very own “hypocritic oath”, in fact – NOW MORE THAN EVER to things like, but not limited to, *do no harm, respect privacy, promote fairness, act with integrity, champion security*, and also and (even more particular to quantum adoption) *continuously learn, adapt and build for long-term impact not just short term gain!!* To be practical, there are big opportunities for tech leaders to engage in meaningful and financially rewarding work. And there is also hybrid quantum clipping at IT executive heels. I am seeing meaningful growth in hybrid computing where quantum computers are used to accelerate specific tasks while more traditional systems handle the rest, and this is happening today, now, so there is also a hybrid approach to IT teams where there is both innovation and sustainability of existing infrastructure for other operations.

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