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How RBS made a quantum leap into the future

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In the shadow of a giant airship hangar on a defunct navy base in Silicon Valley, Ross McEwan sat down for a presentation about the future. It was 2015, and the then boss of Royal Bank of Scotland already had his hands full repairing the bank's balance sheet after the financial crisis.

Nonetheless, he was transfixed by what the presenter, a bald Canadian with an earring and a goatee, had to say. "Imagine every piece of data your bank has ever created is now public. That is what quantum computing is going to do to you," said Andrew Fursman.

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Andrew Fursman, 1Qbit co-founder

The co-founder and boss of Canadian start-up 1Qbit proceeded to set out how quantum computing would be the next leap in processing power, fuelling a new class of hardware, far ahead of today's supercomputers, that would upend every industry — including banking.

John Stewart, RBS's head of innovation, recalled: "I was watching Ross and [current chief executive] Alison Rose and their jaws were on the floor. Ross said, 'We need to get all over this. More people in the bank need to know. What do we need to do?' "

So began a partnership with 1Qbit, a quantum computing startup. RBS invested in 2015 — a rare move for the bank — and has just doubled down by joining the latest venture capital round.

Most computers work in bits: electrical pulses represented by 1s and 0s. Quantum computers work in quantum bits, or qubits, which are subatomic particles such as photons. Unlike bits, qubits can be both one and zero at the same time, making them capable of bigger and more complex calculations.

Some businesses are already working with quantum computers, though the hardware is still relatively crude. Volkswagen has used them to research battery improvements for electric cars; Amazon and Microsoft have integrated the tech into their data centres to help clients in need of some extra computing horsepower.

RBS has trialled 1Qbit's algorithms to see how much it should set aside for bad loans. A process that typically takes weeks "was done in seconds, and provided a better answer", Stewart said.

Qubits are fragile and unstable, and the best way to generate them has yet to be determined. Despite the challenges, the prize is alluring. One thing that quantum computers excel at is simulating complex systems and then carrying out virtual experiments instantly. This is why pharmaceutical giants, for example, are intrigued.

Fursman, 39, said: “If you could do more work in a single day than has ever been done before in the history of humanity, you can only imagine the things that you would discover, the materials that would be possible . . . real opportunities to, quote unquote, change everything.”

Even if the true quantum age is still years away, the pitch resonated with RBS. The bank is “18 to 24 months” ahead of its rivals in terms of understanding and integrating the technology, Stewart reckons.

Ploughing cash into 1Qbit is also an insurance policy for RBS. It cannot afford to be caught off-guard by a technology that emerges suddenly and, for example, renders all its digital security useless overnight.

“Maybe a million-dollar investment in order to understand something that could jeopardise your multibillion-dollar business is a great trade-off at this stage,” Fursman said.

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