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ASX Announcement (ASX: **AXE**) 26 May 2021

Quantum algorithms for AI-driven ^{12}CQ chip end-uses

Highlights

- Archer progresses quantum algorithm development for Artificial Intelligence ("AI") applications of its ^{12}CQ quantum computing processor chip ("^{12}CQ chip").
- The Company is working on optimising Quantum Neural Networks, which could be relevant to consumer and enterprise-scale AI technology products.
- AI is set to transform the productivity and GDP potential of global economies[†].
- AI is one of many future applications for the ^{12}CQ chip, and Archer will explore other applications such as blockchain, space, autonomous cars and cybersecurity.

Archer Materials Limited ("Archer", the "Company", "ASX: **AXE**") is pleased to provide shareholders with an update on the development of its ^{12}CQ chip. Archer is working with Max Kelsen to develop quantum algorithms relevant to the ^{12}CQ chip in the field of AI (ASX ann. 9 Dec 2020). Archer and Max Kelsen are members of the global IBM Quantum Network.

Quantum algorithm development, testing, and validation is an essential part of the early-stage development and commercialisation of the ^{12}CQ chip because it links the chip operation to end-use applications. The collaboration with Max Kelsen (a leading Australian Artificial Intelligence and Quantum Computing business) is part of the Company's broader strategy to target end-uses and applications of the ^{12}CQ chip in *Mobility Technology* (Exhibit 1).

Neural Networks form an essential part of AI technology[‡]

Archer and Max Kelsen have made significant progress in the development of Quantum Neural Networks. The work has involved adapting a unique class of quantum algorithms, called Quantum Approximation Optimisation Algorithm, to be used in the training of Quantum Neural Networks and more generally Variational Quantum Eigensolvers. These quantum algorithms could potentially allow quantum computing devices to outperform modern computers in solving complex problems with broad applications.

Early results of the ongoing algorithm development with Max Kelsen indicate that significant improvements in algorithmic performance can be achieved. This is important since it may provide a viable pathway to implementation of Quantum Neural Networks and related algorithms on near-term, early versions of quantum computing hardware devices. Testing and validation are performed using IBM's Qiskit software and quantum computers.

Archer and Max Kelsen will continue to build the algorithm with the aim of making it publicly available on the Qiskit platform in the second half of this year.

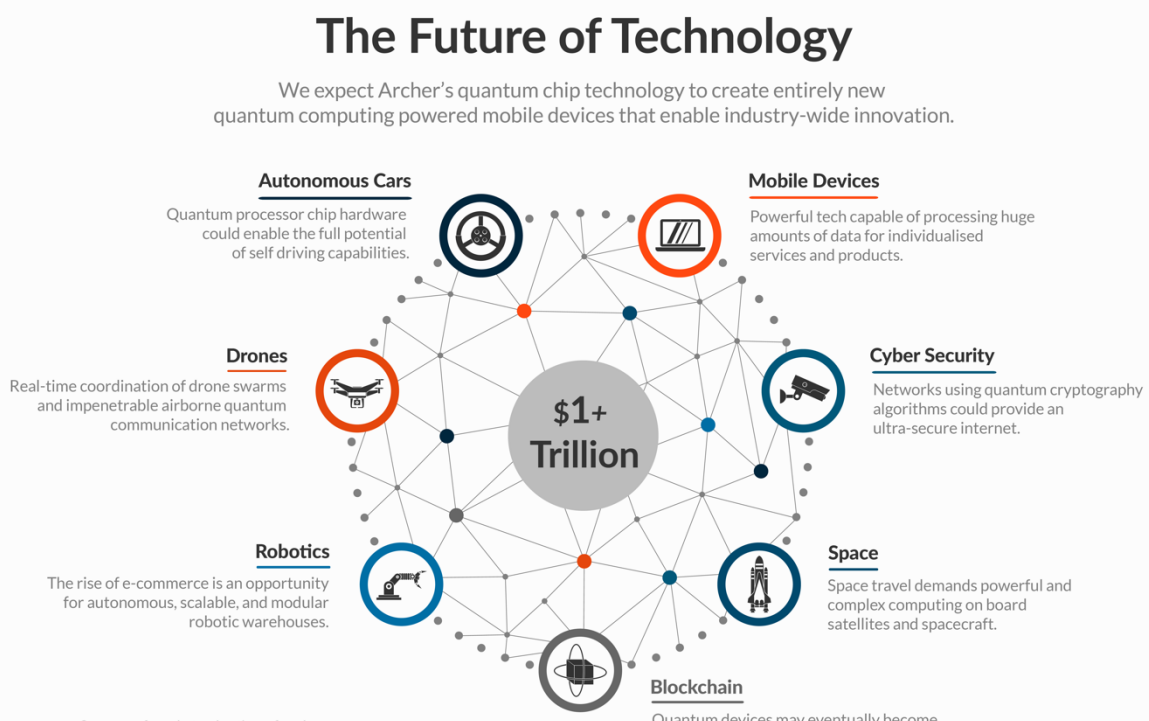
[†] https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html
[‡] https://www.ibm.com/cloud/blog/ai-vs-machine-learning-vs-deep-learning-vs-neural-networks

Commenting on the ^{12}CQ chip development, Archer CEO Dr Mohammad Choucair said: "There are parallels between the business growth strategies of quantum computing companies today and the computing companies of the 1980s that have since come to dominate global tech.

"Hardware and software firms working together at an early stage of technology development is a well-known recipe for success in the computing industry.

"At Archer, we are working with global leaders in computing and AI to develop and integrate the software required to enable the operation of our ^{12}CQ chip and its proposed high impact end-use applications".

Exhibit 1: ^{12}CQ quantum computing chip potential end-uses in mobile and data-centric industries.



Algorithms are the backbone of software development

Algorithms are logical ways to solve problems that are written in software with most implemented as computer programs and considered 'technology'. Hardware, *e.g.* chip processors, are needed to run algorithms. Well known algorithms used in modern computing devices form the basis of cryptography (including cryptocurrencies), searches, and social media platforms. The principal purpose of building quantum computing processors is to apply and run *quantum algorithms* to generate value from outperforming modern computing.

About Archer and the ^{12}CQ quantum computing chip

Archer is a technology company that builds advanced semiconductor devices, including processor chips that are relevant to quantum computing. ^{12}CQ is a world-first qubit processor technology that Archer is building to enable quantum computing powered devices for mobile and data-centric applications. For more information, please view Archer's webinar with IBM.

The Board of Archer authorised this announcement to be given to ASX.

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