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21st century themes: The blockchain

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Three years ago, a little-known digital currency called Bitcoin erupted on a bull-market run that boosted its value from around US\$15 (A\$20) a coin to just under US\$1,000 in 12 months. Fortunes were made by the anarcho-capitalists who saw bitcoin as a way to revolutionise the economy by sweeping away government-controlled money – riches that in many cases were lost in the subsequent price collapse, all the way down to about US\$220 by early 2015.

Bitcoin’s volatility remains an impediment to its widespread adoption as money. But it has left a legacy in the form of hype around the “blockchain” – the encrypted, distributed or public ledger on which Bitcoin is based. The excitement is tied to hopes that distributed-ledger technology could lead to big cost savings for businesses, especially those in financial services. Venture capital is flooding in and estimated spending on this technology is expected to reach US\$400 million by 2019.

The blockchain innovation is that its architecture allows for instantaneous sharing of centralised, encrypted information. At the moment, databases are logically decentralised and physically centralised. Firms maintain physically distinct databases, protected by perimeter security, but store unencrypted information. Independent servers mean that when they share information – in order to process financial trades, for example – they must independently verify data. Reconciling different sets of the same data costs global financial players billions of dollars each year.

In contrast, a blockchain – or distributed ledger – is logically centralised and physically decentralised. Information is accessible in a central ledger, via multiple nodes. Data can be accessed more or less instantaneously and can be replicated instantly between parties. It is encrypted, meaning it’s protected by mathematical proofs that make it impossible to corrupt the record of ownership and transactions. Blockchains can be public – as with the Bitcoin chain – or private, whereby permission to access the database is given only to select participants.

Amid the frenzy about the blockchain’s potential, investors need to consider the long time-horizons and technical challenges surrounding a theme that carries the risk of being overhyped in the short term. But the blockchain’s potential is real enough. It’s likely a major 21st century investment theme.

Beyond finance

Trading in many securities still relies on old-fashioned systems of negotiated contracts between buyers and sellers. It still takes almost 20 days on average to settle syndicated loan trades. The total cost to the finance industry of clearing, settling and managing post-trade environments is around US\$65 billion to \$80 billion a year. Using decentralised networks for payments and settlement could help banks save potentially US\$15 billion to US\$20 billion a year from 2022 according to Santander[1] by improving and outsourcing back-office settlement.

Blockchain startups are likely to emerge outside of core capital markets in the next 18 to 24 months to capitalise on the hype. But collaborative efforts to overhaul core capital market data infrastructure are likely to take far longer to come to fruition – more than 10 years seems likely. Regulatory encouragement, however, could speed up development, given regulators’ interest in market infrastructure that reduces costs for consumers and limits operational and systemic risk. Investment opportunities in successful financial adopters need to be considered in the context of these time frames.

Successful blockchain development could result in profit gains across the financial sector and, potentially, gains for consumers in the form of lower prices for popular financial products. But distributed ledgers could have ramifications for other markets too. Online retail has gained tremendous market share over the past 20 years, but the blockchain could refine the process further by allowing instantaneous sharing of information and buy-sell transactions on a host of goods and services.

Distributed ledgers could open the internet to many low-value products that had previously been excluded, because it would have cost more than the product was worth to collect payment. For example, if people had the option of an instant payment of five cents to read an online article, this could help solve the problem the media has had in monetising online content because it would do away with the hassle and cost of signing up for annual subscriptions. Similarly, the music industry has struggled to adapt to the internet. But blockchain technology could facilitate the development of music exchanges, where payment for songs could be made directly to artists, instead of media platforms. This could serve the creative community and consumers by redistributing money away from intermediaries. In terms of more general retail use, Overstock.com of the US is examining integrating the blockchain into its retail business.

Others companies are sure to follow. Some potentially promising start-up examples include Bitproof, an online notary that provides blockchain-based certification of intellectual property and other digital assets. Then there is Otonomos, which allows people to incorporate firms by opening a digital share wallet. Shares can then be transferred peer to peer, creating a market for non-listed shares.

Another one to watch is Factom, a developer of a proof of concept for next-generation land title registry – aimed at stopping criminality surrounding land titles in the developing world. Look out, too, for Filament, which is seeking to market the “Filament Tap” – a sensor device that allows devices to communicate with phones, tablets and computers at distances of up to 14 kilometers.

Watch out, intermediaries

Synergies with the internet of things could be particularly significant. Samsung and IBM unveiled a proof of concept earlier this year for ADEPT, a system that uses elements of bitcoin’s underlying design to build a distributed network of devices – “a decentralised internet of things”.

ADEPT included an example of how a washing machine could become a “semi-autonomous device capable of managing its consumables supply, performing self-service and maintenance, and even negotiating with other peer devices”. [2] Blockchain-connected devices could be the next exponential

leap in computing technology.

The blockchain could help to create decentralised energy markets. A US startup called TransActive Grid has pioneered peer-to-peer sales of solar electricity – allowing those who don’t have solar panels to buy electricity from those who do. Again, disintermediation is the theme: with the middleman – in this case, traditional utility firms – disappearing as energy consumers buy directly from producers. Realistically, this could only work in the short term in small residential and industrial grids, given that the vast majority of power generation will likely remain centralised for decades to come. But the seeds for developments in this field have been sown and could lead to exciting investment opportunities; in the short term, perhaps most clearly in off-grid providers in developing countries offering pay-as-you-go supplies of electricity.

Blockchain does face obstacles, however. Increasing network capacity is likely to be a challenge for blockchain developers. The closed-system ledger that underpins Bitcoin works reasonably well, as shown in part by the steady growth in the size of the Bitcoin blockchain. While trading and settling other securities via this type of ledger is possible, the complexity of doing so – while admitting millions more participants – would require a serious leap in network capacity. The US credit-card company Visa handles on average around 2,000 transactions per second; in contrast, the Bitcoin network is restricted to seven transactions per second, on account of the one-megabyte limit on block sizes.

Exchange costs are another question. The bitcoin community is debating whether bitcoin should have a greater role as a medium of exchange – hence the need for greater transaction capacity – or as it remains: an ultra-secure, scarce store of value, with limited utility as a medium of exchange. Scaling up the network and adding different assets to the mix could entail significant new costs and complexities.

And while big banks and clearing houses appear to be embracing the blockchain, this may be more of a defensive measure designed to contain a competitive threat rather than a whole-hearted embrace of the concept. As Wired magazine points out in relation to the US Depository Trust & Clearing Corporation (DTCC) – the body which oversees the US stock-settlement system, and which is co-owned by the biggest entities on Wall Street and beyond – it and the broader industry it represents “are embracing a technology that could potentially overturn them”. Carried far enough, the blockchain could after all eliminate the DTCC.[3] While the path of development remains uncertain, the blockchain is likely to bring about significant changes in a variety of industries in the coming years.

Important information

References to specific securities should not be taken as recommendations.

[1] Financial Times. “Banks seek the key to the blockchain”. 1 November 2015.

[2] Goldman Sachs “Profiles in innovation: blockchain – putting theory into practice.” May 2016

[3] <http://www.coindesk.com/what-is-the-bitcoin-block-size-debate-and-why-does-it-matter/>

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