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Blockchain and payments: Reality after the hype

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In 2017, blockchain moved from a fringe innovation used by a small, tech-savvy community, to a tool being developed and deployed by stock exchanges, banks, shipping companies and governments. Blockchain and distributed ledger technology (DLT) has great potential to improve security, reduce costs and drive efficiency gains in the financial services industry.

But it is not a panacea. Despite the hype of 2017, there are limitations. While some may be improved through further innovation, others, like processing speed, are fundamental to blockchain's functioning. The wild price fluctuations of cryptocurrencies like regulators' misgiving about initial coin offerings as a means of raising capital, and high-profile hacks of digital currency exchanges, all give reason to pause. In 2018 and beyond, we expect to see blockchain deployed by financial services companies to solve specific, bounded problems, like trade finance, while other payments mechanisms remain dominant in the consumer space. This white paper explores the events of the last year, and what they mean for the future of payments.

"Distributed Ledger Technology and Blockchain offers an exciting and fundamental redrawing of the existing payment landscape, and although widespread implementation will take some years to achieve, it will likely be a vital ingredient in delivering the kind of banking and payments services that customers are coming to expect in a digital world," says Radi El Haj, Chief Executive Officer of RS2. "The challenge in implementing fundamentally new technologies is how to navigate the difficult road between traditional providers, and the way things are done now, and new innovators as the transition plays out in the coming years. Increasingly, an important part of the job for all of us in the payment industry is to help connect incumbent institutions and new entrants in a way that benefits the customer and smoothes their banking and payment journey."

Blockchain is a distributed ledger technology (DLT) in which digital transactions are recorded in a 'block', which is connected to the transactions before and after, in an irreversible chain linked through algorithmically-generated cryptography. The blockchain is de-centralised across multiple computer devices. No transactions can be faked or tampered with, and there is no central depository. Strictly speaking, blockchain transactions require no central authority or third-party verification at all.

In its earliest imaginings, blockchain was a marginal experiment with a libertarian ideology, developed by technologists who envisaged a currency system outside the purview of central banks, regulators and governments, and with potential applications into broader transactions including contracts. In the beginnings, this anti-establishment ideology, and the anonymity it provided, meant blockchain was largely synonymous with nefarious cryptocurrency transactions over the 'dark web', including drug dealing. Many dismissed blockchain as a fad after Mt. Gox, once the world's largest trading exchange for bitcoin, collapsed in early 2014 after being hacked, losing hundreds of millions of dollars' worth of currencies. A further 10 cryptocurrency exchanges - the locations where digital currencies are bought, sold and stored - have since closed due to theft, fraud and deception¹. Blockchain is not synonymous with cryptocurrencies even though it is the underlying infrastructure that enables currencies like Bitcoin, and governance challenges in cryptocurrencies do not reflect on the power of the distributed ledger technology. However, such events do tend to get lumped together with blockchain, not helped by the fact that its founding proponents had such a strong anti-state ideology that some associate with criminal activities.

Yet despite such drama, interest in blockchain and cryptocurrencies did not wane. On the contrary, a growing list of mainstream organisations began to accept cryptocurrency payments, including Microsoft, WordPress, Virgin Galactic, Amazon, Starbucks and Expedia. In 2017, billions of dollars of funds were raised by companies so-called initial coin offerings (ICOs) - with start-ups raising \$5.6bn².

Governments have taken an interest in blockchain and cryptocurrencies too. Estonia and the Emirate of Dubai are exploring the use of blockchain for public information records. In April 2017, Japan's government officially recognised virtual currencies, and Switzerland is reportedly now accepting tax payments in bitcoin.

Regulators are also, of course, worried about security risks and consumer protection, as evidenced by the reigning in of ICOs. These raised over \$3bn in 2017, with most interest coming from Asia. This led the governments of South Korea and China to step in to cool the market. The Chinese government described ICOs as a “form of unapproved illegal public financing”, prompting some ICO investors to move to over-the-counter markets, or relocate offshore. In January, media reports suggested that South Korea was planning a bill to ban cryptocurrency trading³. This caused the price of bitcoin to plummet since the Asia region has been a central driver of growth. Some governments are also exploring cryptocurrency for questionable ends. The

government of Venezuela, facing a serious credibility crisis as the economy unravels, has issued over \$5bn in an oil-backed cryptocurrency. And Russia is reportedly exploring the possibility of cryptocurrencies to side-step financial sanctions.

As the dust settles on this eventful year, the promise and limitations of blockchain and its related technologies are becoming clearer. How will all this change the payments industry? Evidence so far suggests that cryptocurrencies are a long way from displacing current popular payments methods, especially cards and online payments, but its value for clearing and settlement activities among trusted partners is more promising.



¹<https://www.reuters.com/investigates/special-report/bitcoin-gox/>

²<http://money.cnn.com/2017/12/18/news/companies/overstock-ico-ceo-byrne/index.html>

³<https://www.ft.com/content/0d5ff7d4-f67d-11e7-88f7-5465a6ce1a00>

While some advocates hope that blockchain-based payments will usher a new era in de-centralised transactions, the reality is rather different. Blockchain has a lot of problems to overcome before rivalling the use of so-called 'fiat' currencies. Firstly, payments are very slow and cumbersome relative to online payments or cards, taking up to 10 minutes for average users although huge improvements have been achieved in this area.. Processing speed is not just a growing pain; its fundamental to the blockchain process, through which transactions are recorded and distributed across multiple disconnected computers through a 'mining' process.

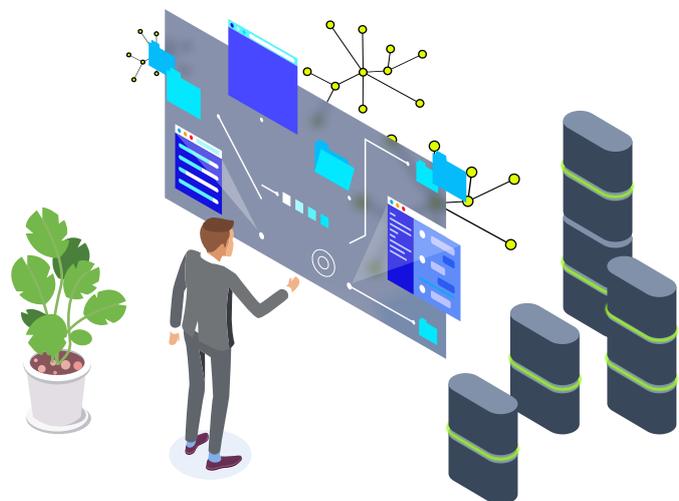
Estimates of the electricity used in mining bitcoin alone are 'staggering' according to Philip Lowe, governor of the Reserve Bank of Australia, although new ways of mining, requiring less power consumption, are emerging⁴. Other inconveniences, relative to current payments approaches, include people's loss of access if they forget passwords, which has cost some people tens of thousands of dollars, and with few of the helpful identification-recovery mechanisms offered by banks⁵.

Cryptocurrencies are also unlikely to become mainstream payments mechanisms, at least in the short term, because of their wildly gyrating values. In 2013, one bitcoin was worth just \$12; four years later, it scaled \$10,000. The bitcoins used to buy two pizzas in a landmark 2010 transaction would, if they hadn't been spent, be worth \$46m by November 2017. Trading in bitcoins has thus been inversely related to price changes. The more it is worth, the less people are spending it, in the hope of selling at the peak, which makes this an investment asset rather than a currency. The hype reached its apotheosis when a Long Island-based iced tea company's share price surged by 500 percent when it rebranded to 'Long Blockchain'⁶ Other cryptocurrencies have also seen frothy valuations. Ethereum has increased around 10,000% this year. Ripple, Litecoin and Dash have all seen rapid valuation increases.

Each focuses on a different part of the payments ecosystem. Ripple, for instance, is focusing on financial market transactions like foreign exchange, while Ethereum is focusing on broader applications like debt-registry storage, and smart or automated contracts and workflows, like futures contracts.

It could be argued that blockchain-based transactions could, if they had emerged and matured earlier, been of more appeal to smaller commercial merchants, who were for a long time penalised by the predominance of expensive proprietary software to support online transactions. But payments innovators like Stripe, whose APIs provide companies with flexible tools for online commerce, and improvements in payment processing technology and costs generally, have made commercial merchant transactions far easier even for small players. The frictions to card and online payments is simply not significant enough to make a large-scale transition to crypto worthwhile, even if some consumers would like to use it.

Combined, the reality is that the cryptocurrency and blockchain hype is far beyond usage at present. In any given week, according to the Wall Street Journal, \$34bn in bitcoin is traded, less than 1 percent of the global foreign exchange market. The speech by Australia's Mr Lowe thus described the current fascination with crypto-currency as speculative mania, rather than optimism based on their use as an efficient and convenient form of electronic payment. Whilst he acknowledged that mainstream financial institutions needed to improve their game to stay relevant, in terms of providing low-cost solutions to customers, Lowe asserted that electronic payments will continue to occur 'largely through the products offered by the banking system', adding 'there is a certain attraction of being able to make payments from funds held in prudentially regulated account can earn interest'. That attraction may grow as interest rates return to more normal levels in the developed world.



⁴<https://www.rba.gov.au/speeches/2017/sp-gov-2017-12-13.html>

⁵<https://www.wired.com/story/i-forgot-my-pin-an-epic-tale-of-losing-dollar30000-in-bitcoin/>

⁶<https://www.google.co.uk/search?q=long+island+iced+tea+blockchain&oq=long+island+iced+tea+blockchain&aqs=chrome..69i57j69i61.4121j0j7&sourceid=chrome&ie=UTF-8>

While these obstacles indicate that blockchain is less efficient than current payments for general consumers and in some realms of payments, there is evidence that distributed ledger technologies in general can make a positive difference to financial services in other ways, including eliminating inefficiencies and costly burdens like trade insurance.

Formal and mainstream financial institutions began seriously engaging with blockchain early in 2017. Seven European banks including Deutsche Bank, HSBC and Rabobank, announced Digital Trade Chain, a partnership offering blockchain-based trade finance, eventually awarding the contract for technology development to IBM, which is one of the most active blockchain development firms⁷. The goal of the project is to 'manage, track and secure' trade transactions through an enterprise blockchain system. This can help improve efficiency because of how burdensome trade finance processes are, in terms of paperwork, security and approvals. Indeed, cross-border trade has been one of the most active sectoral applications. IBM has been working with global logistics firm Maersk to deploy blockchain to its cross border trade. Creating a 'smart contract' and automated workflow, involving everyone from a Kenyan flower seller to a port in Rotterdam, greatly simplified a complex process in one of its pilot. As each step in the trade chain completes, relevant trade documents are shared, with no party able to modify or delete records without the consensus of the full network. Of course, moving from a pilot to a business-as-usual technology is far from straightforward. Moreover, there will be significant educational investments needed to on-board all trade participants to use and understand the system.

International trade is nonetheless proving a popular application of DLTs because, currently, it remains a sector that is woefully inefficient, with little innovation since the arrival of the shipping container. The physical movement of large volumes of trade-related documents creates vulnerabilities to fraud, error, and delays, and the costs of managing trade paperwork securely make a huge addition to the financial burden of international trade. Other banks are working with the Singaporean government to use blockchain to produce prototype letters of credit, which are how banks guarantee buyer's payments.

Investment banking and capital markets are a second area in which DLTs can replace inefficient current processes. Accenture⁸, the consultancy, reckons investment banks could save \$10 billion by applying DLTs to areas like internal controls, central finance reporting, compliance, Know Your Client (KYC) and onboarding processes, and clearance and settlement. Such cost-savings are germane in the post financial crisis era. Tightening regulatory compliance, rising capital allocation requirements, and falling revenue have all taken a toll on the banking sector, argued Accenture. Providing that DLTs do

not pose systemic risks, these new tools could lower costs without compromising stability and security.

Regulators seem more comfortable with DLTs that are 'permissioned', with formal financial partners collaborating. Equities clearing and stock exchange processes are areas which could be positively impacted. Credit Suisse argued that, although stock orders can be placed in a matter of seconds, actual trades can take days to settle. Reports suggest that the IT operations expenditure in the capital markets industry is around \$100 to \$150 billion per year⁹.

Digitizing and combining the individual ledgers used by brokers, exchanges, clearing houses, registrars, central securities depositories and custodians can make the reconciliation trades cheaper, faster and less risky. The bank argued that lower trading costs could in turn increase trade volumes, a big boon for those with significant cash trading and related businesses like the Deutsche Borse and Euronext¹⁰. These are not merely hypotheticals. NASDAQ has implemented blockchain to complete and record private market transactions, which had previously been kept in manually updated spreadsheets which are prone to errors¹¹.

The Australian Securities Exchange and blockchain vendor Digital Asset Holdings, backed by the likes of JP Morgan Chase, IBM and Goldman Sachs, are now working to replace its existing settlement system, called the Clearing House Electronic Subregister System (CHES), with a DLT. Developed over the last two years, this initiative makes ASX the first global exchange to commit to blockchain in this way. In a public statement, its CEO argued that DLT would enable the development of new services and reduce costs, putting Australia at the 'forefront of innovation in financial markets'.

Australian commercial banks are in fact among the frontrunners globally. Australia and New Zealand Banking Group have collaborated with Westpac to use blockchain for bank guarantees on commercial property leasing. ANZ also engaged with JP Morgan Chase and Royal Bank of Canada in a project known as the Interbank Information Network (IIN). Designed and led by JP Morgan, IIN promises to allow payments to reach beneficiaries faster, and with greater security, than conventional approaches. Even though JP Morgan CEO Jamie Dimon has spoken publicly about the flaws of cryptocurrencies, that has not stopped his firm exploring the value of the underlying technology. IIN is appealing because global payments are complex to complete, with multiple communication layers needed between participants to safely and securely verify and process transactions. IIN, based on a variant of the Ethereum blockchain, provides greater security, functioning more like a cloud-based enterprise technology for shared use among trusted and vetted participants.

⁷https://www.grantthornton.global/globalassets/1.-member-firms/global/insights/blockchain-hub/blockchain-timeline_final.pdf

⁸https://www.accenture.com/t20170120T074124Z_w_us-en/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Consulting/Accenture-Banking-on-Blockchain.pdf

⁹<http://www.nasdaq.com/article/how-stock-exchanges-are-experimenting-with-blockchain-technology-cm801802>

¹⁰<https://www.credit-suisse.com/corporate/en/articles/news-and-expertise/forget-bitcoin-but-remember-blockchain-201702.html>

¹¹<http://uk.businessinsider.com/blockchain-index-companies-to-bet-on-2017-11>

A dramatic year has cast light on the promise and pitfalls of blockchain in financial services, with several lessons emerging from experiences so far. As we head into a new year, it is clear that blockchain has withstood a number of tests. Despite high profile hacks, regulator unease and a number of structural constraints, the engagement of such a varied cast of financial players proves that blockchain is going to be part of the financial system for years to come, even if its exact applications remain uncertain. A number of trends will likely play out and shed light on blockchain's future over the coming year, including the following:

Permissioned blockchain will help improve payments efficiency in areas like cross-border trade, securities clearing, and know-your-client on-boarding processes.

Payments and commercial transactions which feature heavy administrative burdens and paperwork are ripe for blockchain. But when applied to large-scale mainstream financial processes, there can be a substantial transition costs, so more often blockchain is being applied in specific, bounded ways, rather than being rolled out en masse.

The SWIFT system is more vulnerable to disruption.

The cards payment system looks resilient to the threat of blockchain, as major card networks have built trusted brand names, enormous scale and remarkable processing speeds that blockchain applications will struggle to rival. In contrast, the SWIFT system remains slow and costly, with outdated infrastructures, and is increasingly prone to cyberattacks, according to Credit Suisse¹². It is also less than transparent. The infrastructure, as it currently works, does not allow banks to monitor their positions in real time due to the lack of intraday reporting coverage. SWIFT is exploring what blockchain could do

to help a painfully slow process and is working on developing a proof of concept technology to help banks reconcile international nostro accounts in real time. In early 2017, it announced a partnership with six major banking institutions, including ANZ, BNP Paribas, BNY Mellon and Wells Fargo, and by the summer adding a further 22, including China Construction Bank, FirstRand Bank and Rabobank¹³. Time will tell if SWIFT will keep up with its upstart rival Ripple.

Blockchain is a long way from displacing card and online payments for the mass of consumers.

Wildly gyrating values of cryptocurrencies, slow processing times, and complex usage for the uninitiated are among the reasons it lacks appeal. The rising of interest rates will also encourage consumers to lean more heavily on interest-bearing formal bank accounts. For merchants, meanwhile, many of the frictions and annoyances that used to affect their ability to process payments are being eroded by technological innovations, led by the likes of Stripe. There are also structural issues with blockchain, especially the slowness necessary to allow for its decentralized cryptography, which can never stand up to the pressure of commercial payments made in the real world by cards and online.

"Notwithstanding the birth pangs associated with early stage, highly disruptive technology, governments, investors and mainstream organisations are investing considerable resources and funds in understanding DLT and its potential impact on society and the way in which we trade and transact." emphasises Radi El Haj, Chief Executive Officer of RS2. "Distributed ledger technologies will continue to evolve, and organisations who are serious about transforming finance and commercial systems for future generations, should invest time in this space," he concludes.



¹²<https://www.credit-suisse.com/corporate/en/articles/news-and-expertise/forget-bitcoin-but-remember-blockchain-201702.html>

¹³<https://www.swift.com/news-events/press-releases/22-additional-global-banks-join-the-swift-gpi-blockchain-proof-of-concept>



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