

Building on the BLOCKCHAIN



How the technology is changing traditional business

By David Hicks

Ten years have passed since its beginning, but to write about blockchain in 2018 still feels like an exercise in speculation. Most people don't know what a blockchain (*the Blockchain? some blockchains?*) is. It feels new. While organizations like Walmart, JD.com, Microsoft, Bank of America and the Alibaba Group's Hema supermarkets stand among its most prominent early adopters, industry groups and governments are still struggling to determine what role blockchain could (and should) play in our future.

Meanwhile, the technology is advancing. The \$945 million that corporations spent on blockchain software in 2017 will expand to \$2.1 billion in 2018, according to researcher International Data Corp. Application across the public sector is similarly on the uptake: a district in Guangzhou is linking wearable and blockchain technology to help track the location and evaluate the creditworthiness of ex-offenders. This article aims to show how blockchain technology is currently being applied, how it could

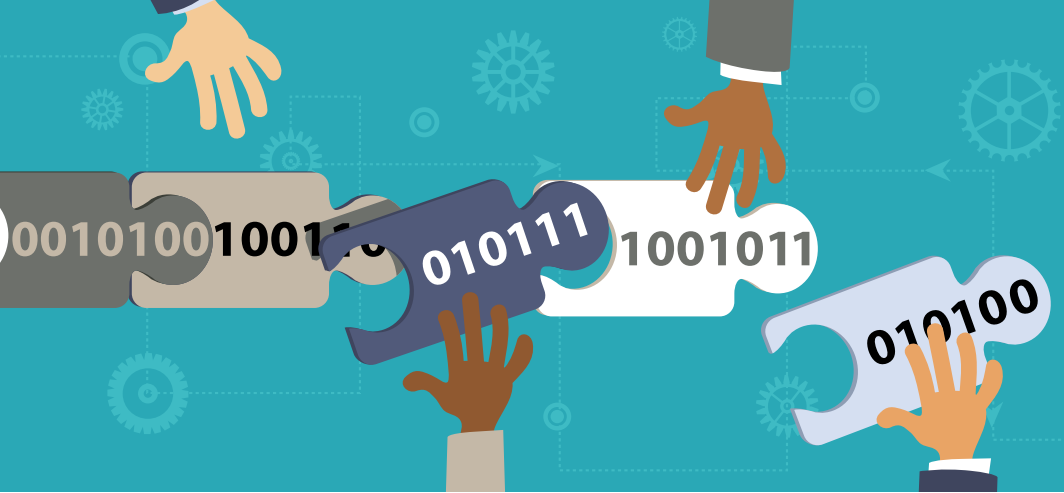
advance, and the obstacles it will face along the way.

■ What's a "blockchain"?

'Blockchain' refers to a digital ledger of transactions that is distributed across millions of computers, which rely on cryptography to continuously verify new transactions ("blocks") as being genuinely part of a given "chain." Blockchain specialist William Mougayar describes it like a Google Document, which grants synchronous access to any number of parties for a given document; decentralized, but with a single version constantly available to all of them. By relying on cryptography and consensus among the computers on a given blockchain platform, the technology allows its users to know beyond reasonable doubt that a chain's transactions are genuine. It is also immutable: erroneous transactions cannot be deleted, only reversed in future transactions. Because of this, transactions that occur over a blockchain are far more reliable and trustworthy than anything previously available in the digital age.

The tamper-resistant and distributed nature of blockchain technology makes it a potentially industry-changing tool. Participants in a 2018 cross-industry survey conducted by consultancy PricewaterhouseCoopers and the blockchain platform VeChain identified security traceability, distributed data storage, identity authentication and supply chain management as some of the most valuable applications of blockchain technology to their businesses. It is no accident that these are applications which require significant trust: blockchain technology, its supporters are quick to point out, stands out for the trust it creates. Party #1 need not worry about any mistrust they might have of Party #2 because transacting on a blockchain ensures complete transparency as they interact.

Resolving the problem of trust could be particularly helpful in China. Microsoft China CTO Jiang Li points out, "In China, trust – especially outside of the organization – is very valuable and very hard to achieve... It's a major challenge for people doing business



ways? Sure it can.

That's China's bet. While spurring digital currency, the technology's potentially transformative impact on everything from supply chain management to insurance is spurring executives across the country to find ways to apply it to their operations.

■ Applying blockchain

Logistics is oft-noted as one of the industries most likely to be transformed by blockchain, and for good reason. All of the 130 respondents to the PwC survey said they believed that the technology would be very helpful for supply chain management. As Zenon Kapron, founder and director of consultancy Kapronasia, noted, "The authenticity and origin of products, like say an apple, can also be tracked on the blockchain. As there are multiple different parties involved in a cold-chain supply chain, it would be something difficult to do with traditional technology and platforms."

A high-profile vote of confidence in this application came last December when Walmart, JD.com, IBM and Tsinghua University collaborated to launch a Blockchain Food Safety Alliance, which aims to address the challenges posed by traditionally "complex and fragmented data sharing systems that are often paper-based and can be error-prone" with a "standards-based method of collecting data about the origin, safety and authenticity of food" based on blockchain technology, according to the Alliance's press release. Through a simulated food recall, Walmart had already demonstrated the

in China." Traditionally, he noted, businesses could rely on intermediaries to increase the level of trust, "but this can increase costs." Additionally, "some people feel that working through the intermediary isn't comfortable, because it decreases contact with their customers." In circumstances such as these, blockchain technology provides a solution.

■ Blockchain and China

Conversations about technology in China largely gravitate toward artificial intelligence and mobile payment, both relatively mature domains, particularly when compared with blockchain. But 2018 is looking to be the year when that will change. This May, President Xi Jinping publicly identified blockchain, for the first time, alongside artificial intelligence, quantum information, mobile communications, and Internet of Things as having "breakthrough applications."

Xi's comment was significant, but is also unsurprising amidst the long trend of expanding official support for the technology. Since 2016, when it was first mentioned in the State Council's 13th Five-Year Plan, local governments have sought to incorporate blockchain in their development plans. Hangzhou, Shenzhen and the Xiongan economic zones are among the regions that have established funds for blockchain investments; in 2017, the number of blockchain startups in China shot to 456, six times more than in 2014, according to a May 2018 white paper on the industry released by China's Ministry of Industry and Information Technology. The country could have its first unified national standard for blockchain technology by the end

of 2019, a director of the Standardization Administration's blockchain research institute told local media.

When many people hear 'blockchain,' they think 'Bitcoin.' The association is understandable, since the technology was originally devised in 2008 as the technical backbone for the world's first cryptocurrency. For casual observers, China's increasing official enthusiasm for blockchain technology stands in apparent contradiction with increasing restrictions on digital currencies. Last September, just as China was becoming the world's top filer of blockchain patent applications (submitting 225 of 2017's 406 blockchain-related patent applications, far surpassing the United States' 91 applications), regulators banned initial coin offerings (ICOs) and required all cryptocurrency exchanges to close.

Conflating blockchain and cryptocurrency is tantamount to saying a computer won't work without an internet connection. Does lack of connection to the web limit a computer's potential usefulness? Absolutely. But can a computer work within that limitation to change the world in all sorts of other



▲ Blockchain, tracking your steak from pasture to plate

effectiveness of its blockchain system when they traced a bag of sliced mangoes back to its source in just two seconds; under the company's other systems, the same process required nearly seven days.

JD.com's application of blockchain serves as a good example of how the technology could be applied in China to address food safety concerns. Through a partnership with Kerchin, an Inner Mongolia-based beef and dairy company, they were able to ensure the quality of their beef's supply chain. Yongli Yu, the company's president of supply chain research and development, wrote, "We generated serial numbers for every cow slaughtered at the very beginning of this supply chain, which enabled us to track where any cow was raised, all vital information, and how the resulting beef was handled, checked for quality, and transported, up to the point it reaches customers."

In the insurance industry, where confirming the details and processing claims pertaining to an incident can require a lot of time and money, blockchain could make pertinent information immediately accessible to all parties. (This is exactly what China's largest online insurer ZhongAn Online Property & Casualty Insurance is doing via its blockchain-based data-sharing agreement with over 100 hospitals throughout China. By uploading important data to the blockchain, "insurance clients no longer need to file paper documents as proof, instead they can just say when and which hospital they attended," said the chief of the company's technology incubator.)

Also worth noting are smart contracts, a computer program stored on a blockchain that executes once certain pre-specified conditions are met, a function which could help expand the impact of blockchain technology on all sorts of industries. According to the MIT Technology Review, "Using a smart contract, two people could create a system that withdraws funds from one person's account – a parent's, let's say – and deposits them into a child's account if and when the child's balance falls below a certain level. And that's just the simplest example – in theory, smart contracts can

be used to program all kinds of financial agreements, from derivatives contracts to auctions to blockchain-powered escrow accounts."

All of these examples share a theme of reducing inefficiencies. As Kapron points out, "Most of the current applications of blockchain technology help lower costs, but there are a few that drive revenue." And as the technology scales up, the cost-cutting potential will increase. For instance, companies now interested in using blockchain technology can turn to one of the many "blockchain-as-a-service" (BaaS) platforms that several technology companies now offer. Customers can pay BaaS providers like Microsoft, IBM, Baidu, or Tencent to setup and manage the backend hardware required for blockchain's implementation. BaaS is an important gateway to popularizing blockchain, as it hugely reduces the risk a company might shoulder in setting up its own blockchain platform from scratch.



■ What else is needed

For many enterprises, Microsoft China's Li says, "[Blockchain] is still very sensitive; they don't have a clear roadmap to leverage the blockchain." His point is affirmed by the PwC survey, in which 35% of companies that had not yet applied blockchain technology attributed this to management not having yet decided, while 19% pointed to a lack of industry standards.

Regulatory standards, too, are a barrier. While adopting a set of national standards – as China is endeavoring to do – would be a boon for businesses with a domestic scope, international standards could allow the technology to transform domains like global supply chains, contracts, and banking. Additionally, the development of various blockchain platforms has resulted in a hodgepodge of technical protocols

that vary based on the platforms the chain is built upon – these differences raise interoperability problems when users want to transact across platforms. As one of 35 participating members of the International Organization for Standardization's (ISO) technical committee (TC) 307 to adopt global blockchain standards, China is working to resolve issues pertaining to interoperability, smart contracts, digital identity and more. "Once policy normalization is established at all levels," PwC predicted, "there will be a huge number of enterprises and industries taking chances on Blockchain technology."

While blockchain is not yet diffuse enough to be useful to regulators, its assurance of transparency might eventually make it a valuable tool in ensuring regulatory compliance across any given industry. "Blockchain technology does provide an efficient regulatory and audit platform, so we should start seeing the technology being used more for regulatory reporting in the next 3-5 years," predicted Kapron. Watch how governments experiment at the local level to get a sense for how blockchain might eventually be applied. This May, the Shenzhen Municipal Bureau of State Taxation partnered with Tencent to develop digital invoices that rely on blockchain technology to streamline the tax and invoicing process. Speaking about these invoices, Li Wei, deputy director of the bureau, said they include "features such as complete traceability of the whole process and non-disruptive information, which... can effectively avoid false invoices, and improve the invoice supervision process."

Other problems – including the cost of a blockchain platform and ensuring data privacy – will need to be addressed as blockchain technology advances. But for the business community, lack of understanding and regulatory barriers are often identified as the main barriers keeping the present technical capabilities of blockchain from being taken advantage of. The slow creep of companies cautiously integrating blockchain into their systems could very well reach a tipping point once these early adopters have proven the value of the technology. **1**