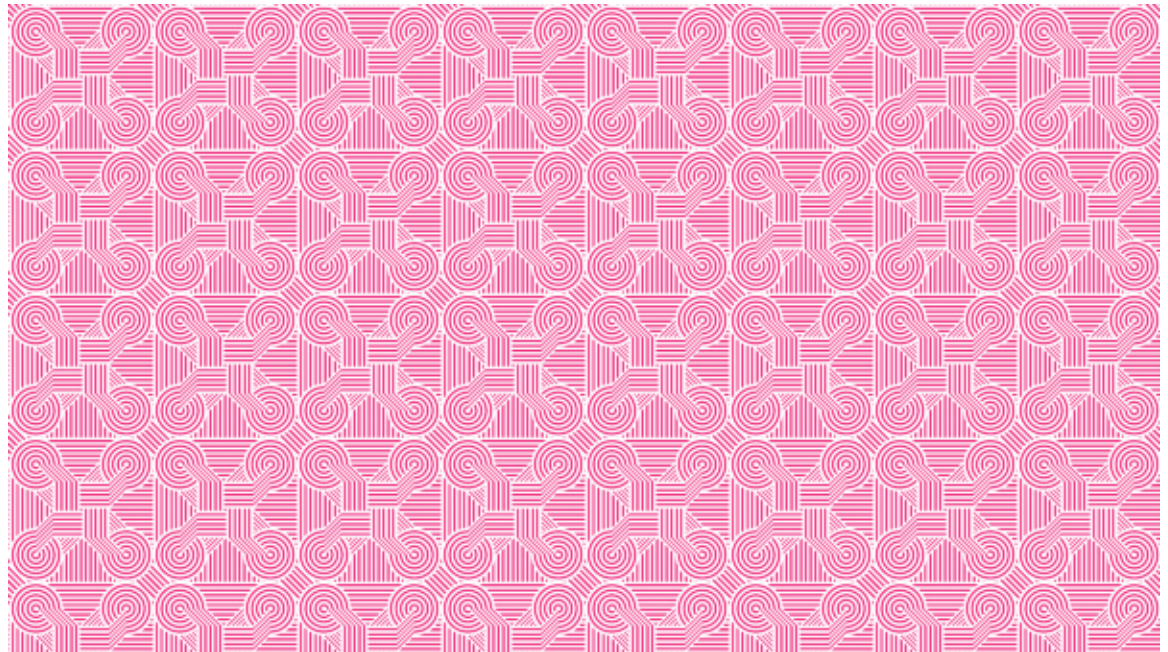


FINANCIAL MARKETS

# How Blockchain Is Changing Finance

by Alex Tapscott and Don Tapscott

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Our global financial system moves trillions of dollars a day and serves billions of people. But the system is rife with problems, adding cost through fees and delays, creating friction through redundant and onerous paperwork, and opening up opportunities for fraud and crime. To wit, [45% of financial intermediaries](#), such as payment networks, stock exchanges, and money transfer services, suffer from economic crime every year; the number is 37% for the entire economy, and only 20% and 27% for the professional services and technology sectors, respectively. It's no small wonder that [regulatory costs continue to climb and remain a top concern for bankers](#). This all adds cost, with consumers ultimately bearing the burden.

It begs the question: Why is our financial system so inefficient? First, because it's antiquated, a kludge of industrial technologies and paper-based processes dressed up in a digital wrapper. Second, because it's centralized, which makes it resistant to change and vulnerable to systems failures and attacks. Third, it's exclusionary, denying billions of people access to basic financial tools. Bankers have largely dodged the sort of creative destruction that, while messy, is critical to economic vitality and progress. But the solution to this innovation logjam has emerged: blockchain.

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## How Blockchain Works

Here are five basic principles underlying the technology.

### 1. Distributed Database

Each party on a blockchain has access to the entire database and its complete history. No single party controls the data or the information. Every party can verify the records of its transaction partners directly, without an intermediary.

### 2. Peer-to-Peer Transmission

Communication occurs directly between peers instead of through a central node. Each node stores and forwards information to all other nodes.

### 3. Transparency with Pseudonymity

Every transaction and its associated value are visible to anyone with access to the system. Each node, or user, on a blockchain has a unique 30-plus-character alphanumeric address that identifies it. Users can choose to remain anonymous or provide proof of their identity to others. Transactions occur between blockchain addresses.

### 4. Irreversibility of Records

Once a transaction is entered in the database and the accounts are updated, the records cannot be altered, because they're linked to every transaction record that came before them (hence the term "chain"). Various computational algorithms and approaches are deployed to ensure that the recording on the database is permanent, chronologically ordered, and available to all others on the network.

### 5. Computational Logic

The digital nature of the ledger means that blockchain transactions can be tied to computational logic and in essence programmed. So users can set up algorithms and rules that automatically trigger transactions between nodes.

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Blockchain was originally developed as the technology behind cryptocurrencies like Bitcoin. A vast, globally distributed ledger running on millions of devices, it is capable of recording anything of value. Money, equities, bonds, titles, deeds, contracts, and virtually all other kinds of assets can be moved and stored securely, privately, and from peer to peer, because trust is established not by powerful intermediaries like banks and governments, but by network consensus, cryptography, collaboration,

and clever code. For the first time in human history, two or more parties, be they businesses or individuals who may not even know each other, can forge agreements, make transactions, and build value without relying on intermediaries (such as banks, rating agencies, and government bodies such as the U.S. Department of State) to verify their identities, establish trust, or perform the critical business logic — contracting, clearing, settling, and record-keeping tasks that are foundational to all forms of commerce.

Given the promise and peril of such a disruptive technology, many firms in the financial industry, from banks and insurers to audit and professional service firms, [are investing in blockchain solutions](#). What is driving this deluge of money and interest? Most firms cite opportunities to reduce friction and costs. After all, most financial intermediaries themselves rely on a dizzying, complex, and costly array of intermediaries to run their own operations. Santander, a European bank, put the [potential savings at \\$20 billion a year](#). Capgemini, a consultancy, estimates that [consumers could save up to \\$16 billion in banking and insurance fees](#) each year through blockchain-based applications.

To be sure, blockchain may enable incumbents such as JPMorgan Chase, Citigroup, and Credit Suisse, all of which are [currently investing](#) in the technology, to do more with less, streamline their businesses, and reduce risk in the process. But while an opportunistic viewpoint is advantageous and often necessary, it is rarely sufficient. After all, how do you cut cost from a business or market whose structure has fundamentally changed? Here, blockchain is a real game changer. By reducing transaction costs among all participants in the economy, blockchain supports models of peer-to-peer mass collaboration that could make many of our existing organizational forms redundant.

For example, consider how new business ventures access growth capital. Traditionally, companies target angel investors in the early stages of a new business, and later look to venture capitalists, eventually culminating in an initial public offering (IPO) on a stock exchange. This industry supports a number of intermediaries, such as investment bankers, exchange operators, auditors, lawyers, and crowd-funding platforms (such as Kickstarter and Indiegogo). Blockchain changes the equation by enabling companies of any size to raise money in a peer-to-peer way, through global distributed share offerings. This new funding mechanism is already transforming the blockchain industry. In 2016 blockchain companies [raised \\$400 million](#) from traditional venture investors and [nearly \\$200 million](#) through what we call initial coin offerings (ICO rather than IPO). These ICOs aren't just new cryptocurrencies masquerading as companies. They represent content and digital rights management platforms (such as [SingularDTV](#)), distributed venture funds (such as the [the DAO](#), for decentralized autonomous organization), and even new platforms to make investing in ICOs and managing digital assets easy (such as [ICONOMI](#)). There is already a deep pipeline of ICOs this year, such as Cosmos, a unifying technology that will connect every blockchain in the world, which is why it's been dubbed the "[internet of blockchains](#)." Others are sure to follow suit. In 2017 we expect that blockchain startups will raise more funds through ICO than any other means — a historic inflection point.

Incumbents are taking notice. The New York-based venture capital firm Union Square Ventures (USV) [broadened its investment strategy](#) so that it could buy ICOs directly. Menlo Park venture

capital firm Andreessen Horowitz joined USV in [investing in Polychain Capital](#), a hedge fund that only buys tokens. Blockchain Capital, one of the industry's largest investors, [recently announced](#) that it would be raising money for its new fund by issuing tokens by ICO, a first for the industry. And, of course, companies such as Goldman Sachs, NASDAQ, Inc., and [Intercontinental Exchange](#), the American holding company that owns the New York Stock Exchange, which dominate the IPO and listing business, have been [among the largest investors in blockchain ventures](#).

As with any radically new business model, ICOs have risks. There is little to no regulatory oversight. Due diligence and disclosures can be scant, and some companies that have issued ICOs have gone bust. Caveat emptor is the watchword, and many of the early backers are more punters than funders. But the genie has been unleashed from the bottle. Done right, ICOs can not only improve the efficiency of raising money, lowering the cost of capital for entrepreneurs and investors, but also democratize participation in global capital markets.

If the world of venture capital can change radically in one year, what else can we transform? Blockchain could upend a number of complex intermediate functions in the industry: identity and reputation, moving value (payments and remittances), storing value (savings), lending and borrowing (credit), trading value (marketplaces like stock exchanges), insurance and risk management, and audit and tax functions.

Is this the end of banking as we know it? That depends on how incumbents react. Blockchain is not an existential threat to those who embrace the new technology paradigm and disrupt from within. The question is, who in the financial services industry will lead the revolution? Throughout history, leaders of old paradigms have struggled to embrace the new. Why didn't AT&T launch Skype, or Visa create Paypal? CNN could have built Twitter, since it is all about the sound bite. GM or Hertz could have launched Uber; Marriott could have invented Airbnb. The unstoppable force of blockchain technology is barreling down on the infrastructure of modern finance. As with prior paradigm shifts, blockchain will create winners and losers. Personally, we would like the inevitable collision to transform the old money machine into a prosperity platform for all.

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