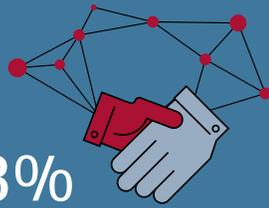# What every CEO should know about blockchain

The emerging technology could completely restructure the value chains for many businesses.

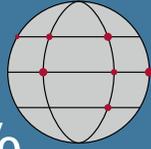By Mukund Umalkar, Alice MacNeil and David Light

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83%

Executives who believe trust is the cornerstone of the digital economy

10%

Global GDP that is likely to be stored on blockchains by 2027

2017

The year blockchain is expected to take hold for financial services early adopters

Trust is critical for business. Today, we trust banks to hold our money, e-commerce companies to deliver the products we buy online, and payment platforms to protect our transactions from fraud or misappropriation. The Accenture Technology Vision 2016 indicates that 83 percent of executives believe that trust is indeed the cornerstone of the digital economy.[1] So what if trust were technologically embedded into the very nature of transactional activities?

Blockchain is a distributed (decentralized) digital network that enables the exchange of value or the ability to confidently share data—including financial assets and contracts—in a secure environment (see "What is blockchain?"). By design, blockchain builds trust into every transaction and shared data source, enabling greater security, cost efficiency and optimized reconciliation processes.

So far, blockchain has gained the most traction in the financial services industry. According to a report published by Santander InnoVentures last year, the technology could cut bank

infrastructure costs for cross-border payments, securities trading and regulatory compliance by $15 billion to $20 billion a year by 2022.[2] But blockchain also has the potential to become a general-purpose technology—a breakthrough, like the steam engine, electricity or the Internet, that changes how society and the economy work. The World Economic Forum has predicted that, by 2027, 10 percent of global GDP is likely to be stored on blockchain platforms.[3]

As such, blockchain will alter traditional value chains, forcing stakeholders across all industries to rethink their roles in the not-so-distant future. What if you could unlock new revenue sources, sell to machines directly or shift your primary focus from operating to innovating? Major corporations like Citibank, Intel and Philips are already experimenting with the technology, and CEOs in every industry should consider the potential effects of blockchain in three critical areas: strategy, customers and operations.

Redefining the role and value of intermediaries

Intermediaries typically create value by making markets for buyers and sellers, solving operational or logistical challenges in a supply chain or business process or reducing systemic risk. Digital intermediaries like Amazon and Orbitz have clearly played significant roles in reshaping industry structures, and technologies like blockchain promise to continue that transformation. Accenture research reveals that 82 percent of executives believe industry boundaries are being erased[4]—and they're right. OpenBazaar, for example, is a Bitcoin community where users buy and sell goods to each other, bypassing a centralized e-commerce platform—a potential model for B2B transactions. The distributed cloud network Storj also dispenses with the middleman by permitting users to store files securely without going through a centralized service such as Dropbox. In the future, similar decentralized-network-based solutions that allow two parties to exchange value or information directly could be leveraged by corporate IT departments—provided such solutions become scalable.

Executing contracts with new "customers"

Blockchain can make commercial contracts programmatic, triggered by predefined events and conditions. One result? Machines that buy and sell like people. Imagine the following scenario: Currently, smart meters are used to record and report energy consumption. In the future, a blockchain-enabled utility market could allow customers to authorize those meters to buy electricity—even automatically switch providers—on predefined terms. For their part, utility companies could then sell electricity to the highest bidders, whether machine or person. A number of promising experiments are moving toward making this hypothetical situation a reality. Accenture recently created a smart plug prototype that can buy electricity from different suppliers and adjust power consumption at regular intervals. In New York City, TransActive Grid helps consumers buy and sell any of their surplus renewable energy directly to their neighbors, with blockchain enabling and verifying the transactions. Similar approaches could eventually be used for computer processing power, network bandwidth and other utilities.

On a more widespread scale, blockchain could enable an autonomous Industrial Internet of Things (IIoT). Accenture research has found that 84 percent of executives believe their organizations have the ability to create new, service-based income streams from the IIoT.[5] Early steps in that direction with blockchain have already occurred, though the technology will take time to perfect. The start-up Filament, for example, has created a blockchain wireless network that allows offline devices within a nine-mile radius to transact with each other. This network, which does not require a centralized network authority, could enable industrial equipment with built-in sensors to place orders for maintenance services or new parts. Filament's customers include several Fortune 50 companies across oil and gas, manufacturing, agriculture and mining.

Streamlining operations

Companies must coordinate various resources in order to sell products and services. A number of processes underlie these activities, such as accounting, data management and workflow approvals. Blockchain could streamline many of these processes, especially those that rely on rule enforcement, reconciliation and verification. Take invoicing, for example. This process can be complex and error-prone, requiring cumbersome (and time-consuming) reconciliation between the transacting parties. Now Tallysticks, part of the Barclays' tech startup "accelerator," has begun to build a blockchain-backed invoicing network that would hold an unchangeable invoice record for all parties, enabling near real-time invoicing reconciliation and settlement. The company Factom also allows the publication of encrypted data (such as a company's IP) on a blockchain that only the data owner can access. Factom recently signed a deal to help a Chinese notarization service use the platform to enhance the integrity of its information management. Such solutions could increase accountability, while reducing corruption, fraud and forgery across the business landscape.

CEO Checkpoint

As blockchain-based solutions start to automate various kinds of operational activities, how will you reimagine your business? How will you take advantage of an increased opportunity to focus more on innovating? How could blockchain enable you to shift resources from operations to innovation-related activities?

Making blockchain a reality for your company

To date, Bitcoin has been the most well-known implementation of blockchain, even though it continues to face challenges with regulation, governance and scalability thanks to its open, permissionless network. (Many companies are looking at permissioned, or closed, networks, which can be custom engineered to solve many of the challenges of open environments.) Given these and other issues arising from early experiments with the technology, CEOs should consider the following when evaluating blockchain opportunities:

1. **The technology and standards are still evolving.** Several communities and organizations are currently developing solutions to problems of scale, design choices, the degree of openness, incentive mechanisms and governance. For example, members of the HyperLedger Project (a collaboration between the Linux Foundation and a group of professional services firms, including Accenture) are working to establish cross-industry open standards.

2. **Many types of blockchain solutions rely on network effects.** The more participants, the greater the value of the network. The pace at which consortium and industry infrastructure blockchain solutions will scale is directly related to how quickly stakeholders can cooperate on standards and governance challenges.

3. **Some of the best applications for the technology may be in-house.** Many organizations have recognized the value of applying blockchain technology internally, where the ability to confidently share data and benefit from immutable data lineage and security are ideal—think, client onboarding efforts.

4. **The economic model isn't straightforward.** It's now split between solutions aimed at making existing business processes more efficient and the development of new products and services. The magnitude of cost efficiency for solutions at scale is a key question to address across multiple industries. The high valuations Fintechs currently receive clearly indicates an optimistic view of products and services based on this technology.

CEOs (along with their chief strategy and innovation officers) should evaluate blockchain's potential impact on their company's value chain, customers and operations. Next steps may include identifying and building specific prototypes and investing in startups that are working to solve industry-specific problems.

Financial services firms have clearly taken the lead on blockchain. Their early adoption of the technology is expected to continue through 2017, with applications maturing by 2025—and other industries are likely to follow suit.[6] In this exploratory phase, many experiments are bound to fail. But blockchain has enormous potential to recast how value is exchanged in the economy. Before the anticipated disruption permeates their industry, CEOs would do well to evaluate the technology's prospective opportunities, as well as the likely threats it poses.

What is blockchain?

Blockchain technology fundamentally changes how data is managed, enabling companies to move from a scenario where every organization maintains its own copy of a data set to one where all parties have controlled access to a shared copy. This "mutualization" of data is only possible with strong cryptographic techniques that use public and private "keys" to ensure confidentiality and privacy. Blockchains offer a way to verify and order transactions in a distributed ledger, a record of consensus that is validated and held within a network of separate nodes (computers or servers). Entries can be altered but not deleted. Maintenance and validation is performed by communicating nodes that run dedicated software to replicate the ledger among participants in a peer-to-peer network. All transactions have an auditable trail and a traceable digital fingerprint. What's more, the data in the ledger is pervasive and persistent, creating a reliable "transaction cloud" where it cannot be lost. And, unlike traditional databases that have a layer of security that—once breached—offers unlimited access, distributed ledgers encrypt individual transactions or messages in the data stored on the blockchain. In a world where the threats of hacking, data manipulation and compromised data are very real, the security and risk management implications of these two different approaches are important to consider.

Characteristics and benefits of blockchain technology
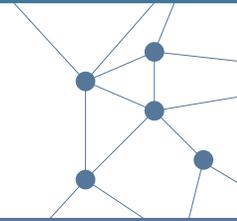
Process characteristics	Blockchain benefits
Consensus between multiple parties	Enhanced coordination and choreography between parties through a shared view of the latest status, obligations and other information
Reconciliation	Master source of data instead of disparate data stores that require constant validation and reconciliation
Data lineage	Complete traceability, ensuring integrity of data that is continuously updated and maintained by multiple parties
Auditability	Reliable and accurate audit trail with transparency of the identity responsible for each data change

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