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Title: Blockchain beyond the hype: What is the strategic business value?

Authors: Carson, Brant¹
Romanelli, Giulio²
Walsh, Patricia³
Zhumaev, Askhat³

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Abstract: The authors discuss their study on the strategic business value of blockchain to major industries. They described a structured approach that companies can follow to examine blockchain strategies. The core advantages of blockchain are decentralization, cryptographic security, transparency, and immutability. It is said that the value of blockchain will shift from driving cost reduction to enabling entirely new business models and revenue streams.

Author Affiliations: ¹Partner, McKinsey's Sydney office
²Associate partner, Melbourne office
³Consultant, Melbourne office.

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Blockchain beyond the hype: What is the strategic business value?

Blockchain can generate meaningful value for many companies. The key is figuring out what strategy makes sense, given your customers' pain points and your company's market position

Blockchain is all the rage. Bitcoin-the first and most infamous application of the technology-has grabbed headlines for its rocketing price and volatility. Predictions such as the World Economic

Forum survey suggesting that 10 percent of global GDP will be stored on blockchain by 2027 have inspired government task forces, breathless press reports, and a multitude of conversations at Davos and in corporate conference rooms.[1]

Tellingly, large investments are being made. Last year, venture capitalists put more than \$1 billion into blockchain start-ups.[2] Initial coin offerings (ICOs), the blockchain-backed sale of cryptocurrency tokens in a new venture, raised \$5 billion in 2017. Leading technology players are putting money and people into blockchain: IBM has invested \$200 million and more than 1,000 employees in the blockchain-powered Internet of Things (IoT).[3]

Yet the fact remains that blockchain is an immature technology with a nascent market and no clear recipe for success. No wonder many corporate leaders are asking themselves a lot of questions. Is blockchain a disruptive threat? Is it a fad? Most importantly, can blockchain have strategic value for my company?

To help answer these questions, we embarked on an industry-by-industry analysis of existing blockchain strategies, interviewing a range of experts including the executives overseeing these efforts at a number of companies. We evaluated the strategic importance of blockchain to major industries and identified who can capture what type of value through what type of approach. Our research led us to three key insights on the strategic value of blockchain:

- Blockchain does not have to be a disintermediator to generate value.
- Blockchain's short-term value will be predominantly in reducing cost.
- Commercially viable blockchain solutions deployed at scale are three to five years away for most companies.

In this article, we'll explain how we arrived at these insights and we'll describe a structured approach companies can follow to evaluate blockchain strategies. Some organizations may discover ways to extract value from blockchain in the short term. Dominant companies may discover even more: if they are willing to invest now to establish their blockchains as market solutions, they can cement their leadership and forestall the incursion of disruptive digital natives.

WHAT IS BLOCKCHAIN?

Blockchain is not synonymous with Bitcoin, which is just one cryptocurrency application that uses it. Blockchain is a distributed ledger, or database, shared across a public or private computing network. Each computer node in the network holds a copy of the ledger, so there is no single point of failure. Every piece of information is mathematically encrypted and added as a new "block" to the chain of historical records. Various consensus protocols are used to validate a new block with other participants before it can be added to the chain. This prevents fraud or double spending without requiring a central authority. The ledger can also be programmed with "smart contracts," a set of

conditions recorded on the blockchain, so that transactions automatically trigger when the conditions are met. For example, smart contracts could be used to automate insurance-claim payouts.

Blockchain's core advantages are decentralization, cryptographic security, transparency, and immutability. It allows information to be verified and value to be exchanged without having to rely on a third-party authority. Rather than there being a singular form of blockchain, the technology can be configured in multiple ways to meet the objectives and commercial requirements of a particular use case. Indeed, our research focused on more than 90 discrete use cases of varying maturity for blockchain across industries. To clarify this variety of applications, we structured use cases into six categories across blockchain's two fundamental functions: record keeping and transacting. Some industries have applications across multiple categories, while others concentrate on one or two.

Blockchain's disruptive potential lies partly in its technology, which eliminates the need for an entity to be in charge of managing, storing, and funding a database. A public blockchain, such as Bitcoin, has no central authority. This peer-to-peer model can become commercially viable due to blockchain's ability to compensate participants' contributions with "tokens" (application-specific cryptoassets), as well as with a stake in any future increases in the value. As a result, public blockchains can foster total disruptive disintermediation. However, as we explain in the following section, smart incumbent companies willing to engage with blockchain now can use the technology to prevent disintermediation.

THREE BLOCKCHAIN TRUTHS TO HELP SHAPE YOUR STRATEGY

Incumbents looking to defend against disintermediation-or to go on the offensive themselves-should start by understanding three key insights.

'Permissioned' blockchains generate value and ward off disintermediation

The commercial model that is most likely to succeed in the short term is a different kind of blockchain, a "permissioned" one, with controlled access and editing rights (exhibit). In this model, participants can benefit from securely sharing data while automating control of what is shared, with whom, and when. Equipped with meaningful transparency and fraud controls, these permissioned blockchains help existing companies reduce the complexity and cost of multiparty transactions. It's a way for incumbents to harness blockchain rather than be overtaken by it. Dominant players can maintain their positions as central authorities or join forces with other industry players to capture and share value.

Permissioned blockchains allow companies to develop distinctive value propositions in commercial confidence, with small-scale experimentation preceding scaled executions. At the Australian Securities Exchange, for example, a blockchain system is being deployed for equities clearing to reduce back-office reconciliation work for its member brokers.[4] IBM and Maersk Line, the world's largest shipping company, are working together to create a blockchain platform that would provide traders with a secure, real-time exchange of supply-chain data and paperwork.[5]

The potential for blockchain to become a new open-standard protocol for use cases such as trusted records, identity, and transactions offers incumbents a powerful safeguard against disintermediation. Industry players greatly reduce the aperture for radical new entrants by learning to extract value from blockchain, especially if that value benefits customers. The degree to which incumbents adapt and integrate blockchain technology will determine its disruptive force in their industry.

In the short term, blockchain's strategic value is mainly in cost reduction

Initially, blockchain will drive operational efficiencies. It takes cost out of existing processes by removing intermediaries and rationalizing administrative processes such as record keeping and transaction reconciliation. In the cases we analyzed, approximately 70 percent of the value at stake in the short term was in cost reduction.

Certain industries' fundamental functions are inherently more suited to blockchain solutions. The core functions of financial-services firms, for example, such as verifying and transferring financial information and assets, align closely with blockchain's core transformative impact. This explains why approximately 90 percent of major Australian, European, and North American banks are already experimenting or investing in blockchain. Governments, too, can reap considerable savings by putting key record-keeping and verifying functions onto blockchain infrastructure. From birth certificates to taxes, blockchain-based records and smart contracts can simplify interactions with citizens and increase data security. More than 25 governments are actively running blockchain pilots supported by start-ups. In healthcare, blockchain applications could unlock the value of data availability and exchange for providers, patients, insurers, and researchers. Blockchain-based healthcare records can improve administrative efficiency and give researchers access to the historical, patient-identity-protected data sets crucial for advancements in medical research.

Significant, scaled commercial applications are likely three to five years away

Over time, the value of blockchain will shift from driving cost reduction to enabling entirely new business models and revenue streams. One promising use case is the creation of a distributed, secure digital identity. This could be helpful for individuals and lucrative for companies, which could customize services to people who grant them access in ways we can't imagine now. But these kinds of new businesses are more of a long-term possibility than a nearterm reality. Why? Because time is needed for four key factors to mature: standards and regulations, technology, asset digitization, and ecosystem.

Common standards must be developed. The lack of common standards and clear regulations can be a major limitation on the scalability of blockchain applications. When cooperation between multiple players is necessary, establishing such standards is as complex as it is critical. Industry consortia, such as the 70-bank group that collaborated to develop the financial-grade open-source Corda blockchain platform, will be needed to establish common standards. That kind of work is time-consuming.

Thankfully, regulators are generally engaged rather than opposed or unaware. The US Securities and Exchange Commission, for example, is bringing ICOs under the agency's regulation and into the mainstream.[6]

Technology must advance. The immaturity of blockchain technology is a major concern for companies today. Organizations need a trusted enterprise solution, particularly because they may not realize the cost benefits of blockchain until their old systems are decommissioned. Currently, few startups have sufficient credibility, technology stability, or industry expertise for government or industry deployment at scale. Major technology players are positioning themselves to address this gap with blockchain-as-a-service (BaaS) offerings in a model similar to cloud-based storage.

Assets must be digitally connected. Assets such as equities, which are digitally recorded and transacted, can be simply managed end to end on a blockchain system or integrated through application programming interfaces (APIs) with existing systems. However, connecting and securing physical goods to a blockchain requires enabling technologies like IoT and biometrics. This connection can be a vulnerability in the security of a blockchain ledger.[7] While the blockchain record might be immutable, the physical item or IoT sensor can be tampered with. Certifying the chain of custody of commodities such as grain or milk, for example, would require a tagging system like radio-frequency identification, which could increase assurance even if it couldn't deliver absolute provenance.

The cooperation paradox must be resolved. Blockchains become more valuable with more participants, but they also become more complex to coordinate. For example, a blockchain solution for digital media, licenses, and royalty payments requires massive coordination among producers and consumers of digital content. Resolving this paradox of natural competitors having to cooperate is the toughest of these four factors. The issue is not identifying the network-or even getting initial buy-in-but agreeing on the governance decisions around how the system, data, and investment will be led and managed. The strategic incentives of the players must be aligned, a task that can be particularly difficult in highly fragmented markets. Overcoming this issue often requires a sponsor, such as a regulator or industry body, to take the lead.

A STRUCTURED WAY TO DEVELOP BLOCKCHAIN STRATEGY

Fear of missing out on a new technology sometimes leads companies to develop solutions to problems that don't exist. We believe companies can avoid this trap through a structured approach to blockchain.

First, identify and skeptically assess a specific use case that can create value. Most companies can find use cases by taking a close look at the pain points affecting their industry and their customers. Companies can decide whether these cases are feasible by considering a variety of factors, such as its capability to design a blockchain solution, technology and asset constraints, and the potential for passing on benefits and savings to customers. If a use case does not meet a minimum level of

feasibility and potential return, then companies should avoid launching a project just to "be in the game."

Companies that have identified a promising use case, however, will move on to the second part of our structured approach: understanding how their market position will impact that target use case.

Part of blockchain's value comes from its network effects and interoperability, and all parties need to agree on a common standard to realize this value- multiple siloed blockchains provide little advantage over multiple siloed databases. As the technology develops, a market standard will emerge and investments into the nondominant standard will be wasted. Coordination with other industry players is critical. That's why a company's market dominance, or lack thereof, affects its ability to influence other key players in the industry and to help shape standardization and regulatory barriers. Here's how market position shapes blockchain strategy.

Leaders: Build on existing strengths

Leaders are dominant players in industries with few requirements for coordination and regulatory approval. These companies should pursue use cases now. They have the potential to create solutions that can solidify their market position and set industry standards. The greatest risk for these companies is inaction, which could open a competitive window for disruptors.

Change Healthcare is an example of a company taking advantage of its market leadership. One of the largest independent healthcare IT companies in the United States, it launched an enterprise-scale healthcare blockchain for claims processing and payment.[8]

Conveners: Shape standards to gain an edge

Conveners are dominant players who cannot single-handedly direct blockchain adoption, since they operate in industries with considerable regulatory and standardization barriers. Conveners need to drive the conversations and consortia that will shape the new standards poised to disrupt their current businesses. Then they can position themselves to shape and capture the value of new blockchain standards.

Convening tactics should be deployed for high-value use cases, such as trade finance, that cannot be realized without a broadly shared set of standards. An example of a convener following this strategy is Toyota, whose Research Institute set up the Blockchain Mobility Consortium with four global partners to focus on blockchain solutions for critical accelerators of autonomous vehicles: data sharing, peer-to-peer transaction, and usage-based insurance.[9]

Followers: Stay informed and be ready to move fast

Most companies are followers, in the sense that they lack the power to influence all necessary parties, especially when applications of blockchain require high standardization or regulatory approval. But followers cannot afford to ignore blockchain. They must be informed about market innovations, keeping a close watch on blockchain developments. They should also be prepared to move fast to adopt emerging standards. Just as businesses have developed risk and legal

frameworks for adopting cloudbased services, companies should focus on developing a strategy for how they will implement and deploy blockchain technology.

Followership is risky, given the ability of dominant players to establish private-permissioned networks. A follower, no matter how fast, may find itself locked out of the exclusive club that establishes the initial proof of concept. Companies can mitigate this risk by joining select existing and emerging consortia early. The short-term investment costs of membership are often outweighed by the long-term costs of getting left behind.

Attackers: Leverage their market leadership

Attackers are often new market entrants without an existing market share to protect, armed with disruptive or transformative business models and blockchain solutions. Attackers offer a service intended to disintermediate existing players. Most peer-to-peer applications, from finance to insurance to property, fall into this category. A good example of an attacker is Australian start-up Power Ledger, a peer-to-peer marketplace for renewable energy that raised 34 million Australian dollars through its ICO.[10] Sometimes, companies pursuing an attacker strategy will try to partner with a dominant company in the market to leverage their leadership influence.

Incumbents can deploy an attacker's blockchain strategy in a separate, noncore digital business. Blockchain-as-a-service (BaaS) providers, for example, often adopt an attack strategy when they try to sell services into industries where they currently do not participate.

Blockchain has strategic value for many companies. In the short term, the technology can reduce costs without disintermediation, and in the long run it can create new business models. Existing digital infrastructure and the growth of BaaS offerings have lowered the costs of experimentation. However, a variety of fundamental factors limit the scalability of many use cases and extend the amount of time needed for return on investment on proof of concepts.

Assessing these factors with pragmatic skepticism about the scale of impact and speed to market will help reveal the correct strategic approach on where and how companies can extract value in the short term. Dominant players, however, have an enormous opportunity to establish their blockchain as the market solution. They should be making those moves now.

1 Deep shift: Technology tipping points and societal impact, World Economic Forum, September 2015, weforum.org.

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3 " IBM invests to lead global Internet of Things market-shows accelerated client adoption," IBM, October 2016, ibm.com.

4"ASX selects distributed ledger technology to replace CHESSE," ASX, December 2017.

5" Maersk and IBM to form joint venture applying blockchain to improve global trade and digitize supply chains," IBM, January 2018, [ibm.com](#).

6 Jay Clayton, "Statement on cryptocurrencies and initial coin offerings," U.S. Securities and Exchange Commission, December 2017, [sec.gov](#).

7 To be sure, blockchain does not eliminate the possibility of fraudulent data being written to the database, which could in turn be used to substantiate the existence of fraudulent assets.

8 "Change Healthcare announces general availability of first enterprise-scale blockchain solution for healthcare," Change Healthcare, January 2018, [changehealthcare.com](#).

9 "Toyota Research Institute explores blockchain technology for development of new mobility ecosystem," Toyota, May 2017, [toyota.com](#).

"Power Ledger token generation event closes with A\$34million raised," Power Ledger, October 2017, [web.powerledger.io](#).

DIAGRAM: Exhibit. Private, permissioned blockchain architecture offers a way to optimize network openness and scalability. Blockchain-architecture options

PHOTO (COLOR)

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By Brant Carson; Giulio Romanelli; Patricia Walsh and Askhat Zhumaev

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