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

Companies can determine whether they should invest in blockchain by focusing on specific use cases and their market position.

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Speculation on the value of blockchain is rife, with Bitcoin—the first and most infamous application of blockchain—grabbing headlines for its rocketing price and volatility. That the focus of blockchain is wrapped up with Bitcoin is not surprising given that its market value surged from less than $20 billion to more than $200 billion over the course of 2017.[1] Yet Bitcoin is only the first application of blockchain technology that has captured the attention of government and industry.

Blockchain was a priority topic at Davos; a World Economic Forum survey suggested that 10 percent of global GDP will be stored on blockchain by 2027.[2] Multiple governments have published reports on the potential implications of blockchain, and the past two years alone have seen more than half a million new publications on and 3.7 million Google search results for blockchain.

Most tellingly, large investments in blockchain are being made. Venture-capital funding for blockchain start-ups consistently grew and were up to $1 billion in 2017.[3] The blockchain-specific investment model of initial coin offerings (ICOs), the sale of cryptocurrency tokens in a new venture, has skyrocketed to $5 billion. Leading technology players are also heavily investing in blockchain: IBM has more than 1,000 staff and $200 million invested in the blockchain-powered Internet of Things (IoT).[4]

Despite the hype, blockchain is still an immature technology, with a market that is still nascent and a clear recipe for success that has not yet emerged. Unstructured experimentation of blockchain solutions without strategic evaluation of the value at stake or the feasibility of capturing it means that many companies will not see a return on their investments. With this in mind, how can companies determine if there is strategic value in blockchain that justifies major investments?

Our research seeks to answer this question by evaluating not only the strategic importance of blockchain to major industries but also who can capture what type of value through what type of approach. In-depth, industry-by-industry analysis combined with expert and company interviews revealed more than 90 discrete use cases of varying maturity for blockchain across major industries. We evaluated and stress tested the impact and feasibility of each of these use cases to understand better blockchain's overall strategic value and how to capture it.

Our analysis suggests the following three key insights on the strategic value of blockchain:

- Blockchain does not have to be a disintermediator to generate value, a fact that encourages permissioned commercial applications.
- Blockchain's short-term value will be predominantly in reducing cost before creating transformative business models.
- Blockchain is still three to five years away from feasibility at scale, primarily because of the difficulty of resolving the "coopetition" paradox to establish common standards.

Companies should take the following structured approach in their blockchain strategies:

1. Identify value by pragmatically and skeptically assessing impact and feasibility at a granular level and focusing on addressing true pain points with specific use cases within select industries.
2. Capture value by tailoring strategic approaches to blockchain to their market position, with consideration of measures such as ability to shape the ecosystem, establish standards, and address regulatory barriers.

With the right strategic approach, companies can start extracting value in the short term. Dominant players who can establish their blockchains as the market solutions should make big bets now.

The nuts and bolts of blockchain

With all the hype around blockchain, it can be hard to nail down the facts (Exhibit 1). 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

Exhibit 1 Five common blockchain myths create misconceptions about the advantages and limitations of the technology.

	Myth	Reality	
1	**Blockchain is Bitcoin**	• Bitcoin is just one crypto-currency application of blockchain	• Blockchain technology can be used and configured for many other applications
2	**Blockchain is better than traditional databases**	• Blockchain's advantages come with significant technical trade-offs that mean traditional databases often still perform better	• Blockchain is particularly valuable in low-trust environments where participants can't trade directly or lack an intermediary
3	**Blockchain is immutable or tamper-proof**	• Blockchain data structure is append only, so data can't be removed	• Blockchain could be tampered with if >50% of the network-computing power is controlled and all previous transactions are rewritten—which is largely impractical
4	**Blockchain is 100% secure**	• Blockchain uses immutable data structures, such as protected cryptography	• Overall blockchain system security depends on the adjacent applications—which have been attacked and breached
5	**Blockchain is a "truth machine"**	• Blockchain can verify all transactions and data entirely contained on and native to blockchain (eg, Bitcoin)	• Blockchain cannot assess whether an external input is accurate or "truthful"—this applies to all off-chain assets and data digitally represented on blockchain

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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.

To bring some clarity to the variety of blockchain applications, we structured blockchain use cases into six categories across its two fundamental functions—record keeping and transacting (Exhibit 2). Some industries have applications across multiple categories, while others are concentrated on only one or two. This framework, along with further industry and use-case level analysis, led to our key insights on the nature and accessibility of the strategic value of blockchain.

Three core insights about the strategic value of blockchain

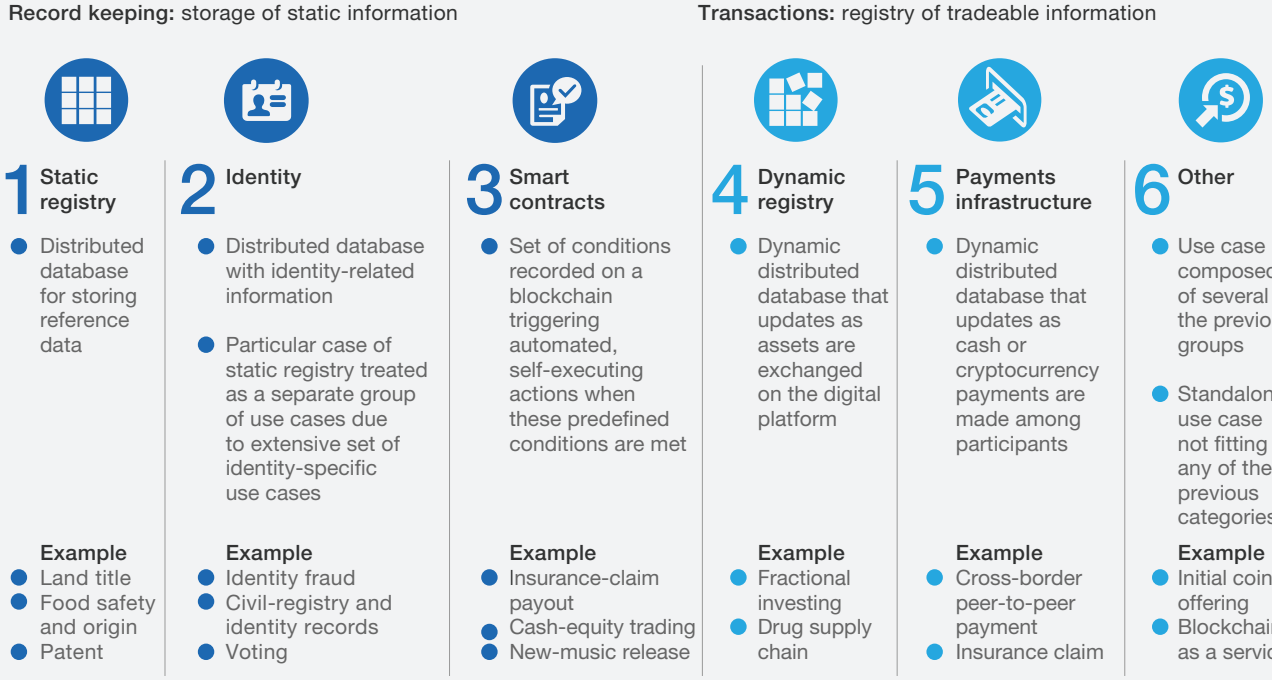
Our analysis revealed some key takeaways about blockchain.

Blockchain does not need to be a disintermediator to generate value

Benefits from reductions in transaction complexity and cost, as well as improvements in transparency and fraud controls can be captured by existing institutions and multiparty transactions using

Exhibit 2

There are six distinct categories of blockchain use cases addressing two major needs.



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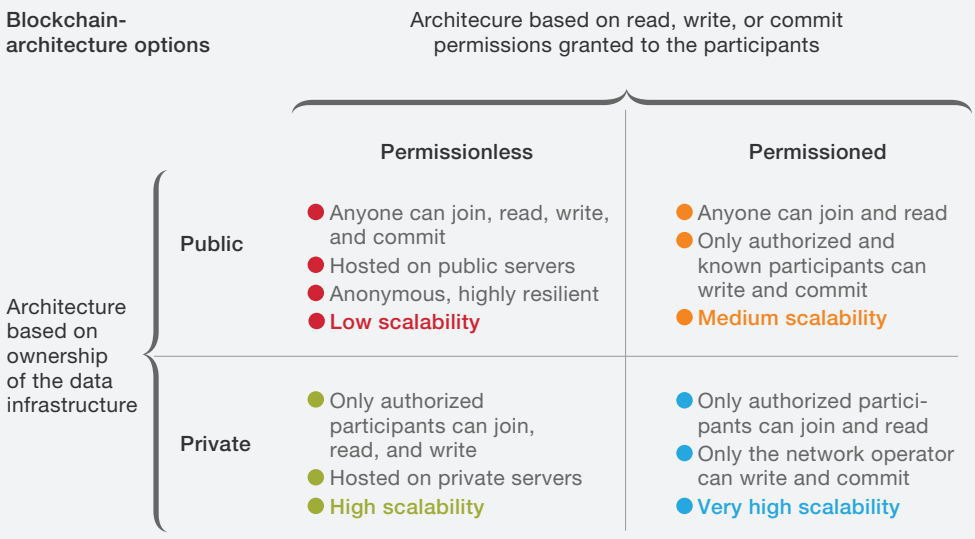
appropriate blockchain architecture. The economic incentives to capture value opportunities are driving incumbents to harness blockchain rather than be overtaken by it. Therefore, the commercial model that is most likely to succeed in the short term is permissioned rather than public blockchain. Public blockchains, like Bitcoin, have no central authority and are regarded as enablers of total disruptive disintermediation. Permissioned blockchains are hosted on private computing networks, with controlled access and editing rights (Exhibit 3).

Private, permissioned blockchain allows businesses both large and small to start extracting commercial value from blockchain implementations. Dominant players can maintain their positions as central authorities or join forces with other industry players to capture and share value. Participants can get the value of securely sharing data while automating control of what is shared, with whom, and when.

For all companies, permissioned blockchains enable distinctive value propositions to be developed in commercial confidence, with small-scale experimentation before being scaled up. Current use cases include the Australian Securities Exchange, for which a blockchain system is being deployed for equities clearing to reduce back-office reconciliation work for its member brokers.[5] IBM and Maersk Line, the world's largest shipping company, are establishing a joint venture to bring to market a blockchain trade platform. The platform's aim is to provide the users and actors involved in global shipping transactions with a secure, real-time exchange of supply-chain data and paperwork.[6]

The potential for blockchain to become a new open-standard protocol for trusted records, identity,

Exhibit 3 Most commercial blockchain will use private, permissioned architecture to optimize network openness and scalability.



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and transactions cannot be simply dismissed. Blockchain technology can solve the need for an entity to be in charge of managing, storing, and funding a database. True peer-to-peer models can become commercially viable due to blockchain's ability to compensate participants for their contributions with "tokens" (application-specific cryptoassets) as well as give them a stake in any future increases in the value. However, the mentality shift required and the commercial disruption such a model would entail are immense.

If industry players have already adapted their operating models to extract much of the value from blockchain and, crucially, passed on these benefits to their consumers, then the aperture for radical new entrants will be small. The degree to which incumbents adapt and integrate blockchain technology will be the determining factor on the scale of disintermediation in the long term.

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

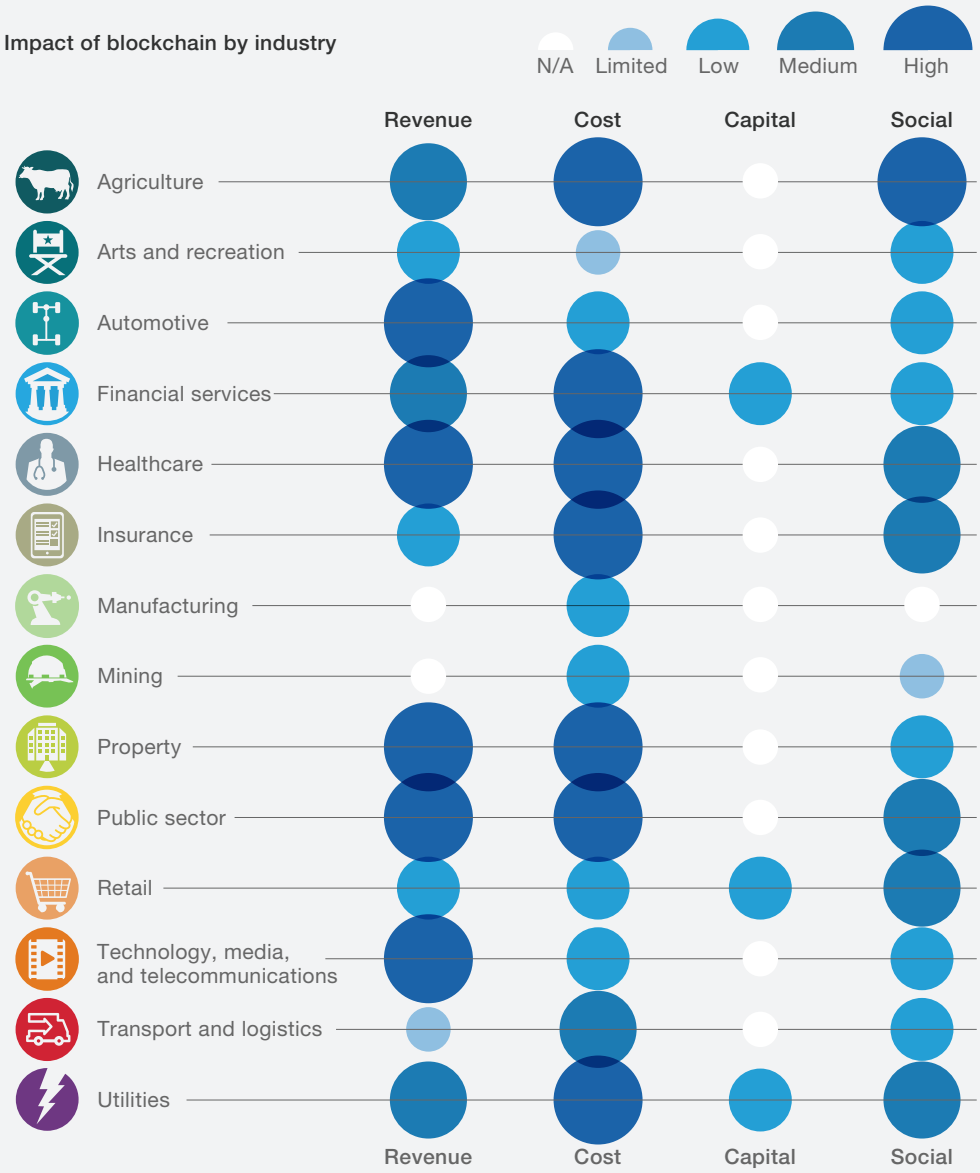
Blockchain might have the disruptive potential to be the basis of new operating models, but its initial impact will be to drive operational efficiencies. Cost can be taken out of existing processes by removing intermediaries or the administrative effort of record keeping and transaction reconciliation. This can shift the flow of value by capturing lost revenues and creating new revenues for blockchain-service providers. Based on our quantification of the monetary impact of the more than 90 use cases we analyzed, we estimate approximately 70 percent of the value at stake in the short term is in cost reduction, followed by revenue generation and capital relief (Exhibit 4).

Certain industries' fundamental functions are inherently more suited to blockchain solutions, with the following sectors capturing the greatest value: financial services, government, and healthcare. Financial services' core functions of verifying and transferring financial information and assets very closely align with blockchain's core transformative impact. Major current pain points, particularly in cross-border payments and trade finance, can be solved by blockchain-based solutions, which reduce the number of necessary intermediaries and are geographically agnostic. Further savings can be realized in capital markets post-trade settlement and in regulatory reporting. These value opportunities are reflected in the fact that approximately 90 percent of major Australian, European, and North American banks are already experimenting or investing in blockchain.

As with banks, governments' key record-keeping and verifying functions can be enabled by blockchain infrastructure to achieve large administrative savings. Public data is often siloed as well as opaque among government agencies and across businesses, citizens, and watchdogs. In dealing with data from birth certificates to taxes, blockchain-based records and smart contracts can simplify interactions with citizens while increasing data security. Many public-sector applications, such as blockchain-based identity records, would serve as key enabling solutions and standards for the wider economy. More than 25 governments are actively running blockchain pilots supported by start-ups.

Within healthcare, blockchain could be the key to unlocking the value of data availability and exchange across providers, patients, insurers, and researchers. Blockchain-based healthcare records can not only facilitate increased administrative efficiency, but also give researchers access to the historical, non–patient-identifiable data sets crucial for advancements in medical research. Smart contracts could give patients more control over their data and even the ability to commercialize data access. For example, patients could charge pharmaceutical companies to access or use their data in drug research. Blockchain is also being combined with IoT sensors to ensure the integrity of the cold

Exhibit 4 The value at stake from blockchain varies across industries.



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chain (logistics of storage and distribution at low temperatures) for drugs, blood, and organs.

Over time, the value of blockchain will shift from driving cost reduction to enabling entirely new business models and revenue streams. One of the most promising and transformative use cases is the creation of a distributed, secure digital identity—for both consumer identity and the commercial know-your-customer process—and the services associated with it. However, the new business models this would create are a longer-term possibility due to current feasibility constraints.

Feasibility at scale is likely to be three to five years away

The strategic value of blockchain will only be realized if commercially viable solutions can be deployed at scale. Our analysis evaluated each of the more than 90 potential use cases against the four key factors that determine a use case's feasibility in a given industry: standards and regulations, technology, asset, and ecosystem (Exhibit 5). While many companies are already experimenting, meaningful scale remains three to five years away for several key reasons.

Common standards are essential

The lack of common standards and clear regulations is a major limitation on blockchain applications' ability to scale. However, where there is strong demand and commitment, work is already under way to resolve this issue. Standards can be established with relative ease if there is a single dominant player or a government agency that can mandate the legal standing. For example, governments could make blockchain land registries legal records.

When cooperation between multiple players is necessary, establishing such standards becomes more complex but also more essential. Strong headway has already been made by industry consortiums, as seen with the R3 consortium of more than 70 global banks that collaborated to develop the financial-grade open-source Corda blockchain platform. Such platforms could establish the common standards needed for blockchain systems.

Globally, regulators have taken varying positions, but most are engaged rather than opposed. For example, the US Securities and Exchange Commission's recognition of ICOs as securities brought ICOs under the agency's regulation and into the mainstream.[7] In 2017, Standards Australia took a leadership position in developing a road map of priorities on behalf on the International Organization for Standardization and helping establish common terminology as a key first step.[8] So far, many governments are following a technologically neutral regulatory approach—not promoting or banning specific technologies like blockchain.

Technology must advance

The relative immaturity of blockchain technology is a limitation to its current viability. The misconception that blockchain is not viable at scale due to its energy consumption and transaction speed is a conflation of Bitcoin with blockchain. In reality, the technical configurations are a series of design choices in which the levers on speed (size of block), security (consensus protocol), and storage (number of notaries) can be selected to make most use cases commercially viable. As an example, health records in Estonia are still in databases "off chain" (meaning not stored on blockchain), but blockchain is used to identify, connect, and monitor these health records as well as who can access and alter them. These trade-offs mean blockchain performance might be suboptimal to traditional databases at this stage, but the constraints are diminishing as the technology rapidly develops.

The immaturity of blockchain technology also increases the switching costs, which are considerable given all the other system components. Organizations need a trusted enterprise solution,

Exhibit 5 Blockchain feasibility in each industry will depend on the type of asset, technology maturity, standards and regulation, and the ecosystem.

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particularly because most cost benefits will not be realized until old systems are decommissioned. Currently, few start-ups have sufficient credibility and technology stability for government or industry deployment at scale. Major technology players are strongly positioning themselves to address this gap with their own blockchain as a service (BaaS) offerings in a model similar to cloud-based storage.

Assets must be able to be digitized

Asset type determines the feasibility of improving record keeping or transacting via blockchain and whether end-to-end solutions require the integration of other technologies. The key factor here is the digitization potential of the asset; assets like 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 because while the blockchain record might be immutable, the physical item or IoT sensor can still be tampered with. For example, certifying the chain of custody of commodities like grain or milk would require a tagging system like radio-frequency identification that would increase the assurance being provided but not deliver absolute provenance.

The coopetition paradox must be resolved

The nature of the ecosystem is the fourth key factor because it defines the critical mass required for a use case to be feasible. Blockchain's major advantage is the network effect, but while the potential benefits increase with the size of the network, so does the coordination complexity. For example, a blockchain solution for digital media, licenses, and royalty payments would require a massive amount of coordination across the various producers and consumers of digital content.

Natural competitors need to cooperate, and it is resolving this coopetition paradox that is proving the hardest element to solve in the path to adoption at scale. 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. Overcoming this issue often requires a sponsor, such as a regulator or industry body, to take the lead. Furthermore, it is essential that the strategic incentives of the players are aligned, a task that can be particularly difficult in highly fragmented markets. Critical mass is much lower in some industries and applications than in others, while in some cases, networks need to be established across industries to achieve material benefits.

What strategic approach should companies take?

Our research and emerging insights suggests following a structured approach to answer the classic questions of blockchain business strategy.

Where to compete: Focus on specific, promising use cases

There is a plethora of use cases for blockchain; companies face a difficult task when deciding which opportunities to pursue. However, they can narrow their options by taking a structured approach through a lens of pragmatic skepticism. The first step involves determining whether there is sufficient accessible value at stake for a given use case. Companies can only avoid the trap of developing a solution without a problem by rigorously investigating true pain points—the frictions for customers that blockchain could eliminate.

Identification of specific pain points enables granular analysis of the potential commercial value within the constraints of the overall feasibility of the

blockchain solution. Overall industry characteristics as well as a company's expertise and capabilities will further influence this decision, as companies need to understand the nuances of all these components to decide which use case will generate a solid return on investment. If a use case does not meet a minimum level of feasibility and potential return, then companies do not even have to consider the second step of which blockchain strategy to adopt.

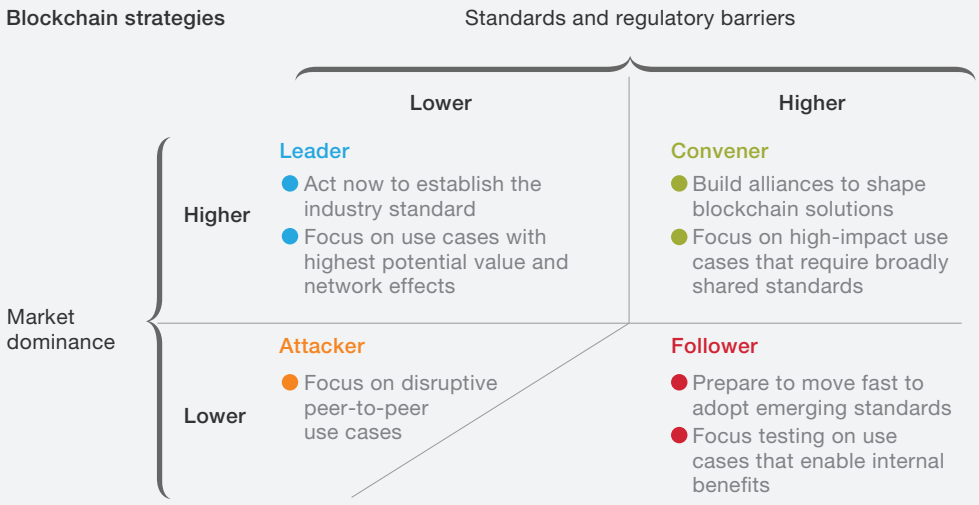
How to compete: Optimize blockchain strategy based on market position

Once companies have identified promising use cases, they must develop their strategies based on consideration of their market positions relative to their target use cases. Many of the feasibility factors already discussed are within a business's sphere of influence; even technology and asset constraints can be managed through trade-offs and a series of design choices to shape a viable solution. Therefore, a company's optimal strategic approach to blockchain will fundamentally be defined by the following two market factors, which are those they can least affect:

- market dominance—the ability of a player to influence the key parties of a use case
- standardization and regulatory barriers—the requirement for regulatory approvals or coordination on standards

These two factors are critical in determining a company's optimal strategic approach because they are integral to achieving the coordination required (Exhibit 6). 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.

Exhibit 6 Optimal blockchain strategy for each use case is dependent on market position and ability to influence standards and regulatory barriers.



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This consideration of a company's market position will inform which of four distinct strategic approaches to blockchain should be deployed and, in fact, further refine which type of use cases to focus on first.

Leaders

Leaders should act now to maintain their market positions and take advantage of the opportunity to set industry standards. As dominant players pursuing use cases with fewer requirements for coordination and regulatory approval, they can establish market solutions.

The greatest risk for these companies is inaction, which would cause them to lose the opportunity to strengthen their competitive advantages compared to competitors. An example of a leader following this strategy is Change Healthcare, one of the largest independent healthcare IT companies in the United States, when it launched an enterprise-scale healthcare blockchain for claims processing and payment.[9]

Conveners

Conveners need to be driving the conversations and consortiums that are shaping the new standards that will disrupt their current businesses. Despite being dominant players, they cannot single handedly direct blockchain adoption as they face greater regulatory and standardization barriers. Instead, they can position themselves to shape and capture the value of new blockchain standards.

Convening tactics should be deployed for high-value use cases—like 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.[10]

Followers

Followers should also carefully consider and implement an appropriate blockchain strategy. Most companies do not have the capability to influence all necessary parties, especially when applications of blockchain require high standardization or regulatory approval. Such companies cannot be unaware of market innovations—they should keep a watching brief on blockchain developments and be prepared to move fast to adopt emerging standards. Just as businesses have developed risk and legal frameworks for adopting cloud-based services, they should focus on developing a strategy for how they will implement and deploy blockchain technology.

Followership is a particularly risky strategy for blockchain, given the likelihood of select players in an industry establishing private-permissioned networks, as in freight, for example. A follower, no matter how fast, might already be locked out of the exclusive club that established the initial proof of concept. Companies can mitigate this risk by joining select existing and emerging consortia early, when the short-term investment costs of membership are outweighed by the long-term costs of getting left behind.

Attackers

Attackers are often new market entrants without an existing market share to protect, so they need to seek disruptive or transformative business models and blockchain solutions. Attacker approaches are suited to use cases with the highest disruptive potential through offering a service to the market that would disintermediate existing players. Most peer-to-peer applications, from finance to insurance to property, fall into this category. An example of an attacker following this strategy is Australian start-up PowerLedger, a peer-to-peer marketplace for renewable energy that raised 34 million Australian dollars through its ICO.[11]

Incumbents should deploy an attacker blockchain strategy in a separate noncore digital business.

Blockchain as a service (BaaS) providers often adopt an attack strategy because they are selling the services into—and disrupting—industries in which they are not currently participants. Companies pursuing an attacker strategy often seek partnership with a dominant company in the market to leverage their leadership influence.

The insights from our analysis suggest that, beyond the hype, blockchain has strategic value for companies by enabling both cost reduction without disintermediation as well as, in the longer term, the creation of new business models. Existing digital infrastructure and the growth of blockchain as a service (BaaS) offerings have lowered the costs of experimentation, and many companies are testing the waters. However, fundamental feasibility factors delimit what can be scaled and when as well as the realistic time scales for return on investment on proof of concepts.

Assessing these factors with pragmatic skepticism about the scale of impact and speed to market will reveal the correct strategic approach on where and how to compete to enable companies to start extracting value in the short term. Indeed, those dominant players who can establish their blockchain as the market solution should be making the moves—and making them now.

[1] Cryptocurrency market value is subject to high variation due to the specific volatility of the market.

[2] *Deep shift: Technology tipping points and societal impact,* World Economic Forum, September 2015, weforum.org.

[3] "Blockchain startups absorbed 5X more capital via ICOs than equity financings in 2017," CB Insights, January 2018, cbinsights.com.

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

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