THE REAL

BUSINESS

OF

BLOCKCHAIN

HOW LEADERS CAN

CREATE VALUE

IN A NEW DIGITAL AGE

DAVID FURLONGER
CHRISTOPHE UZUREAU

GARTNER, INC.

THE REAL BUSINESS OF BLOCKCHAIN

On a recent flight to Dubai, David sat next to the CEO and chairman of a European company investing in blockchain. Over the eight hours, the CEO talked about transforming his family's business from its twentieth-century origins as an industrial extractive company into a real estate developer, and then diversifying into cloud computing and now blockchain. This classic tale of creative destruction executed from inside an organization would seem, on the surface, the least likely move for a company like his, given its old money and old-world history.

That's how it happens with blockchain. It has captured the business imagination. Many see it as the solution for bringing trust and transparency to digital environments. In doing so, it could expand trade, enable new markets, and provide better tools to manage expensive, opaque processes that cost firms millions of dollars. This promise has made blockchain one of the most popular subjects among clients at Gartner, the global research and advisory firm where both of us work.

Companies in industries as diverse as finance, sports, health care, retail, oil and gas, and pharma are engaging in a wave of blockchain experiments. They're hoping to solve intractable issues such as counterfeiting and fraud, inefficiencies caused by opaque or manual processes, and perennial challenges with data quality and data management. Startups are also developing solutions, for example, to innovate movie financing, social media engagement, hospitality, and the gaming industry.

Here are just a few organizations that we spoke with while researching this book:

- The Australian Stock Exchange (ASX) and the Depository Trust and Clearing Corporation (DTCC) are developing blockchain platforms to modernize the mechanisms used for asset clearing and settlement.

- Taipei Medical University Hospital is developing a blockchain solution to facilitate cross-organizational access to patient records, with the patient's consent.

- The Union of European Football Associations (UEFA), organizer of the Champions League and Euro football tournaments, is working with IT solution provider ELCA to develop a blockchain solution to prevent fraud and price gouging—major problems with tickets sold on the secondary market—and to maintain security oversight at tournament venues.

- Volkswagen and Renault are separately using blockchain to create an immutable "passport" that captures vehicle history and maintenance records to prevent odometer tampering and other costly forms of fraud.

- The city of Austin, Texas, is creating an ID system to help homeless people access medical care and other services.

Expectations for blockchain are well founded. With our colleagues at Gartner, we have estimated that blockchain could generate as much

as $3.1 trillion in new business value by 2030, half of it by 2025 with applications designed for operational improvement.[1]

Yet these returns will not come for free. One of our aims with this book is to substantiate the claims made for blockchain, clarify what is real and what isn't, and help you as a business leader understand what you will have to do to secure your share of the value. With that in mind, we want to emphasize that the way enterprises are talking about and using blockchain today is just an initial step. Beyond operational improvements and increased efficiency, fully mature blockchain solutions will allow you to reengineer business relationships, monetize illiquid assets, and redistribute existing data and value flows in ways that could reinvent how your business engages in a digital world. That is the *real* business of blockchain.

To describe how you can begin to unlock your share of that value, we will first clarify what blockchain is and what it enables you to do that can't be done with other technologies.

THE FIVE CORE ELEMENTS OF BLOCKCHAIN

Formally, blockchain is a digital mechanism to create a distributed digital ledger on which two or more participants in a peer-to-peer network can exchange information and assets directly without the need for a trusted intermediary. The blockchain authenticates the participants and validates that they own the assets they want to exchange and that the transaction can take place. The blockchain records the information pertaining to the transaction on a digital ledger, a copy of which is independently held and updated by each participant in the network. Records are unchangeable, time-stamped, encrypted, and linked to each other in blocks; each block is a cluster of about two thousand transaction records grouped together.[2] The ledger grows as participants transact.[3]

But informally, what does that definition mean? It means you can theoretically do business with an unknown partner located anywhere on the planet and trade any asset at any transaction size and not need

FIGURE 1-1

The five elements of blockchain

Distribution

Encryption

Immutability

Tokenization

Decentralization

Blockchain
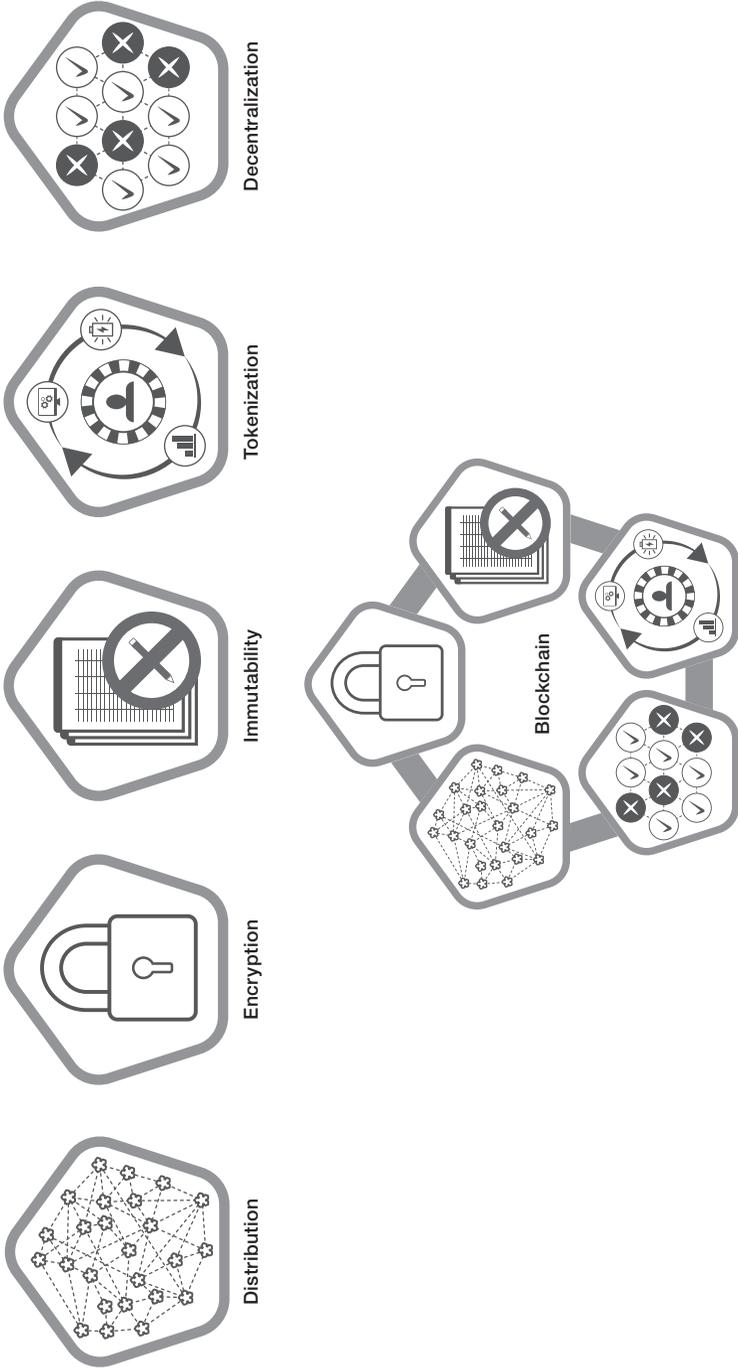
a lawyer, a bank, an insurance company, or any other intermediary making sure both of you follow through on what you've promised to do. Such a solution vastly expands the range of assets that a business could trade. The arrangement also greatly increases who or what a business could directly trade with, without needing a third party (which would take a piece of the value).

Blockchain combines existing technologies and techniques into a novel architecture composed of five elements (figure 1-1):[4]

1. **Distribution.** Blockchain participants are located at a physical remove from each other and are connected on a network. Each participant operating a full *node* maintains a complete copy of the ledger, which updates with new transactions as they occur. Nodes are the machines owned or used by participants and equipped to run the consensus algorithm described below.[5] Any participant can review any part of the ledger but cannot change it except under prescribed circumstances.

2. **Encryption.** Blockchain uses technologies such as public and private keys to record the data in the blocks securely and semi-anonymously (participants have pseudonyms). The participants can control their personal identity and other information and share only what they need to in a transaction.[6]

3. **Immutability.** Completed transactions are cryptographically signed, time-stamped, and sequentially added to the ledger. Records cannot be corrupted or otherwise changed unless the participants agree on the need to do so. Such an agreement is known as a *fork.*[7]

4. **Tokenization.** Transactions and other interactions on a blockchain involve the secure exchange of value. The value comes in the form of tokens.[8] Digital markets can function more effectively with tokens and need to create them (tokenization) for various reasons. Tokens might function as digital representations of physical assets, as a reward mechanism to incentivize network

participants, or to enable the creation and exchange of new forms of value. They also allow private and corporate participants to control their data.

5. **Decentralization**. Both network information and the rules for how the network operates are maintained by multiple computers, or nodes, on the distributed network. In practice, decentralization means that no single entity controls all the computers or the information or dictates the rules. Every node maintains an identical encrypted copy of the network record. A consensus mechanism operated by each full node verifies and approves transactions.[a] This decentralized, consensus-driven structure removes the need for governance by a central authority and acts as a fail-safe against fraud and bad transactions.

Together, these five core elements of blockchain allow two or more participants who don't know each other to safely interact in a digital environment. Our insistence on all five elements is not semantics. When a blockchain is missing one or more of these elements, its value is limited or even negated.

There are, however, opposing views on this subject. New technology often goes through a period when opportunistic actors try to define the market in ambiguous or self-serving ways. The use of the word "database" to describe blockchain is an example of this. Blockchain *isn't* a database. Although vendors sometimes falsely describe it as one, the mechanism has several key differences. For instance, unlike databases, blockchain is not a general store for information. Moreover, blockchain is immutable; it is not read, written, deleted, and changed the way that databases are. Most importantly, while a database can be distributed to various parties, only one central administrator controls it. In block-

a. *Consensus mechanisms* are algorithmic rules defining and describing the data exchange between network nodes. Consensus is achieved through majority agreement, which allows for data to be factually agreed on and recorded on a ledger.

chain, administration is through consensus.[9] Central control is contradictory to the very idea of blockchain.

We see misleading language in other contexts as well. There is rampant "blockchain washing" by vendors trying to sell packages or services that use some blockchain-enabling technologies and only a subset of blockchain's design elements. Likewise, some tech-savvy companies are implementing solutions they are calling "blockchain," and then requiring supply-chain partners to integrate with them as a way to embed these partners deeper into their ecosystem.

Then there is the simple reality that blockchain is immature and organizations don't know how to use or extract value from it yet. Many are therefore experimenting with only the elements they understand and have the skills to manage. Consequently, most of the so-called blockchain solutions currently in development, a few of which we listed at the start of this chapter, use only some of the five elements of blockchain. The companies may not have even needed blockchain to achieve the same ends. According to our research, traditional data architecture could have done as well as, or better than, blockchain in 85 percent of these projects.

HOW BLOCKCHAIN UNLOCKS VALUE FOR YOUR BUSINESS

We cannot overstate the amount of new commercial activity that blockchain could enable. To get a sense of the opportunity, consider the amount of data produced today by mobile devices, GPS, internet of things (IoT) sensors placed in physical environments, and dozens of other enabling devices that are rendering both digital and physical assets visible to networked environments. Almost unfathomable, this network of devices captures more than 2.5 quintillion bytes of data created daily.[10] Leaders like you want to monetize these new data assets for your company and trade them with willing buyers.

But the centralized infrastructure you rely on to execute commercial transactions and manage risk—payments systems, insurance, delivery

and logistics services, and legal contracts—was not designed to handle the kinds of machine-to-machine transactions possible today with digital or digitalized assets. Digital transactions don't have a minimum size the way transactions do in the analog world. Units of data, cryptocurrency, reward points, and pieces of an asset (as opposed to the whole) are just a few new forms of value that digitalization makes tradable in single units. Individually, the units could be worth less than $0.01, but they can be traded by the millions or trillions. The burgeoning trade in these digital assets is big business, exploding as we write this book. Amazon has a patent for a streaming data marketplace.[11] Digital industries like gaming are embracing microtransactions for in-game purchases. And new markets are forming daily to trade data, single watts of energy, carbon credits, and other digitally represented assets. The cryptocurrency and initial coin offerings (ICO) craze that took hold in 2017—followed by a deep crash and movements toward regulation—has not curtailed the enthusiasm to experiment with finance. This enthusiasm points to the mainstreaming of token-driven business models that are enabled by a blockchain to finance and capture digital opportunities.

Traditional centralized mechanisms for establishing trust, identity, and payment were not built to autonomously handle these microtransactions by the trillions in a distributed machine-centric environment—and they can't handle them, certainly not securely and efficiently. Businesses need a different way to deal with new digital assets and interactions without involving an intermediary that can collect data on every party in the transaction and take a piece of the value. You need blockchain.

Blockchain can also redirect *existing* value flows. It does this by reducing control over four business currencies by central market powers—including large multinational corporations, digital platforms, and large intermediaries. The business currencies are: data, access, technology, and contracts. We revisit them at various points throughout this book. Suffice it to say for now that data is the anchor currency because of how customers leave behind a data trail, like Hansel and his breadcrumbs. Powerful market intermediaries such as large retailers, financial services firms, government agencies, and digital platforms can pick up this data

essentially for free and analyze it to improve user experiences and to drive product development. Organizations that can capture plenty of data at very low cost and analyze it thus have an advantage over others in the value chain.

Blockchain starts to break that advantage by redacting the data trail. Instead of leaving data behind as you search and interact with a person or an organization, the data related to both you and the other parties on a blockchain can, under specific design conditions, be kept under participant control and shared as needed for a transaction. This shift in control prevents a central actor from capturing an outsize share of value and ushering it off-chain or using undue influence to nudge customer behaviors in particular directions. In this way, blockchain also reopens existing markets to new competition.

GOING BEYOND THE HYPE

The potential to create new value and unlock existing value flows makes blockchain one of the most revolutionary technologies available today. But in its current state, blockchain is, from an enterprise perspective, still young and evolving. It has yet to prove itself in a hardened business context, and some of its elements—decentralization and tokenization, in particular—are radical enough to make many business leaders pause. More sophisticated application will come through experimentation and ongoing maturation of the technology and the businesses that use it.

In the meantime, a great deal of contradictory information is floating around the market. On the one hand, many observers applaud blockchain as *the* solution to an impossible range of problems. On the other hand, we hear anecdotes about enterprises that launched blockchain pilots but couldn't convert them into operational deployments, resulting in limited cost savings or value. Combine unrealistic expectations and real-world disappointments with the cryptocurrency crash of 2018, and you get what we have been predicting since at least 2016. In Gartner

lingo, blockchain is moving toward the "trough of disillusionment" or, more colloquially, the blockchain winter.[12]

It is normal for technologies at blockchain's stage of evolution to be touted for a period of time and then experience a near-complete backlash during which people dismiss the high expectations as hype, resulting in the slide into the trough. The backlash can be especially strong for technologies with the potential to solve a wide range of complex problems or create vast amounts of value. We saw a similar dip in enthusiasm with the dot-com crash of 2001 and the more recent challenges enterprises are having with digital transformation.[13] Blockchain's inevitable slip into the trough doesn't signal that you should do less with the technology, however. On the contrary, you will want to do more with it now. Despite changes in attitude about blockchain, its technologies are maturing and use cases for the enterprise are beginning to show impact. It is in this period of evolving maturity that you will more easily find the use cases and design elements that solve *real* problems and unlock a technology's true potential. After the trough of disillusionment comes the plateau of productivity; after winter, spring.

THE GARTNER BLOCKCHAIN SPECTRUM: MAPPING YOUR FUTURE

Blockchain will evolve from its early application today to realize its full potential to enable a wide range of new digital transactions. We created the Gartner blockchain spectrum (figure 1-2) to illustrate the evolutionary path from the late 2000s, when many of blockchain's enabling technologies reached mainstream awareness, to the current-day solutions that use only a few elements, to blockchain's longer-term potential to enable microtransactions and unlock digital value flows. The spectrum reflects the experiences of organizations, including hundreds of our clients, engaged in the real-world development and application of blockchain technologies and design principles. Using

FIGURE 1-2

The Gartner blockchain spectrum
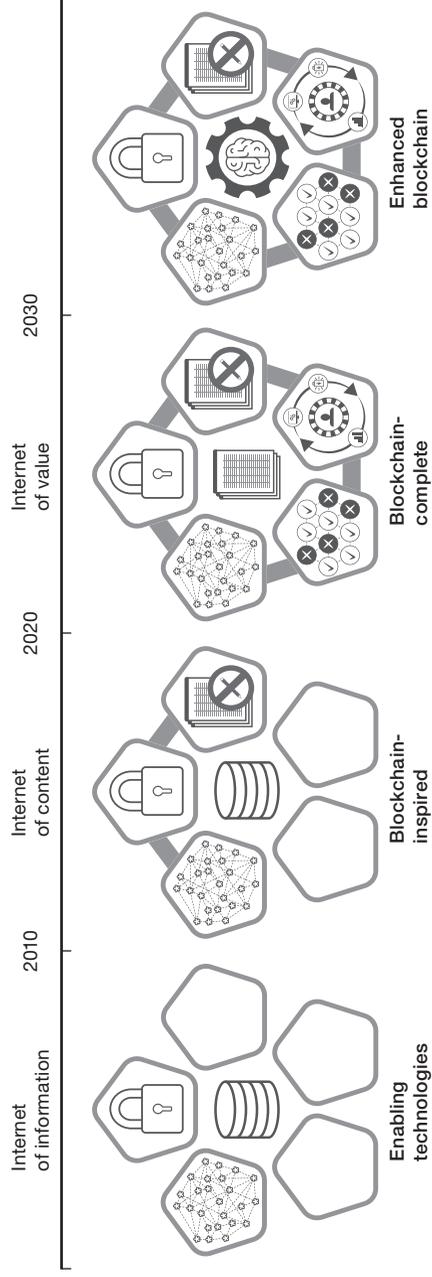
the spectrum as our guiding framework for this book, we reveal how blockchain will evolve from what it is today to what it will be by 2030. As seen in the figure, we expect this evolution to unwind in three phases.

PHASE 1: BLOCKCHAIN-INSPIRED

The first phase of the blockchain spectrum began to pick up momentum after 2012, when business leaders started exploring the technology through proofs of concept and pilots. We expect this phase to last through the early 2020s. Blockchain-inspired solutions use only three of the five elements—distribution, encryption, and immutability. These solutions often aim to reengineer existing manual processes specific to an individual organization or to an industry. High-profile blockchain-inspired examples include a solution developed by Alibaba to facilitate tracking and tracing of food products, including milk products from Australia and New Zealand, and honey and wine from around the world. The global shipping and logistics company Maersk also launched a blockchain-inspired solution called TradeLens for managing documentation flows in supply chains.[14]

There are several reasons why the solutions developed during the blockchain-inspired phase will focus on only three of the five elements. The explanations boil down to the maturity of the technology, the enterprises' readiness to embrace each element, the ease of implementation of each element (internally and externally), regulatory considerations and the propensity to deal with a limited set of known, and therefore trusted, participants.

As it pertains to blockchain technology, each of the underlying elements—distribution, encryption, immutability, tokenization, and decentralization—has a separate set of technologies associated with it, and each technology has its own maturity path. The technologies also need to interact in ways that are scalable, reliable, and secure. Despite this challenging work, it is well under way, and Gartner analysts expect that the major technical challenges of enterprise-scale blockchain will be

resolved by 2025. Meanwhile, the market has hundreds of experiments in progress but few full implementations. Only 3 percent of the 2,871 chief information officer (CIO) respondents to Gartner's 2019 CIO survey say they have a live and operational blockchain for their business, and an additional 8 percent of respondents are in short-term planning or pilot execution. Few to none of these implementations use all five elements of blockchain.[15]

The challenge is not just technical. There are also organizational challenges. To benefit from blockchain solutions that go beyond the efficiency and process improvement focus in the blockchain-inspired phase, organizations must embrace decentralization, the most difficult of the five elements. Decentralization means that every full node in a blockchain network gets an equal vote on whether a participant and a transaction are valid, and every node has access to and full viewing rights over the ledger. Many business leaders are as troubled by the notion of full transparency (albeit in an encrypted form) as they are by letting lines of code execute business decisions, especially if such execution is outside their full control. Technology infrastructure providers and market intermediaries stoke those fears. These actors make money on centralized technology and processes and have a vested interest in having you continue using their methods.

Blockchain's technological immaturity, coupled with the conservatism inside many organizations, combine to create the current market for blockchain-inspired solutions in *centralized* environments. You can identify these solutions by the words *closed*, *private*, *permissioned*, *enterprise*, and *proprietary*. Some of the solutions also incorporate tokens, but in a limited way. By definition, blockchain-inspired systems are centralized and hence cannot allow unmediated trade in data and other forms of assets.[16]

PHASE 2: BLOCKCHAIN-COMPLETE

Blockchain-complete solutions deliver the full value proposition of blockchain. The big upgrade from blockchain-inspired solutions comes from tokens operating in a decentralized environment using

smart contracts.[b] Tokenization allows you to create new assets and represent illiquid assets in a form that can be autonomously traded. Decentralization uses consensus to authenticate potentially untrusted users, assets, and transactions and ensures that no central provider can own or control the underlying mechanisms of trade in these assets. Deployed with all five elements of distribution, encryption, immutability, tokenization, and decentralization, blockchain-complete solutions enable trade in new forms of value and unlock monopolies on existing forms.

Few mainstream enterprises or governments that we know of are building blockchain-complete solutions yet. Many startups are doing so, however, and some of them will gain market momentum by the early 2020s, with more scale apparent after 2025. Though not immediate, the proliferation of blockchain-complete solutions will push organizations to explore new ways of operating with greater degrees of decentralization than they have now.

PHASE 3: ENHANCED BLOCKCHAIN

Sometime after 2025, complementary technologies such as IoT, artificial intelligence (AI), and decentralized self-sovereign identity (SSI) solutions will converge and become more integrated with blockchain networks.[c] The resulting enhanced blockchain solutions will expand the types of

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b. A *smart contract* is a computer program or protocol that typically runs on a blockchain. The program facilitates, verifies, or executes business processes triggered by events, on-chain transactions, or interactions with other smart contracts. A smart contract is a digital and autonomous representation of the traditional contract process, including contract formation, creation of enforceable and immutable rights and obligations, and execution of performance.

c. Self-sovereign identity (SSI) allows individuals or organizations to own their digital and nondigital identities and to give express consent to share that identity with others to engage in commercial transactions. Decentralized identity services enabled by an identity trust fabric can immutably store the proof of identities and their profile attributes cryptographically. Organizations, people, or things can then extract and share part or all of that identity record as needed for an interaction. In this way, SSI adds security and flexibility to individuals or organizations that want to share their data or ID on a per-interaction basis.

value that can be tokenized and exchanged and will enable a greater number of smaller transactions to occur and be supported by smart contracts than would be possible with traditional mechanisms. Enhanced blockchain will eventually allow microtransactions to take place between mutiple autonomous computerized objects without human intervention. From these capabilities, new markets will emerge to monetize previously unmonetizable or illiquid assets such as intellectual property (IP), data, physical objects, and other high-volume or high-value assets.

Decentralized, self-sovereign identity solutions will bring particular benefit to enhanced blockchain networks. These technologies allow participants to secure their personal data in a digital wallet or another storage mechanism and share it according to rules set up for this purpose. (The participants will also be able to selectively share data on blockchain-complete solutions by consenting to the tokenization of personal data they want to share with third parties.) When combined with AI, SSI dynamically enforces the rules established by the data owner and automatically requires the owner's consent before data can be shared or used. After they agree to share their data, the participants can also trace and document who saw it and who used it. This transparency enables broader monetizing of, and accountability for, the use of personal data while also ensuring privacy.

As new forms of value come online with enhanced blockchain solutions, businesses will likewise innovate new business models using decentralized operational structures. Organizations will be technically able to delegate economic decision making to "things," which would act autonomously and according to the terms defined in a smart contract that runs on the blockchain. These enhanced things could remove humans from the transaction and eventually move blockchain networks toward completely autonomous transactions and ultimately the establishment of decentralized autonomous organizations (DAO).[d]

d. A decentralized autonomous organization (DAO) is a digital entity that can engage in business interactions with other digital agents and corporate entities without conventional human management. DAOs rely on smart contracts to manage and execute interactions. By definition, DAOs operate independently and can span multiple geographic and legal jurisdictions and institutional boundaries.

The Gartner blockchain spectrum articulates how blockchain adoption will evolve over time to include decentralization as a design element. This evolution will create a new path to digitalize your industry and organization.

THE PROGRAMMABLE SOCIETY

As blockchain—and business—evolves, what is at stake is no less than your ability to participate in a fair and accessible digitally-enabled world economy and society. In such an environment, a diverse range of businesses, individuals, and things interact, operate, earn profits, and create value on their own terms. This world is not a foregone conclusion.

Figure 1-3 illustrates the directional options in today's increasingly tech-enabled world. The *y*-axis represents the environment of evolving digital capability, from web enablement to full programmability. *Fully programmable* implies that smart things or autonomous agents have attained legal authority to make independent decisions to produce or consume assets. To illustrate with a simple example, a sensor in a programmable building could decide on the amount of energy a room needs for the lighting system and then could "buy" the necessary energy from the sensors managing the micro-wind turbines installed on a neighbor's roof. In a fully programmable environment, these value exchanges can take place with or without human involvement. The *y*-axis is blockchain independent. Business and society will become more programmable with or without blockchain technology as IoT, AI, and advanced computing paradigms such as edge and quantum become more dominant.[e]

e. *Edge computing* describes a distributed computing environment in which data processing takes place close to the things or people that produce or consume the data. The goal is to reduce latency (delays) by keeping unnecessary traffic from the center of the network. Edge computing also establishes local hubs for interconnections between interested peers. *Quantum computing* is an advanced form of computing whereby various aspects of quantum mechanics, including superposition and entanglement, perform operations on data. Quantum computing can significantly increase the efficiency and speed of calculations. See Wikipedia, s.v. "quantum computer," last modified February 12, 2018, https://simple.wikipedia.org/wiki/Quantum_computer; and Neil Gershenfeld and Isaac L. Chuang, "Quantum Computing with Molecules," *Scientific American*, June 1998, 66–71.

The *x*-axis represents the continuum from full centralization of the governance structure to full decentralization. The idea of a continuum is critical, since decentralization is itself a dynamic condition—even in blockchain. Some industries and corresponding businesses are highly centralized today as a function of their structure. Others are naturally more fragmented. Even given that variation, any significant movement along the *x*-axis is blockchain dependent, since organizations that want to digitally transform and operate under decentralized governance *need* blockchain or some other form of digital ledger technology to allow all economic participants, including autonomous things, to transact with each other and earn due economic returns. Only decentralization *enabled by blockchain* makes transactions without an intermediary possible in a networked environment.

Thus, while the figure depicts four quadrants, the inevitable increase in programmability realistically limits an organization's directional options to two: organizations will either move north to become more digital under centralized governance, or they will move northeast to become more digital under decentralized governance.

The prevailing emphasis for the past two decades has been to drive toward "digital transformation." In terms of figure 1-3, the progression has moved organizations north from the lower left corner—where most business in most industries operate as relatively centralized and mostly analog—over the line into the upper left quadrant. While some legacy businesses have realized positive results from this approach, far more organizations struggle to realize value through the digital transformation of their current models.[17] Legacy infrastructure, investments, processes, partners, organizational cultures, profit models, and other aspects of these businesses are a source of competitive advantage, but are also extremely difficult to adjust without risking critical relationships and current sources of income. Because digital native platforms do not have these limitations, they can grab territory in the northwest quadrant (digitally sophisticated, centralized business), and, with that position, draw in customers. A diverse and relevant product set, an intuitive user interface, uncomplicated payments, and convenient delivery cultivate customer loyalty, enabling further centralization.

FIGURE 1-3

Planning for digital capability and level of decentralization
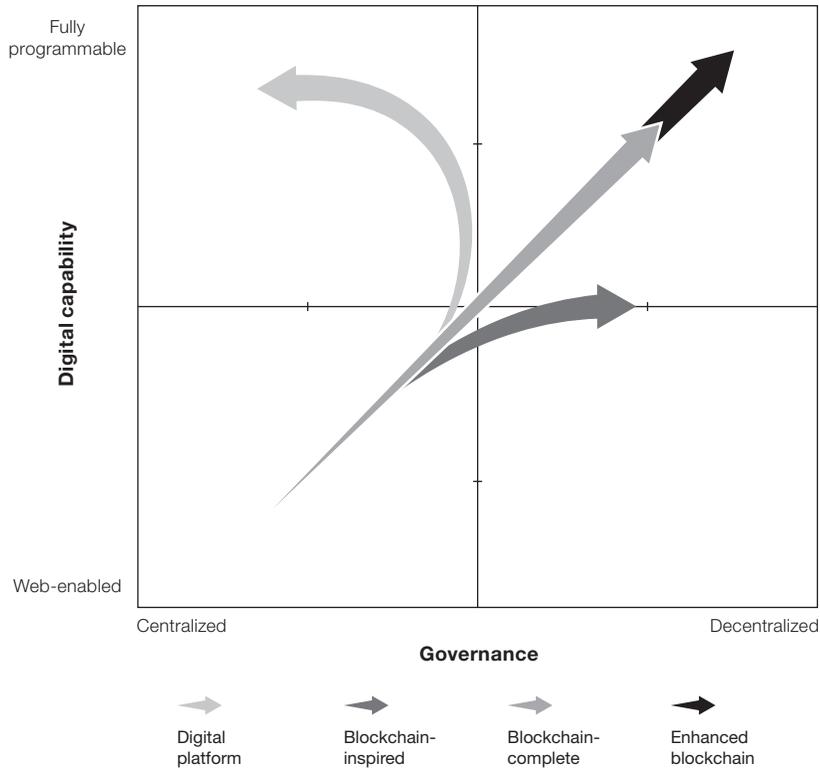
Nondigital native platforms vying for the same customers and using the same techniques lack the proficiency the native platforms enjoy.

Organizations that choose to move north will thus see increased programmability and will continue along the same trajectory they have followed for the past two decades under the control of a few large, digitally capable businesses (and government agencies) using the increasingly centralized infrastructure we rely on today. Allowing digitalization to progress in this way results in an outsized share of value accruing to a few powerful organizations—including large digital platforms, banks, insurers, telecommunications companies, logistics giants, and central governments. These organizations would have unlimited control over the data and value produced in a programmable world, allowing them to dictate

the terms of how other businesses access markets and technology and how they benefit. Absolute control would enable these programmable entities to become even more centralized over time.

Alternatively, organizations can choose a north-east trajectory to become more digital and more decentralized. A few companies have already decided to tackle the northeast quadrant to compete in their markets with relatively decentralized, digitally enabled business models. We say "relatively" because the multifaceted nature of business also means that a company can be quite centralized in some ways but decentralized in others. Some examples of companies embracing decentralization in aspects of their business or operating models include car-sharing providers like Zipcar, which enables decentralized car ownership, and LO3 Energy, which uses blockchain to support personal energy generation and exchange without the involvement of a centralized utility. Apparel brands such as Betabrand and Everybody World have open-source and crowdfunded product development models. And crowdfunding from the likes of Kickstarter, Indiegogo, and Ulule provides decentralized financing for independent ventures.[18] These examples and dozens of others show how decentralization of certain operational functions can deliver value. The companies themselves may be small, but they are among the fastest-growing firms in their respective sectors.

These are the available paths as the world becomes more programmable: move north and compete directly with digital native platforms and other central actors; move northeast, and you open the potential to step around the digital native platforms and other centralizing forces and set new terms of engagement. Along this northeast path lies, first, blockchain-complete solutions designed with the five defining elements and, later, enhanced blockchain solutions built on networks that include "things" as participants and use AI in the design protocols.[f]

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f. We use the word *things* to describe computerized and network-enabled machines. In today's internet of things (IoT), these machines function mostly to capture data about the device or environment in which they are embedded and transfer it to a central

MOVING ALONG THE
DECENTRALIZATION CONTINUUM

The very notion of the consensus-driven decision making that is inherent in the design of blockchain-complete and enhanced blockchain solutions is antithetical to most organizations and business leaders. You and other leaders might be tempted to simply focus your energy on the blockchain-inspired phase, hence limiting your movement to the lower edge of the northeast quadrant of figure 1-3 and ignoring the later phases of the spectrum.

Yet we encourage you to keep the long view in mind as you experiment with blockchain-inspired solutions. We positioned movement along the decentralization continuum as a choice you face in an increasingly programmable world and society, but we don't believe each of the available options is equally appealing. Millions if not billions of internet nodes and networked objects have spent the last two decades capturing communications; recording conversations; and keeping track of movements and transactions, relationships, objects used, and objects under consideration for billions of networked humans and organizations around the globe. Increasingly, the companies and governments that control this data are not just collecting but are also interpreting it, communicating it back, nudging people, and influencing behaviors.

This is reality—our reality. A handful of organizations worldwide hold vast reams of customer and company data. We handed it to them in exchange for added convenience and cool new gadgets. They don't need to have nefarious goals à la Big Brother for centralization of those resources to have unappealing economic and societal consequences.

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store. As internet-connected things become more intelligent—as they become embedded with if-then algorithms or eventually with more-sophisticated forms of AI—they will be able to buy, sell, and request service. This increased sophistication will open new opportunities for revenue, efficiencies, and customer relationship management. Smart things represent new customers that organizations can sell to and that governments can tax. Humans have already enabled some things to negotiate, buy, and sell.

Our economy and society are not going to become less digital and programmable in the coming years. On the contrary, they are on a clear path toward continued adoption of AI and ongoing expansion of IoT to the point that nearly every asset, environment, process, and interaction will be fully programmable within just a few decades, just as Alan Turing described more than fifty years ago. You now need to decide what kind of a programmable society you want to live in. Do you want one in which interactions, transactions, and the data related to them are controlled by a small group? Or do you want a society with widespread access, privacy, engagement, and value exchange?

The latter society requires an embrace of blockchain with eventual adoption of all five elements. To build such a society, you and other business leaders must actively collaborate to reconceive your enterprises as dynamic and increasingly autonomous participants in a larger network. The benefits will accrue to you, your organization, the economy, the business community, and society as your ways of exchanging value align with the increasingly intelligent and things-driven environment in which we live.

YOUR REAL BUSINESS LENS

WHAT DID YOU LEARN?

Blockchain is a computerized way to allow two or more participants in a network to exchange assets without needing a third-party intermediary, which would take a share of the value. Blockchain as we define it includes five core elements: distribution, encryption, immutability, tokenization, and decentralization. Together, these elements create a trusted environment in which to create and share value. These elements are not equal in terms of how easy they are to implement. Decentralization is the most challenging, as it also requires a business-level embrace of some degree of decentralized governance.

WHAT SHOULD YOU DO ABOUT IT?

As a leader, you should develop a vision of how increased decentralization could benefit your business. The timelines are short, as blockchain-complete solutions with all five elements will begin to gain market traction around 2023. Only slightly further out lies a future business and societal environment that includes IoT and AI, in which autonomous and intelligent things own assets and trade value. You need to know how you can prepare to interact through IoT and AI without needing a central actor to mediate the interaction for you.

WHAT'S NEXT?

The evolution of blockchain cannot be ignored. Dozens of case study interviews and thousands of client inquiries at Gartner over the last few years reveal that countries, industries, governments, enterprises, and consumers are taking steps to understand its use and application. The impact of the technology will be significant. You have to decide what, where, and how you will participate. Let's begin by delving deeper into the current blockchain-inspired phase of the spectrum.