Predicts 2019: Blockchain Business

Analyst(s): Adrian Leow, Avivah Litan, Richard Hunter, Rajesh Kandaswamy, Dave Aron, Andrew Stevens

Blockchain introduces a new vector to accelerate the move to digital business. This allows enterprise architecture and technology and innovation leaders to create or represent assets in a digital context and to create a new, decentralized economic and societal model.

Key Findings

- The market rush to exploit blockchain in operational supply chains pressures organizations to adopt this technology before it is sufficiently mature, and before their business or ecosystems are ready.

- Although financial services was among the first industries to experiment with blockchain, the potential benefit of blockchain is transformational or high in nearly all industries.

- Governments and central banks across the Asian region are being careful not to overregulate blockchain. Asian authorities want blockchain-related fintech startups to continue to innovate, and banks to be able to safely adopt new technologies.

- Governance is emerging as a significant constraint to scaling public blockchain.

Recommendations

For enterprise architecture and technology innovation leaders looking to understand where blockchain could be applied in their organization:

- Use Gartner's supply chain traceability framework to help map out all the risks, challenges, opportunities and requisite levels of maturity across trading partners — for longer-term positioning and planning for blockchain opportunities across extended future supply chain networks.

- Determine how blockchain can benefit your organization by analyzing the blockchain strategy of the startups closest to your industry.

- Approach Asia's digital disruption as an opportunity rather than a threat, by establishing local partnerships in the Asian region to navigate local conditions and restrictions. Prepare to be flexible in emerging markets in order to grow with partners that are at a smaller scale.

- Immerse yourself in the governance mechanisms for blockchain, first by understanding how those mechanisms work, and then by participating actively in them. Expect development of public blockchain governance to be dynamic through 2023.

Table of Contents

List of Figures

Strategic Planning Assumptions

By 2023, blockchain will support the global movement and tracking of $2 trillion of goods and services annually.

Through 2023, more than 80% of the largest successful blockchain projects will be outside financial services.

Through 2021, successful blockchain projects in Asia will outnumber those in the rest of the world by a ratio of 2-to-1.

Through 2023, the absence of robust governance mechanisms for nontechnical issues will inhibit global adoption of public blockchain.

Analysis

Enterprise blockchain has passed the Peak of Inflated Expectations in Gartner's "Hype Cycle for Blockchain Technologies, 2018." Gartner client inquiry shows an urgent demand to avoid wasted resources on an overhyped technology. This means that enterprise architecture (EA) and technology innovation leaders need to respond to questions from CEOs and boards of directors about what

blockchain is, how it can be applied, and how companies can extract value from its anticipated benefits.

It is critical to understand what blockchain is, and what it is and is not capable of today, compared with what it might become and how it will transform enterprises, industries and society tomorrow. Various technology evangelists have adjusted the original concepts to assert that blockchain is not only new, but that it can be applied in an aspirational manner to solve a multitude of business problems.

While the scope of its impact spans technology, business, industry and society, blockchain is still a promise; successful implementations are very rare. Blockchain needs to mature and settle — together with viable business models that leverage the technology — for it to fulfill its potential.

What You Need to Know

This report offers insights into the challenges organizations face when adopting blockchain-based solutions during the next few years. Blockchain introduces a new vector that will accelerate the move to digital business — allowing individuals or enterprises to create or represent assets in a digital context, and to create a new, decentralized economic and societal model.

The forecast in Figure 1, which illustrates the business value of blockchain use cases, depicts a measured evolution. The expectation is that little business value will be generated in the next five years. By 2025, the business value added by blockchain will grow to slightly more than $176 billion, then surge to exceed $3.1 trillion by 2030.[1] Business value is expected to grow at a significant rate, starting in the mid-2020s. Overlaid on this time frame is Gartner's Blockchain Spectrum model for examining the phased evolution of blockchain solutions (see "Understanding the Gartner Blockchain Spectrum and the Evolution Technology Solutions"). The spectrum enables CIOs and business leaders to have a clear framework they can apply in order to understand which types of solutions are suitable for their business context.
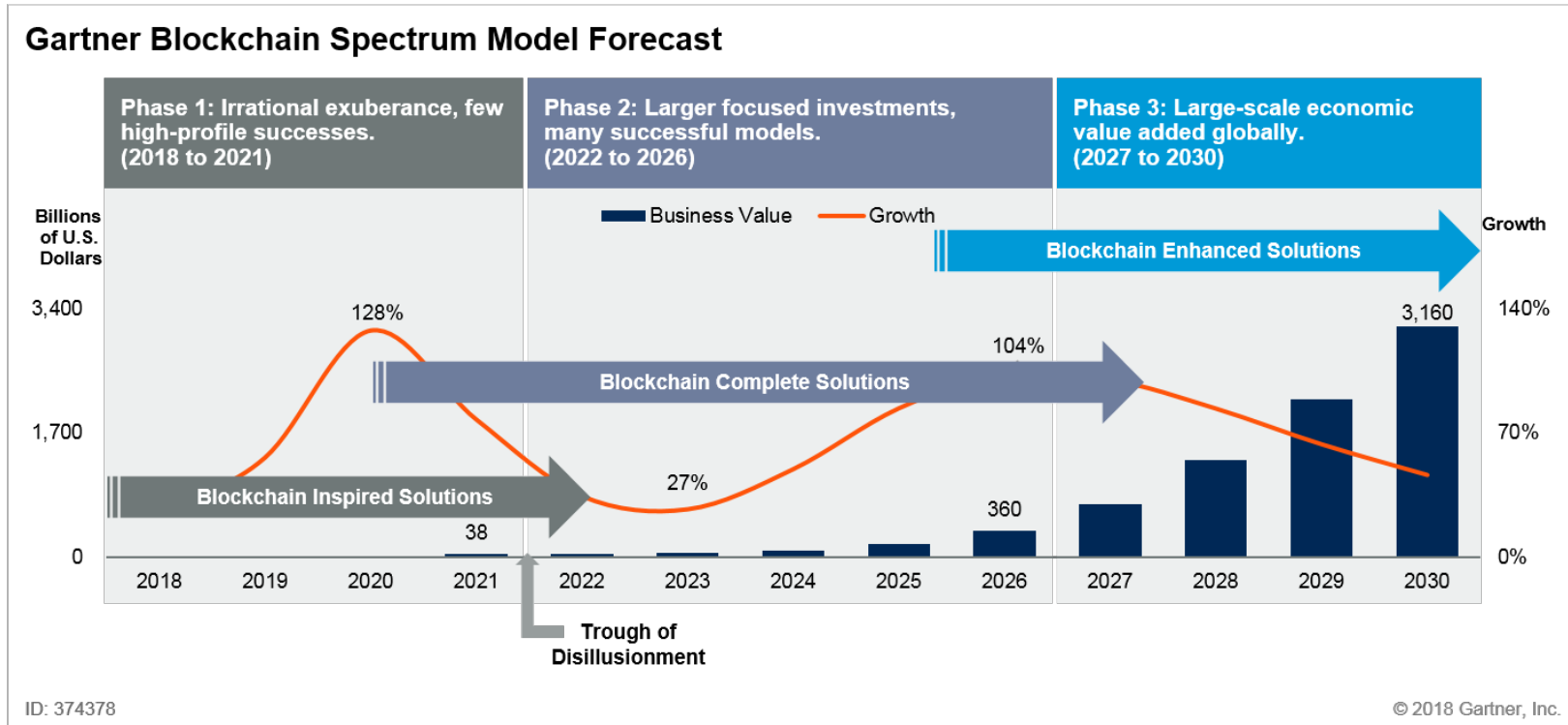
Gartner's Blockchain Spectrum sees:

- **Blockchain-Inspired Solutions —** Prominent for the next four to five years. These will be solutions that do not meet all the aspects of blockchain, but combine some elements of blockchain-enabling technologies in order to offer limited capabilities.

    - Most blockchain-inspired solutions lack the full extent of blockchain core tenets — especially tokenization and *true* decentralization.

    - Be wary that blockchain will slide into what Gartner calls the "Trough of Disillusionment" on our Hype Cycle during this blockchain-inspired phase. You shouldn't lose faith in the technology, but if you're a service provider, converting deals may become more difficult while in the trough, and if you are internal IT then you may struggle to get any blockchain business cases approved.

- **Blockchain Complete Solutions —** Won't come for another couple of years and will take about another seven years after that to mature, through to 2027. These will be interoperable solutions

that meet all the components of blockchain. These include things such as record encryption and immutability, monetized tokenization, and decentralization via algorithmic trust.

- ■ **Blockchain-Enhanced Solutions —** In a decade from now, you'll have mainstream solutions. These will combine the full extent of "blockchain complete" solutions with other technologies such as artificial intelligence (AI) and the Internet of Things (IoT), delivering intelligent solutions that allow for things such as dynamic programmability using AI-informed smart contracts.

This model is intended to reduce the considerable level of confusion and hype that exists in the market for blockchain solutions, showing the value these solutions may bring and what it will take to achieve that value.

Figure 1. Gartner Blockchain Spectrum Model Forecast

Gartner Blockchain Spectrum Model Forecast

Phase 1: Irrational exuberance, few high-profile successes. (2018 to 2021)

Phase 2: Larger focused investments, many successful models. (2022 to 2026)

Phase 3: Large-scale economic value added globally. (2027 to 2030)

Billions of U.S. Dollars

Business Value — Growth

Blockchain Enhanced Solutions

Blockchain Complete Solutions

Blockchain Inspired Solutions

3,400 · 1,700 · 0

128% · 104% · 27%

3,160 · 360 · 38

140% · 70% · 0%

Growth

2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030

Trough of Disillusionment

ID: 374378

© 2018 Gartner, Inc.

Source: Gartner (December 2018)

EA and technology innovation leaders should leverage this document and:

- Use Gartner's predictions as planning assumptions on which to base their strategic plans.

- Assess the near-term flags that indicate whether or not a prediction is trending toward becoming true.

- Position predictions with longer "time horizons" as having a lower probability of coming true than those with shorter time horizons.

See "Blockchain Technology Spectrum: A Gartner Theme Insight Report" for research on blockchain technologies, capabilities and best practices.

Strategic Planning Assumptions

Strategic Planning Assumption: By 2023, blockchain will support the global movement and tracking of $2 trillion of goods and services annually.

Analysis by: Andrew Stevens, Dave Aron

Key Findings:

- Potential block chain use cases are not quick wins. For transactions involving physical goods and services, additional due diligence is a prerequisite. Consider the implications for legacy infrastructure, regulatory and political requirements, and metrics of trust, and the need to influence change across diverse groups of trading partners.

- Blockchain hype continues for potential supply chain use cases and opportunities that can contribute to an ecosystem of trading partners. The true potential for blockchain across operational supply chains is often clouded, misinterpreted, or lost in the scramble to translate proofs of concept (POCs) into full business rollouts. Despite these issues, there is a fundamental value proposition for a blockchain complete approach — to reduce friction and incorporate decentralized trust across domains — which, for the governance, movement and tracking of physical goods, holds a lot of promise.

- A technology-first approach to scoping supply chain potential has, in part, been driven by fierce competition to be the first to offer a supply chain solution utilizing blockchain. The disproportionate weighting given to the blockchain ignores the immature state of the technology and the relative readiness of supply chains for blockchain (see "Toolkit: Accelerate Your Blockchain Technology Competency Across the Supply Chain").

- Movement and governance of physical products requires agreements and trust among supply chain actors to develop a consensus-based ecosystem of partners. Blockchain offers potential benefits for future supply chain networks, if mapped and positioned correctly across a technology roadmap that involves interorganizational collaboration. Examples of immediate opportunities include frictionless real-time payments, anti-counterfeiting across high-risk products, efficiency play across multiple transactions, and granular traceability of source materials.

Near-Term Flag: Through 2021, 30% of supply chain blockchain initiatives will refocus activities to prioritize physical product data capture, ecosystem governance and stakeholder interoperability. Through 2021, 20% of new blockchain pilots and POCs across supply chains will be working within ecosystems of five trading partners or fewer.

Market Implications:

Many companies, both large and small, are feeling the pressure to begin working on blockchain initiatives. For some, just being active on blockchain can be viewed as a key marketing enabler for the brand or company image. For others, it is a key driving technology to meet critical business objectives. In many instances, there are established and emerging technology solutions that are more suitable and ready for supply chains (see "The 2018 Top 8 Supply Chain Technology Trends You Can't Ignore").

If organizations can navigate the hype correctly, the potential benefits of blockchain across supply chains is significant, but not necessarily immediate. Gartner has observed some companies retrofitting additional technology capabilities to plug gaps when blockchain is positioned as the principal technology. This approach undermines the true potential of blockchain, and could harm a company's productivity and efficiency in the longer term. However, this does not mean blockchain's potential value should be underplayed, or that the momentum to explore blockchain should be postponed or ignored. Many supply chains are presently undergoing unprecedented changes. There are ever-increasing expectations and demands placed on them to deliver across all stages of product life cycles — by internal and external customers' governments, and the media (see "Blockchain Solutions in Supply Chain: 2018 Market Insight").

It is imperative that supply chain leaders, CIOs and other IT leaders perform due diligence in evaluating the merits of other technologies alongside the potential of blockchain. It is equally important to ensure that a full understanding of the additional challenges and implications across operational supply chains are fully incorporated into formal planning cycles (see "Follow Four Evaluation Steps to Decide If Blockchain Is Right for Your Supply Chain").

In the past year, Gartner has observed a gradual realization that blockchain supply chain applications may, eventually, be delivered in many formats depending on the specific use case or objectives. For example, blockchain "as a service" for contract transaction efficiency may be deployed across a portfolio of technologies supporting supply chain applications. Leading technology solution providers, integrators and proactive supply chain organizations are leading the way in participating in working groups, forums and more formalized consortia. This participation is all part of ongoing learning and development, to help ratify, crystallize and refine the supply chain applications of block chain.

Gartner estimates that, by 2023, blockchain will support the global movement and tracking of $2 trillion of goods and services annually.[1] This includes raw materials, spare parts, work in progress, finished goods and service infrastructure for maintenance/repair. That doesn't mean that blockchain-based systems will do everything in the movement of those goods, but that they will play a significant role in development and delivery across the ecosystem.

Recommendations:

Supply chain leaders, and EA and technology innovation leaders should:

- Ensure their organization has the necessary expertise, networks and competencies to position blockchain accurately across process and technology roadmaps in the longer term. Avoid being overly ambitious with early exploration, in terms of objectives or scale. Identify quick-win opportunities across compact groups of stakeholders for their principal pilots, in areas such as security, traceability and provenance, transaction efficiency, and service fulfillment.

- Identify accelerated pathways to incorporate a blockchain-as-a-service component to complement existing technology solutions or planned deployments. Explore the potential of blockchain in this capability with your key solution and enterprise partners.

- Use Gartner's supply chain traceability framework to help you map out all of the risks, challenges, opportunities and requisite levels of maturity across trading partners for the positioning of blockchain, in the longer term, across your extended supply chain networks of the future (see Use Gartner's Framework for End-to-End Supply Chain Traceability).

Related Research:

- "Toolkit: Accelerate Your Blockchain Technology Competency Across the Supply Chain"

- "The 2018 Top 8 Supply Chain Technology Trends You Can't Ignore"

- "Blockchain Solutions in Supply Chain: 2018 Market Insight"

- "Follow Four Evaluation Steps to Decide If Blockchain Is Right for Your Supply Chain"

- "Use Gartner's Framework for End-to-End Supply Chain Traceability"

Strategic Planning Assumption: Through 2023, more than 80% of the largest successful blockchain projects will be outside financial services.

Analysis by: Rajesh Kandaswamy

Key Findings:

- Financial services was the first among industries to experiment with blockchain, but adoption is scarce. According to the 2019 Gartner CIO Survey, less than 8% of CIOs in financial services have deployed blockchain. Financial services was the first industry to reach the Peak of Inflated Expectations on the Hype Cycle for blockchain business. Now, the hype is reducing and the finance industry is proceeding toward the Trough of Disillusionment (see "Hype Cycle for Blockchain Business, 2018").

- The potential benefit of blockchain is transformational or high in nearly all industries, and may take longer than five years to be realized. In addition to financial services and governments, other industries are exploring blockchain. These include (in order of the level of activity we have found): manufacturing, oil and gas, supply chain and logistics, travel and transportation, utilities, healthcare, life sciences, retail, education, media and entertainment, and advertising.

- The key features of blockchain — including asset representation, transaction management, brokerless interactions, contract execution and identity management — are applicable across most commercial and public organizations, and are not limited to the scope of financial services.

- Many blockchain initiatives in supply-chain scenarios are directed by one central organization that has the most to gain and which is also able to direct technology use for suppliers and partners that participate in the ecosystem. The central organization might be a large retailer or manufacturer, for example. This situation is different from that in financial services, where most use cases are at an industry level, not an institution level. This difference can complicate adoption. Peers in an industry, plus other players in the ecosystem, need to be able to isolate noncompetitive functions for such blockchain use. They need to agree on processes and establish governance models in addition to the other complexities that come with large-scale technology implementations.

- Blockchain affecting broad swaths of financial services remains a myth. Even the trials so far are concentrated in a few areas, such as securities clearing, asset management and insurance. Gartner sees little action in consumer banking, which is the biggest area in financial services and includes retail, credit cards, mortgage and consumer lending.

Near-Term Flag: Through 2021, less than 10% of the 100 largest banks will have developed any core systems for blockchain implementations. Though 2021, at least two of the 10 largest companies in five different nonfinancial industries will have announced successful blockchain implementations at scale.

Market Implications:

Financial services has the greatest potential for blockchain use, both as a sustaining technology in improving today's process and as a disruptive technology to exploit new markets. The former is cost-focused and requires a change of processes at industry level, and while firms are in discussions, they are proceeding at a slow pace to make a real impact. The latter is revenue-focused, but this requires forcing financial organizations take more risks — in creating new business models and/or extending into new unchartered territories — and they are reluctant to do that. These complications have resulted in financial services organizations ending up with tepid POCs that prove the technology, but do not lead to meaningful progress.

For incumbents in most other industries, blockchain appears to be a new technology that can solve inefficiencies in their ecosystems which have remained immune to fixing. Most of the projects are primarily "efficiency plays" that hope to use the immutability and traceability of the copies of the distributed ledger to bring business benefits (see "Pay Attention to These 4 Types of Blockchain Business Initiatives"). While blockchain might be a tool that works there, it is crucial for enterprises to identify whether the benefit comes from blockchain technology itself, or the process changes they propose to undertake. Most of the current initiatives fall into the "blockchain-inspired" category (see "Understanding the Gartner Blockchain Spectrum and the Evolution Technology Solutions"). If the benefits come from the proposed process changes, it might suffice for the organization to make those changes and use the current tools and technologies in their repertoire. However, we urge

enterprises to also look at whether a blockchain foundation can enable them to provide new value-added services, or to radically improve their operational processes. Activity in blockchain, in industries, is rampant across startups — either funded by initial coin offerings (ICOs) or venture capital (VC).

A few of these ecosystems can have significant market ramifications. This could be either because they are led by some of the largest industry participations — whose actions affect the market — or that the initiative occurs at an industry or ecosystem level (such as shipping). EA and technology innovation leaders should be watchful if they are members of ecosystems where blockchain networks can emerge, because preparatory action might be needed to join and use those networks.

Blockchain can offer organizations a rare opportunity to improve their efficiency ratios appreciably, but it won't come easy and will require companies in industries to commit to investments and cooperation. Gartner has found that industry cooperation does occur, but does not have the urgency or the momentum to come to the specific product, operational or technology decisions that will be required to use this technology at a foundational level.

Recommendations:

EA and technology innovation leaders should:

- Identify relevant best practices and opportunities in blockchain by using a broader lens to look at blockchain activity in their industry and other nonfinancial industries.

- Perform scenario planning on how blockchain can impact their industry. They should pick three startups closest to their space and determine how these new companies can impact the market and what it will take for them to achieve success, then come up with a list of defensive and offensive actions.

Related Research:

"Blockchain Technology Spectrum: A Gartner Theme Insight Report"

"Hype Cycle for Blockchain Business, 2018"

"Hype Cycle for Blockchain Technologies, 2018"

"Pay Attention to These 4 Types of Blockchain Business Initiatives"

"Follow Four Evaluation Steps to Decide If Blockchain Is Right for Your Supply Chain"

Strategic Planning Assumption: Through 2021, successful blockchain projects in Asia will outnumber those in the rest of the world by a ratio of 2-to-1.

Analysis by: Adrian Leow, Rajesh Kandaswamy

Key Findings:

- Governments and central banks across the Asian region have been careful about which aspects they regulate in order for blockchain-related companies and investors to operate in a healthy environment. The intention is to ensure that fintech startups continue to innovate and banks can safely adopt new technologies. For example, Singapore has an open policy and forward-oriented economic outlook, and South Korea banned ICOs in September 2017. At the same time, these nations are drafting new industry classification standards that recognize crypto exchanges as regulated financial institutions.

- Many organizations based in Asia are taking a two-pronged approach to blockchain. One aspect involves investing in startups, creating alliances and leveraging accelerators. The other aspect involves setting up blockchain innovation labs, with dedicated resources, under the guidance of a blockchain interdisciplinary taskforce. Because the technology is not the exclusive domain of IT, early involvement from business leaders accelerates the pace of blockchain understanding and enterprise adoption.

- Since early 2017, an increasing number of Asian venture-financing funds have been actively involved in early-stage crypto investing. Asia-based investors are directing 40% of the $154 billion in crypto global venture financing, versus their American counterparts at 44%, according to an analysis by the Wall Street Journal.[2]

- In the blockchain space, Chinese companies make up a more than 80% share in mining compute power, while Asia in aggregate makes up a very significant market share in cryptocurrency trading.

- Some global businesses struggle to gain the necessary local knowledge to compete with Asian companies, due to huge regional differences in terms of culture, buying behaviors and market characteristics. The exponential rate of adoption and growth of e-commerce in Asia is also a key reason why many organizations are implementing and improving their blockchain services in Asia.

Near-Term Flag: By 2020, 80% of blockchain developer resources used by enterprises worldwide will be sourced from countries in Asia.

Market Implications:

Hype and interest in blockchain and cryptocurrency began in Asia and the U.S. at around the same time, but Asia got a head start due to a more favorable set of regulations. Blockchain technology has been explored by regulators throughout countries such as China, Japan and Korea. Since the start of 2018, blockchain has been highlighted as one of the most promising technologies by China's President Xi Jingping, who called it "a breakthrough technology." Japan has also placed a spotlight on blockchain in an effort to reinvigorate the country and its economy. Korean regulators have begun debating the idea of using blockchain technology as part of the democratic process, with advocates calling for the introduction of blockchain-powered voting systems. As a result, Chinese and Korean cryptocurrency and blockchain funds have an edge that includes access to proprietary information and relationships, and a massive market.

Blockchain projects, or POCs, are significant for developing countries in Asia for a number of reasons. The first reason is that most developing countries don't have the burden of legacy systems to replace. Blockchain can provide the first upgrade of an existing inefficient system, or can introduce infrastructure that didn't exist before. Another reason for the widespread interest in blockchain in Asia stems from the light regulatory infrastructure in many of its countries. So far, this has been an opportunity, but it also raises some concerns as the technology matures.

The Asian population is about 4 billion at the time of writing, which makes it one of the most densely populated regions of the world. From a business perspective, this means more speculative investors willing to embrace unproven and risky technologies such as blockchain, and a large percentage of crypto users to affect the overall global economy. While blockchain technology is still in its fledgling stage, Asia looks to play a major role in increasing its usability. The petrochemical industry in countries such as China is already starting to break away from the U.S. dollar as a standard currency for transactions, in favor of cryptocurrencies and other means of digital payment.

China is already looking toward introducing a version of bitcoin, to replace the renminbi as the national currency. Singapore has become an attractive crypto hub, because of its highly connected nature and links to global trade flows. Singapore is a key node in the trading of oil and gas, and is looking to further expand its blockchain implementation.

Asia is therefore poised to lead the way by embracing sensible regulations, awareness and education. Obstacles impeding adoption remain, but blockchain presents an opportunity to pioneer life-changing innovative technologies, which could change the manner in which we live and interact in our daily lives.

Recommendations:

EA and technology innovation leaders should:

- Take Asia's digital disruption as an opportunity, rather than a threat, by establishing local partnerships in the Asian region to navigate local conditions and restrictions. Prepare to be flexible in emerging markets and to grow with partners that are at a smaller scale.

- Pay attention to larger Asian countries that are proving successful, such as Chinese digital companies' focus on markets such as Brazil, India, Thailand, Africa and others, to see where the next expansion battles will take place.

- Establish a view of technology-driven transformation and disintermediation forces in your industry, either from established competitors or new, nontraditional competitors. Use this view to drive a sense of urgency with your executive committee about the need to drive digital transformation and investment in emerging technologies such as blockchain.

Related Research:

- "2018 CEO Survey: Asia/Pacific CIOs Must Help the CEO Prepare the Organization for Digital Business"

- "2018 CIO Agenda: A China Perspective"

- "2018 CIO Agenda: A Southeast Asia Perspective"

- "2018 CIO Agenda: An Indonesia, Philippines, Thailand and Vietnam Perspective"

- "2018 CIO Agenda: A Malaysia Perspective"

Strategic Planning Assumption: Through 2023, the absence of robust governance mechanisms for nontechnical issues will inhibit global adoption of public blockchain.

Analysis by: Richard Hunter

Key Findings:

- Current public blockchain governance mechanisms are aimed entirely at technical specifications (for blockchain structure, validation methods, and so on). This focus excludes governance of other significant elements of the blockchain ecosystem (such as cryptocurrency exchanges) that have high potential impacts and influence on blockchain participants. It thus excludes principles and policies that are essential to value exchange mechanisms in general.

- Hard forks, such as those that have occurred for the bitcoin and Ethereum blockchains, split blockchain communities. This can also, to an extent, subsequently inhibit market share for specific blockchain protocols.

- Significant technical barriers to scaling are a current constraint on the growth of public blockchain. Once those technical issues are resolved, the next significant constraint to scaling is governance.

Near-Term Flag: By year-end 2021, at least one "hard fork" — that effectively creates two blockchain protocols from one — will occur in a top-three blockchain protocol (by market capitalization). By year-end 2022, another hard fork will have occurred.

Market Implications:

In June 2017, the decentralized autonomous organization (DAO; backed by the Ethereum cryptocurrency), which had recently raised $150 million via a crowdfunding initiative, suffered a high-profile failure. This failure was in the "smart contracts" written to move the funds and run the DAO, draining the fund of ether valued at $50 million. Resolving that issue in favor of DAO investors required a policy decision, to address unanticipated circumstances, and that decision was not subject to resolution via algorithm. The resolution chosen by the DAO was a "hard fork" from the existing Ethereum protocol, to retrieve the stolen cryptocurrency from the hacker and make it available for withdrawal by injured Ethereum owners. This resolution resulted in Ethereum participants splitting into mutually exclusive camps: Ethereum and Ethereum Classic.

At the root of this split was a disagreement over principle and policy — was it more important to make investors whole (rather than splitting), or to maintain the immutability of the blockchain? An absence of mechanisms for dealing with issues beyond the technical specifications for a transaction, made the decision to fork into a one-off event unmoored to core principles. Devotees of the principle of blockchain immutability would not accept an outcome that involved rewriting the

blockchain, which would effectively mean that there were some things more important than immutability. The split in the Ethereum community that followed was predictable in that context.

Poor Understanding of Blockchain Governance Is a Leading Indicator for Governance Failure

A leading indicator for the success of any governance mechanism is the ability of its participants to clearly describe how it works. It is therefore worth noting that current governance mechanisms for public blockchain are generally obscure and poorly understood by many participants. This lack of understanding is unsurprising, given the focus of governance on technical specifications for blockchain transactions. It is clearly unrealistic to expect a mass population to acquire deep technical expertise in any given domain. (Billions of people have iPhones, but how many of them know how to use every feature of those devices?) As the blockchain user population grows, a large portion of that population will have neither the deep expertise nor the interest in technical specifications, and will therefore participate minimally in governance, if at all (as is currently the case for internet users). It appears that, in the meantime, public blockchain governance is effectively in the hands of the technical elites who understand both the technology and the multistep governance process for the technical proposal, review, acceptance and distribution involved.

A robust value exchange mechanism addresses multiple governance oversight domains, including:

- Principles and processes for assessing liability in the case of error or malicious acts. In the case of public blockchain, such principles and processes are more likely to be applied to ecosystem participants such as exchanges, as opposed to the blockchain itself.

- Principles and processes for defining appropriate and inappropriate behaviors, and outcomes and policies, related to the public blockchain.

- Mechanisms for enforcing policy, without which those policies are meaningless.

Such mechanisms can easily be seen in online platforms for (nontokenized) value exchange such as eBay, Airbnb or Uber. The first point above is obviously relevant to the Ethereum hard fork in 2017. The second item is relevant to issues such as the widely reported manipulation of bitcoin value by currency speculators. According to The New York Times, up to half the value of bitcoin can be attributed to such manipulation.[3] An inability to constrain such behaviors via internal governance invites external governance, and in fact this is already occurring in some countries.[4]

Robust Mechanisms for Governance Go Beyond the Blockchain to the Ecosystem

The mechanisms described above are common and highly elaborative in mature value exchange systems. Such mechanisms are complementary to the mechanisms that govern the technical specifications for blockchain, and generally apply not only to the blockchain itself, but also to the ecosystem of stakeholders and their behaviors.

That ecosystem ultimately includes governing authorities that predate blockchain. As public blockchain adoption grows, so will conflicts between the blockchain and pre-existing governance mechanisms. An obvious example is the "right to be forgotten" regulation, which, on the face of it, is difficult to reconcile with the immutability of blockchain. Blockchain proponents anticipate that

smart contracts will dramatically reduce friction for a wide range of transactions. However, these must be reconciled with national laws, which in the vast majority of cases do not currently accept the validity of an agreement made between non-human actors. It is doubtful that such issues can be resolved solely with reference to an algorithm, given that resolution requires the prioritization of specific principles above others, among participants who do not necessarily agree on first principles.

Such governance issues are less important while public blockchain adoption is limited. The impact of governance decisions is currently felt by a relatively small set of people spread over across the globe. If, as we expect, the technical issues currently constraining blockchain deployment and operations at scale are resolved within the next few years, the number of blockchain providers, applications, and users is likely to expand dramatically. The major tipping point will be in 2026. If robust governance mechanisms for public blockchain are not in place by then, risk-reward ratios will tip toward risk, and growth in public blockchain will be constrained.

Recommendations:

EA and technology innovation leaders that want to participate in public blockchain should:

- Immerse themselves in the governance mechanisms for that blockchain, first by understanding how those mechanisms work, and then by participating actively in them. Expect development of public blockchain governance to be dynamic through 2023.

- Seek legal counsel as to how the legal authorities in countries in which your organization operates will view transactions conducted via blockchain. Note that this could be complex for those operating in multiple geographies and those using tokens to represent multiple kinds of value (for example, value expressed in goods, services, money, and so on).

Related Research:

- "Blockchain Status 2018: Market Adoption Reality"

- "Blockchain-Based Transformation: A Gartner Trend Insight Report"

- "Pay Attention to These 4 Types of Blockchain Business Initiatives"

- "Predicts 2018: Top Predictions in Blockchain Business"

- "Blockchain Primer for 2018"

- "Hype Cycle for Blockchain Business, 2018"

Replay Prediction

The replay prediction is a prediction from a previously published report that is so significant that it is being republished here.

Strategic Planning Assumption: Through 2022, only 10% of enterprises will achieve any radical transformation with the use of blockchain technologies.

Analysis by: Rajesh Kandaswamy, David Furlonger, Ray Valdes

Key Findings:

- Exploiting blockchain technologies to the fullest extent will require enterprises to creatively deconstruct current businesses models. Blockchain technologies enable development of decentralized businesses and systems without the need for a middleman, whereas most of today's systems are centralized or depend on a middleman (see "Hype Cycle for Blockchain Technologies, 2018"). It is possible to use blockchain to build centralized systems, but other proven technologies will suffice in most cases.

- Most of the blockchain activity by enterprises today maintains the status quo in business processes, actors, products and services. The hype around blockchain is increasing in most industries (see "Hype Cycle for Blockchain Business, 2018") and many are experimenting with blockchain without fundamentally reviewing current business models (see "Blockchain Trials Across Industries Show the Pulse of a Rapidly Moving Professional Services Market").

- Blockchain technology solutions must mature further in order to support enterprise needs in areas including performance, data management, integration and interoperability. This will be a progressive evolution and we anticipate future platforms to be able to support these enterprise needs through the early part of the next decade (see "Market Guide for Blockchain Platforms").

- Traditional enterprises might not exploit the benefits of blockchain technologies as much as startups. History tells us that legacy enterprises are not adept at disruption using innovative technologies. Entrepreneurs and startups, with no institutional or technical legacy, are the ones who may initially maximize the potential of disruptive technologies with new business capabilities. Current startup and enterprise activity in blockchain remains true to this phenomenon.

Market Implications:

Enterprises that limit the purview of their blockchain activity to current business models will be oblivious to the new opportunities offered by blockchain. Most of the Gartner interactions with enterprises on blockchain involve their current business models. Our research indicates the business value from blockchain is almost evenly divided between revenue and cost reduction, but most of the industry activity today is predisposed toward the latter. Applying a new technology to a known business process might appear to be a simple way to start. But it will falsely limit the range of possibilities available to any business, based on the current assets (financial, distribution, customers and products, among others) and the new technology. Furthermore, there is a risk of assuming a false sense of security about readiness for any market disruption due to blockchain technologies.

Exploitation of blockchain-based disruption requires a multifaceted approach that spans company strategy, business processes, risk management, workforce skills, technology investments and

managing operations. Blockchain could contribute to remapping or reshaping future supply chain networks of stakeholders in multiple industry verticals.

More than most technologies, blockchain challenges the boundaries of economic architecture — and, therefore, the current business paradigms — much further. For enterprises choosing to take this challenge on, it implies the requirement for a broad approach across the areas listed previously. This might not require a wholesale change immediately, but demands at least anticipatory action today.

Applying blockchain to projects where it is not needed (blockchain washing) can lead to failed projects or suboptimal outcomes. From interactions with clients, Gartner observes that the pressure to invest in blockchain (usually from the top) is leading to a spate of hasty trials that have not considered the following:

- Alternative, "proven" technologies

- The current state of blockchain technologies

- The return on investment

- The amount of the change required to achieve significant business transformation

Such experiments, if pursued all the way to production, will result in regrets and wastage — and not achieve optimal results. Discussions with clients about their inability to turn POCs into in-production, scaled operations, reflect this situation. See "How to Make the Most of a 'Pointless' Blockchain Project" and "Top 10 Mistakes in Enterprise Blockchain Projects" for more information.

Startups unencumbered by current legacy business practices are poised to reap the most value from this technology, with disruptive innovations. Fueled by ICOs and other investment mechanisms, a whole slew of startups have entered the arena. Gartner's research indicates that many startups emphasize the decentralization and blockchain business models much more than enterprise initiatives. Most startups will fail, but there will be a few that will emerge with winning business models. See "Measuring the Impacts of Digital Disruption: Introducing Gartner's Digital Disruption Scale" and "Disruption and Disruptors: Differentiating Disruption From Features and Fads" for more information.
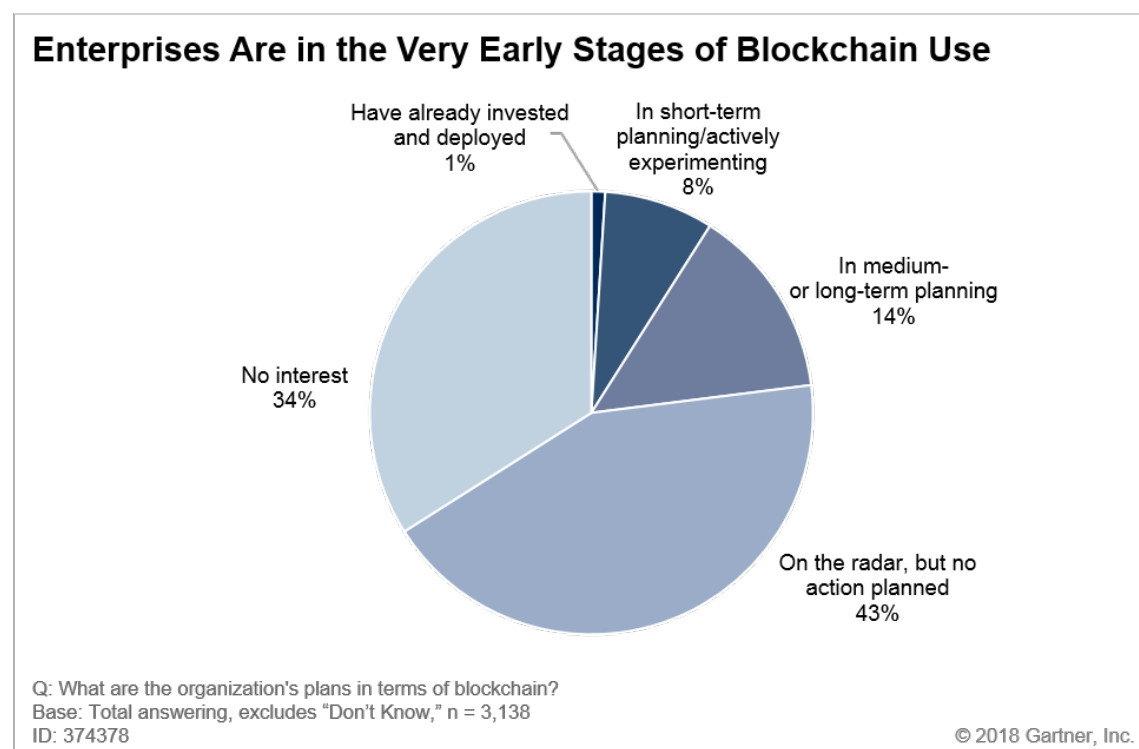
Justification:

Given the immaturity of blockchain technologies, going from POC to at-scale deployment will require an immense effort from any organization. Significant investments will also be required, to address issues such as professional services implementation, security, ecosystem management, data management and legacy system remediation costs. Moreover, any organization implementing an enterprise-scale solution must perform deep integration with its systems of record. Otherwise, the organization runs the risk of a discrepancy between the two systems — especially when current governance models are ill-formed or inadequate — this is unacceptable, as both are supposed to be correct. Systems of record underpin the business's digital attributes, and are usually treated as untouchable because they tend to be old and critical to the business. Performing this integration will

become a major challenge, and an operational risk to the successful implementation of blockchain projects.

Every year, Gartner surveys CIOs across the globe to expose their key priorities, opportunities and threats. This year's survey includes the views of 3,160 CIOs across 98 countries, representing $13 trillion in revenue or public sector budgets, and $277 billion in IT spending. Extrapolating data from this survey that focused on blockchain, Figure 2 shows that blockchain implementation and active piloting is occurring much less often than the media indicates (see "Blockchain Status 2018: Market Adoption Reality" for more detail):

- Only 1% of responding CIOs indicate any kind of blockchain adoption.

- Only 8% of CIOs are in short-term planning and pilot execution.

- Of all the CIOs responding to the Gartner CIO survey, 77% say their enterprise has no interest in the technology and/or no action planned.

Figure 2. Enterprises Are in the Very Early Stages of Blockchain Use

Enterprises Are in the Very Early Stages of Blockchain Use

Have already invested and deployed 1%

In short-term planning/actively experimenting 8%

In medium- or long-term planning 14%

No interest 34%

On the radar, but no action planned 43%

Q: What are the organization's plans in terms of blockchain?
Base: Total answering, excludes "Don't Know," n = 3,138
ID: 374378

© 2018 Gartner, Inc.

Source: Gartner (December 2018)

These findings imply three things:

- Enterprise executives need more help understanding what blockchain is, and its applicability to their business and technology context.

- The value proposition for blockchain remains poorly articulated and is not clearly visible to the business, especially compared with existing similar technologies.

- Enterprise readiness, the capabilities to adopt blockchain, and the resultant new business/ operating models are currently not apparent and/or possible at the level of an individual enterprise, let alone in the context of broad-scale community adoption.

Most CIOs have yet to shift their priorities and make any material investments in blockchain that would demonstrate their confidence in the potential outcomes. While there are clearly multiple instances of market redundancies such as data reconciliation, executives need to consider the fragility of the technology to balance the fear of missing out with the desire to capture first-mover advantages. Long-term scenario planning is also essential, because even with private/enterprise deployments, the risk of disintermediation of centralized businesses is significant.

Recommendations:

For EA and technology innovation leaders:

- Establish a joint business and IT group mandated to develop scenarios for how blockchain technologies and decentralization can affect your business and industry, by including this initiative in your standard innovation and strategic planning practice.

- Pick three business areas that could expect to gain the most impact from — or be significantly disrupted by — blockchain technologies. Perform initial trials to understand the possibilities as well as the work required to exploit or defend such programs. Conduct business capability modeling to better appreciate the organization's readiness for such changes.

- Identify digital key performance indicators (KPIs) in order to measure automation across all key processes and identify technology-infused business initiatives that can be prepared for dramatic improvement.

Related Research:

- "Blockchain Status 2018: Market Adoption Reality"

- "The 2018 CIO Agenda: Mastering the New Job of the CIO"

- "Pay Attention to These 4 Types of Blockchain Business Initiatives"

- "Market Guide for Blockchain Platforms"

- "How to Make the Most of a 'Pointless' Blockchain Project"

- "Top 10 Mistakes in Enterprise Blockchain Projects"

A Look Back

In response to your requests, we are taking a look back at some key predictions from previous years. We have intentionally selected predictions from opposite ends of the scale — one where we were wholly or largely on target, as well as one we missed.

This topic area is too new to have on-target or missed predictions.

Acronym Key and Glossary Terms

DAO	decentralized autonomous organization
EA	enterprise architecture
ICO	initial coin offering
POC	proof of concept

Gartner Recommended Reading

Some documents may not be available as part of your current Gartner subscription.

"Hype Cycle for Blockchain Business, 2018"

"Hype Cycle for Blockchain Technologies, 2018"

"Blockchain Status 2018: Market Adoption Reality"

"Blockchain-Based Transformation: A Gartner Trend Insight Report"

"Blockchain Technology Spectrum: A Gartner Theme Insight Report"

"Market Guide for Blockchain Platforms"

"Use Gartner's Blockchain Conceptual Model to Exploit the Full Range of Possibilities"

"Understanding the Gartner Blockchain Spectrum and the Evolution Technology Solutions"

"Maverick* Research: Crypto-Politics and 'World Wide Ledger' Will Rock Your Business Competition"

Evidence

[1] See "Forecast: Blockchain Business Value, Worldwide, 2017-2030."

[2] "Silicon Valley Powered American Tech Dominance — Now It Has a Challenger," The Wall Street Journal.

[3] "Bitcoin's Price Was Artificially Inflated, Fueling Skyrocketing Value, Researchers Say," The New York Times.

[4] "Bitcoin Faces Regulatory Crackdown, Bank of England Warns," The Guardian.

More on This Topic

This is part of an in-depth collection of research. See the collection:

- Predicts 2019: Leadership Means Expanding Options, Not Limiting Them — A Gartner Trend Insight Report

GARTNER HEADQUARTERS

Corporate Headquarters
56 Top Gallant Road
Stamford, CT 06902-7700
USA
+1 203 964 0096

Regional Headquarters
AUSTRALIA
BRAZIL
JAPAN
UNITED KINGDOM

For a complete list of worldwide locations,
visit http://www.gartner.com/technology/about.jsp