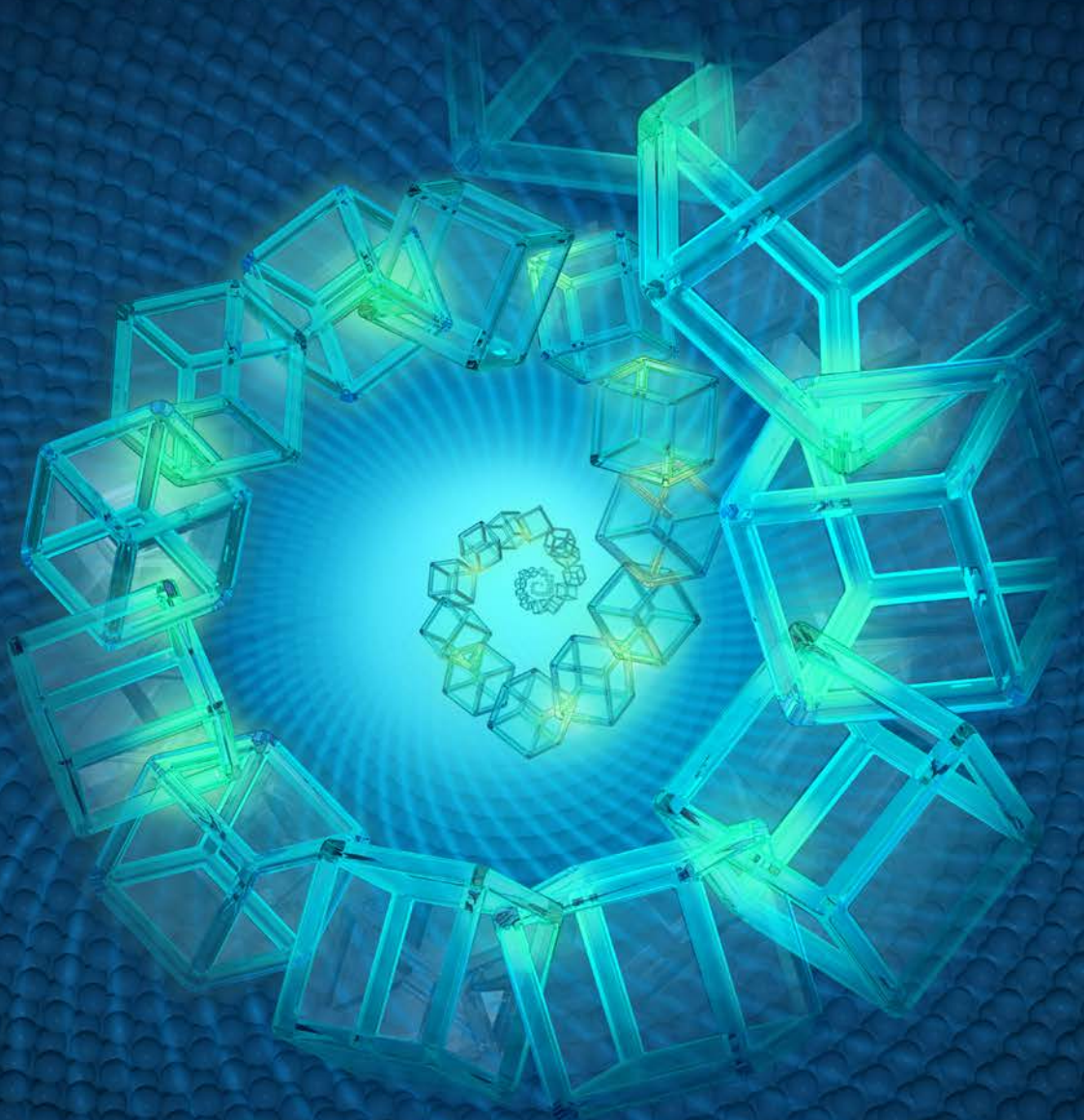


**Deloitte.**  
Insights



# Deloitte's 2019 Global Blockchain Survey

Blockchain gets down to business

## DELOITTE BLOCKCHAIN

At Deloitte, we collaborate globally with clients on how blockchain is changing the face of business and government today. From physical asset traceability, clinical supply chain, global trade finance, cross-border payments and remittances, post-trade processing to voting and digital identity—you name it. Right now, new ecosystems are developing blockchain solutions to create innovative business models and disrupt traditional ones. This is occurring in every industry and in most jurisdictions globally. Our deep business acumen and global multidisciplinary model help organizations across industries achieve their varying blockchain aspirations. Reach out to our leaders to discuss the evolving momentum of blockchain use cases, prioritizing blockchain initiatives, and managing the opportunities and pain points associated with blockchain adoption efforts. [Let's talk.](#)

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# Introduction

SINCE THE FIRST blockchain advocates began promoting the technology's capabilities over a decade ago, leaders across industries have often seemed unsure what to do with it. But in 2019, something unmistakable appears to be happening. What has emerged is a shared recognition that blockchain is real—and that it can serve as a pragmatic solution to business problems across industries and use cases. This is not some far-flung vision held by long-standing believers in the technology. Even leaders wary of tech-based solutions have come to see the larger, transformational importance of the technology.

Though blockchain hasn't reached its full potential, savvy executives surveyed for Deloitte's 2019 global blockchain survey are confident about new and evolving use cases; they continue to see the technology as a connecting platform that can enable

many business processes. Since our last survey,<sup>1</sup> respondents report that overall corporate blockchain investment is growing across most sectors as new, practical applications gain traction.

Like young college graduates quickly adjusting their expectations after entering the workforce, executives have seen time and practical considerations refine and define their view of what is possible in using blockchain into what is plausible—and what is practical. What we're seeing in 2019 is the continuing evolution of blockchain from a capable yet underdeveloped technology into a more refined and mature solution poised to deliver on its initial promise to disrupt.

The question for executives is no longer, "Will blockchain work?" but, "How can we make blockchain work for us?"

## OVERVIEW AND METHODOLOGY STATEMENT

Deloitte conducted this survey between February 8 and March 4, 2019, primarily as a research vehicle to gain greater insights into the overall attitudes and investments in blockchain as a technology. The release of the survey highlights in this article reflects those opinions and perceptions around blockchain and the potential impact of the technology in the future. The information shared provides summaries of a subset of the overall data and insights collected.

The survey polled a sample of 1,386 senior executives in a dozen countries (Brazil, Canada, China, Germany, Hong Kong, Israel, Luxembourg, Singapore, Switzerland, United Arab Emirates, United Kingdom, and the United States) at companies with US\$500 million or more in annual revenue for US respondents and at companies with US\$100 million or more in annual revenue for respondents outside of the United States. Respondents had at least a broad understanding of blockchain and were familiar with and able to comment on their organizations' investment plans.

Between February 18 and March 8, 2019, we also administered the survey to executives at a group of 31 blockchain emerging disruptors to gauge their attitudes and investments in blockchain as a technology. All of these emerging disruptor respondents had revenue of less than US\$50 million.

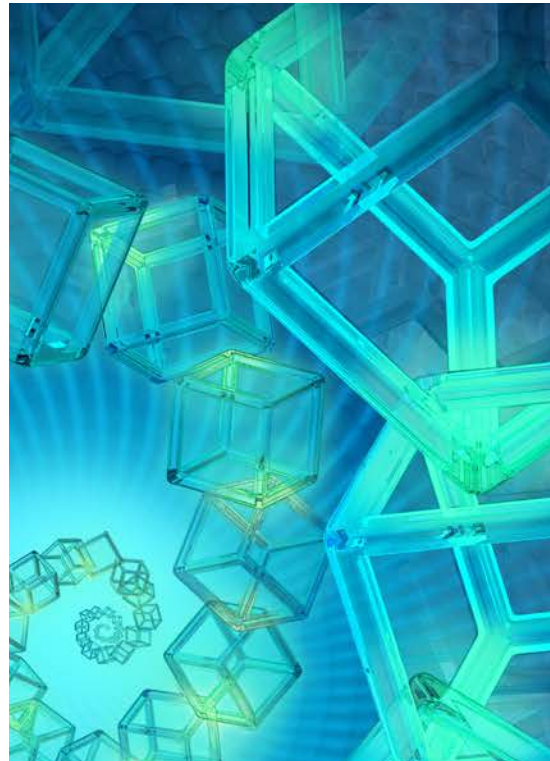
# 2019 survey highlights

LAST YEAR'S SURVEY showed blockchain adoption reaching a turning point: Momentum had begun shifting from “blockchain tourism” and exploration toward the building of practical business applications. Financial services and, more specifically, the financial technology (fintech) sector were leading in blockchain development, while other industries were cautious in their search for use cases to provide a return on investment to justify the cost and effort of implementing blockchain solutions.

Today, fintech remains a blockchain leader, but more organizations in more sectors—such as technology, media, telecommunications, life sciences and health care, and government—are expanding and diversifying their blockchain initiatives. Still, despite these advances, progress remains measured in the wake of blockchain's first cyclical rise and fall, and the resulting attitude shifts following the initial blockchain buzz.

On a positive note, this year's survey reveals continued strong investment, with those willing to invest US\$5 million or more in new blockchain initiatives over the next 12 months, holding steady at 40 percent (up a point from 2018). Simultaneously, 53 percent of respondents say that blockchain technology has become a critical priority for their organizations in 2019—a 10-point increase over last year (see figure 1). Moreover, 83 percent see compelling use cases for blockchain, up from 74 percent (figure 2), and respondents' overall attitudes toward blockchain have strengthened meaningfully.

Other 2019 survey data points to signs of blockchain's increased maturity. For example, respondents saw blockchain providing more diverse advantages than in 2018. Similarly, the



**Fifty-three percent of respondents say that blockchain technology has become a critical priority for their organizations in 2019—a 10-point increase over last year.**

increasing diversification of potential use cases for blockchain—and the wider array and greater parity of identified barriers to blockchain adoption (figure 3)—suggest further signs of maturation.

Anecdotally, and taken as a whole, we read these responses as demonstrating that blockchain is maturing in the eyes of many executives and decision-makers who are increasingly seeing the

technology's real promise. But not everyone is fully on board. Though a majority of respondents call blockchain a top-five priority, only 23 percent have already initiated a blockchain deployment—down from 34 percent. Attitudes about blockchain may be improving (see figure 2), but 43 percent still see blockchain as overhyped, up from 39 percent last year.

Are these attitudes as counterintuitive and contradictory as they seem? The dissonance could reflect a growing pragmatism—one that we first noted last year. As blockchain is expected to continue along a traditional path of maturation and self-discovery, signs of dissonance and caution may

reflect the technology's health as it likely evolves into a more grounded business solution.

Indeed, blockchain is gaining traction and acceptance in more industries, from fintech to technology to media to telecommunications to government to life sciences and health care. Our research shows executives increasingly expressing confidence in blockchain's importance and its disruptive potential that matches some of the most ambitious and far-reaching claims about its transformative potential.

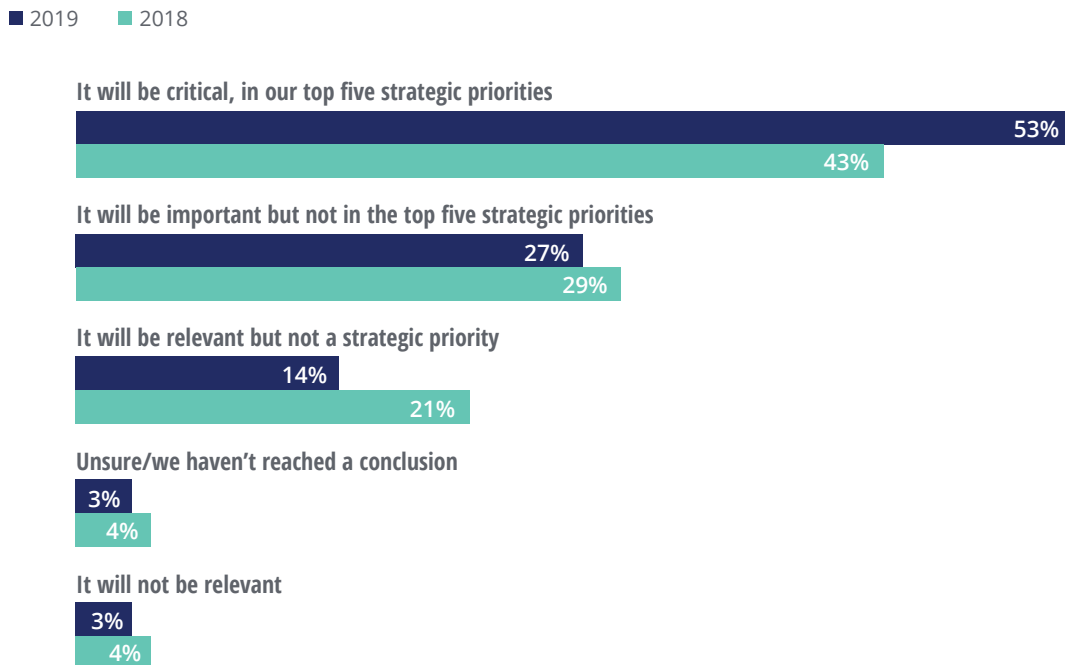
This reflects a "seasoning" of the collective opinion toward blockchain based on increased exposure to the technology and a better understanding of its abilities and drawbacks in practical, day-to-day business use cases.

FIGURE 1

### Views of blockchain's relevance within organizations (2019 vs. 2018)

Most respondents now see blockchain as a top-five strategic priority, a jump of 10 percentage points over 2018

*Survey question: Which of the following best describes how you currently view the relevance of blockchain to your organization or project in the coming 24 months?*



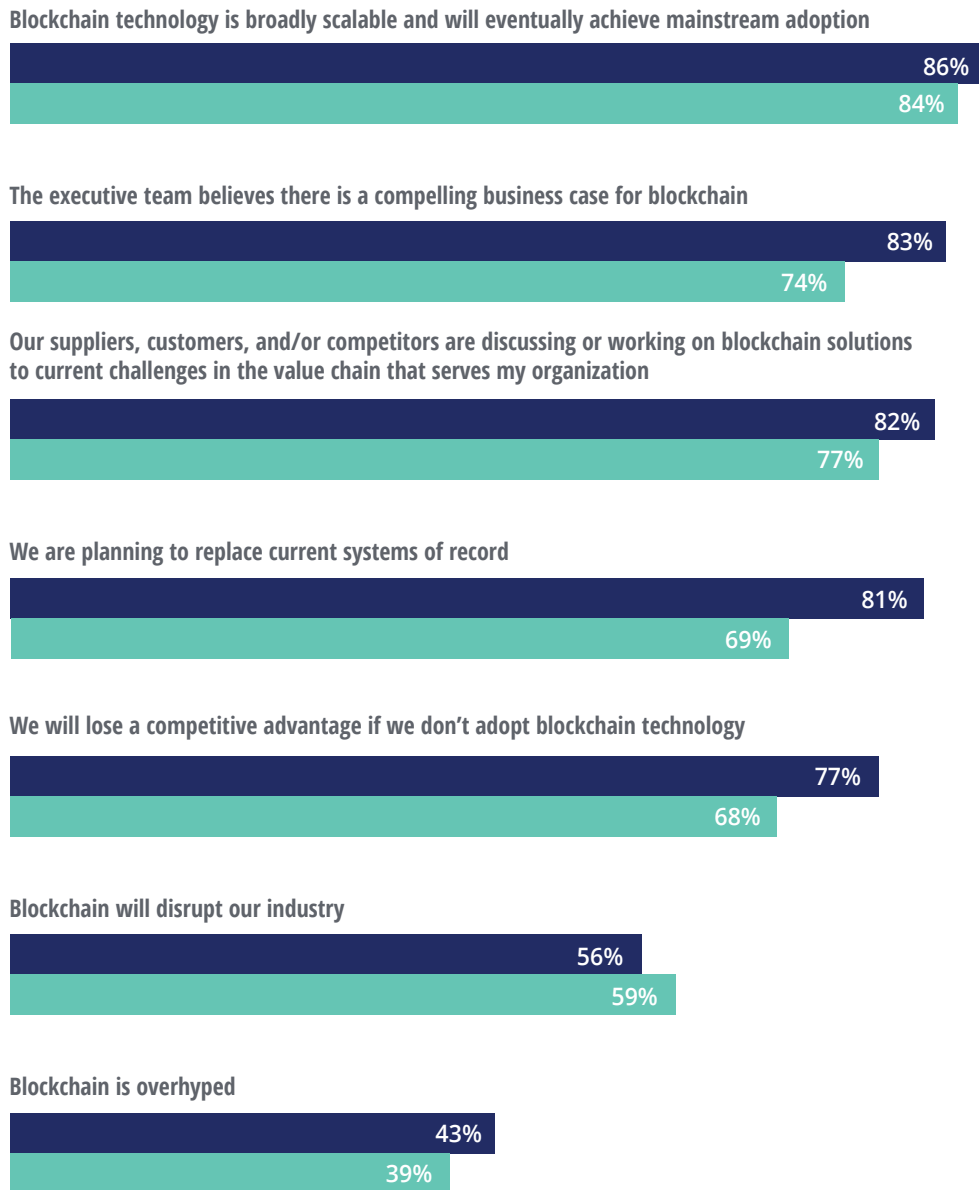
N=1,386 (2019 global enterprise); N=1,053 (2018 global enterprise)  
 Note: Some percentages may not total 100 percent due to rounding.  
 Source: Deloitte's Global Blockchain Survey, 2018 and 2019.

FIGURE 2

### Survey respondents' attitudes on blockchain and its adoption (2019 vs. 2018)

There was a general improvement in attitudes about blockchain over the past year  
*Survey question: What is your level of agreement or disagreement with each of the following statements regarding blockchain technology?*

■ 2019 ■ 2018



N=1,386 (2019 global enterprise); N=1,053 (2018 global enterprise).

Note: Percentages indicate respondents who strongly or somewhat agree with each statement.

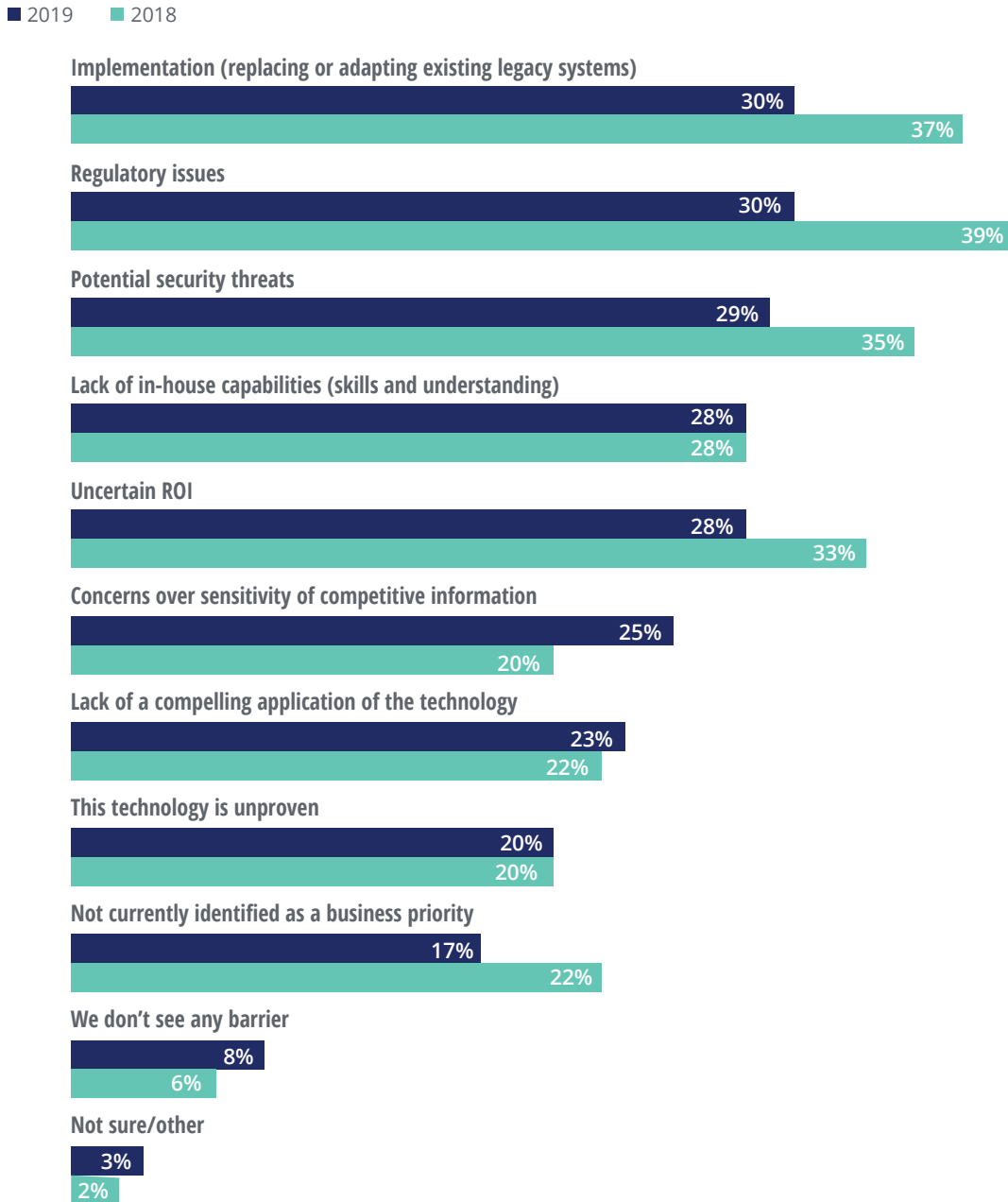
Source: Deloitte's Global Blockchain Survey, 2018 and 2019.

FIGURE 3

### Organizational barriers to greater investment in blockchain technology (2019 vs. 2018)

A more even distribution of barriers emerged in 2019 in comparison to 2018

Survey question: What are your organization or project's barriers, if any, to increasing adoption and scale in blockchain technology? (Percentage of respondents who feel the issue is a barrier)



N=1,386 (2019 global enterprise); N=1,053 (2018 global enterprise).

Note: Percentages total more than 100 percent because respondents were allowed to submit more than one answer.

Source: Deloitte's Global Blockchain Survey, 2018 and 2019.



# Blockchain hype, promises, and challenges

**N**EW! IMPROVED! FASTER! Stronger! Better! Marketers wield such adjectives and exclamations to capture the attention of influencers and potential customers, and tout the development and release of new products and services.

Beyond simple marketing, superlatives can be the language of adoption. Without hype, early movers likely wouldn't know about—let alone try—new technologies such as blockchain. They would be released with the hope that someone might stumble upon them, try them, and find them useful, which is hardly a practical way to do business or to technologically advance processes, companies, or industries.

Of course, few products and services fully live up to their marketing; it's rare that a single tool or solution can do everything that others claim it can do. Even so, many of these new tools and solutions turn out to be useful or even game-changing.

Such is the case with blockchain, which appears poised to disrupt industries and business models. The business community remains upbeat though increasingly grounded about the technology's future: Three-fifths of respondents want blockchain to prove itself with measurable, positive results over the next three years.

Blockchain's maturation is expected to continue as overall investment increases or, at least, remains at current levels (13 percent of respondents plan to decrease investments in the next 12 months). Further supporting this viewpoint is the fact that nearly 60 percent of respondents are confident in blockchain's long-term potential due to the implementation of new solutions. For instance, smart contracts and other token-based transactions can help ensure that artists, agents, producers, and

**Few products and services fully live up to their marketing; it's rare that a single tool or solution can do everything that others claim it can do.**

other creatives receive their share of revenues generated by their work, no matter how it is used or repurposed. In addition, they can help by increasing blockchain's use in such areas as intercompany transactions and warranties financing—for instance, trade finance, letters of credit, and invoice factoring.

## A technology in search of additional use cases

Survey respondents, while remaining generally optimistic, are tempering their overall opinions toward blockchain now that early adopters have had time to look under the hood, discover the technology's limitations, and see beyond the initial buzz. The question: What have they found?

Most people first heard of blockchain through its connection to bitcoin, which inextricably linked the technology to cryptocurrency. Enthusiasts promoted it as a driver of a new distributed economy in which users of token-based currencies would cut traditional banks and brokers out of peer-to-peer and B2C transactions. As such, blockchain advocates were slow to show how it could be used to disrupt and revolutionize other business sectors.

Years later, to the frustration of speculators, cryptocurrency adoption remains a slow-moving

## **“We believe executives should no longer ask a single question about blockchain but, rather, a broad set of questions reflecting the role blockchain can play within their organizations.”**

— Linda Pawczuk, Deloitte Consulting LLP principal and Deloitte consulting leader for blockchain and cryptocurrency

revolution. But this slowdown has boosted blockchain's adoption elsewhere, as other use cases have emerged and begun to drive innovation. In short, as organizations look at blockchain more critically, it is becoming more well-rounded and, potentially, useful to a wider group of users. There also exists a wide range of applications that don't require the use of a coin, including management of loyalty points, digitizing physical assets, and creating virtual wallets for finance management and reconciliation.

### **Cautious optimism**

While many respondents suggest that blockchain is gaining traction in additional sectors outside of fintech—and finding more use cases within more types of businesses—executives appear to be taking a more pragmatic approach toward its adoption.

This is a familiar path for emerging technologies. Take 3D printing, for example. Just six years ago, many analysts and industry experts viewed 3D printing as an interesting tool with questionable broader potential beyond hobbyists and limited prototyping applications. Since then, major manufacturers have widely adopted the technology to change how they design and make products, and to streamline their supply chains and reduce expensive downtimes caused by having to wait for deliveries of hard-to-find specialty parts by creating what they need, when and where they need them.<sup>2</sup>

This is reminiscent of where we see blockchain today. Survey respondents are taking a less myopic view of blockchain than they did before and are focusing on business advantages such as increased security and lower risk (23 percent), new business

models and value chains (23 percent), and greater speed toward production or delivery (17 percent). We are also seeing diversification in blockchain use cases, models, and regulatory concerns.

In other words, organizations seem now less concerned about whether the technology will work and have begun to focus on what business models it might disrupt. To that end, “we believe executives should no longer ask a single question about blockchain but, rather, a broad set of questions reflecting the role blockchain can play within their organizations,” says Deloitte Consulting LLP principal Linda Pawczuk, Deloitte consulting leader for blockchain and cryptocurrency.

Such questions may include:

- How are blockchain-enabled processes changing the way my sector does business?
- How can blockchain reshape my industry? What are my long-term objectives and strategies?
- Does blockchain create the potential for new market ecosystems, and what role should I play?
- How do I leverage the inherently open nature of blockchain?
- What opportunities does blockchain generate for cocreating new markets?
- Where are my biggest blockchain blind spots?

As blockchain adoption moves steadily forward on its journey from the possible to the practical, most respondents say they plan to maintain or even increase their blockchain investments over the next year. But they are expected to do that only if accompanied by the kind of pragmatic understanding that answers to these and similar questions provide.

# Key issues

## Emerging disruptors

Where enterprise organizations seek ways to integrate blockchain into their existing business models—or, more accurately, how to transform existing processes and systems to work with blockchain—emerging disruptors built their businesses around blockchain from the start. This makes them potentially more fluid and agile than competitors and less constrained by similar challenges that inhibit adoption among their more established competition.

In fact, we're seeing signs of these abilities as organizations enter the second phase of disruption, in which most are no longer strictly focused on blockchain but are, instead, reinventing existing business models to create dynamic, blockchain-enabled solutions to reduce friction across organizations and industries.

For this year's survey, we targeted a small sample of emerging disruptors to gauge their attitudes and practices.<sup>3</sup> Given their exclusive focus on blockchain solutions, it is unsurprising that they are more advanced in their deployment of blockchain than are enterprise organizations, and in developing and implementing new solutions to leverage blockchain's potential in new ways.

What is interesting, however, is that the survey results show nuance. For example, when asked for blockchain's most significant advantage over existing systems, respondents from enterprise organizations showed relative parity among several advantages, including new business models and value chains (23 percent), greater security/lower risk (23 percent), and greater speed compared to existing systems (17 percent). In contrast, emerging disruptors were more focused on new business models and value chains, which 42 percent cited as the most significant advantage.

In practice, examples of this creative, innovative thinking can be observed in a different realm: on-demand ridesharing services that have helped to democratize transportation for those who have difficulties hailing or even locating traditional taxis. While there is nothing inherently new in the concept of ridesharing services, disruptive thinking has made possible an entirely new way to access and pay for those services. Some might refer to this as a *democratization of access*.

In a similar regard, there is little new in blockchain's underlying technology—for instance, cryptography or data transaction. What is fresh is the disruptive potential that emerging disruptors are driving in the way organizations get things done. One might call this disruption a *democratization of trust*.

Conversely, when asked what barriers enterprise respondents see in adopting blockchain technology, they see little consensus, with the most frequently cited choice garnering only 30 percent. In contrast, the emerging disruptors overwhelmingly (71 percent) chose regulatory issues as the greatest *barrier* to blockchain adoption, raising theoretical concerns about new rules that could hamper blockchain's continued adoption.

Another interesting difference between emerging disruptors and enterprise organizations is their attitudes toward security offered by blockchain. Enterprise organizations overwhelmingly (71 percent) believe that blockchain provides greater security than conventional IT solutions, while only 48 percent of emerging disruptors feel the same. While we cannot fully explain these differing viewpoints, it is still a noteworthy difference that merits further consideration.

Despite these and other differences, emerging disruptor and enterprise executives hold many similar opinions on issues of blockchain models of

focus, the emphasis of future activities, what they value in consortia, metrics of success, and individual regulatory concerns.

Interestingly, because emerging disruptors generally are accustomed to moving faster—and often with smaller staffs and limited financial resources—than enterprise organizations, four-fifths of our emerging-disruptor sample say they expect to see results from blockchain implementations within three years. Three-fifths of enterprise organization respondents, meanwhile, expect to see results within the same time frame.

## **Emerging disruptors are among the first to identify and test viable solutions that larger organizations may then adopt on a wider scale, forming a symbiotic relationship that drives continued blockchain innovation.**

While emerging disruptors remain nimble, our research suggests that they, like the larger enterprise respondents, are approaching blockchain with caution. Despite the innovative vitality that emerging disruptors bring to the blockchain world, they, too, reveal a measure of skepticism, with nearly 20 percent saying blockchain is overhyped, a figure comparable to enterprise respondents.

So as emerging disruptors move on their blockchain journeys, many show pragmatic impulses. Blockchain represents an investment in resources that emerging disruptors hope will provide a

measurable return. As pioneers of blockchain exploration and implementation, emerging disruptors play an important role in the larger ecosystem. They are among the first to identify and test viable solutions that larger organizations may then adopt on a wider scale. And in that way, the two kinds of organizations form a symbiotic relationship that drives continued blockchain innovation.

“Emerging disruptors are facing big company challenges at an early stage,” says Rob Massey, Deloitte Tax LLP partner and Deloitte tax leader for blockchain and cryptocurrency. “Their innovations can quickly grab the attention of a market and a large user base, putting strain on their technology infrastructure and business processes.”

### **A brief look at consortia: Benefits and challenges**

Much of the discussion around blockchain revolves around the complexities and entry barriers of adopting the technology. Joining consortia—coming together with others in your horizontal or vertical ecosystem, in common purpose—arguably may be blockchain’s largest barrier to entry. Why is this so-called co-opetition so difficult? Primarily, consortia require a shift in mindset: You must ally within your ecosystem—whether direct competitors or not—and work toward some greater good. Getting to that place can be difficult to reconcile.

At a more tactical level, consortia require many important considerations that are not easily resolved in a group setting. Consider a few of these issues:

- What are the consortium’s goals (for instance, revenue play or cost-efficiency)?
- What is the participation structure/governance model?
- What is the funding model?
- How are decisions made on equal voting, rotational power, and other issues?

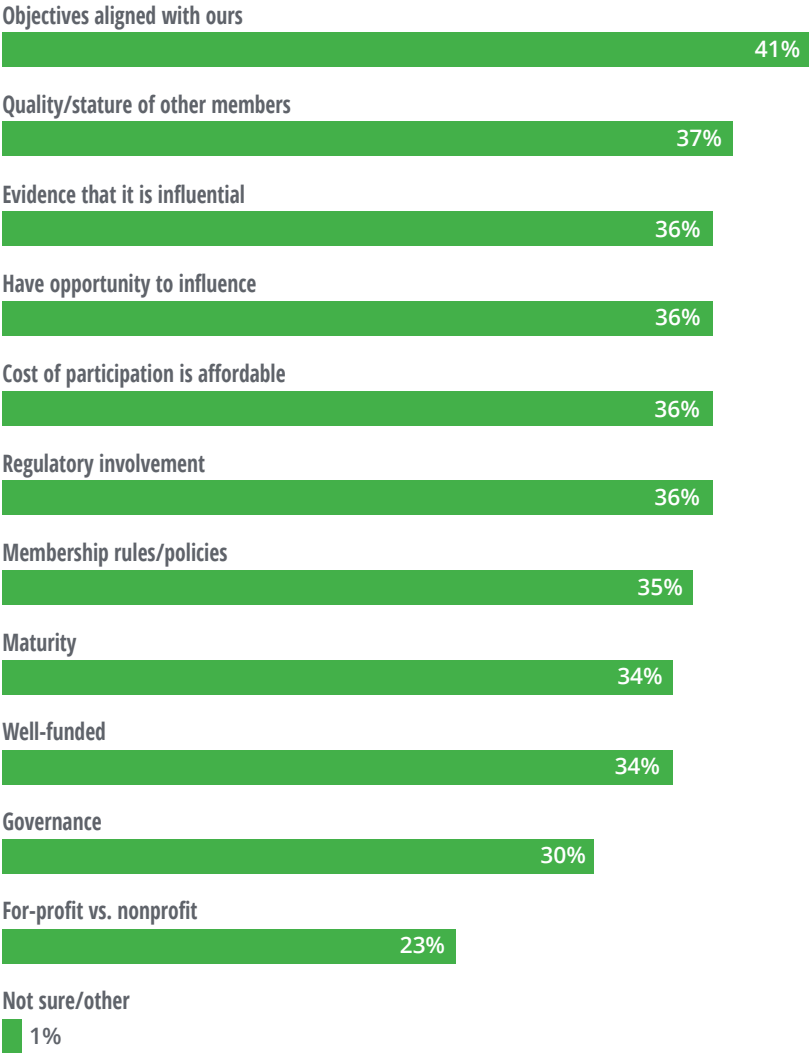
- Who owns the intellectual property (for instance, the association, royalty-free licenses for members, open standard, or source license)?
  - What are the consortium’s business, technology, and regulatory risk factors?
  - What products/services can the consortium offer to incentivize its members?
- The list goes on, which helps explain why consortia are difficult to form and manage even

FIGURE 4

### Criteria organizations use in joining consortia

There is little consensus on how organizations select consortia

*Survey question: When given a choice to join a consortium, what criteria does your organization or project use to pick one vs. the other? (Percentage of respondents who cite that criterion as a reason to join a consortium)*



N=1,386 (global enterprise).  
 Note: Percentages total more than 100 percent because respondents were allowed to submit more than one answer.  
 Source: Deloitte’s 2019 Global Blockchain Survey.

when forming them seems in everyone's best interest. So it may be unsurprising that our survey reveals the same basic story from last year: Consortia do not garner the same level of focus as such models as private and permissioned blockchains.

Still, less focus is not the same thing as indifference. The overwhelming majority (92 percent)

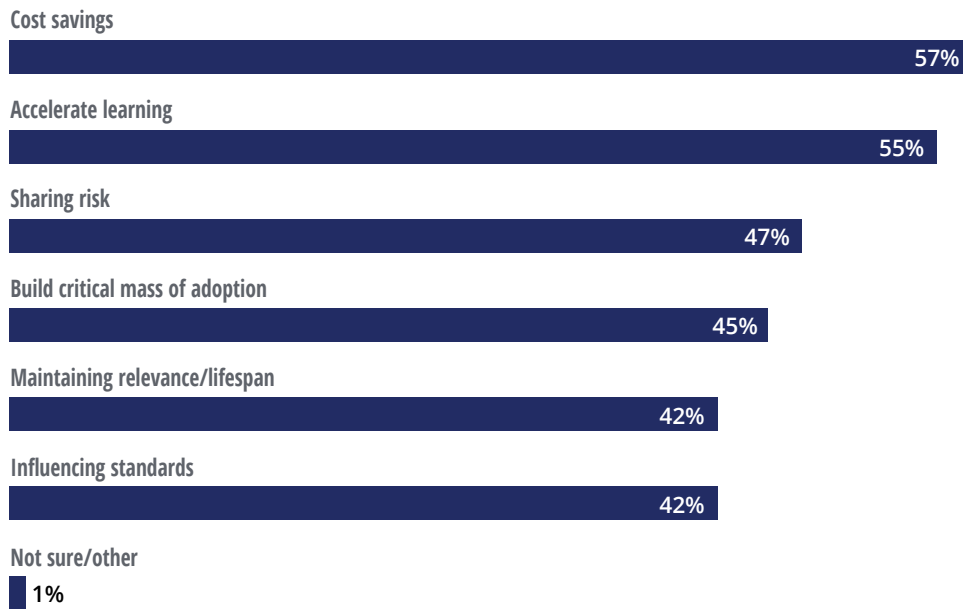
of our respondents say they either belong to a consortium or plan to join one in the next 12 months. In doing so, they identify benefits such as cost savings, accelerated learning, and risk sharing. Despite their complexities, consortia are expected to continue to figure prominently in the larger blockchain ecosystem.

FIGURE 5

### Benefits organizations expect from consortia

Cost savings and learning opportunities are top benefits that respondents expect from consortia participation

*Survey question: What benefits does your organization or project get or expect to get from a consortium? (Percentage of respondents who cite that factor as a benefit from joining consortia)*



N=1,386 (global enterprise).

Note: Percentages total more than 100 percent because respondents were allowed to submit more than one answer.

Source: Deloitte's 2019 Global Blockchain Survey.

# Blockchain regional analysis

JUST AS EMERGING disruptors are changing the dynamics of the industries and sectors in which they compete, new blockchain initiatives in different countries and regions are affecting how blockchain is implemented around the world.

While we cannot generalize about the initiatives in specific countries (see figure 6 for a sense of how survey respondents expressed differing views on select issues), we can look at countries that appear to be emerging as hotbeds of new blockchain solutions, based on their own collective objectives, approaches, and cultural sensibilities.

The following profiles are examples of the drivers and attitudes that affect blockchain development and can serve as guides for organizations that are looking to do business with global partners. Specifically, these profiles show how innovation is informed by context, and why developing an understanding of the people and culture in which they live—the facts on the ground—is often imperative to success.

## China

In China, the government recently established key strategic technology priorities in its 13th five-year plan for IT. A white paper published by the Ministry of Industry and Information Technology cited blockchain as a key driver of economic development. The paper further suggested that the “real economy” was an area in which blockchain could find long-term applications—for example, product traceability and copyright protection. Fintech was also noted as a technology that government regulators were developing along with blockchain solutions to carry out public functions.<sup>4</sup>

Survey respondents overwhelmingly agreed with this assessment, with 73 percent suggesting that

blockchain is a top-five critical priority in China—a figure substantially higher than most other countries in our sample. And because China essentially bans cryptocurrencies, private blockchains—and to some extent, permissioned blockchains—could remain vital, especially given the size of Chinese industrials and their typically large numbers of subsidiaries.<sup>5</sup>

Some 34 percent of respondents “strongly” believe in the disruptive potential of blockchain, more than most countries in our sample. This is important, given China’s place in the global economy and the leadership role it has assumed in the Asia-Pacific region.

“China, more than anywhere else in the world, will use blockchain strategically instead of tactically,” says Paul Sin, consulting partner, Deloitte Advisory (Hong Kong) Ltd., and leader of Deloitte’s Asia-Pacific blockchain lab. “More projects are driven by top management who use blockchain as a strategic weapon rather than a productivity tool.”

## Singapore

In light of China’s de facto ban, Singapore is positioning itself to promote cryptocurrency. Indeed, the government has been highly supportive of free public blockchain platforms. In fact, the Monetary Authority of Singapore has adopted a pro-blockchain stance with favorable tax treatments and public funding for blockchain development.<sup>6</sup> The government, too, appears to be moving beyond its traditional regulatory role by announcing its understanding and acceptance of the importance of blockchain to the financial future. As such, the Monetary Authority recently called blockchain technology “fundamental” to economic development in Singapore. Coupled with the country’s high level of

indigenous talent, entrepreneurial spirit, and fintech development, blockchain is expected to maintain an upward adoption trajectory in Singapore.<sup>7</sup>

It is thus unsurprising that Singaporean executives report a uniformly greater belief in the potential of blockchain than respondents from many other countries. Respondents from Singapore also tend to be more aggressive than their global counterparts in hiring for blockchain-related positions—and more patient in waiting for the technology to provide measurable results.

## Israel

There is substantial blockchain activity within Israeli organizations, focused largely on digital assets—in particular, cryptocurrencies. Israel stands as a strong leader in entrepreneurial activity and R&D in areas such as cyber, cryptography, and intelligence, which, in turn, seems to create a natural affinity for blockchain. Toward that end, some see Israel as a hotbed of blockchain activity. Crypto activities might currently outnumber corporate blockchain efforts, but a shift may be looming. Israeli blockchain startups are pursuing projects in such other areas as DNA data storage, diamond registration, cybersecurity, and international shipping.<sup>8</sup>

For its part, an Israeli stock exchange is moving to develop blockchain applications.<sup>9</sup> And the Israel Securities Authority, a governmental agency, has begun to adopt blockchain in its messaging system.<sup>10</sup> This, too, demonstrates how the Israeli government appears to be adopting blockchain technologies and shifting from a strictly regulatory role to an end-user role—a theme that is becoming increasingly apparent across highly enabled blockchain nations.

While our survey results suggest that Israelis tend to be more circumspect about joining consortia than respondents from other regions, the country—and blockchain firms within it—have formed partnerships with other leading blockchain countries on matters related to codevelopment and regulatory development.<sup>11</sup> Israel's reputation as "Startup Nation" may serve it in good stead as its blockchain entrepreneurial sensibility evolves and matures.<sup>12</sup>

"Given its strengths in intelligence gathering and analysis, security, and cryptography, it is not surprising that Israel was one of the leading countries in the crypto revolution and remains a leader in blockchain-based data security and traceability technologies today," says Hagai Zachor, Deloitte Israel's strategy manager and head of blockchain.

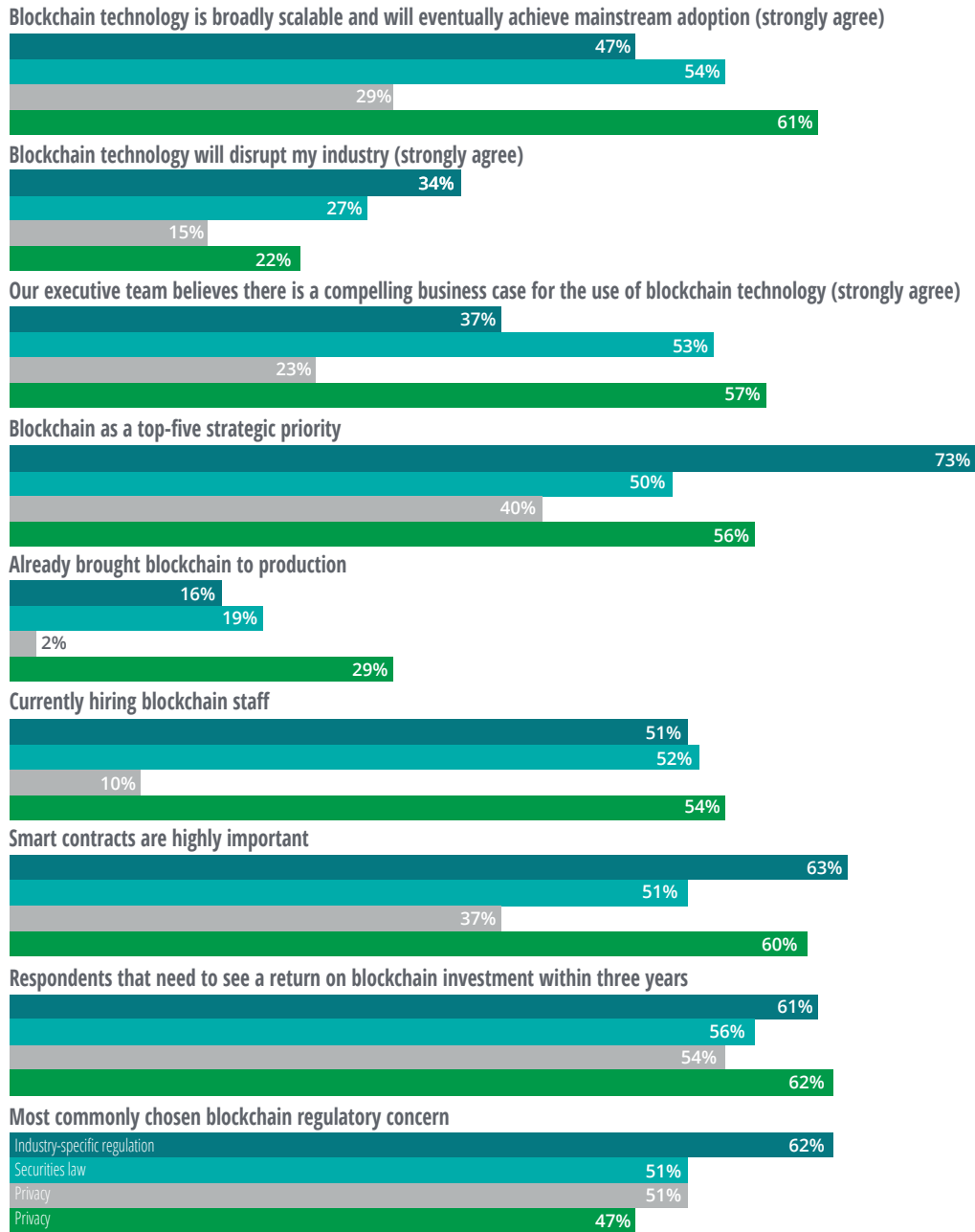


FIGURE 6

### Select country comparisons

Countries show differing attitudes about blockchain along a number of metrics

■ China ■ Singapore ■ Israel ■ United States



Source: Deloitte's 2019 Global Blockchain Survey.

## **GOVERNMENT AS BLOCKCHAIN USER—AND REGULATOR**

Historically, blockchain-related regulatory attention has focused on cryptocurrencies, with regulators helping to shape the legal status of cryptocurrencies as they evolve. For example, a number of US federal court decisions have concluded that virtual currencies that are not otherwise deemed to be securities under the jurisdiction of the US Securities and Exchange Commission (SEC) are commodities under the jurisdiction of the US Commodity Futures Trading Commission.<sup>13</sup> While this has added clarity to jurisdiction, regulations themselves are expected to take some time to emerge with regulators focusing on receiving input from the market and policing individual investor protection cases.<sup>14</sup>

More recently, regulatory concerns about blockchain have gained traction outside of digital assets. For example, the General Data Protection Regulation (GDPR) places strict limitations on how personal data is stored and saved within the European Union. Some see the GDPR leading to an unavoidable clash with the intrinsic immutability of how data is stored on blockchain platforms.<sup>15</sup> Similarly, in the United States, the Health Insurance Portability and Accountability Act limits how personal health information is handled, which may run afoul of blockchain-based solutions within the life sciences context.<sup>16</sup> Indeed, our survey respondents cited privacy more than any other area of regulatory concern (50 percent). So it seems apparent that these and other privacy-based regulations could need to align with the evolving technology.

Moreover, though technically not a governmental entity, the International Organization for Standardization is creating a global framework for blockchain focusing on key areas, such as architecture, taxonomy, and ontology.<sup>17</sup> In the United States, at least one state has passed regulations on the legal status of blockchain companies as limited liability companies while still others have passed laws on the enforceability of blockchain-based transactions.<sup>18</sup> Additional regulatory developments are anticipated in other blockchain applications, such as supply chain tracking, voting records, and general information reporting.

At the same time, governments do more than merely regulate blockchain technology. They often advocate for and incubate new blockchain applications. Over the past several years, we have observed government blockchain participation that extends beyond education and tentative experimentation—specifically, moves toward tactical, bold plays that drive innovation. Representative public use cases include: digital currency/payments (Canada, Singapore, United Arab Emirates, Saudi Arabia); land rights (United States, Brazil, Sweden); voting in elections (United States, Australia, Japan, South Korea); shareholder proxies (United Arab Emirates); identity management (Switzerland, Estonia, United Arab Emirates, Singapore); health care (United States, Estonia); and defense/security (United States).<sup>19</sup>

# Conclusion: An evolving landscape

THE BLOCKCHAIN STORY is beginning a new chapter, one in which the questions executives are asking are tougher, more granular, more grounded, and more pragmatic. They are questions that show an emerging awareness that the technology seems ready for prime time. It works. Now executives must figure out how to make the technology work for them—how to leverage innovation created by emerging disruptors and how to align within the ecosystem.

Our survey seems to make clear this evolving landscape of pragmatism and maturation—more varied use cases and applications than last year, across a greater variety of sectors. Respondents show a more balanced view of expectations and concerns than last year, pointing to an increasingly practical sensibility. And indeed, what appears to be happening every day in the real world also appears to confirm what our survey is telling us: A day hardly seems to pass in which we do not read about

new blockchain use cases or new ways to tokenize assets.<sup>20</sup>

Certainly, blockchain remains a subject of debate. But the tone and terms of the debate themselves seem to be shifting, reflecting more developed use cases and strategic visions of the future. Even those who may have looked askance at the technology in the past appear to be viewing blockchain with a new sense of possibility.

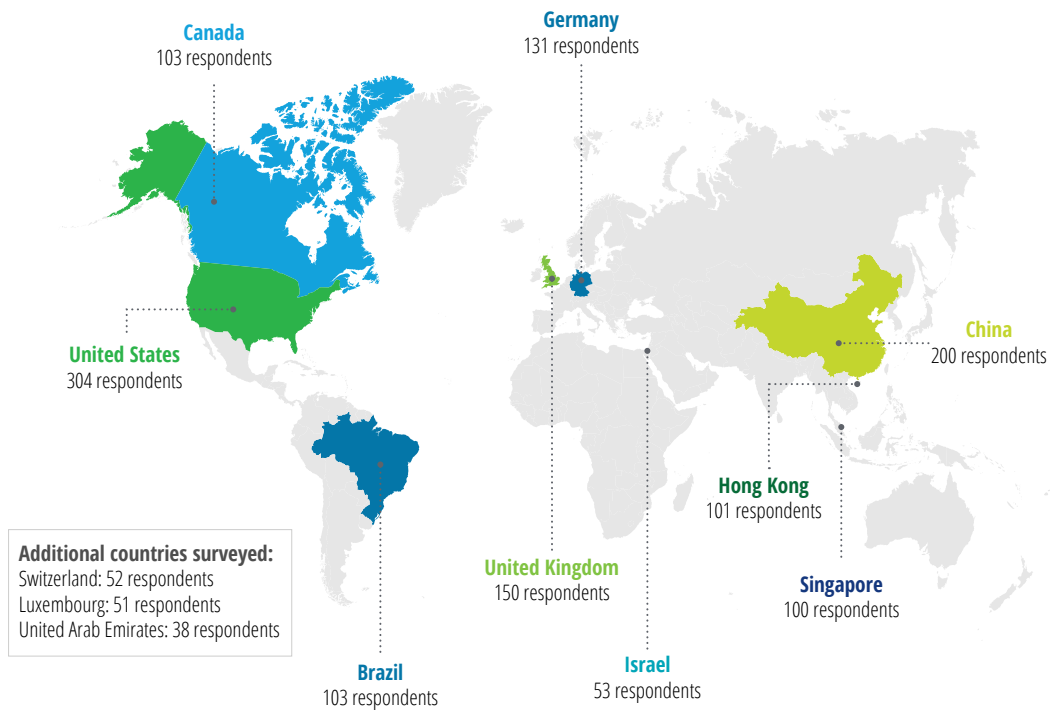
Of course, nobody can accurately predict the future, and we too will refrain from predicting a precise timeline on blockchain's greater adoption. Yet the trajectory for blockchain in 2019 and going forward appears to point in a clearly upward direction. And that journey is the story of growth and potential that disruptive technologies characteristically take, offering adopters tangible strategic advantage in ways that few thought imaginable before.

# Appendix

FIGURE A-1

**To summarize, the survey was fielded in 12 countries and 11 languages**

Total number of enterprise respondents = 1,386



Source: Deloitte's 2019 Global Blockchain Survey.

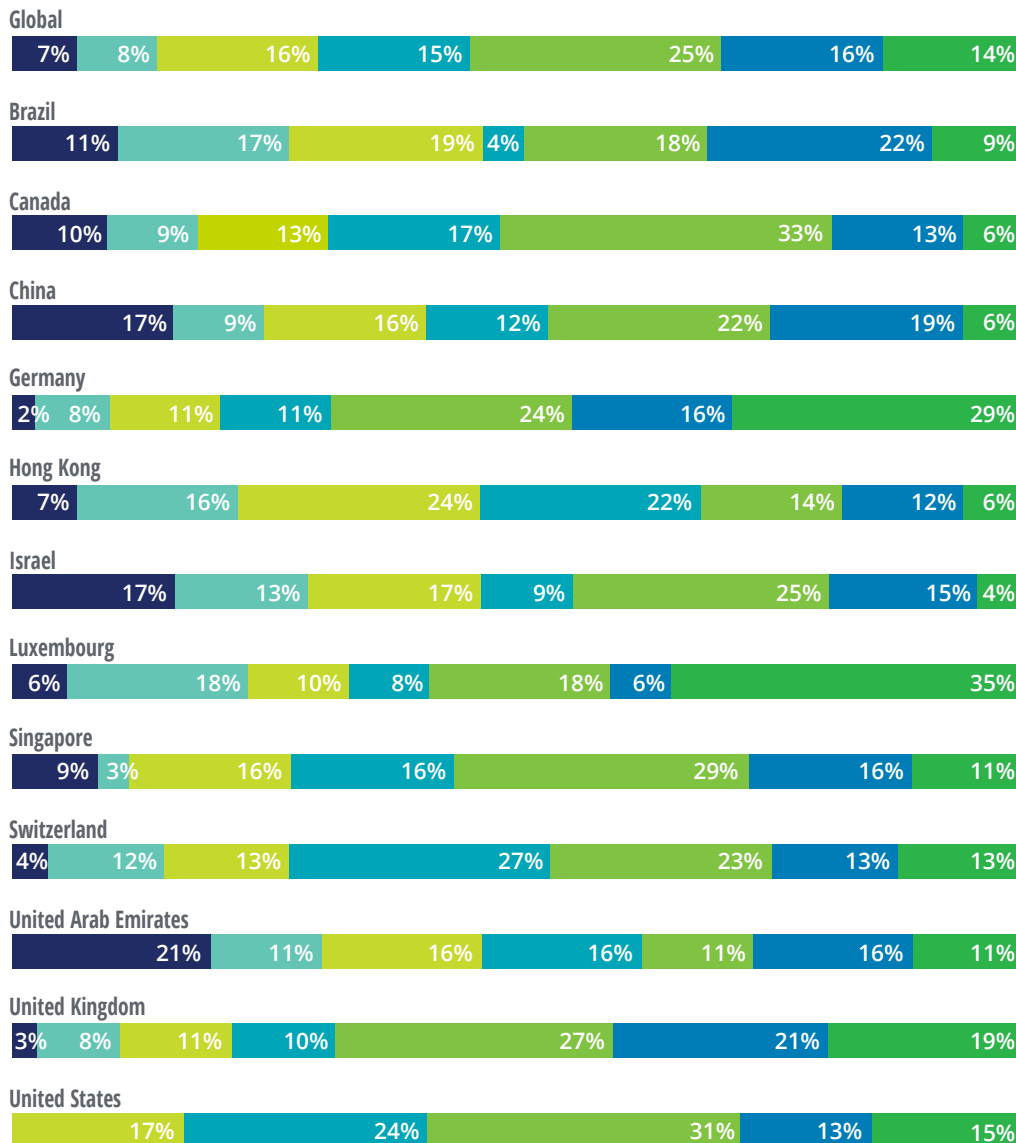
FIGURE A-2

### Company overall annual revenues in 2018

Respondents are senior-level executives at mostly large companies

Survey question: Which of the following best represents your organization or project's overall annual revenues in 2018?

- \$100 million but less than \$250 million    ■ \$250 million but less than \$500 million
- \$500 million but less than \$750 million    ■ \$750 million but less than \$1 billion
- \$1 billion but less than \$5 billion        ■ \$5 billion but less than \$10 billion
- \$10 billion or more



N=1,386 (global enterprise).

Note: All currency amounts are in US dollars. Some percentages may not total 100 percent due to rounding.

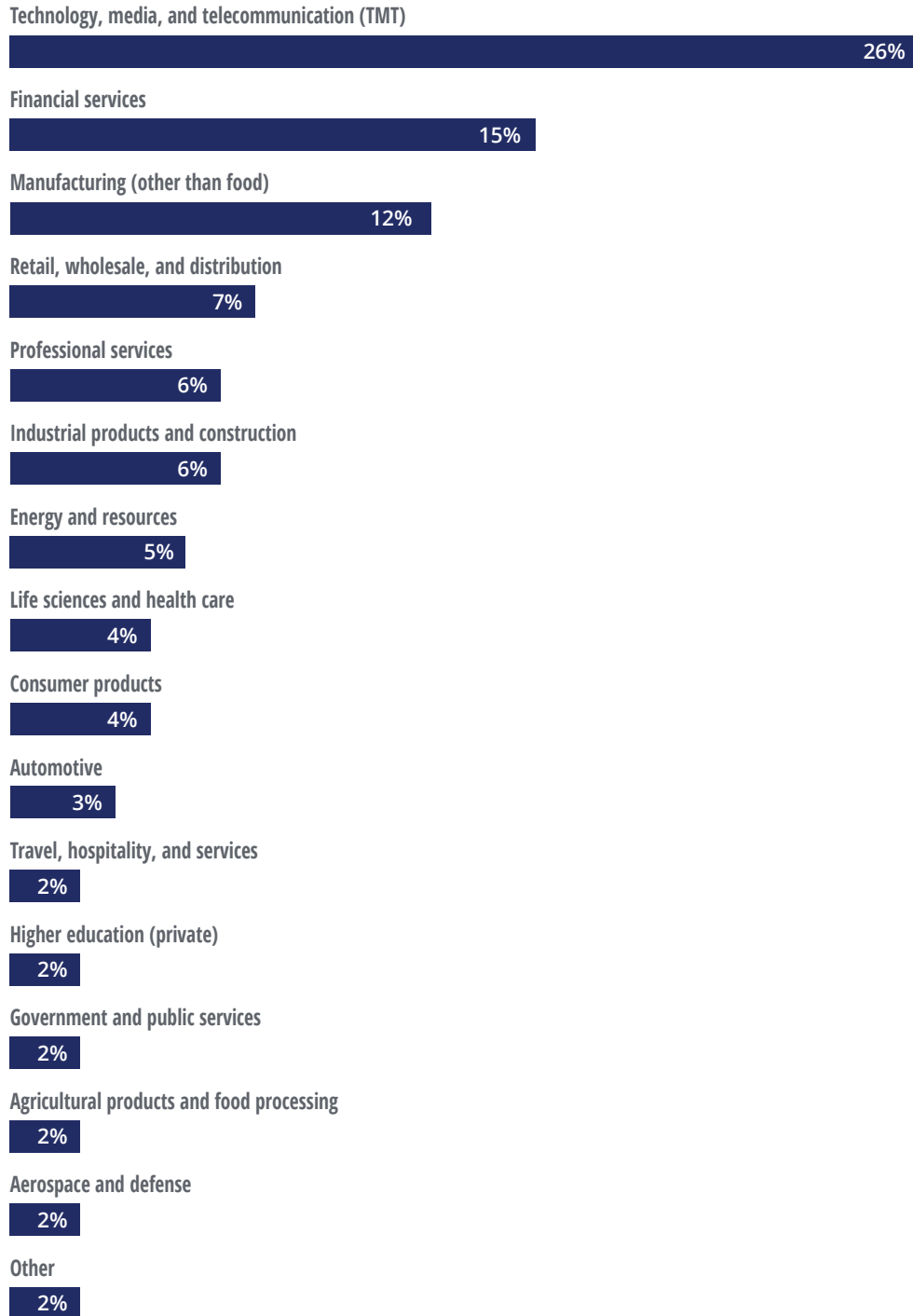
Source: Deloitte's 2019 Global Blockchain Survey.

FIGURE A-3

### Primary operations of organizations by industry

Respondents come from an array of industries, with TMT, financial services, and nonfood manufacturing predominating

*Survey question: In which of the following industries does the organization you work for or the project you are working on primarily operate? (Percentage of total respondents by industry)*



N=1,386 (global enterprise).

Source: Deloitte's 2019 Global Blockchain Survey.

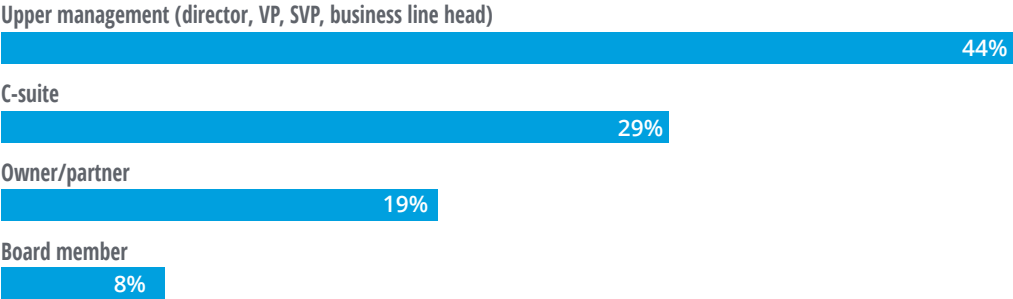
FIGURE A-4

### Respondents by job role and function

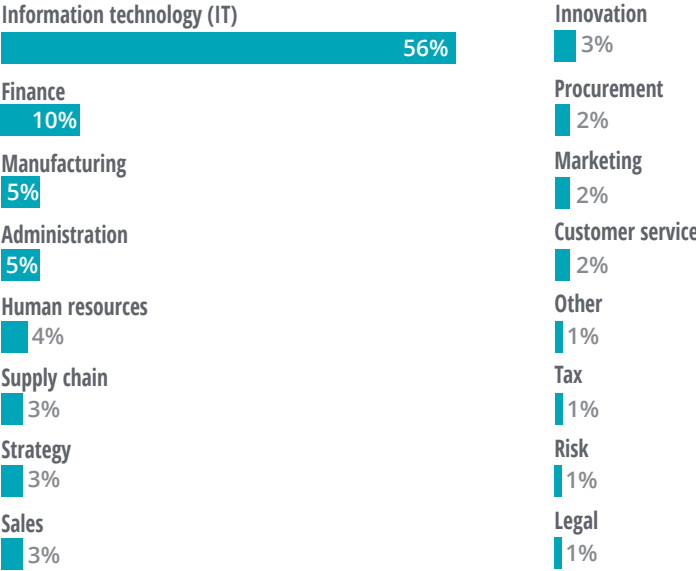
The overwhelming majority of respondents were from upper management and the C-suite, and the majority held IT roles

Survey question: Which of the following best describes your current role and functional area?

#### RESPONDENTS BY ROLE



#### RESPONDENTS BY FUNCTION



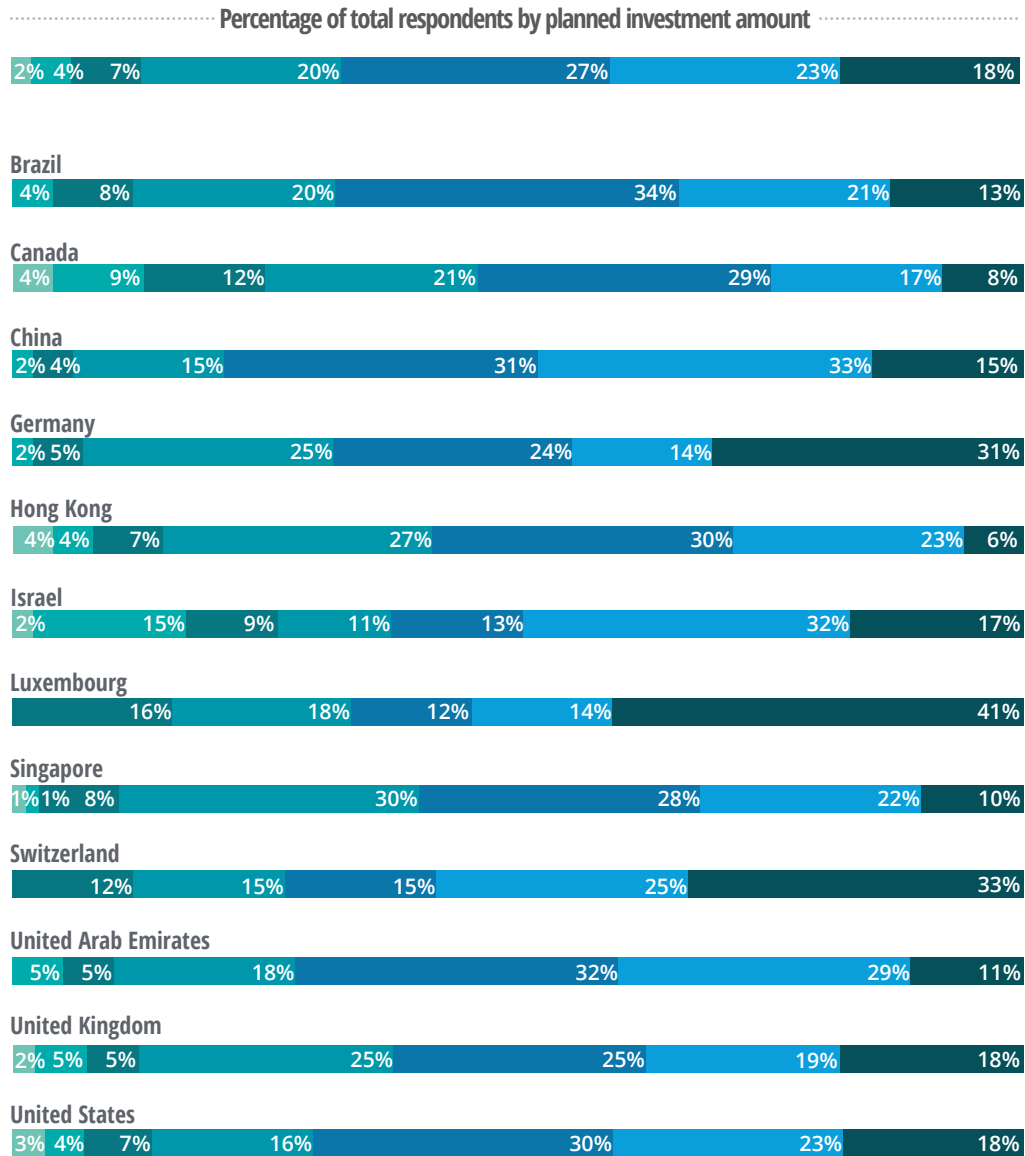
N=1,386 (global enterprise).  
Note: Percentages for "Respondents by function" do not total 100 percent due to rounding.  
Source: Deloitte's 2019 Global Blockchain Survey.

FIGURE A-5

### Approximate blockchain investment that organizations will make in the next 12 months

Blockchain investment plans are strong, with more than 40 percent planning at least \$5 million in spending over the next 12 months

- No investment
- Not sure/prefer not to answer
- Less than \$500,000
- From \$500,000 to less than \$1 million
- From \$1 million to less than \$5 million
- From \$5 million to less than \$10 million
- \$10 million or more



N=1,386 (global enterprise).

Note: All currency amounts are in US dollars. Some percentages may not total 100 percent due to rounding.

Source: Deloitte's 2019 Global Blockchain Survey.

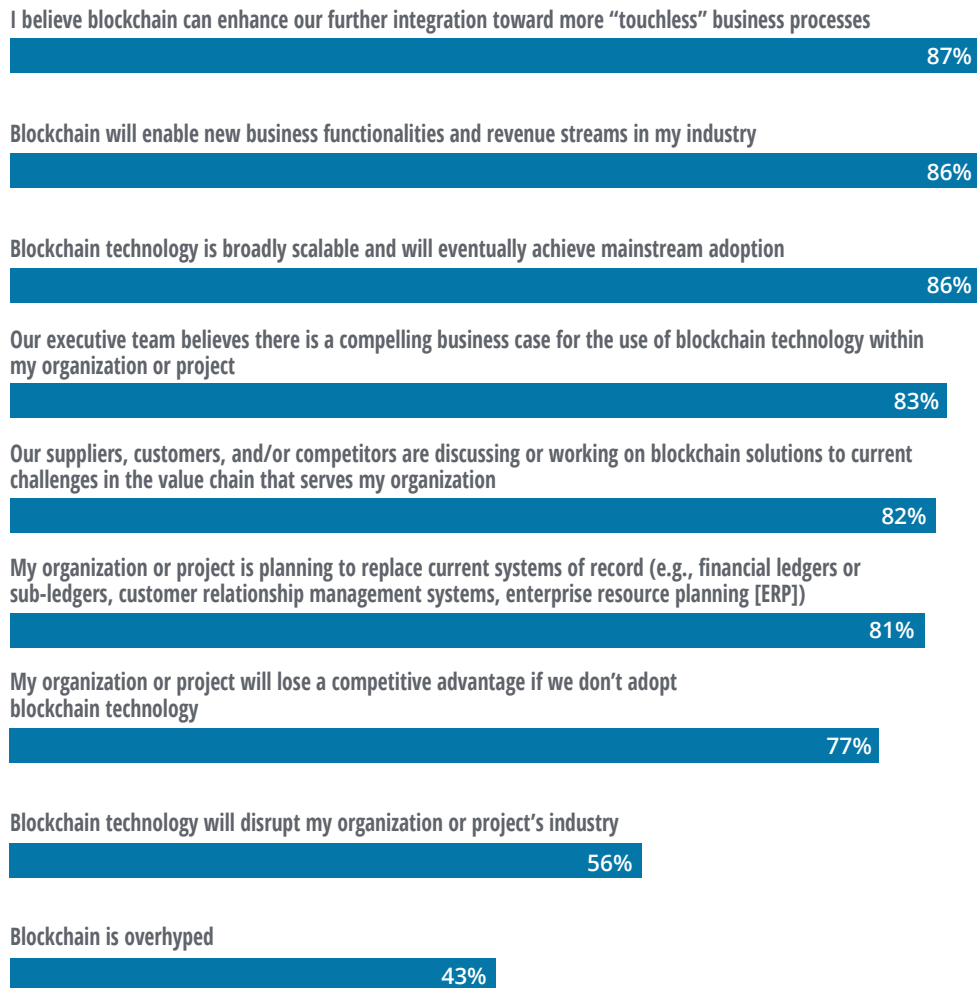


FIGURE A-6

## Attitudes on blockchain and its adoption

Sentiments about blockchain remain strongly positive, even more so than last year overall; still, a slight increase in the view that blockchain is “overhyped” may reflect the growing pragmatism within the blockchain user community

*Survey question: What is your level of agreement or disagreement with each of the following statements regarding blockchain technology? (Percentage of respondents who strongly or somewhat agree)*



N=1,386 (global enterprise).

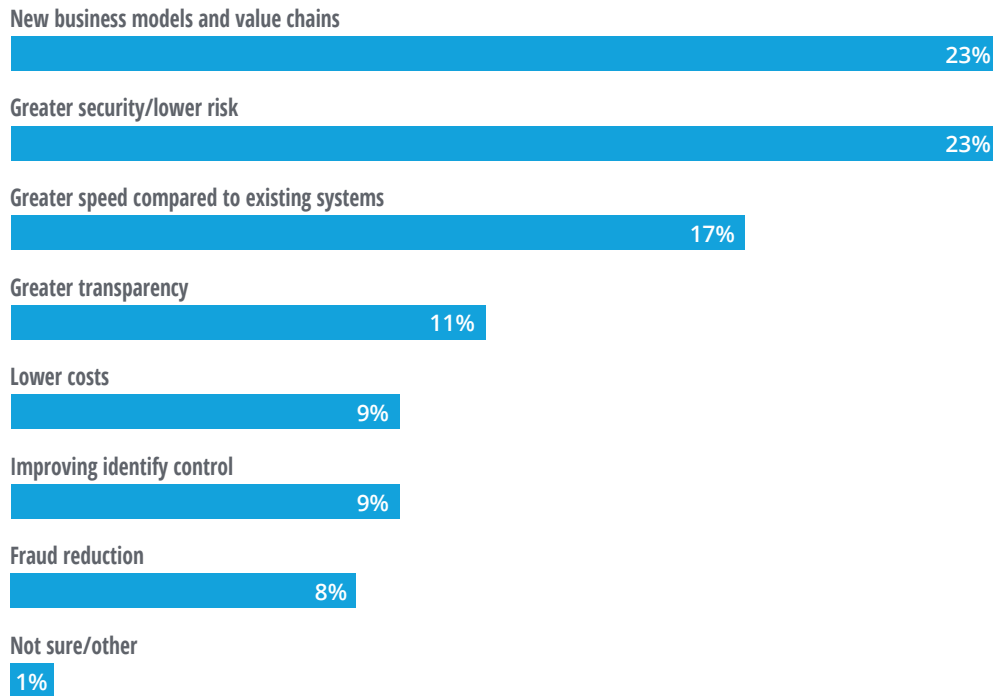
Source: Deloitte’s 2019 Global Blockchain Survey.

FIGURE A-7

### Most significant advantages of blockchain over existing systems

Respondents see business model/value chain innovation and lower risk as key advantages of blockchain technology

*Survey question: Which one of the following, if any, do you believe is the most significant advantage of blockchain over existing systems when thinking of your specific industry? (Most significant advantage of blockchain over existing system)*



N=1,386 (global enterprise).

Note: Percentages do not total 100 percent due to rounding.

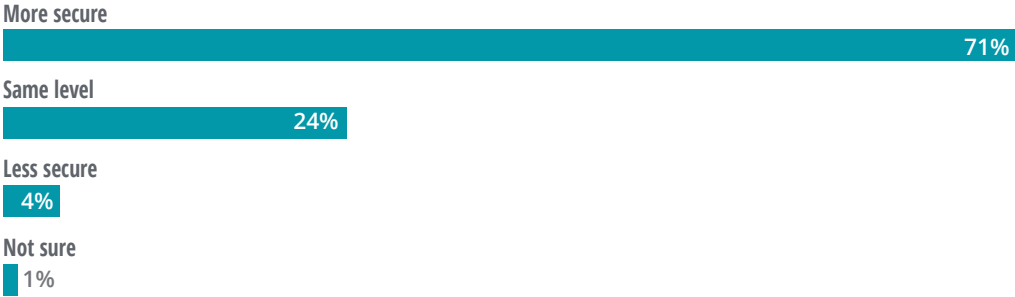
Source: Deloitte's 2019 Global Blockchain Survey.

FIGURE A-8

### Level of security offered by blockchain solutions in comparison to conventional IT solutions

Overwhelmingly, respondents feel that blockchain-based solutions provide greater security than traditional approaches

Survey question: Do you believe that a blockchain-based solution is currently more secure, less secure, or at the same level of security as systems built from more conventional information technologies?



N=1,386 (global enterprise).  
Source: Deloitte’s 2019 Global Blockchain Survey.

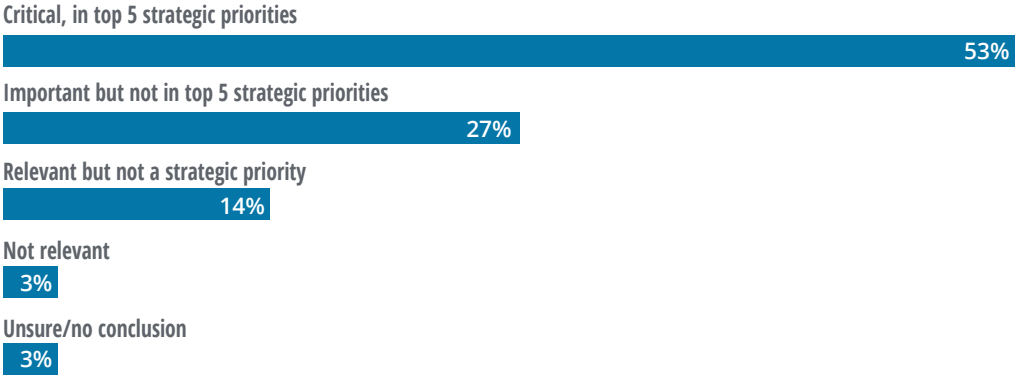
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FIGURE A-9

### Views of blockchain’s relevance within organizations

Most respondents consider blockchain important or even critical to their top priorities

Survey question: Which of the following best describes how you currently view the relevance of blockchain to your organization or project in the coming two years?



N=1,386 (global enterprise).  
Source: Deloitte’s 2019 Global Blockchain Survey.

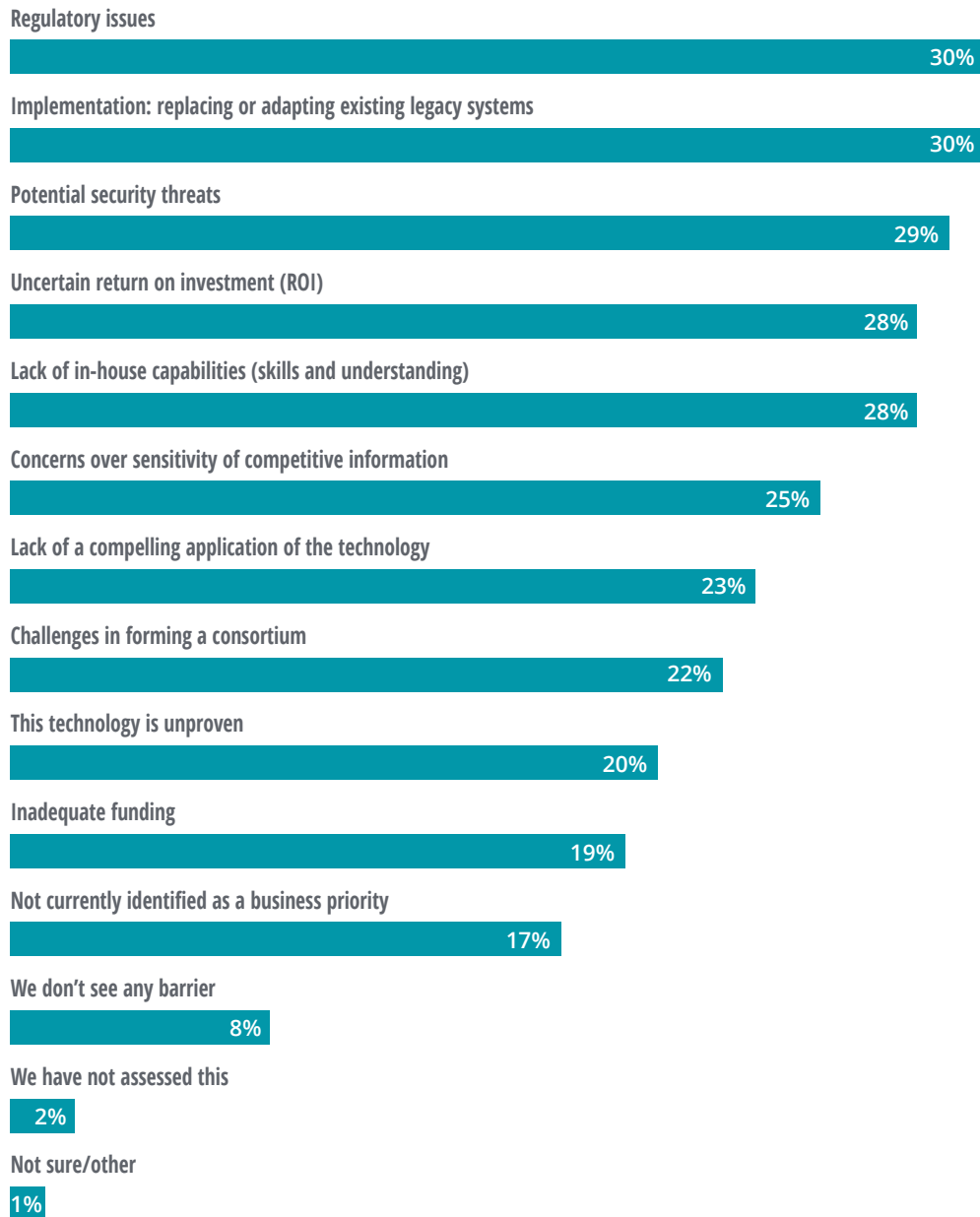
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FIGURE A-10

## Barriers to greater adoption in blockchain technology

Barriers to adoption vary depending on organizations' unique circumstances

Survey question: *What are your organization or project's barriers, if any, to increasing adoption and scale in blockchain technology? (Percentage of respondents who feel the issue is a barrier to greater blockchain investment)*



N=1,386 (global enterprise).

Note: Percentages total more than 100 percent because respondents were allowed to submit more than one answer.

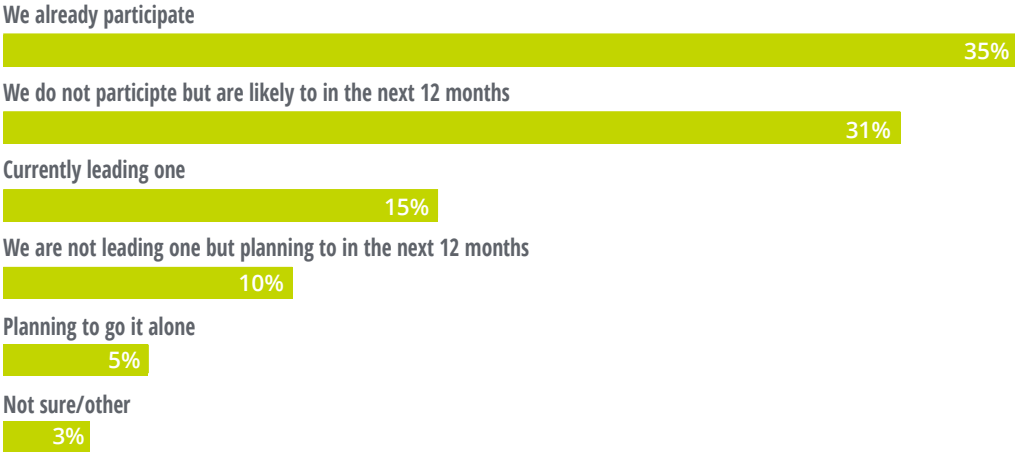
Source: Deloitte's 2019 Global Blockchain Survey.

FIGURE A-11

### Participation in blockchain consortia with competitors

The overwhelming majority of respondents have either joined a consortium or are planning to within the next 12 months

Survey question: Which of the following best describes your organization or project's position on participating in a blockchain consortium with competitors?



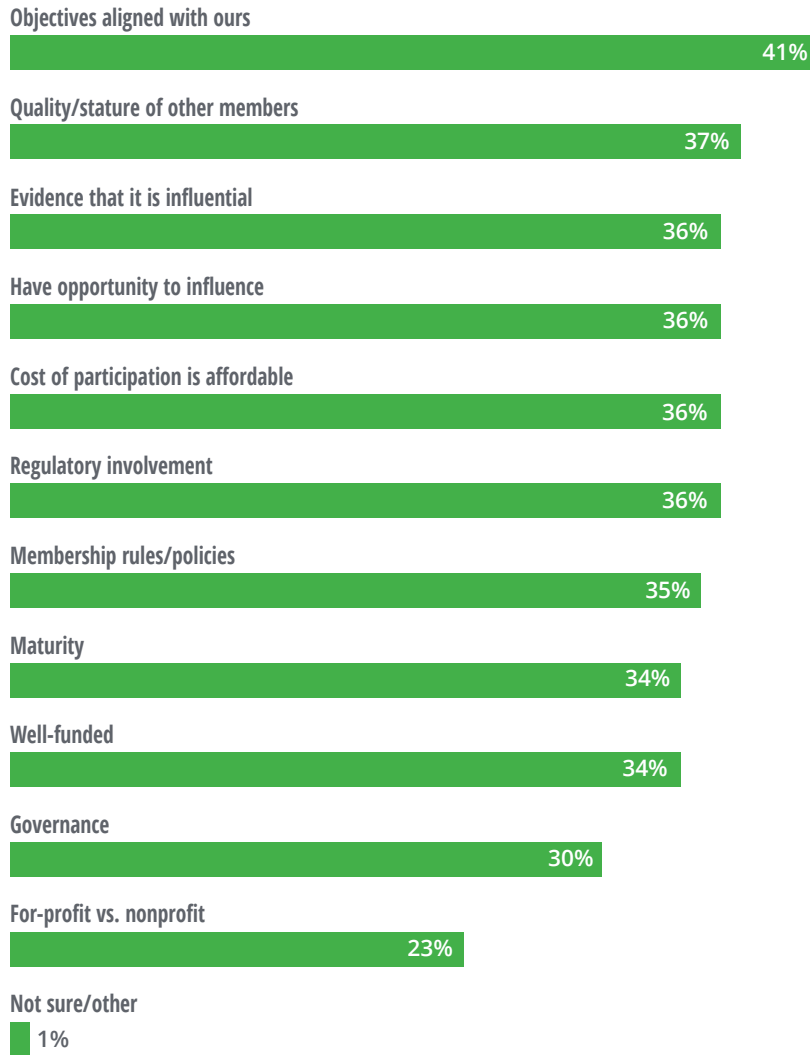
N=1,386 (global enterprise).  
Note: Percentages do not total 100 percent due to rounding.  
Source: Deloitte's 2019 Global Blockchain Survey.

FIGURE A-12

### Criteria organizations use in joining consortia

There is little consensus on how organizations select consortia

*Survey question: When given a choice to join a consortium, what criteria does your organization or project use to pick one vs. the other? (Percentage of respondents who cite that criterion as a reason to join a consortium)*



N=1,386 (global enterprise).

Note: Percentages total more than 100 percent because respondents were allowed to submit more than one answer.

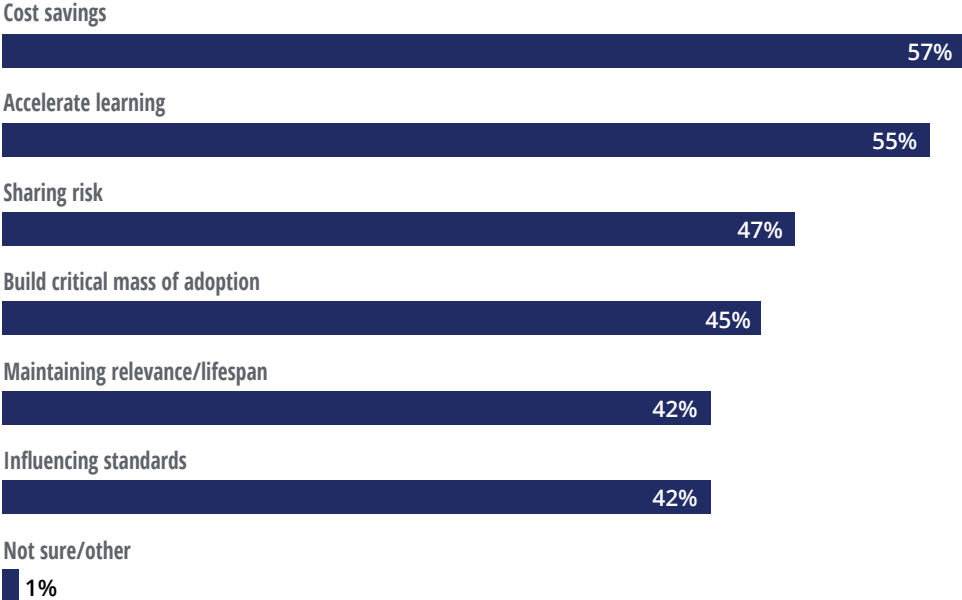
Source: Deloitte's 2019 Global Blockchain Survey.

FIGURE A-13

### Benefits organizations expect from consortia

Cost savings and learning opportunities are top benefits that respondents expect from consortia participation

Survey question: *What benefits does your organization or project get or expect to get from a consortium? (Percentage of respondents who cite that factor as a benefit from joining consortia)*



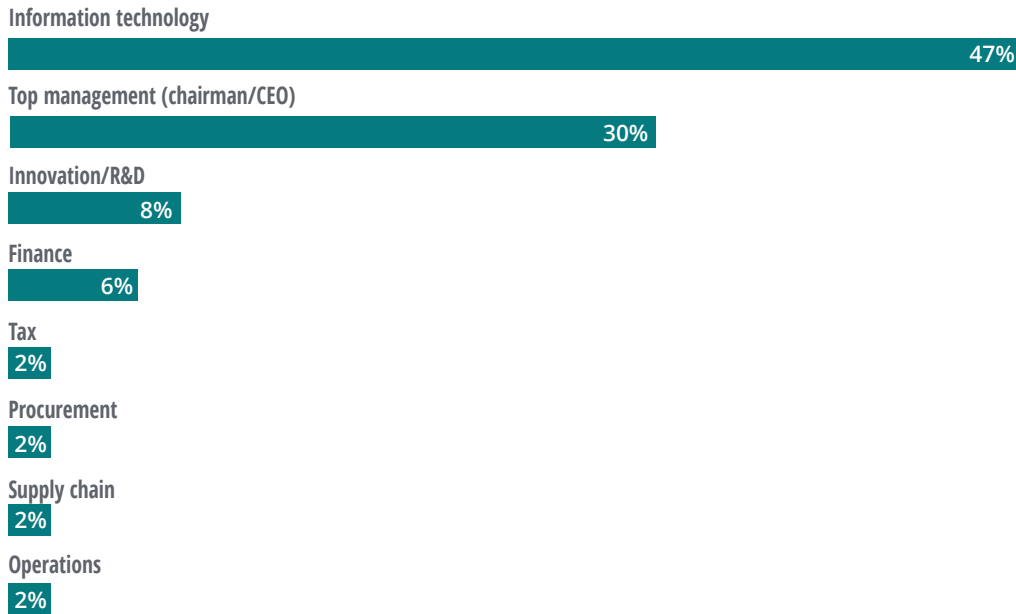
N=1,386 (global enterprise).  
Note: Percentages total more than 100 percent because respondents were allowed to submit more than one answer.  
Source: Deloitte’s 2019 Global Blockchain Survey.

FIGURE A-14

### Which group is making the key decisions about blockchain?

Nearly half of respondents cited IT professionals as the group making the key decisions about blockchain, perhaps reinforcing the perception of blockchain as a technology-driven solution; however, that nearly one-third of respondents cited top management also suggests the technology's emergence as a strategy-focused solution

*Survey question: Which area of your organization or project is making the key business decisions about its blockchain activities?*



N=1,386 (global enterprise).

Note: Percentages do not total 100 percent due to rounding.

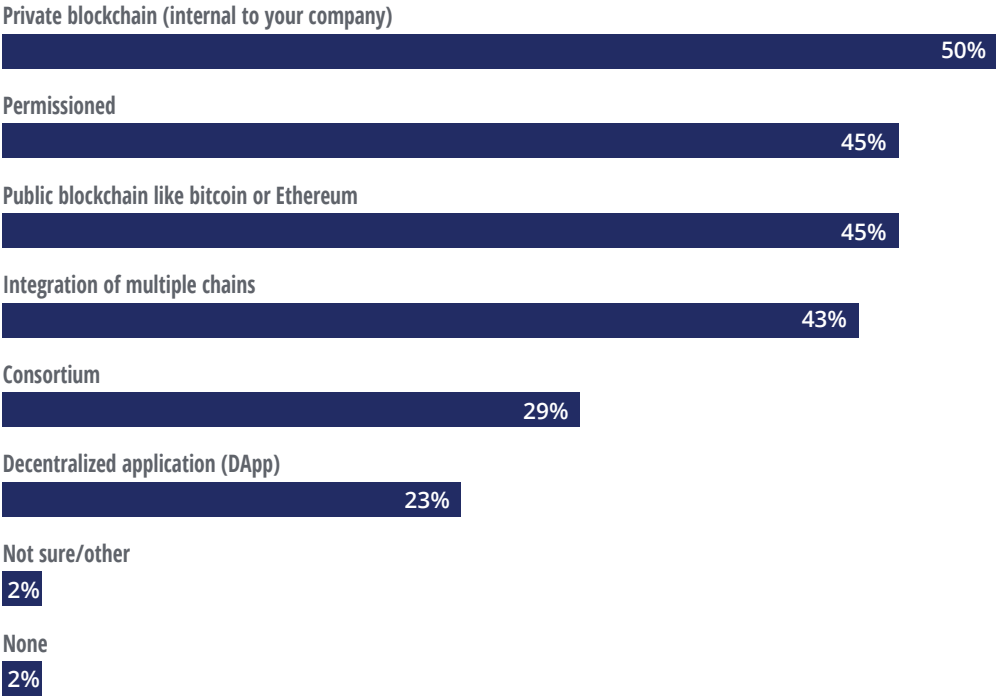
Source: Deloitte's 2019 Global Blockchain Survey.



FIGURE A-15

### Blockchain models

The market hasn't yet settled on any one architecture or approach  
*Survey question: On which blockchain model is your organization or project focusing its activities?  
(Percentage of respondents citing that blockchain model as an area of focus)*



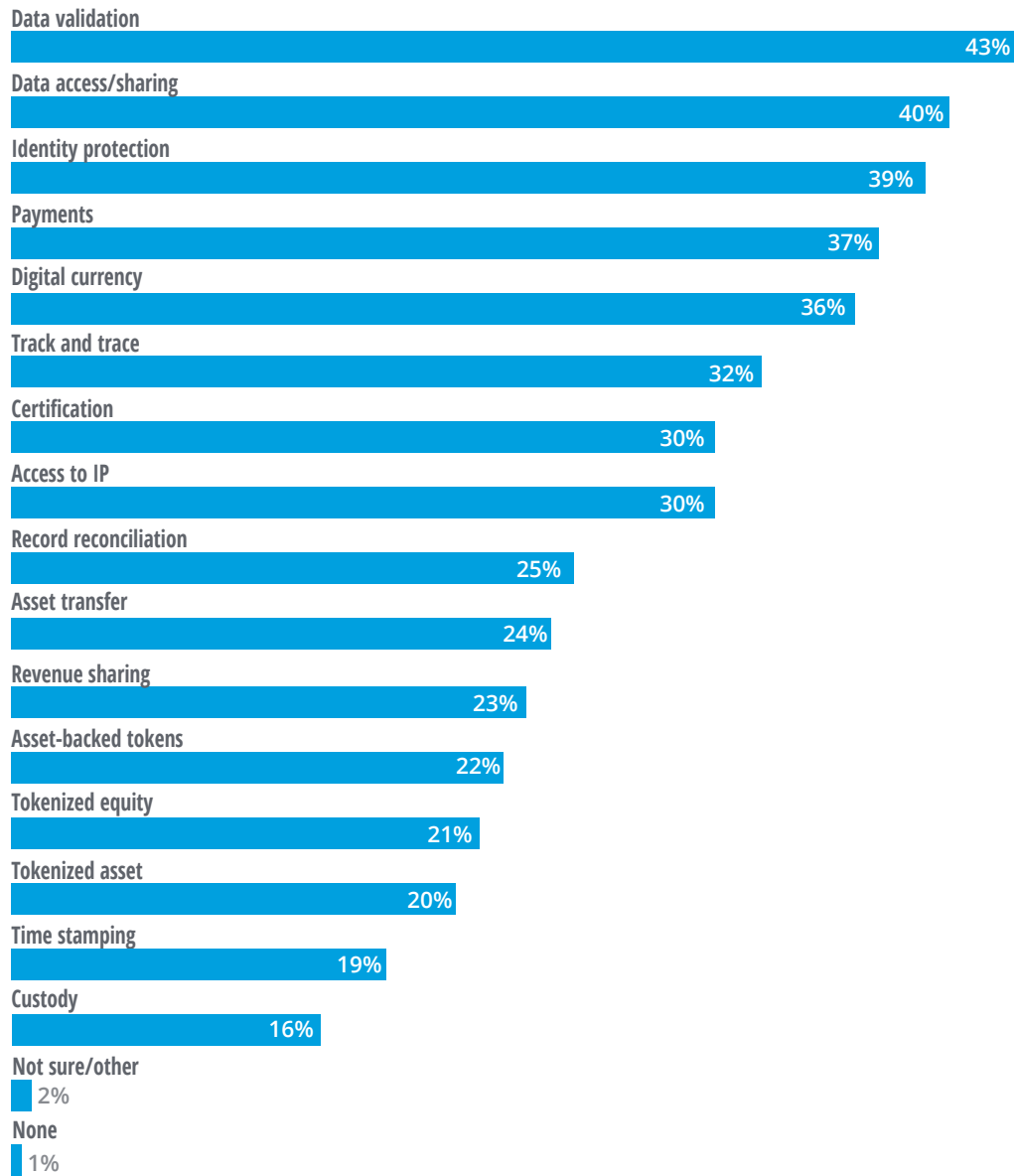
N=1,386 (global enterprise).  
Note: Percentages total more than 100 percent because respondents were allowed to submit more than one answer.  
Source: Deloitte's 2019 Global Blockchain Survey.

FIGURE A-16

## Blockchain use cases

Companies are looking at a wide array of use cases beyond payments and transactions

Survey question: On which of the following blockchain use cases is your organization or project working? (Percentage of respondents citing that blockchain use case as an area of focus)



N=1,386 (global enterprise).

Note: Percentages total more than 100 percent because respondents were allowed to submit more than one answer.

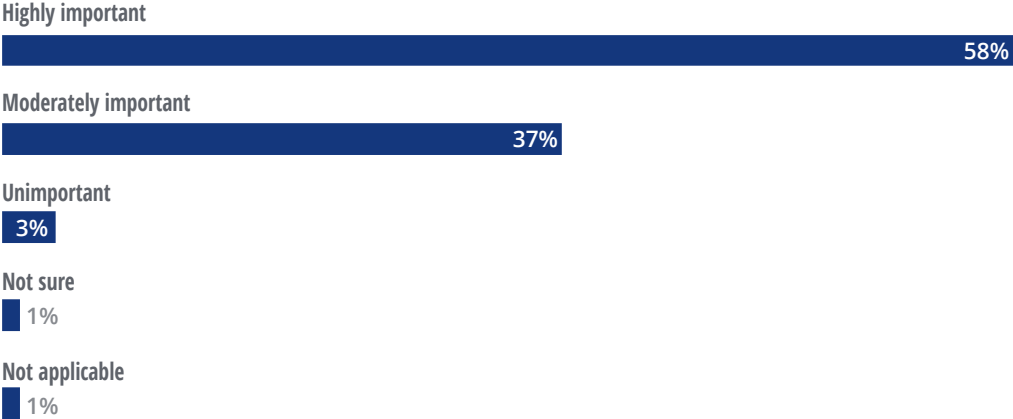
Source: Deloitte's 2019 Global Blockchain Survey.

FIGURE A-17

### Smart contracts as a priority

A large majority sees smart contracts as an important blockchain capability

Survey question: *How important are smart contracts to your organization or project as a potential benefit of blockchain?*



N=1,386 (global enterprise).

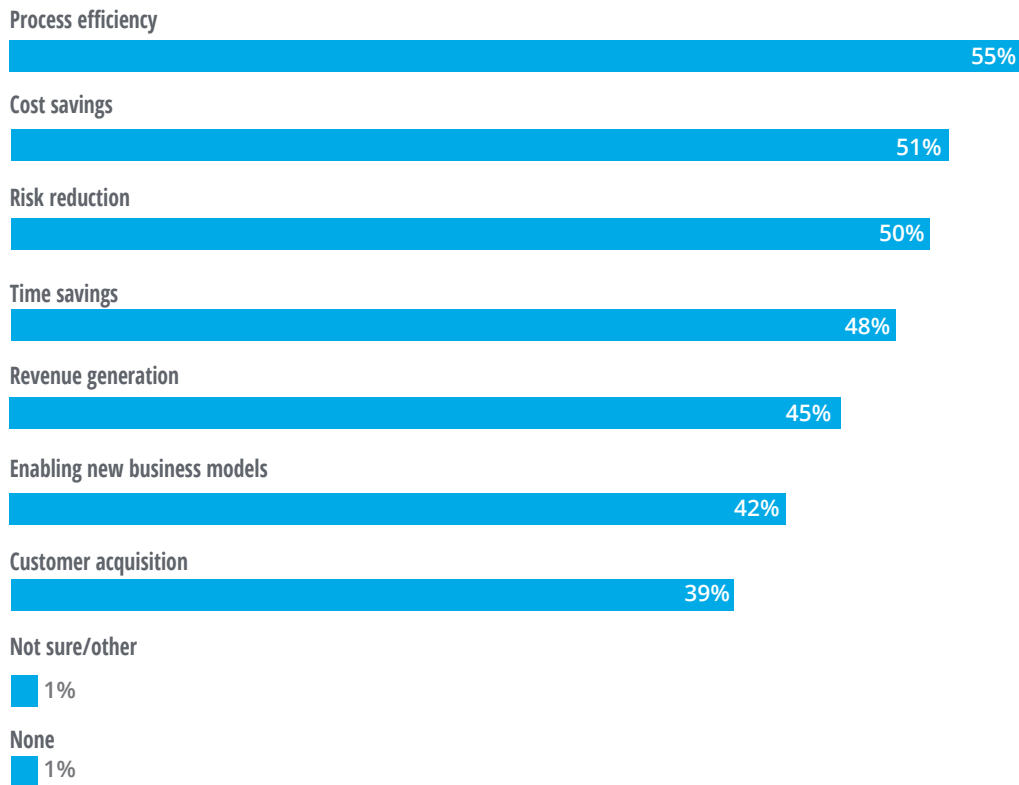
Source: Deloitte’s 2019 Global Blockchain Survey.

FIGURE A-18

### Metrics used to measure blockchain business case results

Efficiency, cost savings, and risk reduction lead the ways in which respondents measure blockchain business case results

*Survey questions: Which metrics does your organization or project use in measuring blockchain business case results? (Percentage of respondents who cite that metric to measure blockchain business case results)*



N=1,386 (global enterprise).

Note: Percentages total more than 100 percent because respondents were allowed to submit more than one answer.

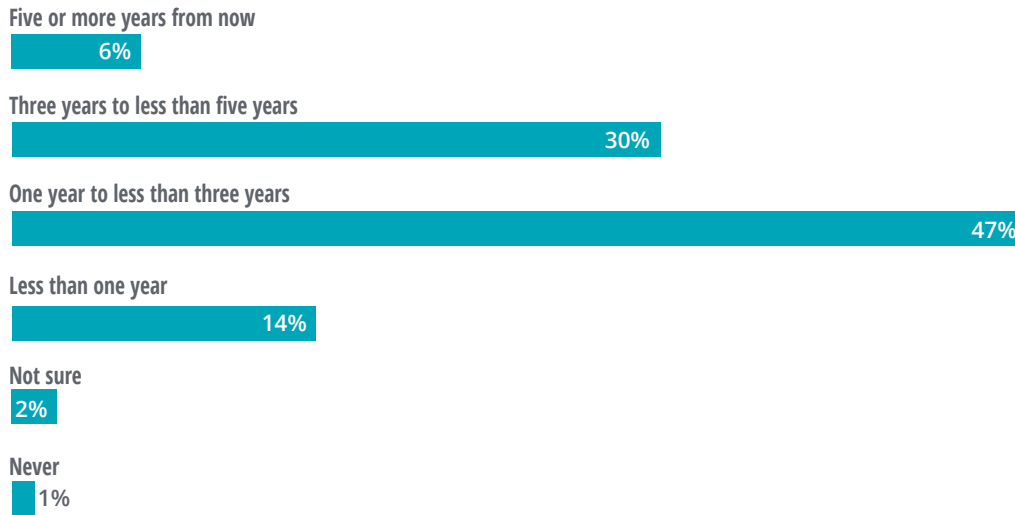
Source: Deloitte's 2019 Global Blockchain Survey.

FIGURE A-19

### Anticipated time frame to achieve measurable, verifiable return on blockchain investment

Most survey respondents expect a return on their blockchain investment within three years

*Survey question: What is the anticipated time frame for your organization or project to achieve a measurable, verifiable return on your blockchain investments? (Percentage of respondents)*



N=1,386 (global enterprise).

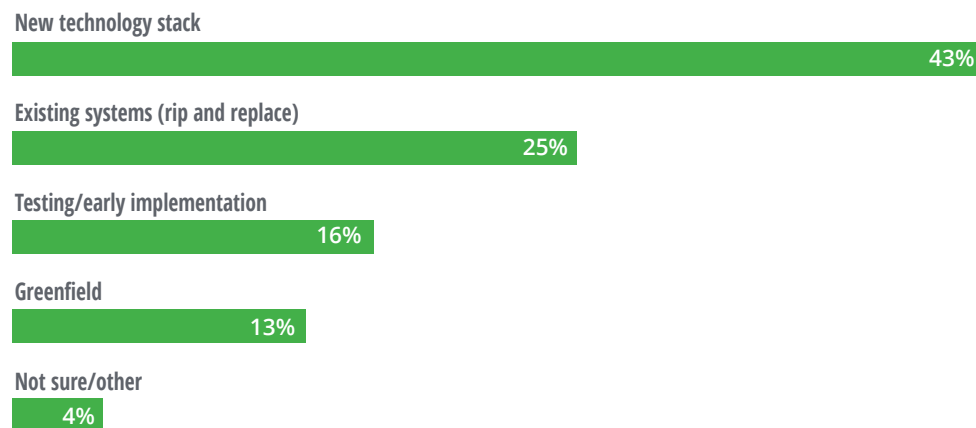
Source: Deloitte's 2019 Global Blockchain Survey.

FIGURE A-20

### How blockchain investment is being deployed

Though respondents more often deploy blockchain via new technology stacks, one-quarter are replacing existing systems with blockchain technology

*Survey question: What best characterizes how your organization or project is deploying blockchain technology through your investments? (Percentage of respondents)*



N=1,386 (global enterprise).

Note: Percentages do not total 100 percent due to rounding.

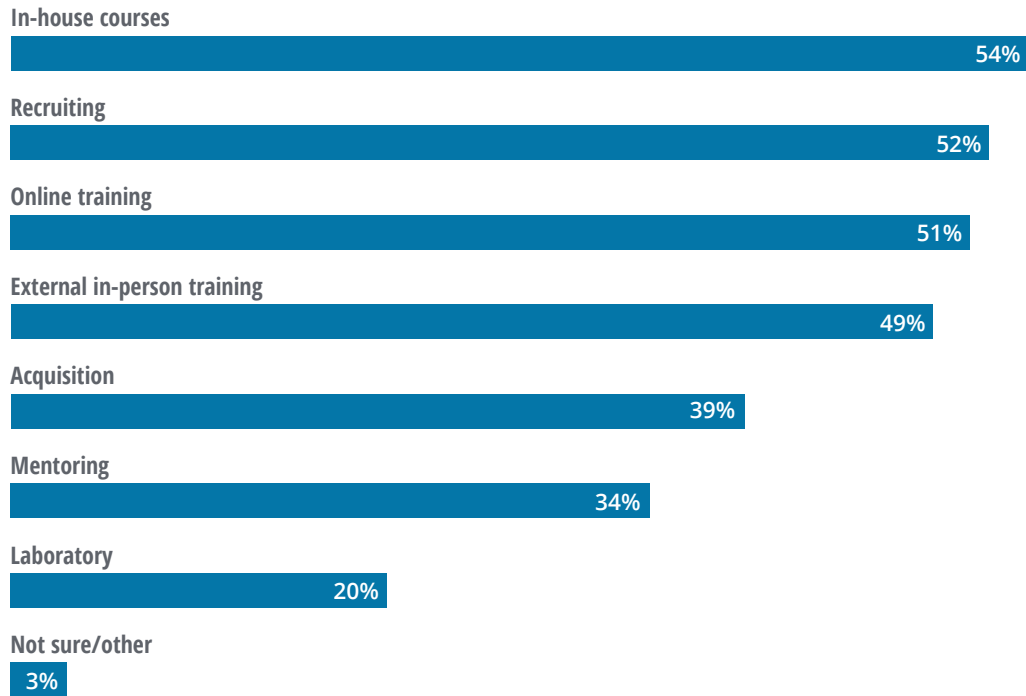
Source: Deloitte's 2019 Global Blockchain Survey.

FIGURE A-21

### Programs in place to develop in-house blockchain skills

Respondents leverage a full array of training channels, as well as recruiting, in building out their blockchain talent base

*Survey question: What programs does your organization or project have in place to develop in-house blockchain skills? (Percentage of respondents who cite that program to build in-house blockchain skills)*



N=1,386 (global enterprise).

Note: Percentages total more than 100 percent because respondents were allowed to submit more than one answer.

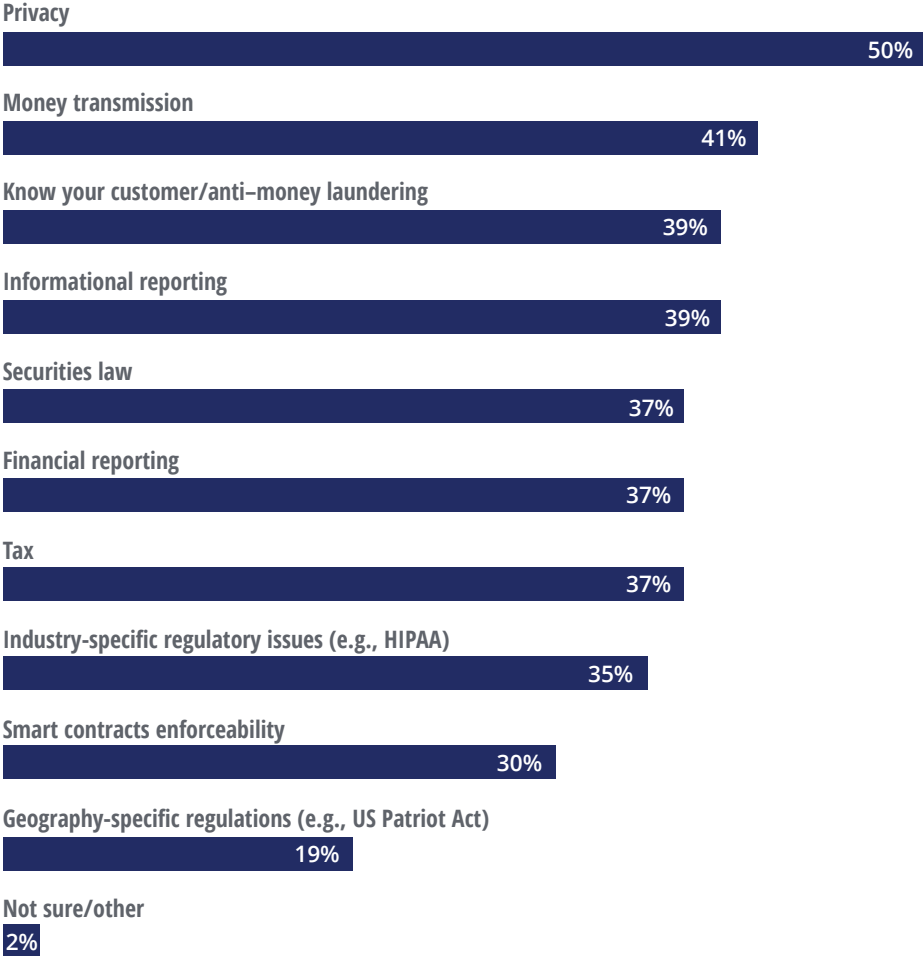
Source: Deloitte's 2019 Global Blockchain Survey.

FIGURE A-22

### Blockchain-related regulatory issues of concern

Half of respondents cited privacy-related regulations as a matter of concern—markedly more than any other choice

Survey question: What blockchain-related regulatory issues are of concern to your organization or project? (Percentage of respondents who cite that regulatory issue as a matter of concern)



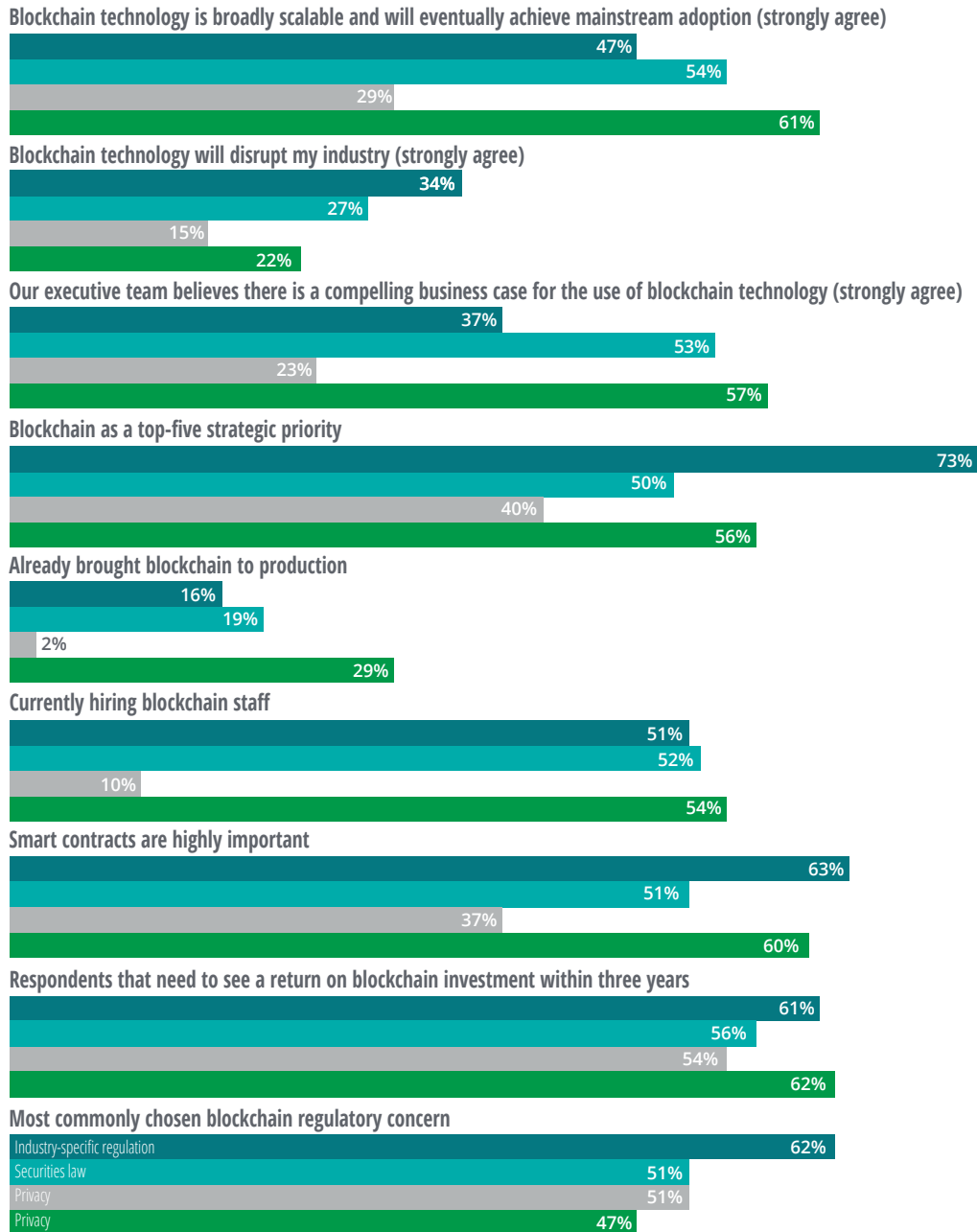
N=1,386 (global enterprise).  
Note: Percentages total more than 100 percent because respondents were allowed to submit more than one answer.  
Source: Deloitte’s 2019 Global Blockchain Survey.

FIGURE A-23

## Select country comparisons

Countries show differing attitudes about blockchain along a number of metrics

■ China ■ Singapore ■ Israel ■ United States



Source: Deloitte's 2019 Global Blockchain Survey.

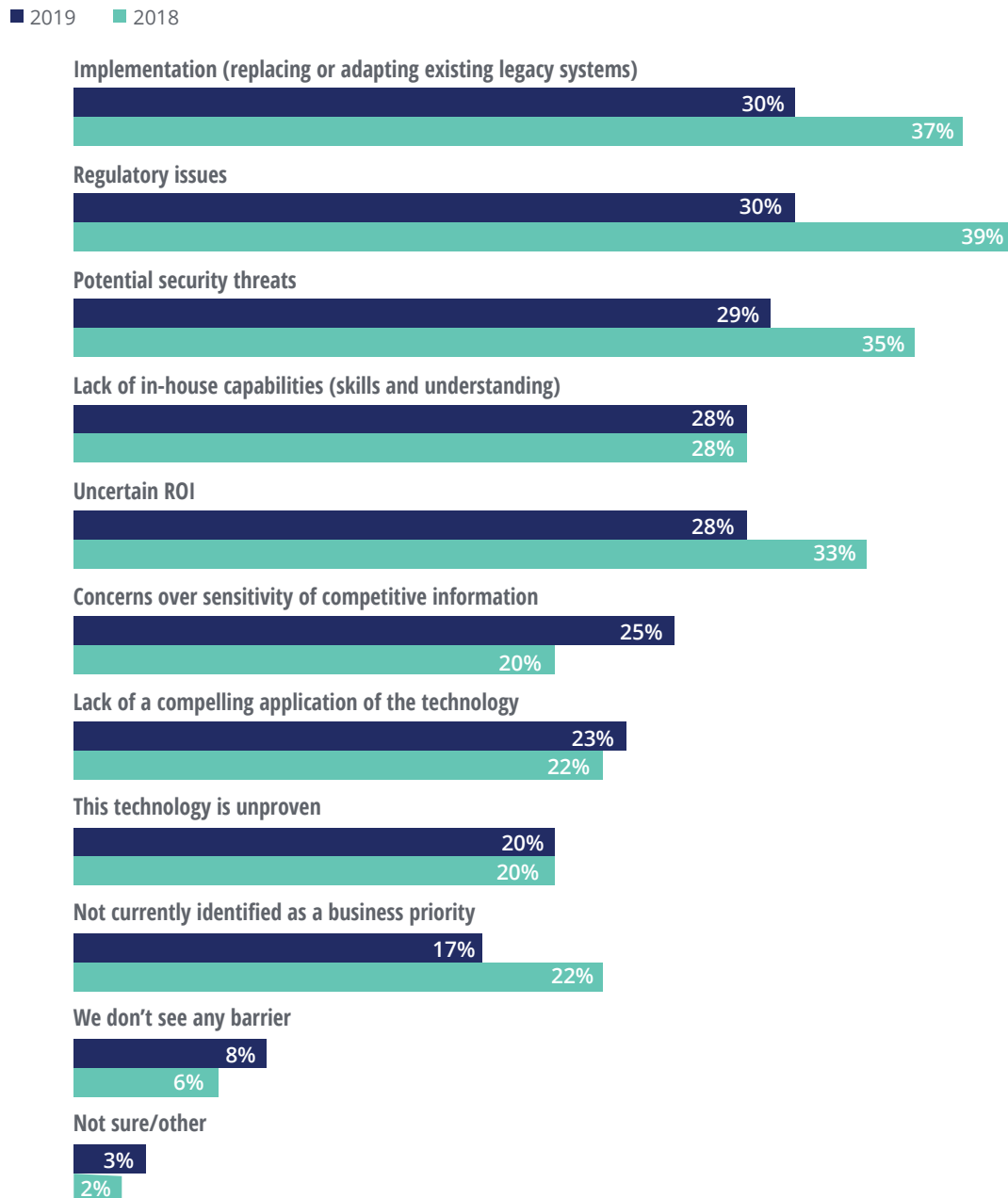


FIGURE A-24

## Organizational barriers to greater investment in blockchain technology (2019 vs. 2018)

A more even distribution of barriers emerged in 2019 in comparison to 2018

Survey question: What are your organization or project's barriers, if any, to increasing adoption and scale in blockchain technology? (Percentage of respondents who feel the issue is a barrier)



N=1,386 (2019 global enterprise); N=1,053 (2018 global enterprise).

Note: Percentages total more than 100 percent because respondents were allowed to submit more than one answer.

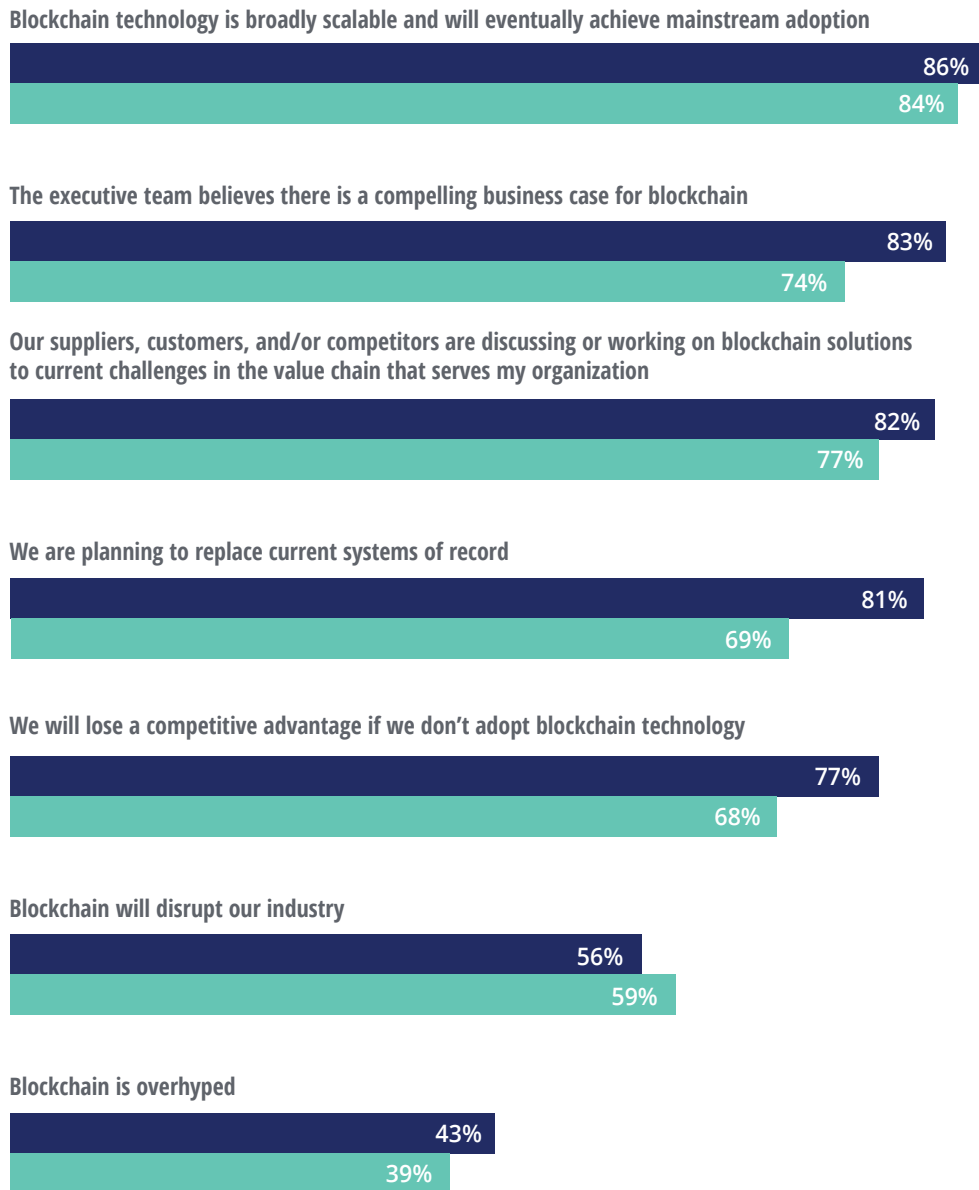
Source: Deloitte's Global Blockchain Survey, 2018 and 2019.

FIGURE A-25

### Survey respondents' attitudes on blockchain and its adoption (2019 vs. 2018)

There was a general improvement in attitudes about blockchain over the past year  
*Survey question: What is your level of agreement or disagreement with each of the following statements regarding blockchain technology?*

■ 2019 ■ 2018



N=1,386 (2019 global enterprise); N=1,053 (2018 global enterprise).

Note: Percentages indicate respondents who strongly or somewhat agree with each statement.

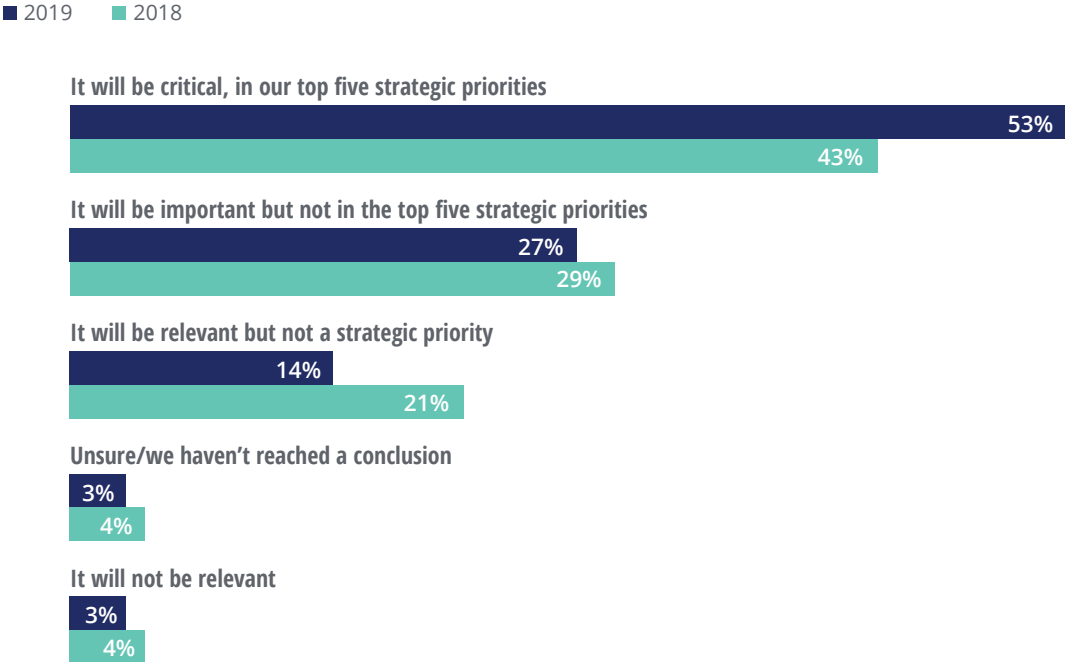
Source: Deloitte's Global Blockchain Survey, 2018 and 2019.

FIGURE A-26

### Views of blockchain's relevance within organizations (2019 vs. 2018)

Most respondents now see blockchain as a top-five strategic priority, a jump of 10 percentage points over 2018

Survey question: Which of the following best describes how you currently view the relevance of blockchain to your organization or project in the coming 24 months?



N=1,386 (2019 global enterprise); N=1,053 (2018 global enterprise)  
Note: Some percentages may not total 100 percent due to rounding.  
Source: Deloitte's Global Blockchain Survey, 2018 and 2019.

FIGURE A-27

## A look at who the emerging disruptors are

In addition to the 1,386 global enterprise respondents, we surveyed 31 emerging disruptors; both sets of respondents took the identical survey

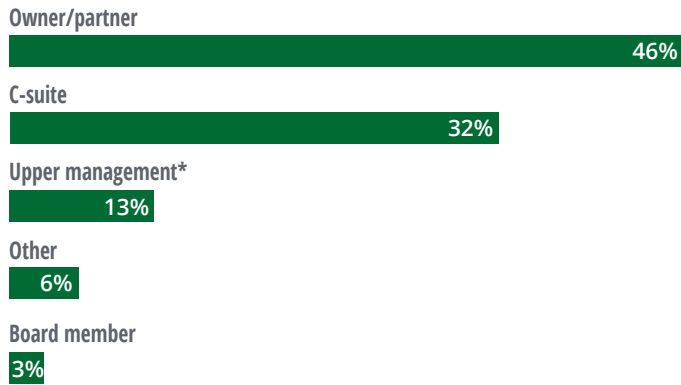
### 2018 REVENUES



### COUNTRY OF RESIDENCE



### RESPONDENTS BY ROLE



\*Director, VP, SVP, business line head

N=31 (emerging disruptors).

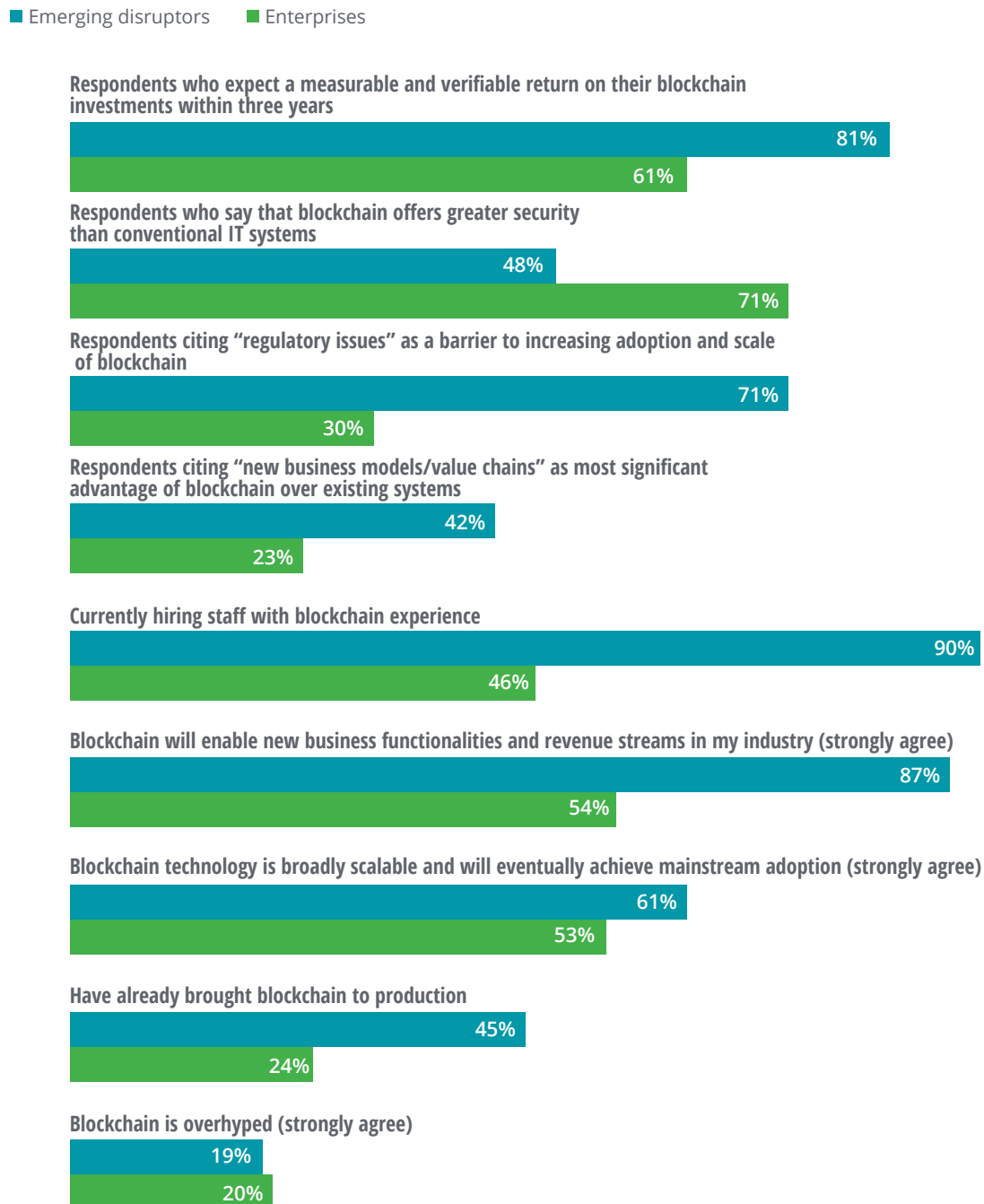
Note: Some percentages may not total 100 percent due to rounding.

Source: Deloitte's 2019 Global Blockchain Survey.

FIGURE A-28

## Emerging disruptors vs. enterprise respondents on select metrics

Despite their unsurprising differences in attitudes, deployment, and hiring activities, emerging disruptors and enterprise respondents share similar feelings on whether blockchain is overhyped



Emerging disruptors: N=31. Global enterprise: N=1,386.

Source: Deloitte's 2019 Global Blockchain Survey.

## Endnotes

1. Linda Pawczuk, Rob Massey, and David Schatsky, *Breaking blockchain open: Deloitte's 2018 global blockchain survey*, Deloitte, 2018.
2. Duncan Stewart, *3D printing growth accelerates again*, Deloitte Insights, December 11, 2018. Also see Deloitte Insights' series of articles on additive manufacturing.
3. We surveyed a total of 31 emerging disruptors. These emerging disruptors were distinct from the 1,386 enterprise respondents. Both groups of respondents completed identical surveys. Of the 31 emerging disruptors, 18 were pre-revenue and 13 had revenue of under US\$50 million in the past 12 months. The country breakout of the 31 emerging disruptors was 27 (the United States), 2 (Canada), 1 (the United Kingdom), and 1 ("Other").
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20. See, for instance, Yoav Vilner, "5 blockchain product use cases to follow this year," *Forbes*, June 27, 2018; Dan Price, "10 blockchain applications and use cases beyond cryptocurrency," Blocks Decoded, October 15, 2018.

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