Blockchain is here.
What's your next move?

Distributed ledger technology and digital tokens are rewiring commerce, but lack of trust may stall progress. Discover four strategies to navigate this new world.

pwc

PwC's Global Blockchain Survey 2018
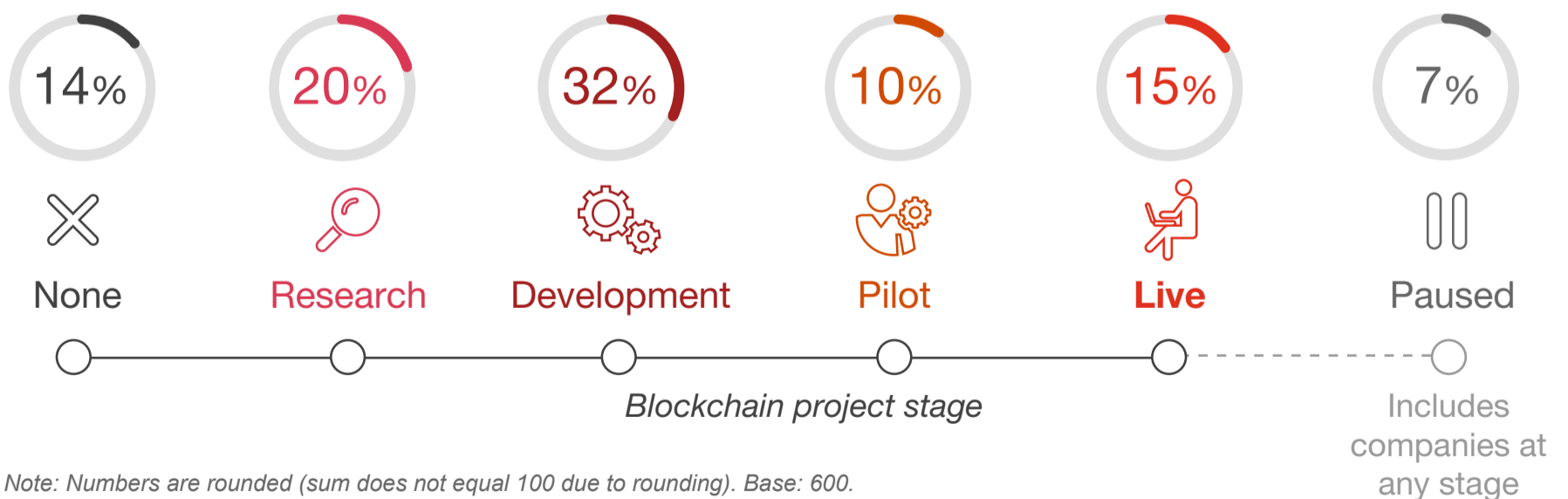
pwc.com/blockchainsurvey

Introduction

What is the state of blockchain today? In PwC's 2018 survey of 600 executives from 15 territories, 84% say their organisations have at least some involvement with blockchain technology. Companies have dabbled in the lab; perhaps they've built proofs of concept (see Exhibit 1). Everyone is talking about blockchain, and no one wants to be left behind.

It's easy to see why. As a distributed, tamperproof ledger, a well-designed blockchain doesn't just cut out intermediaries, reduce costs, and increase speed and reach. It also offers greater transparency and traceability for many business processes. Gartner forecasts that blockchain will generate an annual business value of more than US$3 trillion by 2030. It's possible to imagine that 10% to 20% of global economic infrastructure will be running on blockchain-based systems by that same year.

84%
of respondents are actively involved with blockchain

45%
believe trust could delay adoption

30%
see China as a rising blockchain leader

28%
say interoperability of systems is a key for success

Exhibit 1: How far along are companies with blockchain?

14%	20%	32%	10%	15%	7%
None	Research	Development	Pilot	Live	Paused

Blockchain project stage

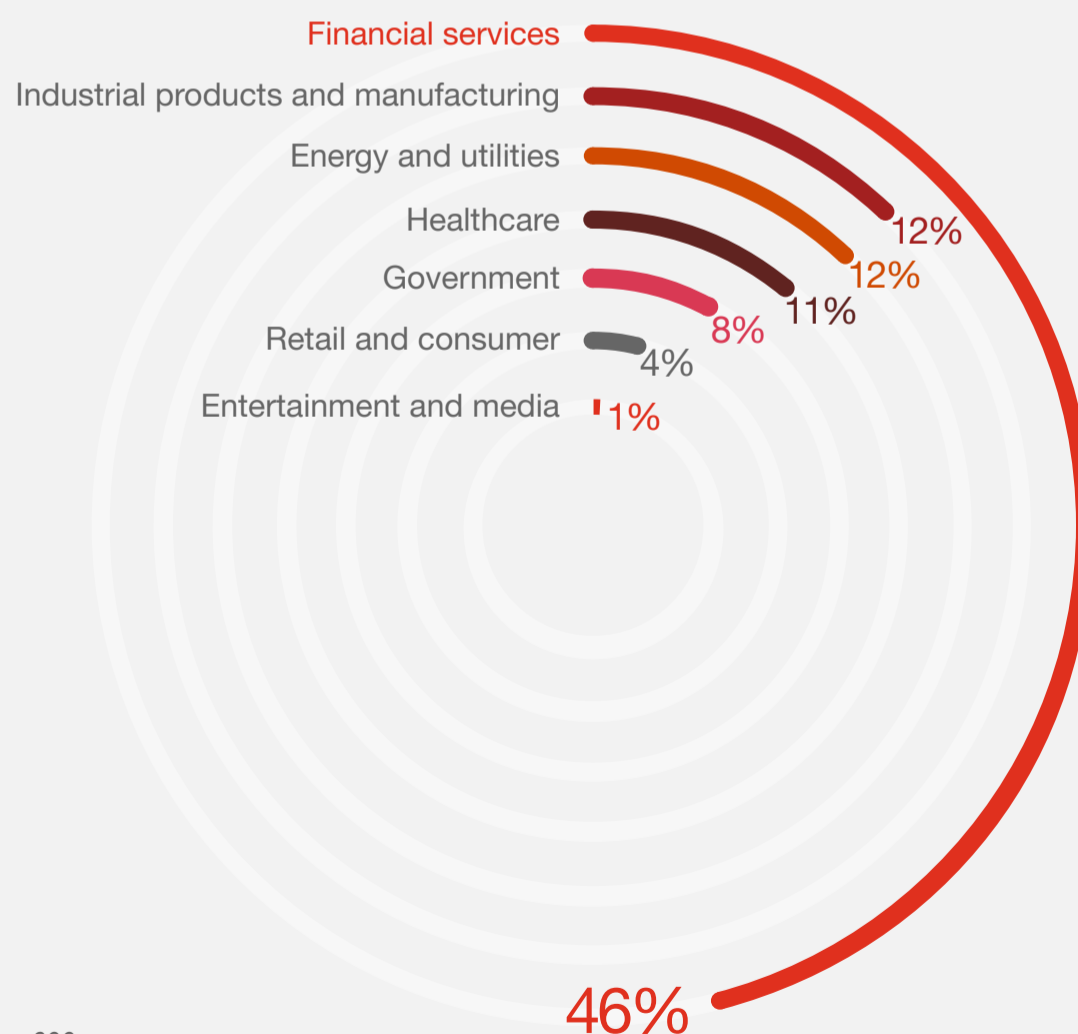Includes companies at any stage

Note: Numbers are rounded (sum does not equal 100 due to rounding). Base: 600.
Q: How would you describe your organisation's current involvement with blockchain?
Source: PwC's Global Blockchain Survey 2018

How blockchain is changing business

There are many indications that blockchain is fundamentally altering the business landscape. Here are just a few significant shifts:

- **Tokenisation** – the representation of real or virtual assets on a blockchain – is spreading to raw materials, finished goods, income-producing securities, membership rights and more. You can now represent on a blockchain almost everything businesses do.

- **Initial coin offerings (ICOs)**, in which a company sells a predefined number of digital tokens to the public, are funnelling billions of dollars into blockchain platforms. Increasingly an alternative to classic debt/capital funding as provided today by venture capital and private equity firms and banks, ICOs in the first five months of 2018 raised $13.7 billion. The largest ICOs to date have been diverse and included EOS, which is focused on blockchain infrastructure; Huobi Token, a coin for a South Korean crypto exchange; and Hdac, an Internet of Things platform.

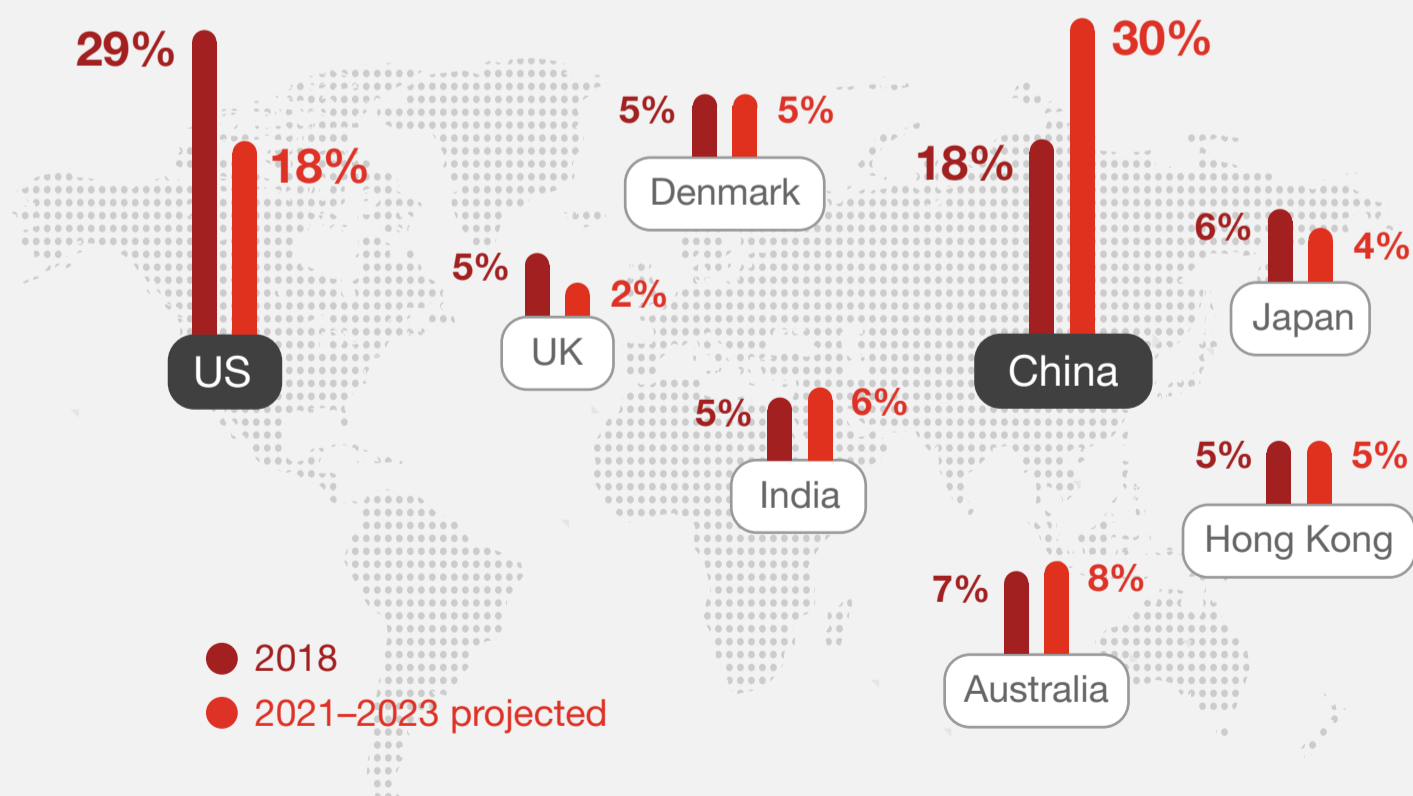**Exhibit 2: Industries seen as leaders in blockchain**

Financial services — 46%
Industrial products and manufacturing — 12%
Energy and utilities — 12%
Healthcare — 11%
Government — 8%
Retail and consumer — 4%
Entertainment and media — 1%

Note: Base: 600.
Q: Which of the following industries are the most advanced in developing blockchain today?
Source: PwC's Global Blockchain Survey 2018

- **Enterprise software platforms** that are the engine for company operations such as finance, human resources and customer relationship management are beginning to integrate blockchain. For example, Microsoft, Oracle, SAP and Salesforce have all announced blockchain initiatives. In the future, many core business processes will run on – or interoperate with – blockchain-based systems. Using blockchain in concert with enterprise resource planning platforms will enable companies to streamline processes, facilitate data sharing and improve data integrity.

- **New industry and territory leaders** are emerging. Gartner has found that 82% of reported blockchain use cases were in financial services in 2017, but that sector's portion dropped to 46% of reported use cases in 2018. Our survey respondents still perceive financial services to be the current and near-term future leader of blockchain, but also see potential in industrial products, energy and utilities and healthcare (see Exhibit 2). Moreover, an early centre of gravity in the US and Europe is shifting. Our survey respondents believe that the US is the most advanced territory in developing blockchain today, but that in three to five years, the leader will be China (see Exhibit 3).

Exhibit 3: Which territories are seen as blockchain leaders?

US **29%** **18%**
Denmark **5%** **5%**
China **18%** **30%**
Japan **6%** **4%**
UK **5%** **2%**
India **5%** **6%**
Hong Kong **5%** **5%**
Australia **7%** **8%**

● 2018
● 2021–2023 projected

Note: Base: 600.
Q: Which of these territories are most advanced in developing blockchain projects?
Source: PwC's Global Blockchain Survey 2018

What's holding blockchain back

Building a blockchain becomes more complex when third parties participate. Consider a multinational that builds a blockchain to manage an intercompany process such as transfer pricing or treasury management. Historically, the company might be struggling with dozens of ERP systems and inconsistent data and processes. Instead of one central ledger for each subsidiary, a single distributed ledger can eliminate the need for reconciliation. Companies are exploring how they might use internal digital tokens to represent cash or other assets, with the aim of streamlining their movement between business units. Instead of time-consuming (and costly) bank transfers, currency conversions and multiple emails about each transaction, a tokenised transfer can be conducted in near real time via smart contracts and allow users to track each transaction's progress.
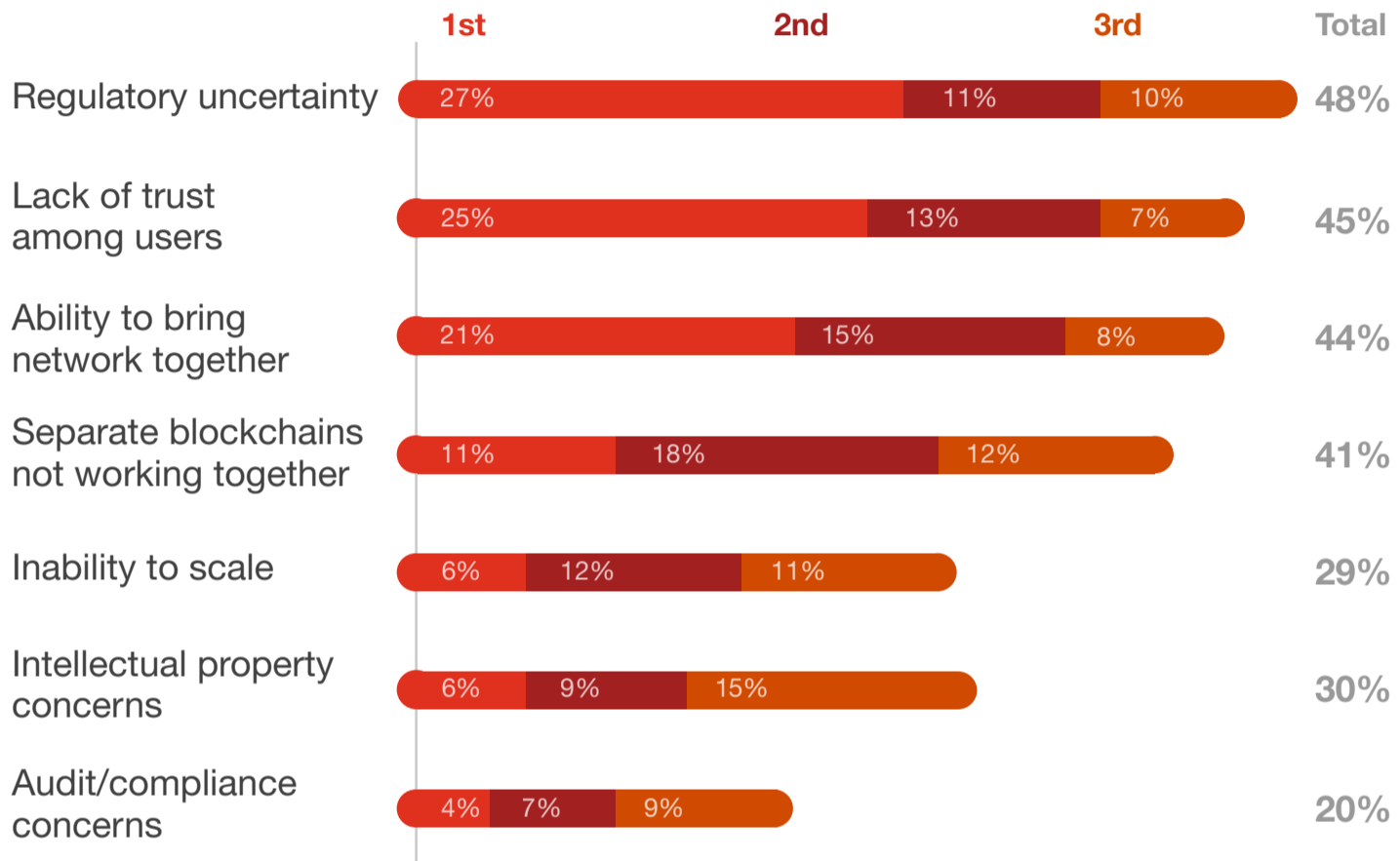
Our survey respondents echo these concerns, with regulatory uncertainty (48%), lack of trust among users (45%) and the ability to bring the network together (44%) making up the top barriers to blockchain adoption.

A company creating a blockchain for itself will undoubtedly confront challenges related to internal buy-in, data harmonisation and scale. Still, this company can set and enforce the rules of the blockchain, just as it does with its ERP today. But generally speaking, you don't realise the greatest return on investment in blockchain if you're building it just for yourself. Blockchain's benefits are best realised when different industry participants come together to create a shared platform. Of course, when you start inviting third parties to engage, you can't write the rules yourself.

Our survey respondents echo these concerns, with regulatory uncertainty (48%), lack of trust among users (45%) and the ability to bring the network together (44%) making up the top barriers to blockchain adoption (see Exhibit 4).

## Exhibit 4: The biggest barriers to blockchain adoption

Percentage of respondents ranking top three barriers to blockchain adoption

	1st	2nd	3rd	Total
Regulatory uncertainty	27%	11%	10%	48%
Lack of trust among users	25%	13%	7%	45%
Ability to bring network together	21%	15%	8%	44%
Separate blockchains not working together	11%	18%	12%	41%
Inability to scale	6%	12%	11%	29%
Intellectual property concerns	6%	9%	15%	30%
Audit/compliance concerns	4%	7%	9%	20%

Note: Base: 600.
Q: Which of the following will be the biggest barriers to blockchain adoption in your industry in the next three to five years?
Source: PwC's Global Blockchain Survey 2018
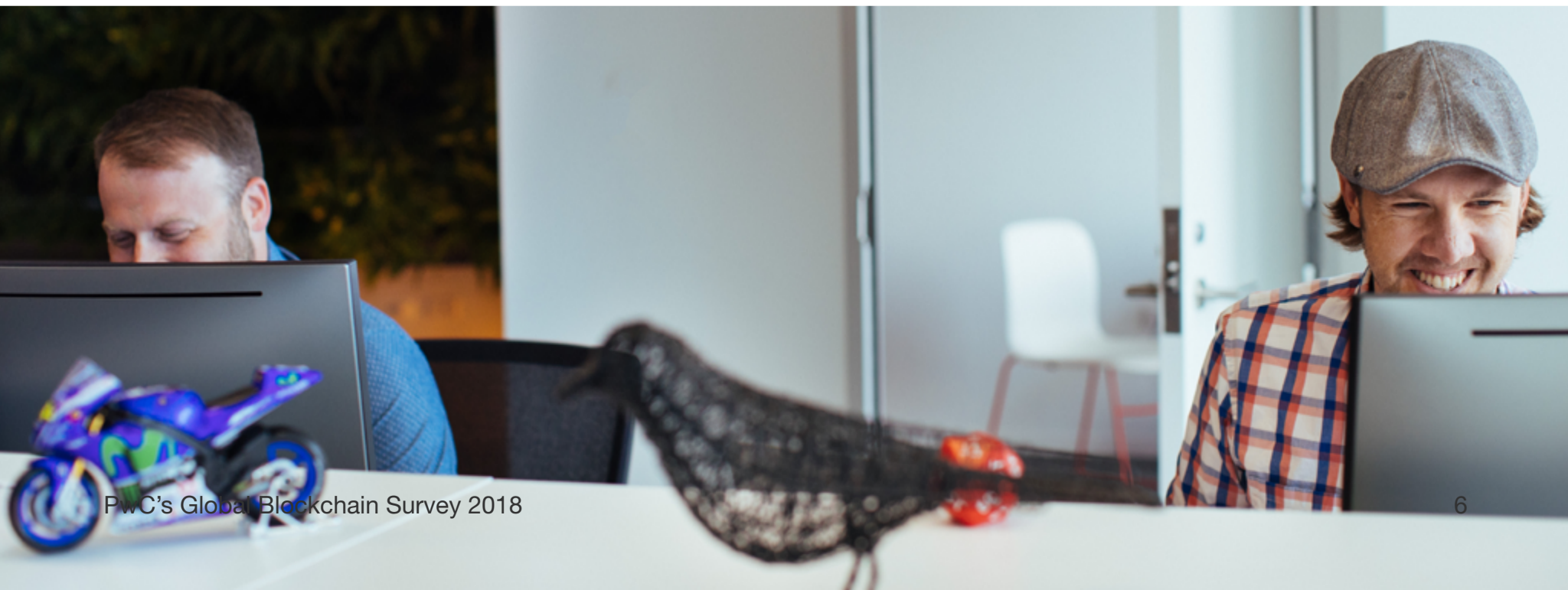
Why it's hard to trust a blockchain

Blockchain, by its very definition, should engender trust. But in reality, companies confront trust issues at nearly every turn. For one, users must build confidence in the technology itself. As with any emerging technology, challenges and doubts exist around blockchain's reliability, speed, security and scalability. And there are concerns regarding a lack of standardisation and the potential lack of interoperability with other blockchains.

Also contributing to the blockchain trust gap is a lack of understanding. Even now, many executives are unclear on what blockchain really is and how it is changing all facets of business. Although the public narrative has moved beyond bitcoin, even the more recent focus and hype around ICOs only hint at the potential impact. Blockchain's role as a dual-pronged change agent – as a new form of infrastructure and as a new way to digitise assets through tokens, including cryptocurrency – is not easy to explain. Think about other new technologies: users can try on virtual reality goggles or watch a drone take flight. But blockchain is abstract, technical and happening behind the scenes.

Another challenge for blockchain is building trust in the network. It is perhaps ironic that a technology meant to bring consensus hits a stumbling block on the early need to design rules and standards. Take payment systems and mechanisms in banking. Though everyone plays by the rules of existing systems today, they don't necessarily agree on how an alternative blockchain-based model should be designed and operated.

Likewise, there's a lack of comfort regarding regulation. The majority of regulators are still coming to terms with blockchain and cryptocurrency. Many territories have begun studying and discussing the issues, particularly as they relate to financial services, but the overall regulatory environment remains unsettled.

It is perhaps ironic that a technology meant to bring consensus hits a stumbling block on the early need to design rules and standards.

Four strategies for blockchain success

How do you come up with a business model in which companies in an industry can agree on common standards and operate together? The answer lies in building trust. By focusing on four key areas early in their blockchain efforts, companies can set themselves on a path toward successful execution.

1 ## Make the blockchain business case: evolution, not revolution

Strategic clarity will ensure that your blockchain initiative has a business purpose around which you and other participants can align.

2 ## Build an industry ecosystem: friend or foe?

Blockchain may call for competitors to collaborate in a new way, as they come together to solve industry-wide problems.

3 ## Design deliberately: determine the rules of engagement

Every blockchain will require rules and standards, particularly around what various participants will be able to access and how they can engage.

4 ## Navigate regulatory uncertainty: watch, but don't wait

You'll need to stay agile to meet regulatory requirements as they evolve in the years to come.

① Make the blockchain business case: evolution, not revolution

Creating and implementing a blockchain is not your traditional IT build. There's no point in re-creating the old world, but with a blockchain at its core. The danger in not recognising this paradigm shift from the outset is that you end up reasserting existing roles, processes and business models. Instead, you need a commitment to a strategy that is suitably transformed from where you are today. And that starts with the business case.
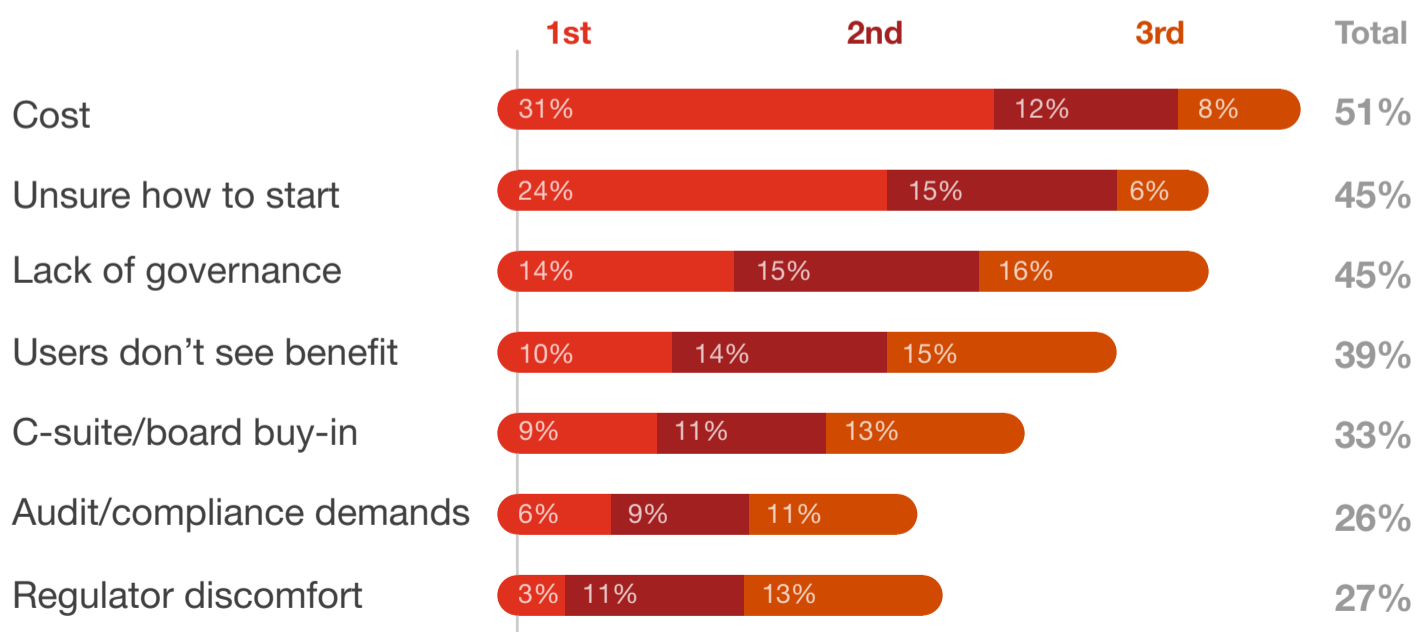
Of our survey respondents, 62% report having a blockchain project underway. This is an impressive sign of progress. But for these companies, as well as those that are still in the research stage or that have yet to dip a toe in the water (the latter two categories encompass 34% of our respondents), getting the business case right can set them up for future success.

Finding strategic clarity

The inverse is also true: failing to start with a clear business case can lead to a stalled project. For that 34% of respondents who report having little to no involvement with blockchain, the top three reasons cited for lack of progress are cost (31%), uncertainty over where to start (24%) and governance issues (14%) (see Exhibit 5).

Exhibit 5: What's stalling blockchain progress?

Percentage of respondents ranking top three reasons their organisations have not progressed with blockchain

	1st	2nd	3rd	Total
Cost	31%	12%	8%	**51%**
Unsure how to start	24%	15%	6%	**45%**
Lack of governance	14%	15%	16%	**45%**
Users don't see benefit	10%	14%	15%	**39%**
C-suite/board buy-in	9%	11%	13%	**33%**
Audit/compliance demands	6%	9%	11%	**26%**
Regulator discomfort	3%	11%	13%	**27%**

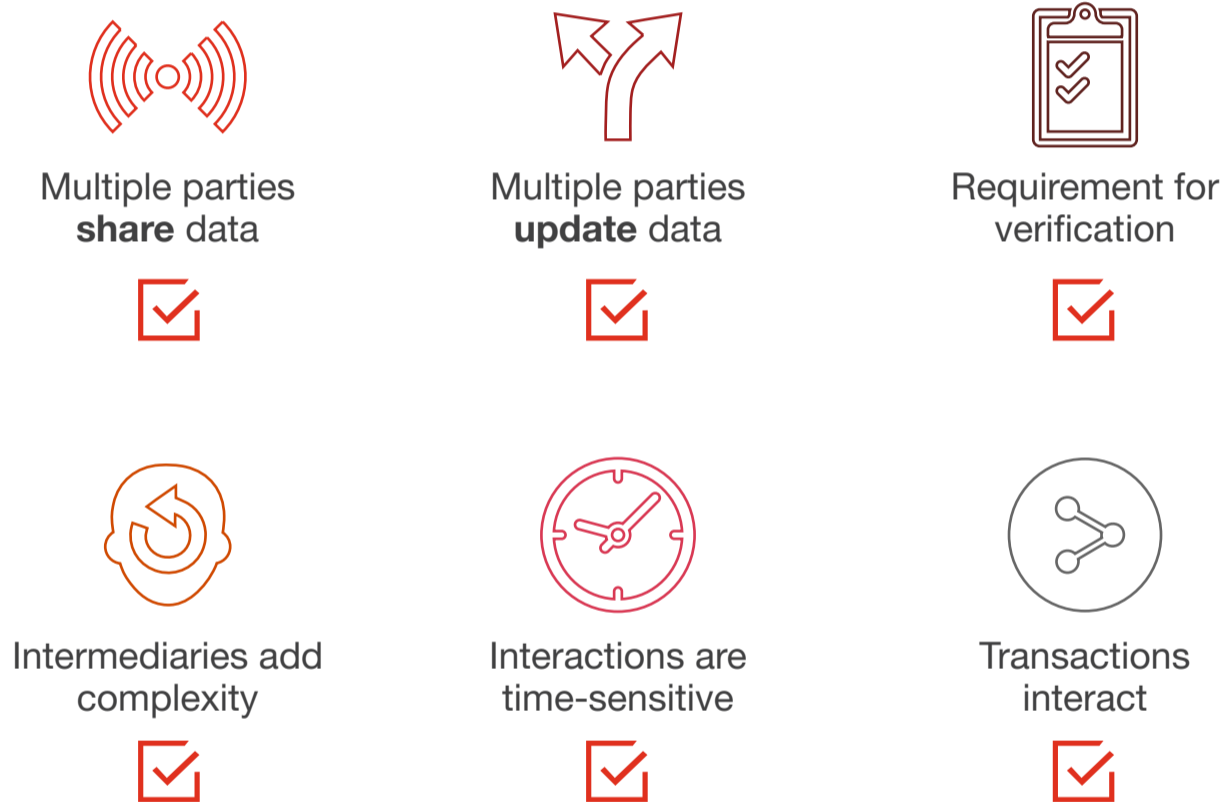*Note: Base: 209 (none or research phase).*
Q: What are the top three reasons that your organisation hasn't progressed further with blockchain?
Source: PwC's Global Blockchain Survey 2018

It is reasonable to assume that some of these issues result from a lack of strategic clarity. Before jumping into a blockchain initiative, you need to ask yourself: what am I strategically trying to get done? This starts with pain points that are tested against key criteria, to determine if blockchain is a good fit or if other technologies are better placed (see Exhibit 6). If blockchain is the best solution, it's time to ask: Which other stakeholders share this pain point? How would we fund such an initiative? How might it be governed?

Exhibit 6: The blockchain checklist: Is the technology right for you?

If your project checks four out of the six boxes, blockchain could be an applicable solution.

|		
Multiple parties **share** data ☑	Multiple parties **update** data ☑	Requirement for verification ☑
Intermediaries add complexity ☑	Interactions are time-sensitive ☑	Transactions interact ☑

Source: PwC

Build confidence in the tech

These are big questions, and they become increasingly complex when third parties come together around a blockchain. Thus, although blockchain may ultimately power expansive networks for frictionless commerce, engendering trust in blockchain has to start small. Here we see a cautionary tale in financial services. In this sector, blockchain has been pitched as a big-ticket solution to big problems. And it very well might be, but the reality is that progress is slow going. Our survey findings reflect this mentality, across industries: of the respondents who report a blockchain project in the pilot stage, 54% say the effort sometimes or often hasn't justified the result (see Exhibit 7).

Exhibit 7: When blockchain projects fall short of expectations

Percentage of respondents who said blockchain efforts sometimes or often didn't justify results, by project stage

49%	54%	38%	55%
Development	Pilot	Live	Paused
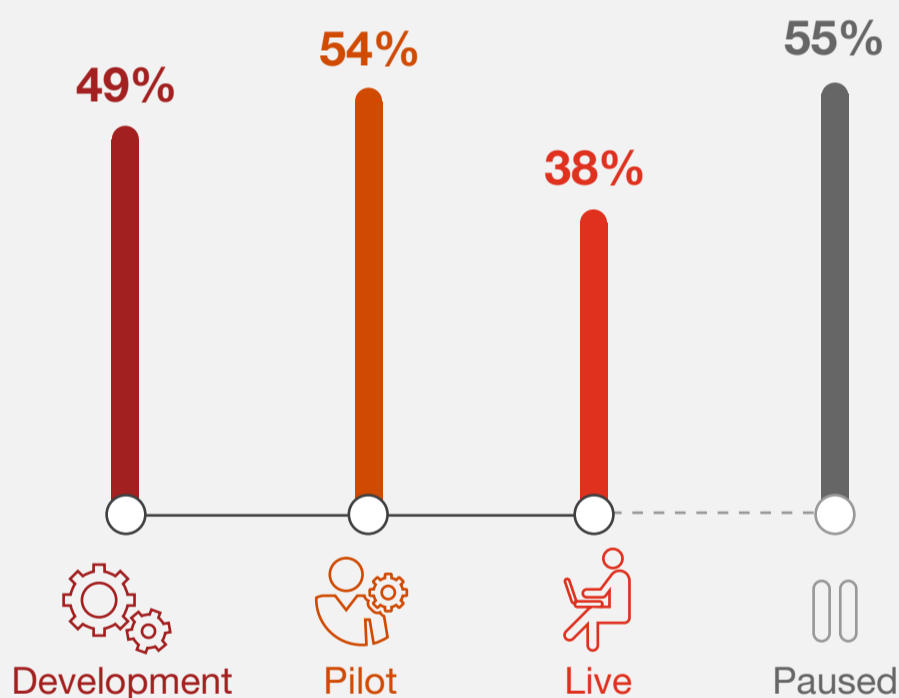
Note: Bases: 44, 193, 62, 90.
Q: For your organisation's blockchain projects, have you faced any of these challenges?
Source: PwC's Global Blockchain Survey 2018

To mitigate risk, don't begin with the big-bang, change-the-world ideas. Instead, try to build confidence in the tech by starting smaller. Consider the insurance claims process: many insurance companies have been looking at putting parts of the process onto a blockchain to avoid costly reconciliation of claims and disbursements. Ideally the whole process would go on the chain, but companies don't start there. Instead, they start with one part of the process, such as claims management.

A blockchain that incorporates all of the documents generated in a claims process would enable all parties instant access to information, and would give them the ability to monitor and review the process. Therefore, clients, brokers and insurers can reduce delays and costs, and offer greater legal certainty and improved customer service. The success of this initiative would prove the value of a collaborative digitisation effort and the use of blockchain.

Make the business case: key takeaways

Commit to new ways of working

Creating a blockchain doesn't have to mean complete reinvention, but you need to make sure you don't slip into familiar ways of doing things. New ways of thinking and operating will be required.

Frame the problem and solution

Your blockchain project needs to be supported by a strategy. What is the issue you are addressing, and how will blockchain help? How might this same issue be affecting others in your industry?

Start small, then scale out

Make sure you know where blockchain will fit in your business environment, and fine-tune issues along the way. But stay focused on the long-term value: an external shared resource that makes new scale economies possible.

2 Build an industry ecosystem: friend or foe?

A single organisation can benefit by more effectively managing enterprise-wide activities, but blockchain's value multiplies when more players – even an entire industry – participate. Blockchain requires the creation of new industry ecosystems, in which participants must work together.

Bringing together a group of stakeholders to collectively agree on a set of standards that will define the business model is perhaps the biggest challenge in blockchain. Participants have to decide the rules for participation, how to ensure that costs and benefits are fairly shared, what risk and control framework can be used to address the shared architecture, and what governance mechanisms are in place, including continuous auditing and validation, to ensure that the blockchain functions as designed.

> The key to the solution is both competitors' participation and trust — trust that the encryption and access do not expose competitively 'sensitive' information.

There's power in numbers

In one aerospace use case currently in discussion, airframers; aircraft manufacturers; maintenance, repair and overhaul providers; and airlines have all come to the table to create a blockchain for aircraft parts provenance. Each has a vested interest in maximising both aircraft safety and the aircraft's operational availability. Specifically, the blockchain solution provides data for the life of the aircraft – parts provenance and as-flown aircraft configurations (the sum of the provenance of all parts on a plane) – as well as the certifications for the personnel maintaining the plane.

The ultimate value of the solution is its ability to maintain data across industry participants for the 30-year life of an aircraft. The innate attributes of blockchain enable competitors' data to co-exist in a shared ledger with encrypted access that prevents one participant

from leveraging its competitors' data for its own advantage. The key to the solution is both competitors' participation (in the form of providing data) and trust – trust that the encryption and access do not expose competitively 'sensitive' information.
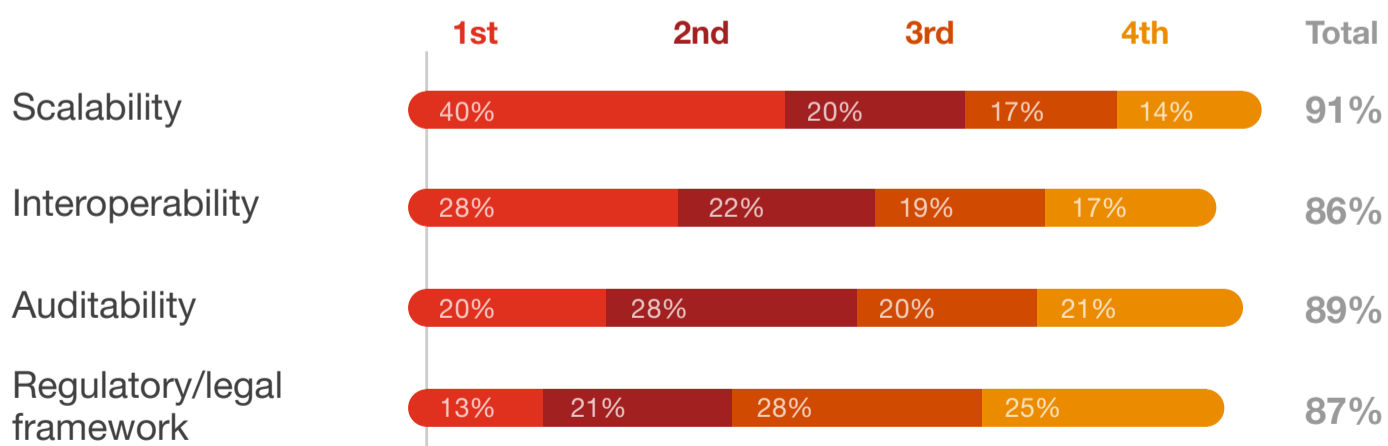
Another example in which companies have united around a critical problem involves food safety. Multiple scandals ranging from rebottled beer to synthetic rice have resulted in widespread food distrust among Chinese consumers. In response, a group of industry leaders including a giant e-commerce player, international nutrition brands and logistics companies came together to tackle this question: how can technology be used to build trust in the food supply chain? These companies are using blockchain technology to enable enhanced traceability to help mitigate counterfeit and fraudulent food products.

Interoperability and scalability

There are technical challenges when creating an ecosystem: 28% of respondents say interoperability is a key ingredient for a successful blockchain (see Exhibit 8). If different participants will be entering data and transactions into the blockchain, that data has to be standardised and its governance must be robust. Standard naming conventions and system-wide data models, for example, have to be developed that all parties will adhere to.

Exhibit 8: What it takes to build your blockcahin

Percentage of respondents ranking top four features required for blockchain success.

	1st	2nd	3rd	4th	Total
Scalability	40%	20%	17%	14%	**91%**
Interoperability	28%	22%	19%	17%	**86%**
Auditability	20%	28%	20%	21%	**89%**
Regulatory/legal framework	13%	21%	28%	25%	**87%**

Note: Base: 389 (All who have one or more projects).
Q: For your organisation's blockchain projects, which features are required to have a successful blockchain project?
Source: PwC's Global Blockchain Survey 2018

Moreover, 40% of respondents specifically called out 'scalability' as necessary for a successful blockchain project. When it comes to supply chain tracking and tracing, for example, scalability won't be an issue that a single company can solve; it's an issue that a group of companies can best address by bringing together their collective capabilities and power. Significant scalability concerns also relate to the technology itself. This is a critical area to monitor, and one that continues to evolve rapidly. For example, a significant number of ICOs have been launched by startups that are developing or making use of more scalable blockchain infrastructures.

What's the right operating model?

There are several different owner/operator models that determine how critical decisions are made. In a sponsor-led model, one company is the 'owner' of the blockchain. This company determines costs, benefits and buildout considerations, and charges services to other participants in the network. The owner also determines standards to which shared ecosystem participants have to adhere, and can license the software to other market participants. This model works best for very large players that can effectively 'make the market.'

Other companies may find it more practical to be a co-owner/co-operator, sharing responsibility for costs, benefits, and buildout and standards with other companies. And one highly effective way to do this is to be a founding member of an industry consortium or utility, influencing a market utility entity responsible for the blockchain infrastructure. Of the 15% of our survey respondents who already have live applications, a startling 88% were either leaders or active members of consortia (see Exhibit 9).

Exhibit 9: Consortia engagement by type of blockchain project

50%
38%

Live projects

13%
40%

Other development stages

Image not to scale

Note: Bases: Live, 92; other stages (none, research, pilot, development, paused), 513.
Q: Which of the following best describes your organisation's involvement with a blockchain industry consortium?
Source: PwC's Global Blockchain Survey 2018

In pharmaceuticals, for example, there's the MediLedger Project, driven by the requirements of the US Drug Supply Chain Security Act, which mandates full interoperability by 2023. For food products, there's the Blockchain Food Safety Alliance. And in the freight industry, there's the Blockchain in Transportation Alliance, which is focused on standards and education.

Growing the blockchain ecosystem

Companies that take a leadership role in a consortium would have principal funding and control considerations, including intellectual property ownership. They would also have considerable influence over shared-services development where cost and benefit are mutualised among participants, and they could expand the base for commercial gain.

Regardless of the model selected, when determining the number of participants for the blockchain, the imperative is once again to start small. In the pharma industry, for example, there's often significant rebate and chargeback activity because drug pricing information is out of sync among manufacturers, wholesalers and retailers that serve end customers. It's a complex environment, with a considerable amount of data to maintain: contract pricing details, rebate information, membership eligibility and more. This presents a compelling business case for manufacturers, wholesalers and retailers to use blockchain to manage the pricing and contracting process in order to reduce transaction time and cost and to increase transparency.

To make progress, a nascent industry effort has begun with a single manufacturer and a few distributors. Together, this pilot group will define the blockchain's operating rules and consider how to develop the incentives for future participants. The idea is to start small, with players that would both benefit through engaging in the conception and creation of an ecosystem and be able to influence their peers to join later.

> The idea is to start small, with players that would both benefit through engaging in the conception and creation of an ecosystem and be able to influence their peers to join later.

Build an ecosystem: key takeaways

Focus on a cooperative few

Start with smaller ecosystems with a tradition of cooperating on matters of industry-wide importance. It's also possible to build a blockchain that starts with just a few stakeholders but is ready to expand.

Broaden your network

Blockchain consortia are valuable resources for staying close to technology developments, but you can look to established industry groups or trade organisations to find a community for exploring industry applications.

Work across the value chain

Conduct a competitive analysis: Are competitors or new entrants already planning on using blockchain? Is there a potential for partnership? Will you have to participate in their blockchain solution in order to continue doing business?

③ Design deliberately: determine rules of engagement

The participants of a blockchain ecosystem need to decide what the operating standards will be and what various users will be able to see and do. The design begins with the strategic business model, which includes making decisions about whether the blockchain will be permissionless, and thus available to everyone, or be permissioned (having various levels of permissions). Permissions determine participants' roles and how they will engage with the blockchain, which can vary from entering information or transactions to only viewing information processed on the blockchain.

The choice of model isn't automatic; organisations will decide based on design and use case considerations. They will also need to consider the type of network to establish. For example, a private, or closed-network, permissionless blockchain might be used to facilitate an internal (company-wide) cryptocurrency. And a public, or open network, blockchain may be used as shared infrastructure to support either a permissioned or permissionless model between organisations.

Choosing your blockchain model

Permissionless blockchains, such as the bitcoin blockchain, are made up of a network of public servers (or nodes). Anyone can connect, initiate transactions and view transactions. This model would not be a good fit for many enterprise applications, as the level of access allows anyone with an Internet connection to view and edit information on the chain.

In a permissioned blockchain, various permissions are required to access different aspects of the blockchain. This type of design is more typical for enterprise applications, across industries, with consortia and even within private companies. The governing body for the blockchain serves as the gatekeeper, determining who will (and won't) see or interact with information on the chain. A company developing a blockchain to manage its supply chain might use this model if it wants to heavily restrict how much information is available on the blockchain, who can see the information and where the blockchain is housed.

Permissioned blockchains typically require two layers of software: one to authenticate and verify users, and one to manage the movement of data into and out of the blockchain. These closed-off blockchains can be well equipped to manage privacy, access to sensitive data and related risks.

Permissioned blockchains can work in conjunction with permissionless ones – provided they are designed to be interoperable. A company might choose this model if it wanted to allow for retail traceability in its supply chain. It would create a permissioned blockchain for supply chain transparency, which its suppliers would use to enter data about raw materials. The company would also create a permissionless blockchain that would offer its customers transparency into the products that they're buying. Only the relevant data from the permissioned blockchain would be passed to the permissionless one.

Our survey results on how businesses are managing blockchains reveal that companies are adopting both approaches (see Exhibit 10). While 40% are using permissioned blockchains, 34% are working with permissionless chains, and 26% are taking a hybrid approach (meaning the project they are working on uses a mix of permissioned and permissionless blockchains).

Exhibit 10: How respondents are designing their blockchains

34%
Permissionless

40%
Permissioned

26%
Hybrid

Permissioned: restricted access

Permissionless: open access

Hybrid: mix of permissioned and permissionless
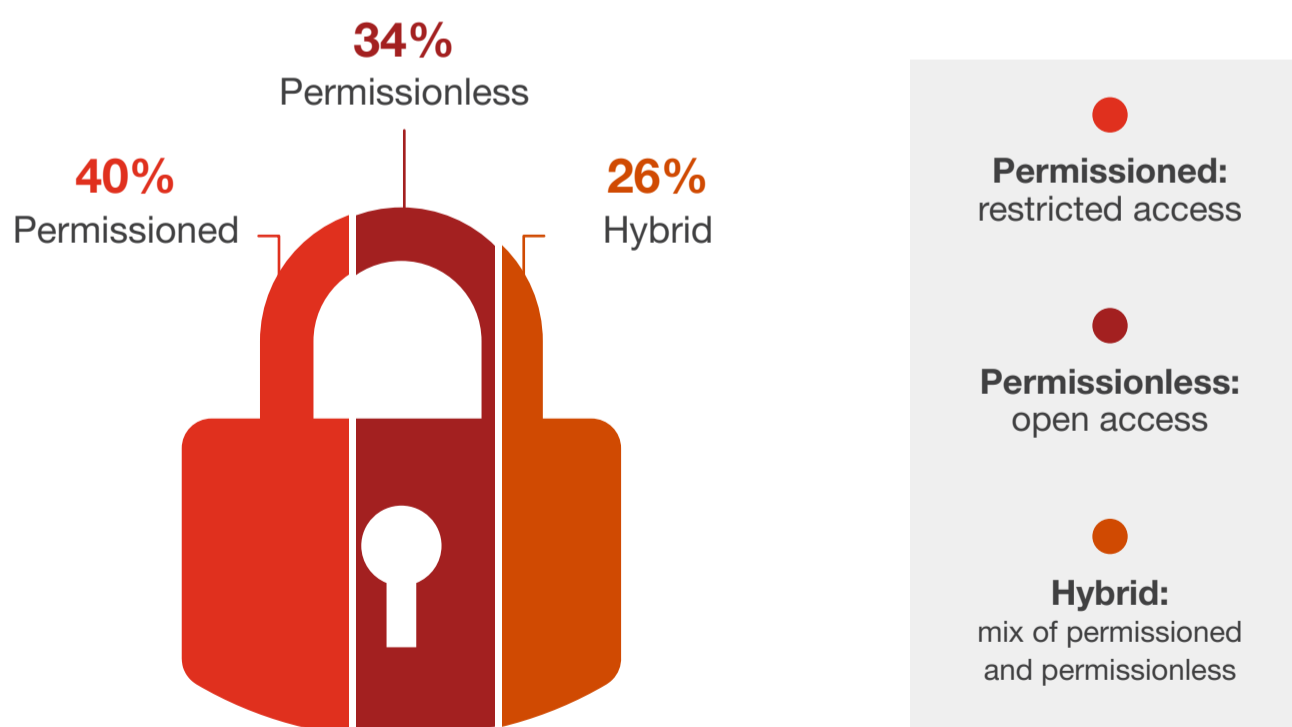
Note: Base: 389.
Q: For your organisation's projects, how do you address membership/participation?
Q: For your organisation's projects, how do you address network access?
Source: PwC's Global Blockchain Survey 2018

Regardless of the approach, you will need a robust governance model, which should be supported by a risk and controls framework for blockchain. Such a framework should address rigorous data governance, provide a tested control environment and involve experienced external partners to review and audit the blockchain and emphasise compliance.

Design deliberately: key takeaways

Confront risks early

Plan to add cybersecurity, compliance, and legal and audit specialists to blockchain development teams. Involving risk professionals from the start will enable you to build a framework that regulators and all your stakeholders will trust.

Consider privacy implications

Blockchain needs to fit into enterprise privacy strategies. GDPR, for example, requires that personally identifiable information be erasable. This has to be reconciled with the fact that data immutability is an important characteristic of blockchain.

Invest in data and processes

Traditional organisational processes, such as sales, manufacturing and shipping, are often suboptimal and siloed. Focusing efforts to streamline processes and data flows lays the groundwork for blockchain efforts.

4 Navigate regulatory uncertainty: watch, but don't wait

A well-designed blockchain validates data and eliminates the need for a central authority, such as a bank, clearinghouse or government, to approve and process transactions. Cutting out that central authority may reduce costs and delays, but it also removes the institutions important in ensuring market stability, combating fraud and more.

There are indications that regulators will eventually step in when it comes to blockchain, but that shouldn't be a reason to slow progress.
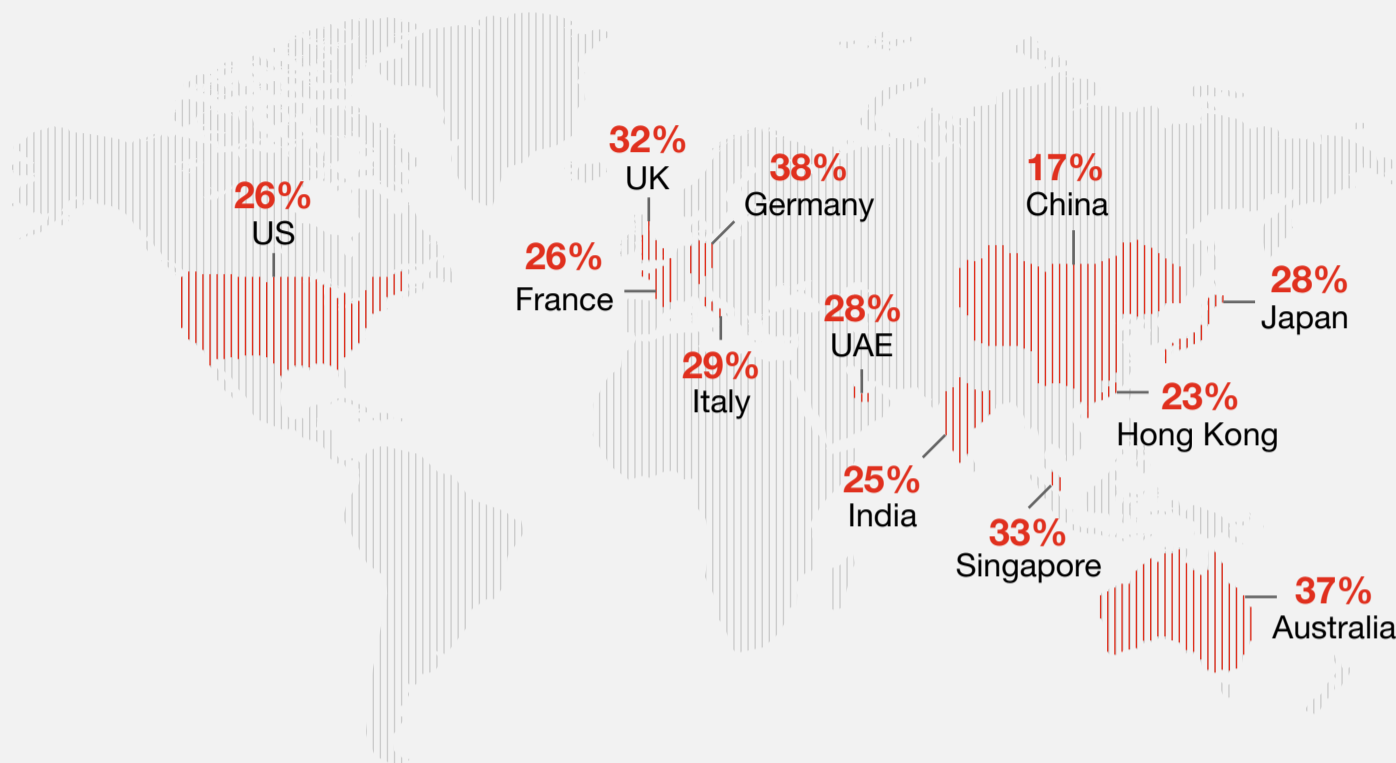
The state of blockchain regulation

Thus far, regulators' main focus has been on how different aspects of the technology cut across traditional commerce models. For example, regulators have had a mixed reaction to tokens and ICOs. Some territories, such as Singapore, Switzerland and Malta, have been moving toward regulations of tokens to speed blockchain growth. But other governments, like the US, have been more agnostic, which leaves individual states attempting to legislate treatment of tokens and smart contracts in the absence of broad federal regulation. In the EU, individual countries may be willing to use blockchain technology for public initiatives, but it is unclear how any blockchain project can meet the EU-wide GDPR privacy standards. In China, the government has been quick to separate its interest in the technology from its ban of cryptocurrency and ICOs, noting the need for further regulation to help blockchain grow.

Among our survey respondents, 27% in total believe that regulatory concerns are the number one barrier to blockchain adoption. These concerns are fairly consistent among many of the territories represented, and the number of respondents who put this barrier at the top of the list range from 17% in China to 38% in Germany (see Exhibit 11).

Exhibit 11 Mapping compliance concerns

Percentage of respondents in territory who report that regulatory uncertainty is the biggest barrier to adoption in the next three to five years

26% US
32% UK
26% France
38% Germany
29% Italy
28% UAE
17% China
28% Japan
23% Hong Kong
25% India
33% Singapore
37% Australia

Note: Bases: 37, 30, 30, 41, 42, 57, 32, 144, 31, 51, 31, 54.
Q: Which of the following will be the biggest barriers to blockchain adoption in your industry in the next three to five years? (Rank one)
Source: PwC's Global Blockchain Survey 2018

Regulatory target and regulatory tool

Given the current environment, companies should anticipate how regulators might respond to commercial activities migrating to a blockchain. You'll want to keep abreast of regulatory developments and engage with lawmakers at all jurisdictional levels. Likewise, build in checkpoints that enable you to take stock of the environment and to change course if needed.

The current regulatory uncertainty doesn't have to be a blockchain roadblock, however. Some companies have set up their pilots in more friendly geographies where they can test and adapt with fewer restrictions. Similarly, there may be an opportunity for companies in industries with little or no emerging regulation related to blockchain to make greater strides. For example, use cases in financial services may face more regulatory obstacles than those in such sectors as industrial products, retail and energy.

Finally, bear in mind that blockchain's potential for transparency, as well as the tamperproof record it creates, could make it a powerful tool for regulators. Because just as blockchain can offer a company unparalleled oversight of its activities, it can also offer that granular view to regulators. It could also make enterprises' compliance responsibilities easier. Blockchain could track regulatory changes, of every kind, all over the world. Its distributed nature would enable, for example, a company to keep track of regulatory requirements for its suppliers in such a way that regulators can easily follow the movements in real time.

> Blockchain's potential for transparency, as well as the tamperproof record it creates, could make it a powerful tool for regulators.

Navigate regulatory uncertainty: key takeaways

Shape the trusted tech discussion	Monitor evolving regulation	Use existing regulation as a guide
The risks of blockchain, and how to trust it, are part of a growing public discussion of responsible innovation and trust in technology. Engage with regulators and industry groups to help shape emerging policies and best practices.	Besides directly regulating the technology itself, laws around data use and protection can fundamentally change how your blockchain operates. It is vital to engage with regulators to help shape how the environment evolves.	Current regulations still apply – but they may apply in different ways. By and large, we expect existing regulation to extend to new business models and applications. If you remain agile, you'll be able to adapt and remain compliant.

Ready to talk blockchain?
Let's get started.

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About the survey

PwC's Global Blockchain Survey 2018 was fielded April through May 2018 and included 600 respondents from 15 territories. Respondents were business executives with technology responsibilities. Reflective of the distribution of respondents globally, 31% work in organisations with revenues of $1 billion or greater.

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