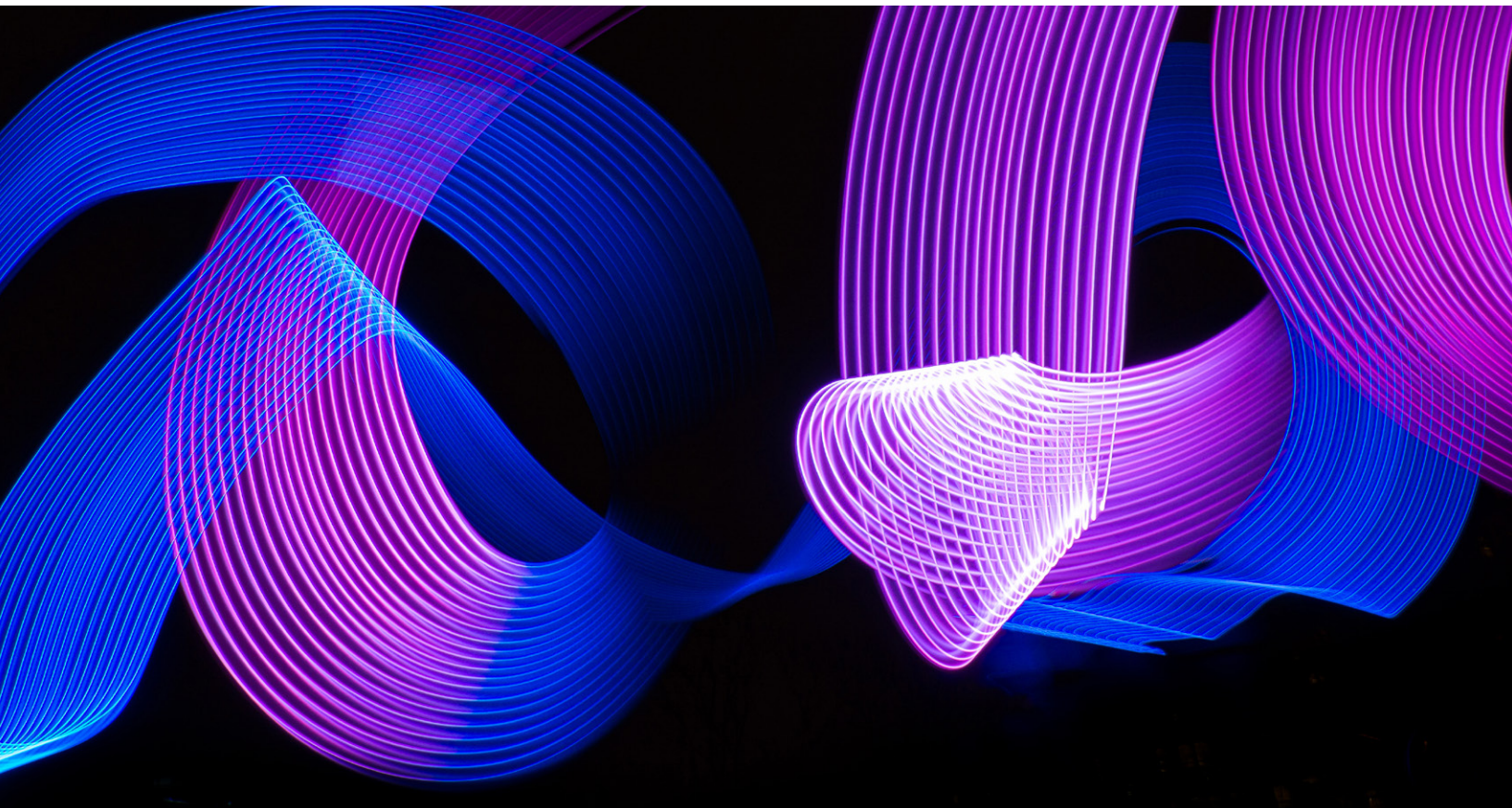


Financial Services Practice

# Tokenization: A digital-asset déjà vu

Tokenization adoption was poised for success six years ago, but progress was limited. Renewed interest might feel like déjà vu, but stronger business fundamentals and structural changes suggest the path could be different this time.

*This article is a collaborative effort by Anutosh Banerjee, Ian De Bode, Matthieu de Vergnes, Matt Higginson, and Julian Sevillano, including input from McKinsey's Corporate and Investment Banking team.*



**The past 12 months** have been highly tumultuous for digital assets and Web3 players, even by the turbulent industry's standards. Multiple bankruptcies, high-profile cases of fraud, and regulatory enforcement actions have had an impact on mainstream enthusiasm for the sector.

Yet companies in financial services, retail, music, gaming, and media, among other sectors, continue to pursue opportunities in Web3, such as tokenized loyalty programs. In financial services, the emphasis is shifting to the reemergence of a "blockchain, not crypto" narrative. Banks, asset managers, and other institutions are intrigued by the technological potential of "tokenization"—the process of issuing a digital representation of a traditional asset on a (typically private) blockchain, sometimes referred to as a distributed ledger. Several leaders of large institutions have publicly voiced interest in tokenization's potential to transform capital markets.<sup>1</sup> Analysts have forecast that \$4 trillion to \$5 trillion of tokenized digital securities could be issued by 2030.<sup>2</sup> While these numbers are, of course, only projections, in-production examples at scale are emerging. For example, US-based Broadridge, a fintech infrastructure company, now facilitates

over \$1 trillion worth of tokenized repurchase agreements monthly on its Distributed Ledger Repo (DLR) platform.

These pronouncements and projects give many digital-asset veterans a distinct sense of déjà vu. The first tokenization took place in 2017, and critics point to the limited traction it has gained since then. The question now is, will this time be different?

This article attempts to provide a careful and balanced look at some of the asserted benefits and perennial challenges of tokenization across asset classes. From this, we conclude that challenges remain, but growing institutional interest and stronger business fundamentals across certain asset classes offer potential for a different outcome this time, especially for players that follow a well-structured approach.

### **Tokenization's potential benefits**

Tokenization refers to the process of creating a token on a blockchain that represents an asset. These tokens can be representations of traditional tangible assets (such as real estate, agricultural

## **In financial services, the emphasis is shifting to the reemergence of a 'blockchain, not crypto' narrative.**

---

<sup>1</sup> As cited by the BNY Mellon CEO in "Time for a reset of the crypto opportunity," *Financial Times*, December 2, 2022; the Goldman Sachs CEO in "Blockchain is much more than crypto," *Wall Street Journal*, December 6, 2022; and the BlackRock CEO in "The next generation for markets will be tokenization," *New York Times*, 2022 Dealbook Summit, November 30, 2022.

<sup>2</sup> "Money, tokens, and games: Blockchain's next billion users and trillions in value," Citigroup, March 30, 2023.

or mining commodities, analog artworks), financial assets (equities, bonds), or nontangible assets such as digital art and other intellectual property. Whether these assets have a parallel representation in other systems of record (“off-chain” in a central securities depository, say) or are native to the on-chain model, tokenization typically involves four fundamental steps (see sidebar, “The process of tokenization”).

Tokenization gives asset holders and market makers access to blockchain technology’s potential benefits. Broadly speaking, these include 24/7 operations and data availability, along with so-called atomic (that is, instantaneous) settlement. In addition, tokenization offers programmability—that is, the ability to embed code in the token, and the ability of the token to engage with smart contracts—enabling higher degrees of automation.

More specifically, when tokenization is conducted at scale, beyond proofs of concept, its benefits will differ by asset class but could include some combination of the following (Exhibit 1):

- **Improved capital efficiency.** Tokenization can deliver meaningful capital efficiencies in certain capital market use cases. Triparty repurchase agreements or money market fund redemptions can occur in a matter of minutes, as opposed to the current T+2 settlement, for instance. Shorter settlement times generate significant savings in high-interest-rate environments such as the current cycle. For investors, these savings may be the greatest near-term impact from tokenization, and the main reason why the business case is now different from six years ago.

Exhibit 1

## Tokenization can benefit asset owners, service providers, and investors.

### Potential benefits from tokenization, by stakeholder type, nonexhaustive

	Asset owners		Service providers		Investors	
	Revenue opportunity	Cost efficiency	Revenue opportunity	Cost efficiency	Revenue opportunity	Cost efficiency
<b>Improved capital efficiency</b> Lower cost of capital and free up capital in transit					✓	✓
<b>Democratization of access</b> Access to new secondary markets; greater liquidity					✓	
Access to new pools of capital with lower minimum investment required	✓					
<b>Operational cost savings</b> Opportunities to embed manual and error-prone product-structuring and asset-servicing tasks into the token smart contract and eventually across a portfolio		✓		✓		✓
<b>Enhanced compliance, auditability, and transparency</b> Embedding of rules and credentials into the token smart contract (eg, investor qualification, carbon credit verification)		✓		✓		✓
<b>Cheaper and more nimble infrastructure</b> Open-source technology driven by thousands of Web3 developers and billions of investment dollars		✓		✓		✓

## The process of tokenization

The “tokenization” of an asset involves the following four steps:

1. **Asset sourcing.** The process begins when the owner or issuer of an asset identifies that the asset or use case would benefit from tokenization. This step also includes identifying the structure to be tokenized, because the specifics will shape the process. For instance, tokenizing a money market fund is different from tokenizing a carbon credit. It helps to understand whether the asset will be treated as a security or commodity, which regulatory frameworks will apply, and which partners will be engaged.
2. **Token issuance and custody.** Creation of a digital, blockchain-based representation begins with immobilization of any related physical asset. This involves moving the asset to a control location, typically with a qualified custodian or a licensed trust company. Then a digital representation of the asset is created on a blockchain in the form of a token with embedded functionality—that is, code for executing predetermined rules. To do this, the asset owner selects a particular token standard (ERC-20 and ERC-3643 are common standards), a network (private or public blockchain), and (compliance) functions to be embedded (for example, user transfer restrictions, freeze capabilities, and clawbacks). The tokenization provider implements these decisions. Once the digital asset(s) have been created, they are stored by a custodian or special-purpose broker–dealer pending distribution.
3. **Token distribution and trading.** The digital asset can be distributed to the end investor through traditional channels or through novel channels such as digital-asset exchanges. The investor or the investor’s delegate will need to set up an account, or wallet, to hold the digital asset, with any physical-asset equivalent remaining immobilized in the omnibus issuer account at the traditional custodian. This step typically involves a distributor (for example, the private wealth division of a large bank) and either a transfer agent or a special-purpose broker–dealer to move the digital assets. Depending on the issuer and type of asset, the owner may enlist a secondary trading venue—for example, an alternative trading system (ATS)—to create a liquid market for these tokenized assets postlaunch. Some issuers prefer that their tokenized assets not trade on secondary trading venues, as this may lead to unwanted price signals that could require markdowns on their portfolios.
4. **Asset servicing and data reconciliation.** A digital asset that has been distributed to the end investor requires ongoing servicing, including regulatory, tax, and accounting reporting, notice of corporate actions, and periodic calculation of net asset value (NAV). The nature of servicing may depend on the asset type; for example, servicing of carbon credit tokens will require different auditing than fund tokens. Servicing requires the reconciliation of off- and on-chain activity, as well as extensive data sources.

The current tokenization process can be challenging to navigate. It involves as many as nine parties (asset owner, issuer, traditional custodian, tokenization provider, transfer agent, digital custodian or special-purpose broker–dealer, ATS, distributor, and end investor), two more than the traditional asset process. Furthermore, many tokenized assets will continue to exist in both physical and digital instances,<sup>1</sup> each with its own data systems to be synchronized and its own servicing needs.

---

<sup>1</sup> A good example of this is the bond issued by the city of Lugano in Switzerland on the SDX platform.

- **Democratization of access.** Among tokenization's most touted benefits is the inherent democratization of access, which offers potential for improved liquidity resulting from the fractionalization of assets (that is, division of ownership into smaller parts). In some asset classes, streamlining operationally intensive manual processes can lower the unit economics, thereby making it feasible to serve smaller investors. However, access to these investments may have regulatory limitations, meaning many tokenized assets may be available only to accredited investors. And while fractionalization can certainly be appealing and feasible for better liquidity, tokenized asset distribution will need to reach much larger scale before true democratization of access is realized.
  - **Operational cost savings.** Asset programmability can be another source of savings, particularly for asset classes where servicing or issuing tends to be highly manual, is error prone, and involves numerous intermediaries. Examples of such assets include corporate bonds and other fixed-income products, which often involve a bespoke structure, imprecise interest calculations, and coupon payment disbursements. Embedding operations such as interest calculation and coupon payments into the smart contract of the token would automate these functions, lowering their costs. System automation via smart contracts also can lower the cost of services such as securities lending and repos. And over time, digital-asset programmability can also create benefits at the portfolio level by enabling asset managers to automate the rebalancing of portfolios in real time.
  - **Enhanced compliance, auditability, and transparency.** Current compliance systems often rely on manual checks and (often retroactive) analyses. Asset issuers could automate these compliance checks by embedding specific compliance-related actions (for example, transfer restrictions) into tokenized assets, automating these compliance checks. In addition, the system's 24/7 data availability creates opportunities for streamlined consolidated reporting, immutable record-keeping, and real-time, auditable accounting (where the blockchain can be used to create a so-called triple-entry bookkeeping system, where immutable time stamps are the novel addition). A high-profile example is carbon credits, where blockchain technology can provide an immutable and transparent record of the purchase, transfer, and retirement of credits, with transfer restrictions and measurement, reporting, and verification (MRV) functionality built into a token's smart contract. This way, when a transaction of a carbon token is initiated, the token can automatically check up-to-date satellite imagery to ensure that the underlying nature-based removal project is still operating, enhancing trust in the ecosystem.
  - **Cheaper and more nimble infrastructure.** Blockchains are inherently open source and continue to evolve, spurred by the thousands of Web3 developers and billions of dollars' worth of venture capital invested in the space. Assuming financial-services companies elect to operate private or hybrid instances of public permissionless blockchains,<sup>3</sup> future innovations—for example, in smart contracts and token standards—could be easily and quickly adopted, further lowering operating costs.
- In light of these benefits, it's clear why many big banks and asset managers are intrigued by the technology's promise. However, some of these benefits remain theoretical in nature given the lack of scale of tokenized assets and use cases, and it begs the question why more progress has not been achieved over the past six years.

---

<sup>3</sup> Public permissionless blockchains currently attract more developers than private blockchains by orders of magnitude, but enterprises may elect to employ a private instance to regulate access to transactions and data and to implement more rigorous governance.

## **Continuing challenges to widespread adoption**

Despite the benefits tokenization may deliver, few assets have been tokenized to date. A notable exception is cash, in the form of fully reserved “stablecoins” and tokenized bank deposits.

Why hasn’t digital-asset tokenization achieved widespread adoption to date? Conditions have posed challenges related to infrastructure, implementation costs, market maturity, regulation, and industry alignment.

### **Technology and infrastructure unpreparedness**

Adoption of tokenization is held back by limitations of the available infrastructure. The limitations include a continuing shortage of institutional-grade digital-assets custody and wallet solutions offering sufficient flexibility in managing account policies, such as trading limits. Also, blockchain technology, particularly the public permissionless versions of it, has been hindered by limited system uptime at high transaction throughputs—a deficiency that is unacceptable to support tokenization of certain use cases, particularly in mature capital markets. Finally, the fragmented (private) blockchain infrastructure—including developer tooling, token standards, and smart-contract guidelines—creates interoperability challenges across financial institutions. This introduces new risks (such as bridging protocols between blockchains), fragmentation of liquidity, and challenges in harmonizing data across systems to deliver necessary reporting.

### **Limited short-term business case and high cost to implement**

Many of tokenization’s potential economic benefits come to fruition at scale, when a sizable majority of assets or use case volumes have migrated to the new digital infrastructure. However, this will likely require a cost-intensive transition to adapt middle- and back-office workflows not designed for tokenized assets. The situation implies unclear short-term benefits and a challenging business case on which to gain organizational buy-in. Further

complicating the short-term business case, such transitions often involve running digital-twin operations (for example, digital and traditional settlement, data reconciliation and compliance on and off chain, digital and traditional custody and asset servicing) to reduce near-term operational and regulatory risk. Finally, many legacy clients in capital markets have yet to demonstrate interest in 24/7 infrastructure and movement of value, presenting further challenges to the go-to-market approach for tokenized products.

### **Market immaturity**

Tokenization’s ability to achieve faster settlement times and greater capital efficiency requires instantaneous cash settlement. However, there currently exists no cross-bank solution at scale, despite the progress that has been made on this front: tokenized deposits currently operate only within a single bank, and stablecoins lack the regulatory clarity for now to be considered bearer assets to provide for real-time ubiquitous settlement. In addition, the tokenization provider landscape has been fragmented and nascent, with no integrated and established one-stop-shop offering the requisite licenses and capabilities. A third remaining issue is the absence of at-scale distribution channels for digital assets to be accessed by the appropriate investors. Many tokenized assets are available only on homegrown platforms from tokenization providers, in contrast to the established distribution channels used by wealth and asset managers.

### **Regulatory uncertainty**

To date, the regulatory framework for tokenization has differed substantially by region or has simply been absent. US players are particularly challenged by undefined settlement finality, lack of legally binding status of smart contracts, and unclear requirements for qualified custodians. Further unknowns remain regarding the capital treatment of digital assets. For instance, the US Securities and Exchange Commission has implied through Staff Accounting Bulletin 121 that digital assets must be reflected on the balance sheet when providing

# Despite the challenges, tokenization may have reached an inflection point for certain use cases and asset classes.

custodial services—a stricter standard than for traditional assets. This requirement makes it cost prohibitive for banks to hold and potentially even distribute digital assets.

## Industry in need of alignment

Capital market infrastructure players have yet to signal the concerted will to build out tokenization capabilities or move markets on chain, although their involvement is critical, as they are the ultimate recognized holders of books of record. Incentives to move to new infrastructure may be misaligned, given that certain functions now performed by intermediaries could become obsolete or change dramatically. Even carbon credits as an asset class have encountered challenges in gaining alignment on an established registry. At present, Gold Standard is the only registry publicly preparing to support tokenized carbon credits, despite the clear benefits of enhanced transparency.

## Tokenization may be at an inflection point

Despite the challenges, tokenization may have reached an inflection point for certain use cases and asset classes. Trends over recent months are consistent with a possible acceleration of adoption.

- *Advances in cash tokenization.* Settling trades of tokenized assets instantaneously and 24/7 requires cash tokenization; without it, only one leg of a transaction can be completed instantly.

Approximately \$120 billion of tokenized cash is now in circulation in the form of fully reserved stablecoins (for example, USD Coin). Some banks have launched or will shortly launch tokenized deposit capabilities to improve the cash settlement leg of commercial trades. These nascent systems are not perfect by any means; liquidity remains fragmented, and stablecoins are not yet recognized as bearer assets. Even so, they have proven sufficient to support meaningful volumes in the digital-assets market. Stablecoin on-chain volumes have routinely exceeded \$500 billion monthly.<sup>4</sup>

- *Improving short-term business case fundamentals.* Higher interest rates have improved the economics for some tokenization use cases that deliver capital efficiency. Short-term liquidity transactions such as tokenized repos and securities lending are more attractive with higher rates, as are tokenized money market funds for fluid collateral management. To see the shift in business case, imagine the difference in cost of a \$100 million notional one-hour repo facility versus the standard 24-hour facility when rates have risen from 0 to 5 percent. In addition, in the United States, established banks have recently received an influx of large (and often very profitable) digital-asset business clients—for example, stablecoin issuers. Keeping these clients will require 24/7 movement of value and tokenized cash, further facilitating the business case to accelerate tokenization capabilities.

<sup>4</sup> Stablecoin data from The Block, accessed July 19, 2023.

- **Emerging regulatory framework outside the United States.** In the past six months, the European Union has moved to approve Markets in Crypto-Assets (MiCA) legislation,<sup>5</sup> and other regions such as Hong Kong, Japan, Singapore, the United Arab Emirates, and the United Kingdom have published new guidelines that enhance the regulatory clarity for digital assets. Even in the United States, market participants are exploring various tokenization and distribution approaches, leveraging existing rules and guidance to mitigate the impact of the current regulatory uncertainty—for example, by limiting distribution of tokenized assets to accredited investors only and by running digital-twin instead of digital-native operations.
- **Increasing market readiness and infrastructure maturity.** Over the past five years, many established financial-services companies have added digital-asset talent and capabilities. Several banks, asset managers, and capital market infrastructure companies have built digital-asset teams of 50 or more people, and these teams are growing. With that, the level of understanding of the technology and its promise has expanded among established market participants. Additionally, we are currently seeing greater experimentation and planned expansion of capabilities (often through partnerships) among these capital market incumbents, with some working on integrating or rolling up necessary capabilities to become a one-stop shop for asset tokenization and distribution.

While tokenization has yet to achieve the scale needed to deliver on all its stated promises, the ecosystem is maturing, underlying challenges are becoming clearer, and the business case for adoption may be improving. Initial proof points, especially in use cases that benefit from increased capital efficiency in a higher-rate environment

(as opposed to the traditional argument of better liquidity for illiquid assets), highlight more use cases where the technology could gain traction and generate meaningful value for global markets over the next two to five years.

### **Considerations for financial-services companies**

Whether or not tokenization is at an inflection point, a natural question to ask is how financial-services companies should respond at this juncture. The specific time frame and ultimate adoption of tokenization are unknown, but early institutional experimentation across certain asset classes and use cases (for example, money market funds, repos, private funds, corporate bonds) has shown the potential to scale in the next two to five years. Those who would look to ensure a leading position in this ecosystem could consider the following steps.

#### **Reexamine underlying business cases**

Businesses should reassess the concrete benefits and value proposition of tokenization, as well as the avenues and costs of implementation. Understanding what impact higher interest rates and volatile public markets have on specific assets or use cases is important to appropriately evaluating tokenization's potential benefits. Similarly, continually exploring the landscape of providers and understanding the early applications of tokenization will help to refine estimates of the technology's costs and benefits.

#### **Build out tech and risk capabilities**

Regardless of an incumbent's position in the value chain, a few capabilities are necessary to prepare for a tokenized world. First and foremost is building a basic understanding of the technology and its associated risks, particularly relative to blockchain infrastructure and governance duties (who can approve what and when), token design (restrictions placed on the asset and enforcement of these restrictions), and system design (decisions about

---

<sup>5</sup> "Crypto-assets: Green light to new rules for tracing transfers in the EU," European Parliament, April 20, 2023. MiCA's general goal is to establish tighter rules for crypto asset service providers (entities engaged in issuance, offer, and trading of crypto assets) while easing access to regulated markets. This includes stricter rules on stablecoins, disclosure obligations, anti-money-laundering checks, and data security procedures.



Find more content like this on the  
**McKinsey Insights App**



Scan • Download • Personalize



where books and records reside and what the implications are for the bearer nature of the asset). An understanding of these underlying principles could also inform conversations with regulators and customers who are still getting up to speed on the technology.

### **Form ecosystem relationships, particularly for asset distribution**

Given the fragmented nature of the current landscape, it will be important for these emerging leaders to develop an ecosystem strategy for off-the-shelf integrations into other (legacy) systems and partners. Very few asset owners are willing to engage eight different parties to tokenize an asset; the custody, distribution, trade, and servicing of these assets should be as simple as possible. Partnerships expanding distribution and access to investors can create meaningful strategic distance for an incumbent by helping such a company reach scale.

### **Participate in standard setting**

Finally, institutions that are looking to have a leading position in tokenization should provide regulators with streamlined input about emerging standards to avoid further fragmentation of liquidity, data, and composability. Some examples of key areas where standard setting can be considered include

controls (that is, appropriate governance, risk and control frameworks to protect end investors), custody (what constitutes qualified custody for tokenized assets on private networks, when to use digital-twin versus digital-native records, what constitutes a good control location), token design (what type of token standards and associated compliance engine to support), and blockchain support and data standards (what data are kept on chain versus off chain, reconciliation standards).

---

This is not the first time an industry has attempted a shift to a more modern infrastructure. These shifts are always challenging, as it means running the old and new operating models in parallel for a while, which is hard to do when costs are in focus. Regulatory uncertainty only compounds the difficulty. However, given the potential benefits tokenization can bring to financial services, recent moves by leading incumbents suggest they may be up for the challenge, although it could take some time. Meanwhile, banks, asset managers, custodians, and others can take some no-regret moves today to prepare for this possibility of a tokenized world—the strategic optionality may be worth it after all.

**Anutosh Banerjee** is a partner in McKinsey's London office; **Ian De Bode** is a partner in the San Francisco office, where **Julian Sevillano** is a partner; **Matthieu de Vergnes** is an associate partner in the New York office; and **Matt Higginson** is a partner in the Boston office.

Designed by McKinsey Global Publishing  
Copyright © 2023 McKinsey & Company. All rights reserved.