The Tokenization of the Economy and its Impact on Capital Markets and Banks

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Management summary

In recent years, blockchain technology has proved itself as a basis for transparent and efficient information sharing. Several use cases have emerged, such as cryptocurrencies, supply-chain monitoring, trade finance and pay-for-usage systems. In particular, tokenization of assets has emerged as one of the most disruptive applications. The tokenization of assets allows for the creation of a new financial trading system, one that is more efficient, transparent and accessible, and it is expected to have a significant impact on financial markets and their participants. Use cases already span the globe and asset classes, acting as a foretaste of the technology's potential.

In the absence of large-scale applications, it is sometimes difficult to grasp the impact tokenization could have on investors, banks, asset managers, infrastructure providers, brokers, clearing houses, custodians and supervisors. To make it more manageable and demonstrate tokenization's potential, in this study we analyze the likely effects on a core segment of the market – equity trading. We find that it alone has a total cost reduction potential of up to EUR 4.6 bn (or 24% of the actual cost).

And it's not just equity trading. Our analysis shows that tokenization has the potential to bring great disruption, but also opportunities, to core activities across the financial spectrum. Some might think the demand is not there yet, but we strongly believe now is the time to act – and avoid becoming a follower. To fully gauge the impact of this technology in your specific area, we outline a four-step approach that can be tailored to your activities and ambitions.

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1. Blockchain and tokenization:

Technologies with the power to transform transactions across businesses and markets

Blockchain is a truly disruptive technology, and potentially an influential trigger for change. It deals with contracts and transactions, the defining structures of our economic, legal and political structure. Cryptocurrencies, a specific use case, have occupied headlines in recent months as a new asset class. However, its potential goes far beyond cryptocurrencies.

What is blockchain?

Blockchain is a shared database that records data in a verifiable and permanent way. It can record transactions as well as track orders and production processes, for example. As such, blockchain is a type of distributed ledger technology, which in addition to providing a shared database, ensures data cannot be changed. No participant in the blockchain can modify a record after it was logged to the shared ledger, unless a new data point is added. In the blockchain, actions (transactions, transfers) can be executed automatically through smart contracts stored on the blockchain. They define specific conditions that need to be met for an action to occur.

In recent years, blockchain has proved itself as a basis of transparent and efficient information sharing in four key areas: supply-chain monitoring, trade finance, pay-per-use systems and, the focus of this study, tokenization.

Other blockchain uses

- **Supply-chain monitoring:** In June 2019, IBM, KPMG, Merck and Walmart announced a collaboration with the US Food and Drug Administration (FDA) in a program to identify, track and trace prescription medicines and vaccines distributed within the US. The intention is to launch a shared blockchain network that permits real-time tracking of products. In addition, it allows for timely retrieval of reliable distribution information, increased accuracy of data shared among network members and identification of integrity of products in the distribution chain (for example, whether they are stored at the correct temperature).

- **Trade finance:** In 2017, seven European banks (Deutsche Bank, HSBC, KBC, Natixis, Rabobank, Societe Generale and Unicredit) formed a consortium to build and operate a trade finance platform based on IBM blockchain. It aims to simplify trade finance processes by addressing the challenge of managing, tracking and securing domestic and cross-border trade transactions.

- **Pay-per-use:** In October 2020, CashOnLedger, a German digital payments company, and Lindner Traktoren, an Austrian tractor manufacturer, announced a partnership to improve pay-per-use rental models of vehicles using a blockchain-based solution. Currently, the majority of vehicle rentals involve inefficient and costly manual processes. But the partnership aims to improve the rental model by integrating the vehicles into the blockchain network, with IoT-enabled sensors able to capture data on vehicle usage. Smart contracts

enable automatic payments based on the actual usage of vehicles, improving cash management. CashOnLedger provides a compliant solution for programmable money, which digitizes the payment claim and links it to traditional payment networks to ensure the multibank capability.

HOW TOKENIZATION WORKS

Tokenization seems to have gained particular traction among blockchain applications. In the traditional sense of the word, it has been around for decades – referring to the process of converting information into a secured reference called a token (for example, in mobile payments). In blockchain, it allows the conversion of any right or asset (both tangible and intangible) into unique digital records, which are represented as tokens on a blockchain. These tokens can then be used, owned and transferred by the holder through a blockchain.

Tokens can be classified based on their nature and the intrinsic purpose that they have. We identify three types[1]: e-tokens, utility tokens and investment tokens (asset-referenced tokens or security tokens). A brief outline of each is given below. This study focuses on the investment tokens, that is, asset-referenced tokens and security tokens.

The three types of tokens

E-tokens: According to the European Commission, these are tokens that can "be used as a means of exchange and that purport to maintain a stable value by referring to the value of a fiat currency". As an example, USD Coin (USDC) is a digital coin running on blockchain that is backed by a real dollar held in reserve (acting as fiat currency). In July 2021, the financial technology firm Circle recorded more than USD 26 billion of USDC in circulation.

Utility tokens: These are defined by the Commission as a token "intended to provide digital access to a good or service, and only accepted by the issuer of that token". Utility tokens are issued with non-financial purposes. In September 2017, the public cryptocurrency Filecoin raised USD 257 million by selling utility tokens that will enable users to access a decentralized cloud storage platform.

Investment tokens: Such tokens give the holder ownership of the asset or financial security, and subsequently rights of usage, voting rights and rights to future cash flows (for example, when investing in private equity, bonds, art and real estate). In this study, we consider investment tokens to be either asset-referenced tokens, or security tokens. Asset-referenced tokens are tokens directly backed by an asset, which can be of any type. Security tokens represent financial securities such as listed stocks, private equity and bonds. Investment tokens enable assets to be fractionated, allowing investors to invest in small percentages of tokenized assets and removing barriers to entry. For example, you could purchase a 5% share of a tokenized real estate property.

ADVANTAGES OF INVESTMENT TOKENS

Investment tokens allow assets and their economic value to be represented virtually, that is, on a blockchain. This allows for the ownership of these assets to be kept up to date via a decentralized ledger, rather than a centralized third party, as in traditional markets. This is the case no matter whether the trading of the asset is done on or off chain.

For example, in a tokenized world, the issuer (such as a listed company) issues an asset on the blockchain for which it would receive payment from an investor. The blockchain replaces third party brokers or intermediaries and allows both issuers and investors to share necessary information on the asset and parties

[1] Cryptocurrencies are excluded from this classification given their different nature as native currencies of DLT (Distributed Ledger Technology) protocols.

involved. Smart contracts ensure the conditions to complete the automated transfer of ownership are met, without the need for an intermediary. → A

We have identified three main advantages of tokenization across trading value chains:

Increased efficiency – faster and cheaper post-trading fees

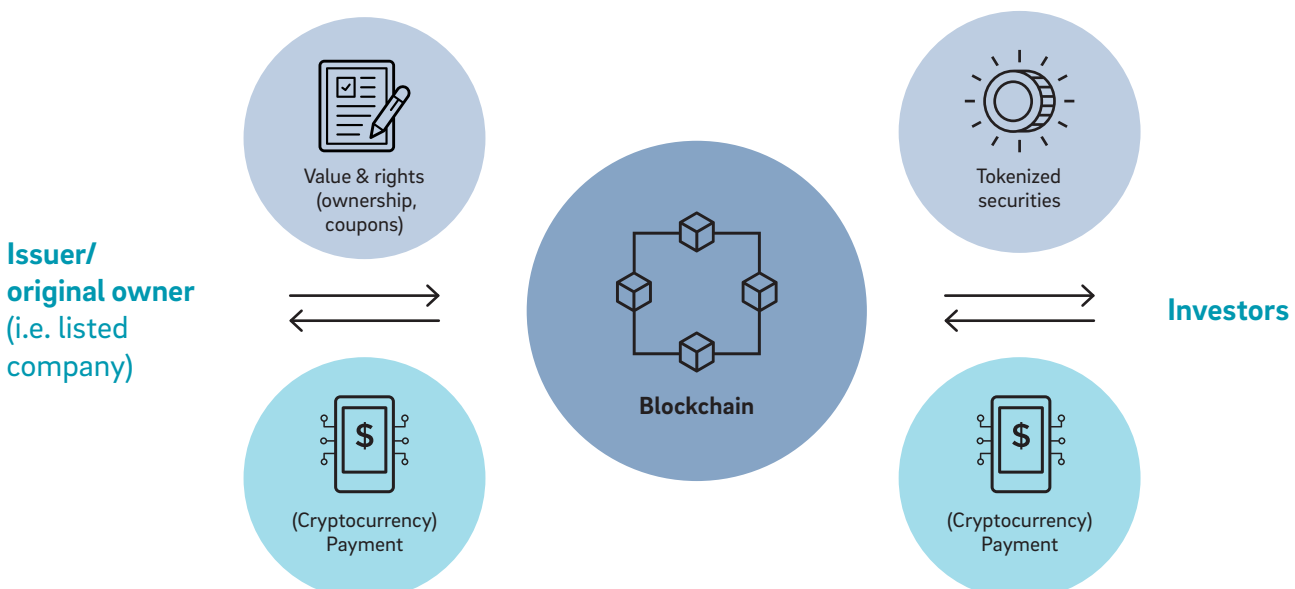
Tokenization can deliver significant efficiency gains by cutting out the intermediaries and safekeeping parties that are currently needed in the post-trading process. The underlying blockchain enables process automation, for example. This accelerates certain steps of the (post-) trading value chain and can generate sizeable cost savings.

Increased transparency – more information, better availability

The tokenization process relies on the recording of enhanced information and the sharing of transactional data (with regards to issuer, investor, type of asset, etc.). If all interested trading parties are connected on one information chain, data can be shared immediately among all involved and relevant stakeholders. The degree to which the information is made available to interested parties will depend on stakeholder policies and local laws.

A Tokenization explained:

Digital tokens recorded on blockchain offer an alternative to traditional analogue ownership documents



Source: Based on OECD (2020), "The Tokenization of Assets and Potential Implications for Financial Markets"

Increased accessibility – fractionality of large assets

Tokenization allows assets to be "sliced up" or fractionated into smaller parts, enlarging the pool of assets available (especially for assets not found on traditional capital markets). This means more (retail) investors can gain access to asset classes and risks that would otherwise have been beyond their financial reach, such as private equity funds and large real estate or infrastructure projects.

INVESTMENT TOKEN APPLICATIONS

So where can investment tokens be used? Anything that features property rights and economic value can be tokenized with investment tokens – tangible assets, financial assets (such as stocks and bonds), real assets (for example, private placements, real estate, commodities and fine art) and intangible assets (like intellectual property).

Use case: Financial assets

In December 2020, DBS, a Singaporean multinational bank, announced a new blockchain-based digital exchange. It will allow both institutional and accredited investors to access and use an integrated tokenization, trading and custody ecosystem for digital assets.

The regulated platform facilitates the issuance and trading of digital tokens backed by financial assets, such as shares in unlisted companies, bonds and private equity funds.

With the Singapore Exchange (SGX) as an investor, and with approval from the Monetary Authority of Singapore (MAS), in May 2021 the DBS Digital Exchange announced its first security token offering (STO), for a SGD 15 million digital bond.

Such markets are traditionally illiquid, making trading rigid and inefficient. Real estate, for instance, is a multibillion-dollar market with estimated global sales of income-producing commercial real estate of almost USD 1 trillion in 2018,[2] but is largely illiquid.

Use case: Real assets

Founded in 2017, ADDX is a blockchain-based exchange platform for the issuance, custody and secondary trading of security tokens. It allows institutional and accredited investors to invest a minimum of USD 10,000 in real estate funds, pre-IPO companies, hedge funds, etc.

ADDX is regulated by MAS, all customer funds are held in a ring-fenced account with banking partner DBS and it is hosted on a secure server at Amazon Web Services. Accredited investors on the platform come from more than 25 countries, spanning Asia, Europe and the Americas.

The situation is similar for fine arts, making transactions slow and burdensome, and therefore less attractive to many investors.

Use case: Fine arts

The rise of non-fungible tokens (NFTs) has the potential to disrupt digital art markets. Each NFT, a unit of data on a blockchain, can represent a unique digital item, for example, a digital art file, that is non-interchangeable. Unlike the sale of a traditional physical painting, the sale via NFTs of digital paintings is instantly documented, time-stamped and reviewable by any interested party – not just the artist and buyer – as a discrete transaction on the blockchain.

[2] Real Capital Analytics (2018)

The recent sale of the first purely digital work with a unique NFT, "Everydays – The First 5,000 Days" by the artist Beeple, for approximately USD 70 million highlights the potential of this new way of trading art.

Intellectual property assets can also benefit as they are even more problematic and less efficient to trade on traditional markets than tangible assets, due to the difficulty of assessing the value of trademarks, brand rights and other intangible assets. → B

THE POTENTIAL OF TOKENIZATION

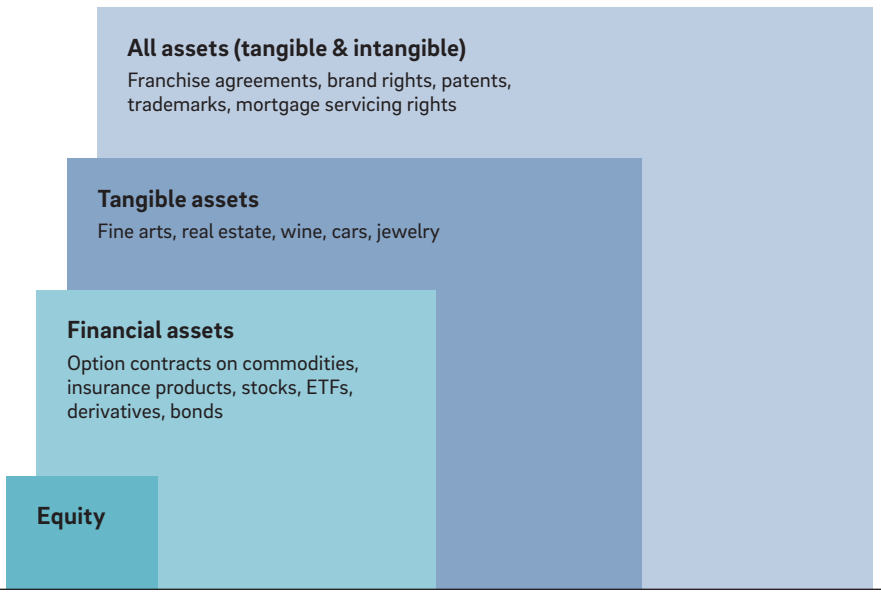
Tokenization on blockchain opens up the possibility of a new financial trading system, one that is more efficient, transparent and accessible. Use cases span markets and geographies, and when all applicable asset classes are considered, experts argue that tokenization could unlock trillions of euros in currently illiquid assets.

However, currently no large-scale applications exist, making it difficult to gauge the full impact of tokenization. To demonstrate its potential, we carried out an in-depth analysis in an area where large-scale applications are likely imminent – equity trading. Our findings are outlined in chapters 2, 3 and 4.

B Assets for all:

Investment tokens have a broad range of applications, from equity trading to patents

Non-exhaustive



Source: Keyrock, Roland Berger

2. The leading contender:

Equity trading is likely to be the first large-scale application of tokenization, despite major barriers

To better understand the potential disruptive power of tokenization, we looked at equities and the post-trade value chain. We believe they will be the first area where tokenization could have a substantial impact, for four main reasons.

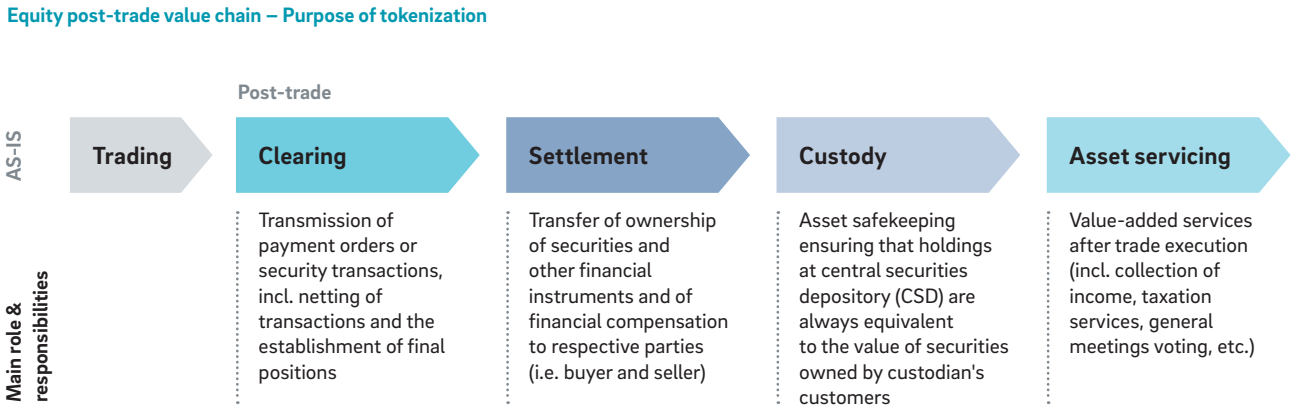
First, given the progress of blockchain in financial markets and specifically the equity markets, most existing proof-of-concepts can be found there. Second, equity is already largely dematerialized (compared to other tangible assets such as cars and fine arts), making the shift smaller. Third, the high level of technology adoption in equity markets makes the shift to a technology-driven model easier. Finally, the significant market size makes it a prominent candidate to scale up.

The current equity post-trade value chain comprises four steps to transfer a financial asset from the seller to the buyer: clearing, settlement, custody and asset servicing. While each step is essential to post-trading, the chain also exhibits complexity and inefficiencies. → C

Tokenization could mitigate this complexity to various degrees, with the most extreme scenario of tokenization being a peer-to-peer (P2P) network market setup where investors would interact directly with each other through the blockchain. Hence, we see that tokenization could have the potential to improve the post-trade process in three distinct ways:

C Options at every step:

Tokenization has potential applications all along the equity post-trade value chain



Source: Keyrock, Roland Berger

- **Elimination of the central counterparty clearing house (CCP):** The secured interlinkage of financial institutions and traders through blockchain could fully eliminate (or at least automate) the clearing process, implying release of collateral and a cost reduction of 100% for this step of the value chain
- **Reduction of settlement times:** Settlement times, which currently take up to a few days, would be shortened
- **Increased transparency along the (post-) trading value chain:** Tokenization of equity would allow for direct ownership, increasing transparency along the trading process due to the immutability in transaction recordkeeping and potentially helping in anti-money laundering cases. In fact, the decentralized nature of the blockchain allows everyone to see all transactions, either by having a personal computer that is a part of the network (that is, a node that has its own copy of the blockchain, which updates as new transactions get posted) or by having a blockchain explorer, which can witness live transactions
- **Efficiency increase through process automation:** Smart contracts can automate dividend payments as well as ease voting and representation rights

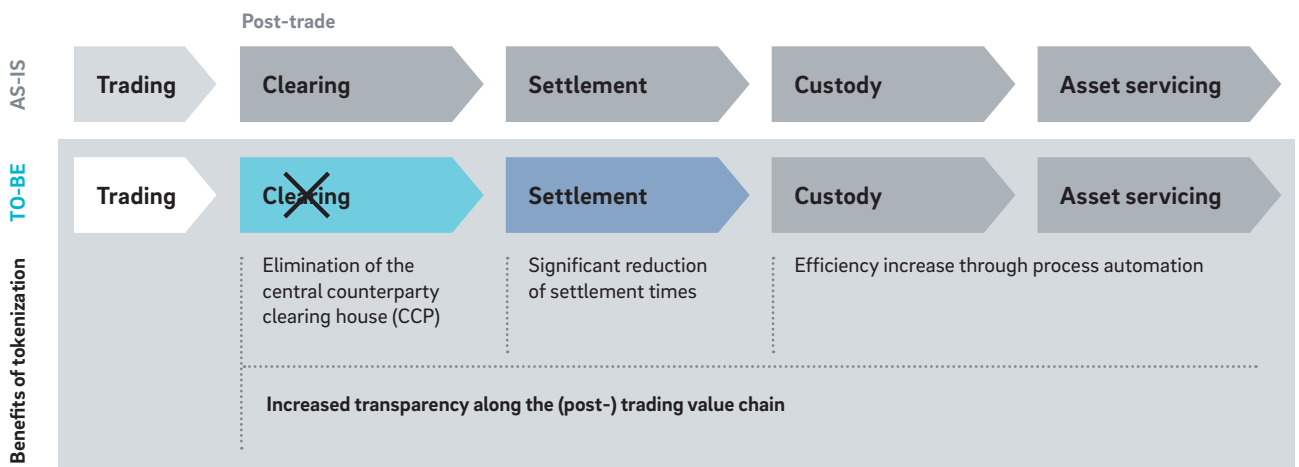
→ D

Gamestop and the potential of tokenization

The Gamestop (GME) trading frenzy in early 2021 highlights a real-life example of the potential added value of tokenization. In late January 2021, following a high volume of short orders placed on the stock, the trading app Robinhood decided to halt trading and raise margin requirements to protect the clearing house. In a tokenized world, a distributed ledger would have prevented this halt in trading by completely removing the clearing house player.

D Future benefits:

Tokenization offers many advantages over traditional equity post-trading, especially relating to clearing



Source: Keyrock, Roland Berger

A change in investors' habits towards tokenization is unlikely to occur quickly. Rather it will come in small and incremental steps. For instance, the historic transition from paper-based securities to electronic formats did not occur overnight but was instead a slowly evolving process (which is still ongoing). However, real use cases for tokenization in equity trading already exist.

Use case: Equity trading 1

The Deutsche Börse, Deutsche Bundesbank and Germany's Finance Agency have developed a settlement interface for electronic securities, using blockchain distributed ledger technology (DLT). In order to test the DLT system, the Finance Agency issued a ten-year federal bond (Bund), with primary and secondary transactions being settled using DLT.

To do this, the stakeholders developed an interface between conventional payment systems and a DLT-based securities system. When the transfer is confirmed by all parties, the securities and central bank money change hands. This type of delivery-versus-payment settlement reduces counterparty risk for both players.

Typically, in a post-trade DLT-based settlement, the securities and the money are tokenized. However, this solution does not require tokenization. The interface connects the DLT platform with conventional payment systems and triggers the payment. As the solution can be adopted by multiple DLT-based settlement systems, it represents a strong progression for further use of DLT in the financial sector and the economy as a whole.

Use case: Equity trading 2

The Nasdaq Marketplace Services Platform is a SaaS platform for cloud-based marketplaces. It provides access to services covering the transaction lifecycle, including issuance of assets, trading, market surveillance and digital custody.

Embedded with a blockchain platform, its Digital Assets Suite offers a workflow throughout the digital asset lifecycle (issuance of native and asset-backed tokens, trading, settlement and custody of assets and funds). It also offers add-on services including market surveillance, reporting and risk management.

Use case: Equity trading 3

The SIX Digital Exchange (SDX), developed by SIX in its Swiss Exchange division, is a tokenization pioneer. In the third quarter of 2019, SDX started with a prototype to demonstrate what financial markets, with tokenization and blockchain at their core, could look like in the future. The original aim was to progressively expand this prototype to various stages of the (post-) trading value chain (Asset Servicing in Q1 2020 for instance) and ultimately reach a full rollout by the end of 2020. But as of October 2021, the full rollout of SDX was yet to happen.

Unlike on fully digitalized exchanges, SDX offers a digital CSD (central securities depository) to stay compliant with Swiss law. As far as custody and asset servicing are concerned, only eligible financial institutions under FINMA (the Swiss Financial Market Supervisory Authority) will be allowed to access the platform and provide services.

Regulatory framework, one of the key hurdles highlighted in this report, has been addressed by the Swiss legislative branch. In fact, Swiss lawmakers adapted the current legislation to add

specific features of blockchain onto the existing legal framework. From a legal perspective, this modification lets tokenized securities be traded on a blockchain just like traditional assets.

SDX believes that there is potential for efficiency gains such as long-term cost savings by reducing collateral requirements and associated costs, for lower operational costs by simplifying asset servicing and for reduced data costs by having a single database, meaning lower fees per transaction.

CHALLENGES FACING TOKENIZATION

Despite growing numbers of use cases, several hurdles need to be overcome before tokenization can become the new standard. Ultimately, it would need to guarantee a more efficient post-trade value chain, such that market participants realize both time and financial gains, all while offering a potentially more secure space.

Tokenization can reach different extents, the most extreme being end-to-end integration from investors to issuers, with them being able to directly interact. However, a less extreme scenario without disintermediation seems more appropriate given the outstanding challenges, which are yet to be fully addressed:

Regulatory framework

Most financial institutions rely on various and often local laws that are based on traditional financial instruments. Adapting to each set of individual laws poses a challenge for a nascent model that works according to a common global standard. Therefore, national regulatory frameworks will need to adapt in the short term (see SDX use case) and international regulatory alignment will be required in the long term (for example, on anti-money-laundering/know-your-customer checks, interoperability between blockchains, legal status of smart contracts, etc.). Furthermore, common industry standards and best practices need to be in place before tokenization can take off.

Scalability

The main barrier to scalability of tokenization is the processing time of transactions: The decentralized nature of blockchain means approval and encryption times into the various blocks of the chain still take a significant amount of incompressible time compared to regular credit card payments for instance.[3] This makes scalability a major bottleneck for the generalized use of tokenization, and it will only gradually be addressed.

Cyber security

Setting up proper cyber security measures for tokenization remains a challenging and possibly costly endeavor, due to the combination of a centralized and decentralized environment as well as the necessity for proper care of the underlying cryptographic materials (private keys). Today, cyber security remains a barrier for market participants who have already heavily invested in their current security environment and must now pay more for tokenization-related upgrades.

Adoption

The tokenization of the financial system is still in its early days, and familiarizing users with the technology is expected to take time. Many retail investors might not fully grasp the concept at first, which could create reticence and a barrier to adoption. Adoption could also be affected by a lack of native tokens, for example bitcoin, in circulation or in the wallet of the buyer. In addition, setting up a transversal blockchain within a company and across company borders and financial systems will require integrating new technologies into legacy IT systems. This IT component will require significant CAPEX and take time, slowing down adoption rates.

[3] Towardsdatascience (2021), "The blockchain scalability problem and the race towards Visa-like transaction speed"

3. Potential savings:

As adoption increases, tokenization of equity post-trading could lead to gains of EUR 4.6 bn by 2030

While we have already seen the first tokenization pilot projects in equity trading, they remain limited to mainly local trading. However, this could change within a few years, with the growth in adoption rates and the fall of barriers to the spread of tokenization. In the first quarter of 2021, USD 2.6 billion of venture capital funding was raised for blockchain startups, already exceeding the total funding in 2020, according to market data firm CB Insights.

The World Bank estimates that the global market volume of traded equities was around EUR 54 trillion in 2019.[4] The first use cases for tokenization in financial securities are imminent (next 18 months):

- Arca Funds, a Los Angeles-based fund manager, is currently seeking approval from the US Securities and Exchange Commission to provide investors with tokenized bonds, a potential revolution in the trillion-dollar bond market
- SDX, the Swiss digital exchange, is in the pre-go-live phase and should launch by the end of 2021
- Sologenic's Decentralized Exchange (DEX) will allow users to manage their wallets and make trades of upcoming tokenized stocks. It is currently awaiting approval of an EU MiFID license from the Financial Supervisory Authority of Estonia, where the firm is based

In a mid-term scenario (from 2025), we expect that adoption rates will remain between 20% and 30%. This represents up to around EUR 16 trillion of traded tokenized equities. In this scenario, overall cost savings could range from around EUR 0.9 billion to EUR 1.4 billion. These are relatively low as adoption will remain limited by a lack of harmonization in regulatory frameworks across borders and a lack of incentives for players to take up the technology due to poor international adoption. → E

E Slow start:

A lack of both incentives and harmonization will lead to rather low adoption rates in the mid term

Mid-term potential savings	Clearing	Settlement	Custody	Asset servicing	Price of risk
Up to...	200 m	90 m	500 m	negligible	600 m
Represents a decrease in current costs of...	30%	6%	3%	negligible	30%

Source: Roland Berger

[4] https://data.worldbank.org/indicator/CM.MKT.TRAD.CD

In a long-term scenario (from 2030), tokenization could be adopted by 90-100% of potential users once an initial wave of diffusion has reached the remaining "laggards". This would result in EUR 53 trillion of equity trading volume being fully tokenized. In this scenario, cost savings could range from about EUR 4.1 billion to EUR 4.6 billion, with growing adoption driven by harmonized regulation and systems that facilitate scalability of the technology across borders and enterprises. In addition, as more and more profitable use cases appear, regulators will be pushed to define the boundaries of the technological and regulatory framework, and users will be drawn to tokenization's financial and time-saving appeal. → F → G → H

F Accelerating adoption:

User will be drawn to tokenization's financial and time-saving appeal in the long-term

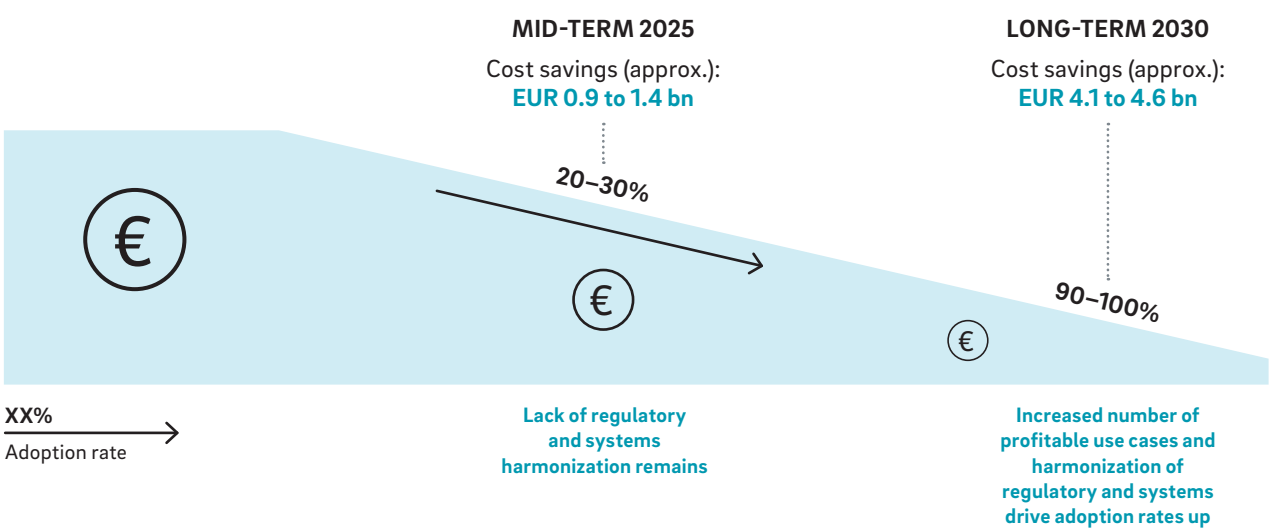
Long-term potential savings	Clearing	Settlement	Custody	Asset servicing	Price of risk
Up to...	700 m	300 m	1,700 m	10 m	1,900 m
Represents a decrease in current costs of...	100%	20%	10%	40%	100%

Source: Roland Berger

G Impact over time:

Tokenization offers total cost savings of up to EUR 4.6 billion by 2030, provided adoption rates are high

Impact of tokenization adoption on trading costs

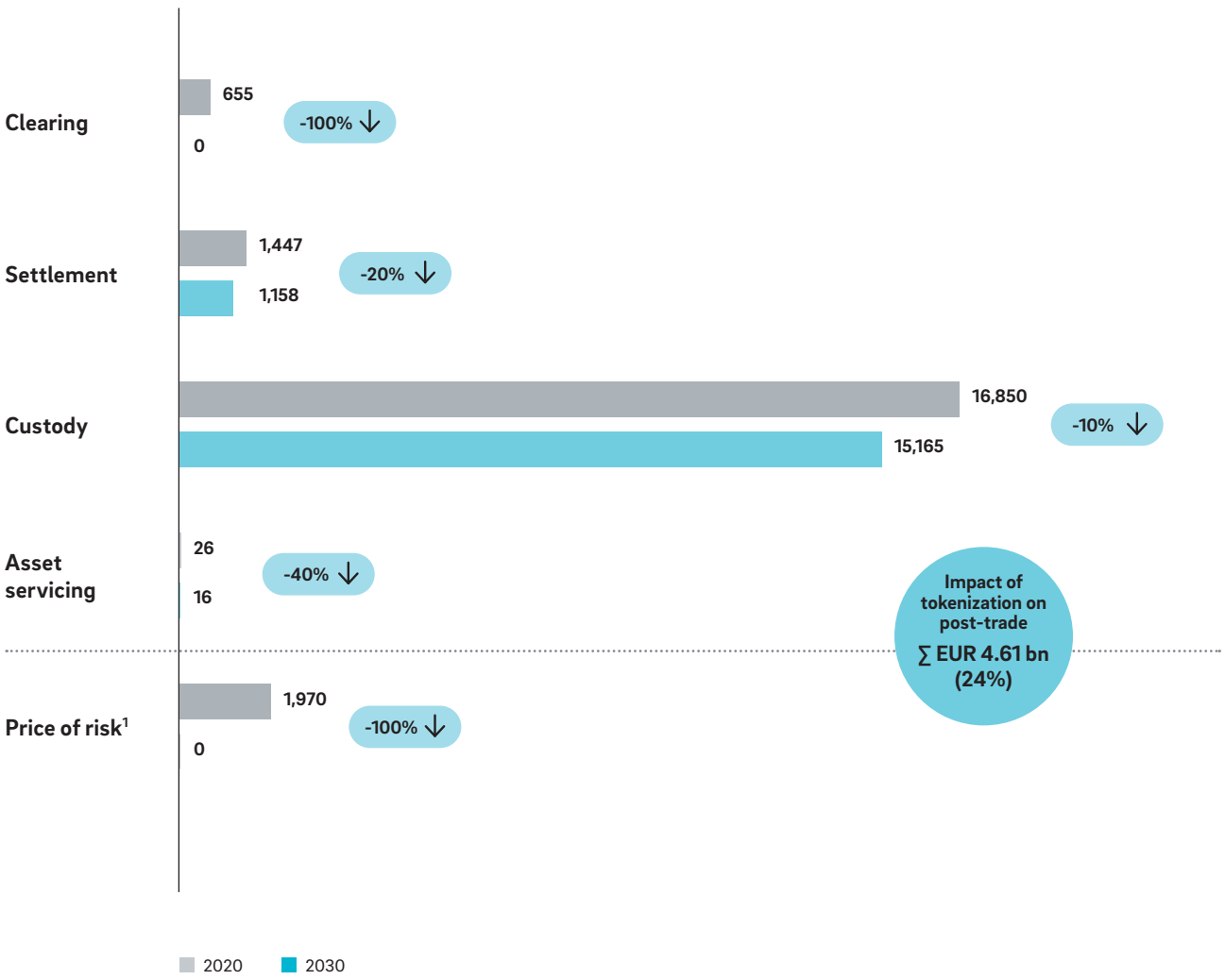


Source: Keyrock, Roland Berger

H Across-the-board savings:

In the long term, all sectors of the post-trade value chain could see significant cost savings, from 10% to 100%

Impact of tokenization on post-trade value chain – Long-term scenario



[1] Elimination of price of risk due to release of collateral

Source: Keyrock, Roland Berger

4. Implications and recommendations:

The tokenization of equity trading presents significant challenges, but solutions exist

It is clear that tokenization will significantly impact current actors involved in the financial system all along the value chain. We can expect downside implications, but also upside potential for different businesses in the post-trade value chain. To assess the effects in detail, in this chapter we look at the implications, and offer recommendations, in the key value chain and supervision sectors of equity trading. For each, we identify the relevant affected business areas in the value chain (banks, asset managers and custodians; market infrastructure providers; regulators; brokers; and issuers and investors).

Implications

- **(Pre-) trading** (investors, issuers, brokers, asset managers, banks)

  → **Expanded investment universe:** Thanks to the applicability of tokenization to various types of assets, the investment universe for customers and investors will expand. Customers will benefit from easier and cheaper access to assets which were largely illiquid before, while investors will see a widening of opportunities available at a lower cost

  → **New opportunities for advice and transaction services:** As the investment universe for customers expands, new opportunities for advice and transactions are created for asset managers, banks, custodians, etc. (for example, fine art or wine advisory for retail investors)

  → **Expanding investment universe results in new revenue potential for market infrastructure providers:** The increased universe of investable assets and the possibility of fractional trading lead to an opportunity for market infrastructure providers to broaden their portfolio and generate new revenues from e.g. settlement services

  → **Brokers under pressure:** In a tokenized world, where transactions will happen on the blockchain with fewer intermediaries needed (as buyer and seller can directly interact), the business model of brokers will come under severe pressure

- **Clearing & settlement** (infrastructure providers, clearing houses, banks)

  → **Suppression of clearing (and to a lesser extent settlement):** The emergence of new players ("token native players") could lead to the suppression of clearing and settlement and lower demand for brokerage firms, making market players – existing market infrastructure providers, agent banks/ custodians, central securities depositories – potentially obsolete

  → **Smaller volumes of fees from customers:** The elimination of the central counterparty clearing house and significant reduction of settlement times will result in smaller customer fee volumes

  → **Massive tech investments:** Huge CAPEX tech investments will be required by current market players to integrate and interlink blockchain in their current legacy IT systems

- **Custody & asset servicing** (infrastructure providers, custodians, banks)

→ **New asset servicing opportunities:** New asset servicing after trade execution may become a new revenue stream, for example, dealing with changed taxation market regulations

→ **Process automation/impact:** The efficiency gain made possible by process automation and smart contracts will require incumbent players to adapt their current processes to compete and interlink with these new technologies. This will lead to investments

- **Supervision** (supervisors)

→ **Shift in role:** The role of regulator will broaden from protecting consumers, controlling market behaviors and enforcing best market practices to directly controlling small/local individual investors. Contrary to current market investors, who tend to be represented by large financial institutions, this new type of investor will act alone over the internet. This will ultimately make enforcement harder, requiring the development of new, micro-supervision capabilities

Recommendations

- **(Pre-) trading** (investors, issuers, brokers, asset managers, banks)

→ **Broaden portfolio and tackle new markets:** Systematically screen tokenization opportunities and assess if there is potential to capture upside by extending the portfolio and generating new revenues. Such avenues will open up thanks to the increase of assets and benefits of fractional trading

→ **Democratization of offering:** Exploit the push towards democratization that will be driven by increased market access of lower segments due to the benefit of fractionality

→ **Service & guidance:** Differentiate into new services as more guidance will be required to navigate client in a universe with a larger choice of assets; focus on innovative and scalable solutions

- **Clearing & settlement** (infrastructure providers, clearing houses, banks)

→ **Shift business model due to suppression clearing and settlement:** Secured interlinkage of financial institutions and traders through blockchain jeopardize the traditional business model of market infrastructure providers. React by thoroughly assessing the business impact/potential. Companies will need to shift business models and acquire new skills and knowledge to adapt to new value-adding services

→ **Industrialize services:** In order to respond to larger market demand, asset managers and banks will need to industrialize the services offered

- **Custody & asset servicing** (infrastructure providers, custodians, banks)

→ **Rise of new services and advisory:** As the tokenization of assets will reshape the equity post-trade value chain, it brings opportunities to develop new business models based on service and advisory. For example, the industrialization of very new digital legal checks of codes and guidance of smart contracts management

→ **Rethink processes to capture efficiency gains:** As a result of increased transparency, immutability in transactions and process automation (such as smart contracts), players will need to rethink their processes to capture efficiency gains →

I A new ecosystem:

Market participants need to respond differently to the various impacts of tokenization

Strategic implications and recommendations	(Pre-) trading	Clearing & settlement	Custody & asset servicing	Supervision
Implications	• Expanded investment universe • New opportunities for advice & transaction services • New revenue potential • Pressure on brokers' current business model	• Suppression of clearing (and to a lesser extent settlement) • Smaller volumes of fees from customers • Massive tech investments	• New asset servicing opportunities (e.g. dealing with new taxation rules, safe-keeping of private keys rather than the assets) • Process automation	• Shift in role, from protecting consumers, controlling market behaviors and enforcing best market practices to directly controlling small/local individual investors
Recommendations	• Broaden portfolio and tackle new markets • Democratize offerings • Differentiate into service & guidance	• Shift business model due to suppression of clearing/settlement • Industrialize services to respond to larger market demand	• Develop new blockchain services & advisory • Rethink processes (e.g. safekeeping, use of smart contracts)	• New regulation enforcement of individual investors needs to be developed (in the context of global players targeting local investors being difficult to control, especially over the internet)
Typical participants involved	• Investors • Issuers • Brokers • Asset managers • Banks	• Infrastructure providers • Clearing house • Banks	• Infrastructure providers • Custodians • Banks	• Supervisors

Source: Roland Berger

As the example of equity trading shows, tokenization will have a major disruptive influence on the core activities of the whole financial services industry and will result in irreversible change. The sector is likely to look very different within a matter of a few years. To avoid being left behind and potentially facing an existential crisis, players must urgently address the challenges. In the next chapter, we look at how all financial players can prepare for the new dawn.

5. A way forward:

Our four-step approach for any industry player to embrace the possibilities of tokenization

Some might think the demand for tokenization is still at a level at which it can be safely ignored, at least for a while. But we strongly believe now is the time to act – and avoid becoming a follower. To fully grasp the impact this technology may bring to your specific case, we recommend the following four-step approach.

1. Evaluate implications of tokenization and create a heatmap
Perform a systematic screening of business lines and core activities to assess the potential disruption and upside tokenization can bring. Based on insights into the current set of use cases and the expected developments, we can provide a view of the potential impact of tokenization on the business model.

→ Split your organization's business into logical value chain steps/activities, and identify core activities where tokenization can have an impact

→ Assess the risks vs. opportunities of tokenization by analyzing use cases that currently exist or are being developed, and assess timing to maturity

2 . Define a target picture
→ Define your overall ambition for each business line and core activity related to tokenization. Where do you want to be a frontrunner or follower?

→ Create a series of development scenarios for core activities, including assessing their value add and the investment required

→ Select a mix of scenarios that is mutually coherent, addresses key challenges and ultimately feasible, using Roland Berger's scenario analysis approach

3. Develop a capabilities roadmap
Once the target picture has been defined, define capabilities that enable the rollout.

→ Select the most promising capabilities to develop in terms of technology, business and regulation

→ Act and frame capabilities-building projects: Conduct a clear business analysis with input required, expected output and constraints to be overcome

4. Design the modus operandi
Once the capabilities-building projects are identified, define the optimal way to put initiatives into practice, such as:

→ In-house skills development/integration through M&A (for highly strategically important projects with a certain critical mass and sufficient maturity of technology) – For example, development of an alternative trading venue

→ Ecosystem/incubation center (where technologies are less mature and it is key to obtain several different perspectives) – For example, to add new asset classes to the trading universe

→ External development (for projects of lower strategic importance for which providers exist on the market) – For example, to build an interface with an existing tokenized market

Transformation essentials – Four prerequisites to keep in mind

1.

Comprehensive change management

A successful technological transformation is strategy-based and accompanied by strong mobilization, at least of a group of people working on tokenization projects

2.

Top management buy-in

Robust top management buy-in is crucial to reduce resistance to change and achieve ambitious results

3.

Knowledge development

In order to adopt tokenization, develop the infrastructure in which knowledge can be built and retained

4.

Open platform and partner approach

Collaboration with partners across borders and industries will be beneficial to complement knowledge development

Appendix

Horizon	Adoption rate	Cost savings	Units	Year	Time savings	Units
Mid term	20%	0.9 EUR bn	Globally/year	2025	122	Hours/transaction
Mid term	30%	1.4 EUR bn	Globally/year	2025		
Long term	90%	4.1 EUR bn	Globally/year	2030		
Long term	100%	4.6 EUR bn	Globally/year	2030		

Quantitative impacts[5] on the post-trading value chain

Source: Roland Berger

[5] Potential time savings per transaction for tokenized assets in adapted post-trading value chain only

WE WELCOME YOUR QUESTIONS, COMMENTS AND SUGGESTIONS

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