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Are token assets the securities of tomorrow?

We often equate crypto-assets with bitcoin or other cryptocurrencies. But “crypto-asset” is actually a much broader term covering security tokens and new disruptive models for the security value chain from issuance to custody & settlement.

Content

Executive summary

When we talk about crypto-assets, the first idea that comes to mind is bitcoin, followed by other token currencies. But the term "crypto-asset" covers much more than just crypto-payment.

At present, we lack a shared definition of the term crypto-asset, but this is essential if we are to properly define and understand what does and does not qualify as such. This is important because different types of asset are treated differently from an operational and a regulatory perspective.

A global consensus has emerged in relation to dividing crypto-assets into three main archetypal assets: payment/exchange (e.g., bitcoin and equivalents), security (investment components including ownership and promise of future cash flows), and utility (access to specific products, services or protocols). These assets can also be combined in various hybrid forms.

This paper aims not only to clarify what is meant by the term crypto-asset, but also to assess current solutions and the related regulatory framework. We will be providing an overview of the business opportunities and impact of using security tokens within a Distributed Ledger Technology (DLT) ecosystem by considering issues relating to the primary market (issuance/notary services), trading and post trading (clearing and settlement), and safekeeping and custody services.

After 10 years spent getting to grips with divergent regulatory frameworks, securities market stakeholders are at a pivotal state in their transformation in which they must balance a need for transparency and risk mitigation in relation to their environment against the need to make the process as efficient as possible.

Are security tokens the answer to this conundrum? Are security tokens the securities of tomorrow? In our view, the answer is yes. The security token is the security of the future. European and local authorities now acknowledge that DLT platforms and security tokens can provide clear added value in terms of transparency, efficiency and enhanced reporting/oversight. However, taking advantage of this opportunity will involve adopting two main principles.

Playing by the rules of the game

Security tokens can be offered (through security token offerings—STO) and existing assets can be tokenized in a way that ensures that they qualify as transferable securities as defined under MiFID. This will entail complying with requirements derived from other European regulations such as the prospectus directive, Central Securities Depositories Regulation (CSDR), Settlement Finality Directive (SFD), European Market Infrastructure Regulation (EMIR), Market Abuse Regulation (MAR), UCITS, and AIFMD. However, doing so will open up new business opportunities throughout the security value chain.

Of course, it is possible that a security token value chain will emerge on DLT platforms with little or no regulatory oversight, as we saw with crypto-payment platforms. From our point of view, security tokens can only secure a sustainable presence in the industry if they are underpinned by a well-defined regulatory framework. This is a prerequisite if we are to establish a trusted, transparent, and resilient environment that serves regulators and investors alike.

Thinking outside the box

To fully leverage DLT and security token opportunities, we need to view DLT not simply as a new type of "database" but rather as a new way to organize the security value chain from issuance to custody. This is clearly one of the main challenges we face, as we will have to break away from the sequential centralized value chain model and embrace a distributed leger model where participants can access the same information at the same time.

This will entail defining a new security value chain, roles, and responsibilities (trustee agent, insurance for digital wallets, etc.), redefining existing roles (issuance, notary services, safekeeping, and custody services), and developing new products and security offerings on the primary and secondary markets (AIF, digital property, digital art, etc.).

To gain greater stability on the security market and to ensure a less risky framework on the security payment side, Central Bank Digital Currency (CBDC, also called digital fiat currency) and Stablecoins have recently emerged as potential solutions to act as the commercial bank and central bank monies of the future Security DLT market.

There are obviously still many open questions that will need to be answered if security tokens are to enter the mainstream. Widespread use of the technology is likely to be particularly dependent on the following three issues:

- Interoperability between ledgers
- Delivery versus payment in central bank money and the ability to settle via DLT
- The legal framework in relation to AML KYC, custody, safekeeping, and redefining what counts as a security

European and local regulators have conducted several consultations to assess the full scale of these questions (e.g., ESMA Securities and Market Stakeholders Group). They have also relied on advice reports (ESMA, EBA), local taskforce initiatives (FCA, AMF), and developed a dedicated legal framework (Luxembourg, Switzerland, Italy...). Market participants, infrastructure operators, and new entrants are monitoring trends closely and have launched or are working on projects aimed at establishing the security token as a new asset class in the security value chain.

This paper aims not only to clarify what is meant by the term crypto-asset, but also to assess current solutions and the related regulatory framework.

Let's call a spade a spade– vital first steps

The financial industry's preference for permissioned ledgers makes sense given the highly sensitive nature of the data and the fact that reaching a consensus is quicker & easier within permissioned ledgers.

Despite a constant stream of publications about blockchain and other crypto-instruments, a shared understanding of what is meant when these terms are used has yet to emerge. Given that this is the case, our first step must be to provide our own definitions of the various terms and concepts and our understanding of how they interact with one another.

Distributed Ledger Technology

The term Distributed Ledger Technology (DLT) refers to the technological infrastructure and protocols that enable simultaneous access, validation, and record-keeping by multiple stakeholders in an immutable manner across a distributed and decentralized network. The term can be broken down into three key notions:

"Distributed" refers to the fact that the data is shared and may be accessed by multiple participants instead of being stored in a single ring-fenced database.
A "Ledger" is a form of database that (like any other database) contains a record of who owns what, or who did what, and can be used to store range of datasets. The information is disseminated among the participants in a secure and synchronized way. Each participant can initiate, confirm, and update information in a ledger.

The word "Technology" refers to the protocol that enables the database to work in a distributed and decentralized way.

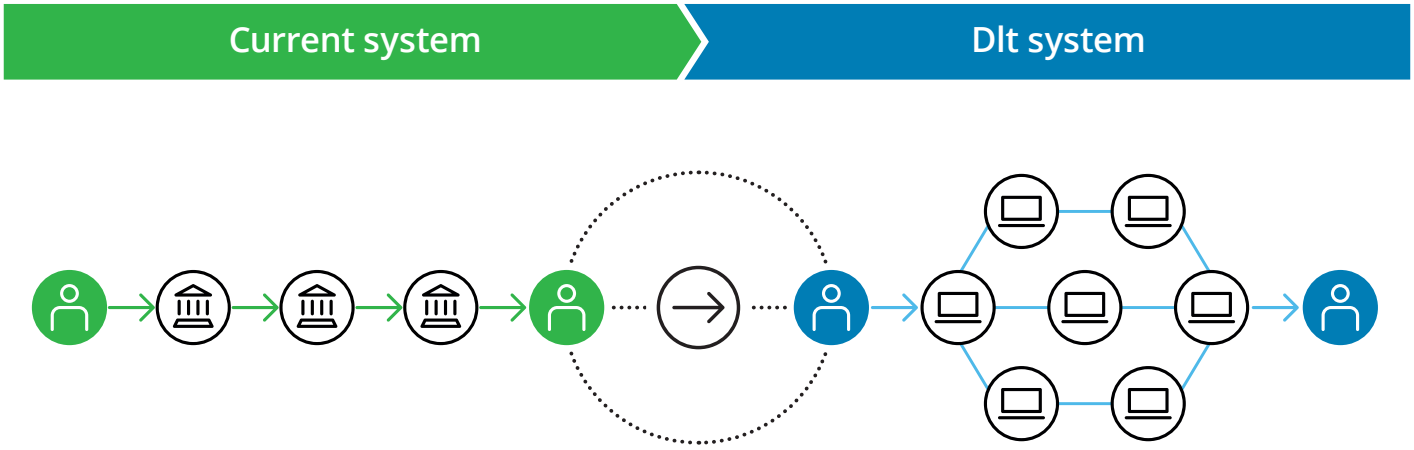
As the technology is still in its infancy, there is no standard form of DLT. There are many types of DLT platform, but they all have four characteristics in common:

- **Data distribution:** Multiple participants can keep a copy of the ledger and are able to read and access the data. This relies on the power of the internet.
- **Decentralized decisions/control:** Based on agreed processes and monitoring, every participant can update and accept any update carried out by another participant.
- **Cryptography:** Defined as the science of transforming information into a form that is impossible or infeasible to forge, duplicate or erase without a secret key. DLT platforms can securely identify all participants, confirm data, and generate consensus[1].
- **Automation/programmability:** Computer-coded automation ensures that contractual terms and conditions (e.g., interest payments on bonds) are automatically implemented. In DLT, this is achieved through the use of smart contracts. Smart contracts are programs that send and receive assets and information when certain conditions are met.

The terms **blockchain** and DLT are often wrongly used interchangeably. In fact, blockchain is just a way of organizing and recording data on a DLT platform. Bitcoin was the first successful DLT platform that proved itself to be sufficiently robust from both a conceptual and a technological standpoint.

What made bitcoin ground-breaking was the fact that it combined technologies

1 BIS, "*Distributed ledger technology in payment, clearing and settlement*", Committee on Payments and Market Infrastructures, 2017, https://www.bis.org/cpmi/publ/d157.pdf



- **Central authorities** (bank, Fed, notary, escrow, etc.) transfers actual value between two parties
- **Multiple intermediaries** and record-keeping are required to facilitate transfer of assets and create trust

- **Distributed network of computers** (nodes) that maintains a shared source of information
- Transaction data is **immutable.** Trust is enabled by cryptographic algorithm

used in DLT and built a distributed network without a central and trusted authority: its main selling point is that it is open to anyone wishing to participate and maintain identical copies of the ledger. This model is referred to as a "public" or "permissionless" ledger.

Nevertheless, most of the DLT platforms that have been developed for the financial industry in recent years are based on a model of restricted access to known and approved parties.
The financial industry's preference for permissioned ledgers makes sense given the highly sensitive nature of the data and the fact that reaching a consensus is quicker and easier within permissioned ledgers. This removes two major concerns: The anonymous nature of the participants and the high cost of running the system.

DLT in a nutshell

- A record, or **ledger, of digital events "distributed"** between unlimited parties
- Can only be **updated by an algorithm consensus** of a majority of the participants in the system
- Contains a **certain and verifiable record** of every single transaction ever made
- Can be **public, permissioned, or private.**

Crypto-assets: a closer look at the terminology

A crypto-asset is a type of private asset whose perceived or inherent value is at least partially derived from its use of cryptography and distributed ledger or similar technology[2]. In other words, the asset **is digitally recorded and provides a graphically secured representation of value that can be stored and transferred within a distributed ledger** (DLT).

A token is an object that represents something else, such as another object (either physical or virtual).

Therefore, in our context, a token is the digital representation of an asset based on DLT. It **can be transferred between two parties** without the need for a central intermediary.

Today, we recognize three main archetypes of crypto-asset/token:

Payment/ Exchange tokens

Payment/ Exchange tokens are a means of payment for goods or services

Buy a pair of shoes in Bitcoin on OpenBazaar platform

Security tokens

Security (investment) tokens may provide to the holder, the ownership of assets and entitlements to use them, dividend distribution (profit sharing) and voting rights

Digital investment Vehicle (DAO) provide holders with voting rights and share future profits

Utility tokens

Utility tokens provide token holders with access to a function provided directly by the token issuer

Filecoin provide token holders available space on computers to store data

2 FSB, "*Crypto-asset markets: Potential channels for future financial stability implications*", Glossary, October 2018. bis.org/cpmi/publ/d157.pdf

Crypto-assets are more than just bitcoin or other payment tokens. At present, there are three main archetypes of crypto-asset (payment, utility, and security (investment) token), which each have specific business purposes, stakeholders, and related regulatory frameworks.

Payment/exchange tokens

Initial Coin Offerings (ICO, also called "token sales") are launched to create a crypto-payment instrument. Issued tokens are meant to function as a means of exchange, a unit of account or a store of value. The aim is to ensure that it is possible to pay for goods or services via a DLT platform. In other words, the objective is for them to be used in the same way as fiat currency. However, most regulators have clearly stated that payment tokens cannot be assimilated with a fiat currency because they are not issued or backed by a central bank. They do not provide the types of right, issuer claims, or access provided by investment or utility tokens. Moreover, their value solely depends on the value that users place in them.

Utility token

ICOs can be used to sell tokens that provide investors with a functional advantage other than the ability to pay for external goods or services. Some utility tokens can be redeemed in exchange for access to a specific product/function (storage of data) provided by the token issuer directly. They can also be used to entitle the owner to access, use or participate in an event, service or product. In some respects, it is appropriate to think of them as a kind of voucher.

Security token

Tokens issued via an ICO may have an investment dimension; these tokens are more similar to financial instruments than they are to cash. They should be thought of as assets providing rights such as ownership, payment of a specific sum of money (dividend) or entitlement to a share in future profits or cash flows. Security tokens may qualify as transferable securities or financial instruments under the EU's Markets in Financial Instruments Directive (MiFID II). Just as depository receipts are certificates representing securities, security tokens are the digital representation of existing securities such as equities, debt instruments, funds, etc.

Some tokens may fall into several categories (e.g., investment and payment tokens). These are what we refer to as "hybrid tokens".

Crypto-assets in a nutshell

Crypto-assets are more than just bitcoin or other payment tokens. At present, there are three main archetypes of crypto-asset (payment, utility, and security (investment) token), which each have specific business purposes, stakeholders, and related regulatory frameworks.

In the next section of our paper, we will focus mainly on the security (investment) token.

Are tokens securities? How should Security Token Offerings (STO) be conducted? What does the future hold for the security value chain?

Are tokens securities?

A security token is defined as an instrument that provides a right of ownership and an entitlement to a share of future profits or cash flows. For example, a token may represent partial ownership of a specific property or of a financial instrument such as a government bond or other debt security.

Some regulators have opted to treat security tokens as securities in most instances. This is because they take the view that these tokens are intended to represent a promise as regards a future cash flow or a claim to partial ownership of a company. In this sense, security tokens are similar to traditional financial assets (equities, bonds, futures, options, etc.) for which there is clear existing legislation.

Issuers can also design tokens in a way that ensures that they qualify as securities by meeting the three main criteria under European law: transferability, negotiability, and standardization.

Transferability

Transferability means that units can be assigned to any other person, irrespective of whether certificates exist that record or document the existence of the units. Certificates are not used to prove the existence of tokens, but tokens can generally be sold on secondary markets. Therefore, they are typically transferable.

Negotiability

While "transferability" refers to the mere fact of passing on ownership in securities, the term "negotiability" refers to how easy it is to do so. Securities are classed as negotiable if they can be traded on a regulated market, multilateral trading facility (MTF) or organized trading facility (OTF). Tokens clearly meet this criterion for classification as transferable securities

Standardization

MiFID defines transferable securities as "classes of securities" that share certain qualities. This implies that the issued units must share a number of characteristics so that they can be considered a class. Most importantly, the claims represented by the units must not be individually negotiated with investors. Units must be defined by common characteristics so that it is sufficient to refer to the type and number of units to trade them.

Is the STO the security issuance process of the future?

A Security Token Offering (STO) is the process whereby a financial security (or a digital representation of a financial security) is issued in the form of a digital asset; typically the digital asset represents ownership rights in an underlying company and/or its assets. This is entirely different to the ICO discussed above, which are "utility tokens"—i.e., digital tokens that provide access to a future product/service but do not entitle the holder to ownership of an asset or equity[3].

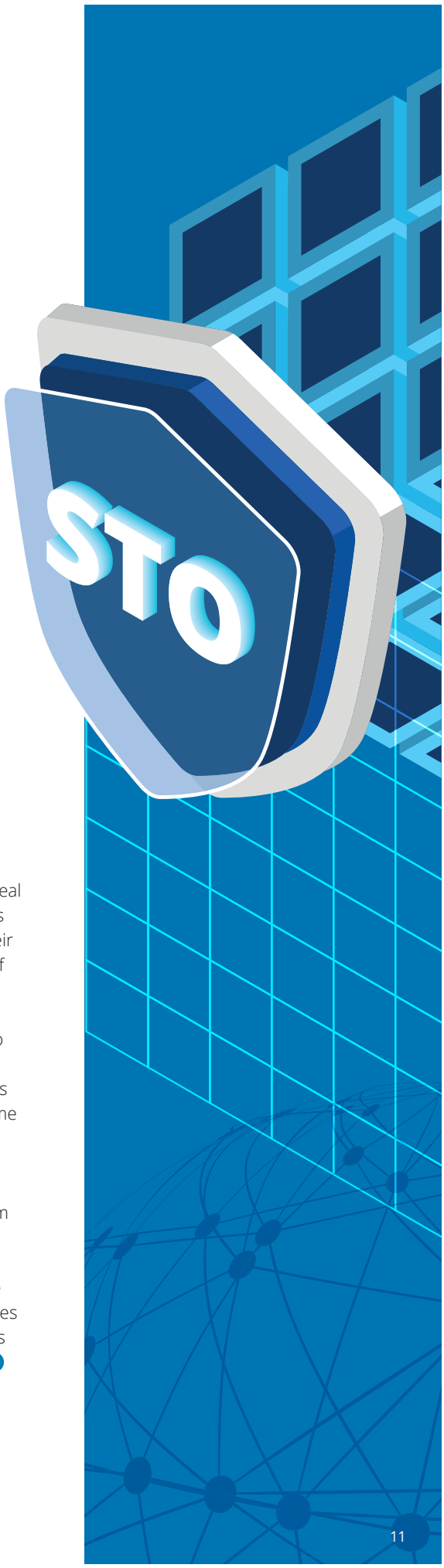
The STO represents an innovative new opportunity for issuers and investors involved in the primary market. STO can be more organized in a more standardized and efficient way. Here are just a handful of the advantages offered by STO:

- The terms and conditions/prospectus are embedded in the security itself (called smart contract)
- Documentation and compliance processes (AML/KYC) are less onerous, it is easier to exchange information with regulators transparently, and all users are identified instantaneously
- An admission to trading (listing) process is emerging that is more automated (and therefore fail-proof and standardized or semi-standardized) than the listing process for regulated markets

Overall, this is likely to reduce the time and cost required to launch new security offerings on the primary market and enhance the compliance process.
STO also provide benefits for investors thanks to a **superior asset universe, enhanced liquidity** (trade/post-trade) and **fractional ownership opportunities.**

The STO represents an innovative new opportunity for issuers and investors involved in the primary market

3 Node Blockchain, Securities Token Offerings, "*The evolution of capital formation*", November 2018.



STO can be used to tokenize traditional debt securities and equities as well as a wide range of tangible assets such as property, paintings, antiques, cars, digital artwork, IP, songs, etc. These are the kinds of asset that were not necessarily accessible to investors previously. In such cases, the token or crypto-asset represents a share of the underlying asset that can be used and exchanged over a digital network.

Another benefit of tokenization is that it allows assets to be divided into smaller units so that investors can access big-ticket items by acquiring a number of units of the assets. In practice, for certain securities with a high value per unit, tokenization may allow investors to buy a tenth or a hundredth of the underlying asset and ensure its immediate replication/ reconciliation with the original.

Secondary trading of tokens via a "regulated platform" will also boost the liquidity of assets and mitigate against risk by allowing investors to "take money off the table" through secondary market selling. This has the additional benefit of qualifying as a recognized and instantaneous property exchange.

While the STO process mainly involves creating new security tokens in the context of primary issuance, DLT can also be used to "tokenize" existing assets.

Tokenization occurs when existing assets are recorded on a DLT platform. As we have seen above, there are several advantages to using tokens to represent assets.

Specifically, doing so improves the issuance (STO), trading (secondary market), clearing, and settlement processes.
From a regulatory perspective, the status of an asset should not be affected by the tokenization processes provided that there are no changes in the regulatory and legal status of the underlying assets. If an asset is currently regulated, using a token to represent that asset will not change its status. Nevertheless, the nature and structure of the DLT ecosystem in which the security token exists may alter the extent to which regulations are applicable.

Practical example:
At present, investors in private equity, real estate and alternative investment funds (AIF) may find it hard to sell/transfer their holdings owing to a lack of liquidity or of organized markets.

If such fund holdings are converted into digital tokens via DLT then these can be exchanged more easily and transactions can be confirmed or validated in real time (or nearly real time).

An additional benefit for investors is that it will be easier to move shares from one account to another because this will happen via DLT. This will also create an opportunity for custodians to be the agents that transform the physical shares into digital assets. In theory at least, this process could be used on any asset.

Tokenization in a nutshell

Primary Market Notary/Issuance

Trade Secondary Market

Post Trade Secondary Market

Safekeeping Custody

Tokenisation of existing Asset
STO allows tokenization of traditional debt securities or equity but as well as a wider range of real assets like property, paintings, antics, cars and/or digital artwork, IP, songs, etc. The kind of assets which were not necessarily accessible to investors before. In that case the token or crypto-asset represents a share of the underlying asset that can be used and exchanges over a digital network.

Security Token Offering (STO)
A digital encryption containing all the information pertaining to the asset and reflecting its market value.

The tokenized assets can be

- Traded
- Tracked
- Registered and reported more easily

Security token issued, traded and settled on a distributed ledger are by definition held in cryptographically secure digital wallets.
Many stakeholders of the security value chain including regulator see DLT as a strong opportunity to facilitate the record of ownership and the safekeeping of assets, by providing a single source of truth and by making ultimate beneficial ownership transparent through the life of an asset and through the custody chain. In this latter context, smart contracts will also probably enhance the processing of corporate actions.

Advantages over traditional asset

- Security / Registry
- Speed
- Ease of transfer
- Liquidity – Enhance investors access to new assets

Point for regulatory consideration

- The interoperability between ledgers
- The provision of Delivery Versus Payment in central bank money as well as the settlement finality in DLT environment
- The legal framework related to AML/KYC, custody, safekeeping and other security definition

In the next chapters, we will take a closer look at the regulatory framework for security tokens and the business impact of security tokens throughout the security value chain.

What is the status quo in terms of the regulatory framework?

Crypto-assets are clearly positioned as a new asset class. As always, when an innovative new solution emerges, there have been many publications and plenty of interest, hype and speculation in relation to crypto-assets, tokens, and ICO.

Regulatory bodies have not sat idly by while these recent changes have taken place. In fact, they have published multiple position papers, advisory documents, and recommendations aimed at industry stakeholders and investors.

The ongoing process of developing new investment token solutions means that the regulatory framework must be constantly updated in response. In this section, we will describe the approach followed by the European Securities and Markets Authority (ESMA) with regards to security tokens, analyze the regulatory implications, and review the risks and issues regulators must consider.

Regulatory approach

As highlighted in the ESMA SMSG (Securities and Markets Stakeholders Group) report, regulators have broadly followed one of the following three approaches in relation to crypto-assets. Abuse Regulation (MAR), UCITS, and AIFMD. However, doing so will open up new business opportunities throughout the security value chain.

- **Case by case and assessment of the regulatory framework.** This is the approach followed by most EU jurisdictions (Austria, Belgium, Germany, Ireland, Luxembourg, Netherlands, Spain, and the United Kingdom). These countries have not prohibited or restricted crypto-asset initiatives outright, but they do conduct a careful review of the various projects/initiatives to ensure compliance with local laws and other relevant EU regulations. We are also seeing multiple consultations (AMF), dedicated taskforces (UK), and other regulatory forums facilitated by the authorities in order to address and assess the questions at hand.
- **Creation of a dedicated regulatory framework.** Malta, Switzerland, Italy and Luxembourg have developed and voted new law provision within their respective legal framework where the inscription and transfer of security is recognised within DLT (blockchain).
- **No approach defined yet**. Some jurisdictions/authorities have not taken a position or publicly stated their approach yet. This does not mean there are no regulations in place or that all crypto-asset initiatives are permitted.

In early 2019, the European regulatory authorities (ESMA and EBA) issued advisory reports on crypto-assets. Meanwhile, local authorities including the FCA and FINMA have issued final reports from the crypto-asset taskforce and a legal framework for DLT has been established in Switzerland.

These recent reports demonstrate that there is global consensus on the need for a well-defined classification system. Indeed, the first step in defining a regulatory framework for crypto-assets is to create a clear token taxonomy. While European regulators may quibble over small points relating to wording, they unanimously agree that tokens can be divided into three main archetypes:

- Payment (exchange) tokens, which are intended to be used as means of payment or value exchange
- Utility tokens, which are intended to provide access to a product service via DLT infrastructure
- Security (investment) token, which are intended to entitle the holder to a future cash flow or partial ownership of a company

European regulators also recognize that security tokens (as defined in our previous section) qualify as financial instruments.

As such, the criteria related to transferability (on a regulated market) and liquidity will trigger the application of relevant legislation (regarding issuance, trade and post-trade).

Regulatory implications of security tokens qualifying as financial instruments

If security tokens are to be classed as financial instruments under MiFID, it is important to have a clear and holistic understanding of the impact and requirements applicable under all existing EU securities regulations. The range of legal provisions applicable to security tokens includes (inter alia): the Prospectus/Transparency directives, the Central Securities Depositories Regulation (CSDR), the Settlement Finality Directive (SFD), the European Market Infrastructure Regulation (EMIR), the Market Abuse Regulation (MAR), UCITS, and AIFMD. Moreover, as security tokens are held on a network, GDPR is likely to be applicable.

The following (non-exhaustive) list contains some of the main impacts of regulatory provisions that apply to security tokens.

Regulation	Topics/Markets	Key Impacts (not an exhaustive list)
Prospectus/ transparency directive	• Issuers' obligations to investors • Primary market • Listing	• Depending on how the ICO/STO is structured, tokens may qualify as transferable securities. This would mean that they would be required to publish a prospectus that would be subject to the approval of the competent authority.
MiFID II/MiFIR	• Services related to capital markets	• MiFID II are most likely to affect ICO/STO if tokens qualify as financial instruments pursuant to Art.4(1) no.15 of MiFID II • ICO participants would be viewed as engaging in certain investment services and activities such as investing in, dealing in or advising on financial instruments (see Art.4(1) no.2 and annex I sec.A of MiFID II
Central Securities Depositories Regulation (CSDR) and Settlement Finality Directive (SFD)	• Issuance services • Post trading	• Transactions must be executed by a system operator (SFD) • If security tokens qualify as transferable securities and are traded on a regulated market, they will have to be recorded with an authorized CSD (CSDR)
Safekeeping and record-keeping of securities ownership	• Custody • Safekeeping • Notary	• No existing harmonized definition of safekeeping and record-keeping of securities ownership at EU-level • CSDR may apply in relation to notary services (initial recording of securities) • Control of private keys may constitute a safekeeping service
MAR and Short Selling Regulation	• Issuers' obligation to prevent insider trading • Primary market • Secondary market	• Investment tokens traded on a regulated market. No transposition at national level
AIFM Directive	• Alternative investment	• ICO/STO may take the form of an investment vehicle and fall under AIFMD • Issuers of security tokens may qualify as AIFM (or even management companies)
EMIR	• Derivatives market	• (Hybrid) security tokens may qualify under EMIR
AML/KYC	• Risk of money laundering/fraud/ terrorist financing	• Issue token via STO • Custodian wallets fall within the scope of AMLD • Scope of AMLD to be incorporated by future providers of STO and exchange services for crypto-assets

We believe that the success and the development of the security token will also, and primarily depend on, compliance with key securities regulations.

Risks and issues regulators have yet to consider

Above, we saw how security tokens may qualify as MiFID financial instruments and how the current regulatory requirements apply to these tokens.
Nevertheless, some gaps and issues remain and will have to be considered by the regulators in the future. These issues include the following three main factors:

- At present, there is no European legal framework around safekeeping and custody services and there are some differences in the legal frameworks in place within the different jurisdictions. De facto, there is a lack of clarity and different interpretations around the services that may be classed asset services, custody, and safekeeping within a DLT environment. New roles and responsibilities will also have to be defined (e.g., trustee agent for public keys) within this new framework.
- The concepts and definition of settlement as well as settlement finality must also be assessed and clarified within a new DLT environment.
- Smart contracts play an important role in the security value chain within DLT. As yet, there is no clear definition of how the security and reliability of smart contracts (and their related content) will be organized. Here also, new roles and responsibilities will have to be addressed and considered by regulators.

Obviously, and as stated by the ESMA in its advisory report on crypto-assets, crypto-assets that do not qualify as MiFID financial instruments also have risk exposure—in fact, this is all the more true for this category. Amongst these issues, ESMA highlights:

- Significant risks related to fraud, cyber-attacks, and money laundering
- On trading platforms, difficulty for investors to distinguish which crypto-assets fall within the scope of current regulations and those that are not covered by a regulatory framework or do not qualify as MiFID financial instruments
- Lack of a consistent regulatory framework within Europe on the way to approach crypto-assets that do not qualify as MiFID financial instruments

Regulatory framework in a nutshell

The EU regulatory framework for crypto-assets is currently undergoing development and definition, but it is clear that the authorities intend to establish a framework that will protect investors and ensure full transparency as per the existing EU securities regulatory framework.

In the next section, we will consider the opportunities and efficiency that can be derived from the use of investment tokens in the security value chain.

We believe that the success and the development of the security token will also, and primarily depend on, compliance with key securities regulations. This is fundamental to winning the trust and confidence of authorities and investors and providing them with the transparency they expect.

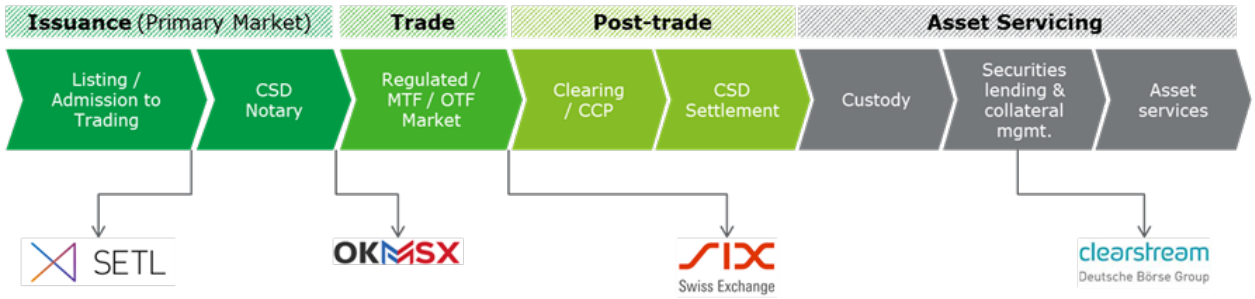
Transformation of the security value chain from niche FinTech initiative to disruptive force re-shaping the securities business model

At present, we are seeing the launch of various projects aimed at using DLT and investment tokens as a way to revisit and re-shape part, or even all, of the security value chain.

The list below includes some of the recent projects and initiatives that have used DLT as part of the security value chain.

- ID2S/SETL was one of the first DLT CSD approved by a competent authority (AMF). ID2S has been granted CSD status and access to the T2S platform. The CSD aims to focus on commercial paper first and facilitate the issuance and distribution of these instruments.
- Clearstream has launched a project that aims to set up a DLT platform to facilitate the exchange of security tokens representing HQLA assets in the context of securities lending and collateral management services.
- The Malta Stock Exchange has launched a DLT platform to organize the listing and trading of security tokens.
- Switzerland's stock exchange—owned and managed by SIX—has announced that it is building a fully integrated trading, settlement, and custody infrastructure for digital assets.

The Swiss and Maltese projects are being run in close cooperation with the local regulator. They involve defining legal provisions and a methodology that will enable the new business model to be organized in line with the relevant securities regulatory framework. relevant legislation (regarding issuance, trade and post-trade).



(OKEx & MSX) 2019

DLT Solution which provides CSD services for Commercial Paper

(OKEx & MSX) 2019

Malta Stock Exchange: Listing and trading services for security tokens and crypto-assets

(SIX Digital Exchange) 2019

Digital (token) Swiss eligible instruments on a DLT platform covering full scope of the value chain to post trade and Corporate Actions

Clearstream HQLAx Project 2018/2019

DLT Solution to create a standardised lending marketplace. Via HQLA tokens, it will allow market participants to redistribute collateral liquidity more efficiently by improving interoperability for pools of securities residing

All of these projects as well as dedicated token platform like Tokeny share the same objectives of enabling greater efficiency and transparency while reducing transaction costs and times. These are key criteria that all members of the securities ecosystem (issuers, market infrastructure operators, authorities, asset services, and managers) are looking to prioritize. At present, we are seeing the launch of various projects aimed at using DLT and investment tokens as a way to revisit and re-shape part, or even all, of the security value chain.

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Security tokens and the security value chain

The process of integrating security tokens into the security value chain will probably involve several phases, each of which will focus on a specific instrument or aspect of the value chain (issuance, trading, etc.) with the aim of ultimately establishing a full end-to-end security token model using a permissioned ledger.

At this stage, it might be helpful to imagine what the future may look like from an operational and regulatory point of view for security tokens traded within a DLT ecosystem.

Issuance and listing tokens

From a process perspective

STO can provide benefits both for issuers and investors.

Issuance processes have been set up in DLT in the context of FCA regulatory forums and the following benefits (among others) were noted:

- Greater transparency as regards asset ownership and records
- A high degree of automation, removing the need for registrars and nominees
- No need for reconciliation between network participants as they share the same record of ownership

Other STO benefits also include:

- The use of smart contracts, i.e., self-executing pieces of code that translate contractual terms into computational material. This should enhance the enforcement of contract terms and the automation of back-office processes, e.g., the processing of some corporate actions
- Compliance procedures such as AML/KYC can be executed in a more automated way

From an investor's point of view, STO enable buyers to access a larger universe of assets. In most cases, tokens are related to "normal" securities (equity, debt, derivatives, etc.). However, depending on local securities legislation, tokens can relate to digital artwork, paintings, property rights, etc.

STO can also be used to divide underlying assets into smaller units and enable fractional ownership. This can provide investors with an opportunity to access big-ticket items in a more affordable way and also set up a much more diversified pool of assets with a smaller capital base.

Finally, issuance, and specifically notary, procedures in relation to new securities are an area in which DLT can be used to ensure the integrity of the token being issued versus the token issued/held in the DLT. These notary/register functions will remain important within the DLT ecosystem.

From a regulatory perspective

From a regulatory perspective, we believe that the issuers of security tokens will still need to publish a prospectus under local law as well as in accordance with the European prospectus regulation. The European prospectus regulation is applicable to securities offered to the public or admitted for trading on a regulated market situated or operating within an EU member state.

The CSDR will remain the reference regulatory framework as far as notary services are concerned.

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Trading and settlement of tokens

From a process perspective

STO can provide benefits both for issuers and investors.

In recent years, we have seen many initiatives related to setting up exchanges to facilitate crypto-payments. As regards security tokens, there is still a big gap in terms of the availability of regulated secondary market infrastructure for both the trade and post-trade stages. The burden of regulatory compliance when setting up such ecosystems is probably a key reason for this gap.

That said, the opportunities in this space are immense and regulators are convinced of the added value of DLT in clearing and settlement activities[4]. As per the ESMA report on how to apply DLT to the securities market, clearing and settlement could theoretically become almost instantaneous with DLT, as trade confirmation, affirmation, allocation, and settlement could be combined into a single step and reconciliations would become virtually superfluous.
This would in turn have a number of benefits, including reduced counterparty risk (see below), and potentially reduced settlement failures and penalties.

These opportunities are fueling the development of new initiatives and projects being launched by:

- New entrant companies with brand new infrastructure (Open Finance Network/ tZERO)
- Traditional financial market infrastructure operators (such as the Australian Stock Exchange, SIX Swiss Stock Exchange, London Stock Exchange, and Malta Stock Exchange) are working on new DLT platforms offering partial or full end-to-end settlement processes including listing, trading, and settlement of security tokens
- This could also make it easier for SMEs to access the financial market via simpler and faster processes, in particular when smart contracts embed all dividends and security life cycle events

From a regulatory perspective

From a regulatory point of view, MiFID[5] refers to transferable securities as classes of security that are negotiable on the capital markets. The fact that tokens can be traded on exchange platforms often with significant liquidity testifies to their negotiability. The existence of ownership rights is also considered by a majority of competent authority as sufficient grounds to class tokens as transferable securities.

On the other hand, tokens can be assigned to another person irrespective of whether certificates exist that register or document the existence of the units. Setting aside the liquidity and transferability that may be facilitated by DLT for a moment, we should consider AIF funds, structured products, etc. It has always been incredibly difficult to transfer such instruments, but DLT would enable market participants to confirm their intentions digitally and the asset could be moved from one institution to another in the blink of an eye.

DLT security token platforms are likely to be adapted to meet the requirements of market infrastructure regulations like CSDR and EMIR. There may still be a need to have dual system in light of key market infrastructure requirements, but within a club of users, reliance on a DLT tool might be enough—print outs or statements will be used for formal confirmation under SFD and CSDR.

- On trading platforms, difficulty for investors to distinguish which crypto-assets fall within the scope of current regulations and those that are not covered by a regulatory framework or do not qualify as MiFID financial instruments
- Lack of a consistent regulatory framework within Europe on the way to approach crypto-assets that do not qualify as MiFID financial instruments

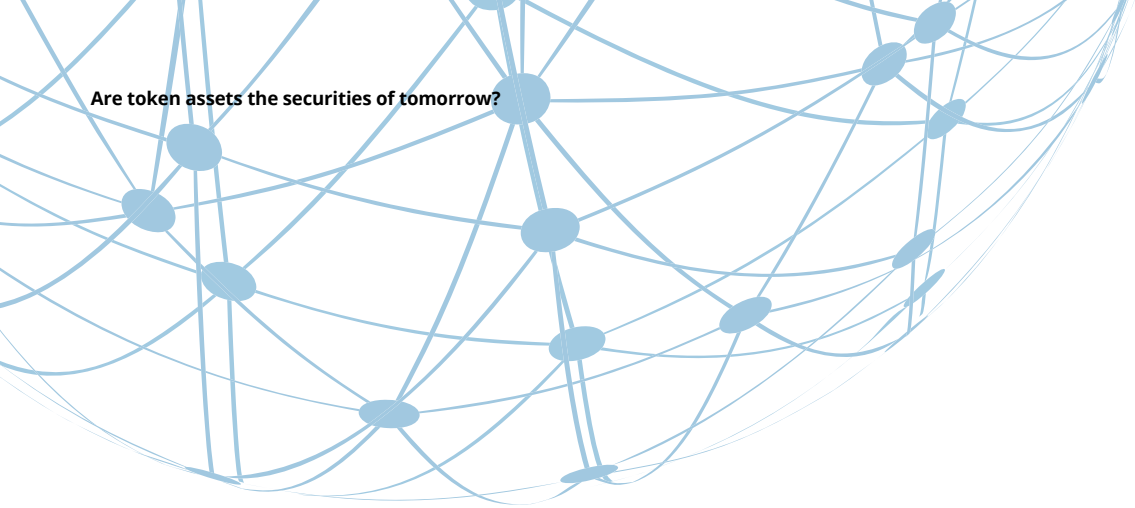
Safekeeping of tokens

From a process perspective

Security tokens issued, traded, and settled on a distributed ledger are by definition held in cryptographically secure digital wallets.
Many stakeholders in the security value chain, including regulators, see DLT as an ideal opportunity to facilitate record-keeping and the safekeeping of assets by providing a single source of truth and by making ultimate beneficial ownership transparent throughout the lifecycle of an asset and throughout the custody chain. In this latter context, smart contracts are likely to make it easier to process corporate actions.

New roles will need to be defined and set up to ensure independent and trusted safekeeping of private keys and other vital wallet management services.
It is therefore fair to question how the role of custodians and CSDs might evolve in relation to security tokens managed via DLT.
From a regulatory perspective
At present, there are no harmonized, Europe-wide definitions of security safekeeping and record-keeping in relation to security ownership. These tasks are

4 ESMA, "*The Distributed Ledger Technology Applied to Securities Markets*", February 2018.
5 Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014.



performed by a wide range of entities such as custodian banks, registrars, notaries, depositaries, and CSDs.
Furthermore, the rules vary according to the national legislation applicable to securities and the rights attached to securities, which are not harmonized at EU level. Some countries may use security tokens within DLT, whereas others will retain a requirement for physical securities.

Payment of security token transactions

From a process perspective

The efficiency of a security transaction heavily relies on the related payment leg. Today, the Delivery versus Payment of a security transaction is organized versus central bank money or commercial bank money. Both central bank and commercial bank monies are essential in the organization of the market infrastructures ecosystem.

As mentioned before, the term crypto-assets was primarily associated with bitcoin and other cryptocurrencies. These currencies were used with and have supported the issuance and payment of security tokens. Nevertheless, it appears the security market was also looking for more stability and a less risky framework on the security payment side.
Stablecoins and the Central Bank Digital Currency have emerged recently as potential solutions to act as the commercial bank and central bank monies of the future Security DLT market.

Central Bank Digital Currency

Central bank digital currency (CBDC, also called digital fiat currency) is the digital form of fiat money (a currency established as money by government regulation or law). CBDC differs from other crypto currencies that are not issued by government.
Today, the world of fiat money is in a clear innovation and transformation process, with central banks looking to provide a digital alternative to cash. Central banks cannot afford to be left behind by the current evolution and emergence of new forms of payment, as they are key stakeholders ensuring the risk-free dimension and stability of payment flows within financial market infrastructures.
Central banks around the world have started assessing the concept of CBDC and launch announcements were made for 2020. CBDC initiatives have even gained increasing momentum since the development of private-sector stablecoins. Among the recent initiatives, France has announced they will experiment to integrate a 'wholesale' CBDC into innovative procedures for exchanging and settling tokenized assets. Central Bank of China is also known to be very active on a CBDC project.

Stablecoins

Stablecoins claim to stabilize the value of major currencies in the volatile crypto-asset market and are backed by a reserve asset. They allow secure, convenient transactions without the high volatility that traditional cryptocurrencies hold. Stablecoins can provide a critical infrastructure layer for the digital assets ecosystem.

Additionally, stablecoins are price-stabilized cryptocurrencies whose market price is pegged to another stable asset, which benefits in simplicity, programmability (e.g., smart contract integration), efficiency (e.g., low-to-zero transaction fees, fast settlement times), fungibility, open (i.e., permissionless) access, and are less vulnerable since no collateral is being held on the blockchain. Attempting to bridge between fiat currencies and cryptocurrencies, three categories of stablecoins exist, (fiat-collateralized stablecoins, crypto-collateralized stablecoins, non-collateralized (algorithmic) stablecoins), which are all based on their working mechanism.
Fiat-collateralized stablecoins are highly regulated, centralized and must be stored by a trusted custodian bank, which also needs audits to ensure its transparency. It maintains a fiat currency reserve like the U.S. dollar, gold, silver, as well as commodities like oil.
Crypto-collateralized stablecoins are backed by other cryptocurrencies and maintain their one-to-one ratio through over-collateralization. The most common form requires users to stake (vault) a certain amount of digital currencies into smart contract, which will result in a fixed ratio for stablecoins.
Non-collateralized (algorithmic) stablecoins do not use any reserve but include a working mechanism and rely on algorithms, for instance that of a central bank, to retain a stable price. Due to no reliance on collateral, they are independent from any central entities.

Stablecoins seem to be a solution for financial institutions due to their simple concept and uncomplicated transactions. The list below includes some well-known stablecoins currently on the market:

- TrueUSD (TUSD) is currently the most reliable and proven stablecoin (fiat-collateralized) that is fully collateralized, legally protected, and transparently verified by third-party attestations. It is the first asset token built on the TrustToken platform — a platform to create asset-backed tokens that can easily be bought and sold around the

world. It is secured by the US dollar and uses multiple escrow accounts to reduce counterparty risk and provides token-holders with legal protections against misappropriation.

- DAI (SAI) is a decentralized (crypto-collateralized) stablecoin built on the Ethereum blockchain and US dollar pegged. Its price stability is sustained through a system of smart contracts, does not rely on any banks, governments, or other centralized third parties, and can be viewed publicly on the Ethereum blockchain.
- USD Coin (USDC) is also a crypto-collateralized stablecoin and created by the cryptocurrency exchange Coinbase and backed by reserves held in financial institutions. It is emitted by banks and focusses on the global market, currently partnering with Goldman Sachs, Bitmain, Blockchain Capital and others.
- Basecoin (BAB) is a price-stable cryptocurrency (non-collateralized stablecoin) with an algorithmic central bank whose protocol is designed to maintain its price using the same economic principles relied upon by central banks around the world and its value is pegged to the US dollar.

From a regulatory perspective

The high volatility and related uncertainty of some cryptocurrencies have lead to a warning from competent authorities in different jurisdictions, as well as the emergence of private sector stablecoin initiatives and the central banks assessing the development of fiat digital currency.

From a regulatory perspective, the development of private stablecoins as well as CBDC initiatives raises several questions related to payment systems, central banking operations, monetary policy, financial stability and legal foundations and regulations in place. One of the main challenges will be to assess and define the legal and regulatory framework not only in one jurisdiction but on a cross-border basis.

In order to answer this challenge, six central banks, comprised of the central banks of Sweden, Canada, Switzerland, the UK and Japan, as well as the European Central Bank (ECB) and the Bank for International Settlements (BIS) will assess together in 2020 the "economic, functional and technical design choices, including cross-border interoperability" of CBDCs.

Other value-added services

There are obviously several areas in which a DLT platform and security token can provide added benefits for the security industry.

DLT platforms can shorten settlement cycles and reduce counterparty risk exposure. In turn, there may be a reduced need to mitigate counterparty risk through central clearing and the posting of collateral.

The bilateral exchange of margins could possibly be accommodated via DLT for non-OTC cleared derivatives.
For transactions that require the posting of collateral to cover counterparty risk, DLT could facilitate reconciliations and accelerate collateral movements.

Market liquidity may improve as a result, although the need to have funds or assets immediately available may exacerbate the strain on liquidity in times of stress.

On top of this, keeping all assets in a digital environment will allow/require the production of new data, along with new data analysis and usage, and therefore new strategies for trading, and hedging against and managing risk.

Open challenges

Some challenges and constraints related to the market infrastructure ecosystem remain open and will need to be addressed in the future to sustain the development of DLT platforms for trading and the post-trade process.

At this stage, the questions of interoperability and standardization across these DLT (probably permissioned) platforms remain open and we may see a list of platforms offering no scope for interconnection. This will prevent them from fulfilling the key "distribution" criterion of DLT.

Another related challenge that may determine whether or not the technology is adopted is the ability to provide Delivery versus Payment (DvP) settlement, in particular in central bank money. Nevertheless, it is worth mentioning that settlement can also be facilitated in commercial bank money.

As we have seen, security tokens can fit (subject to compliance with certain criteria) within the existing European regulatory framework on securities. Nevertheless, there is still some uncertainty related to legal aspects (local transposition of MiFID) and regulatory gaps (safekeeping/custody) that may block the development of DLT solutions for securities unless additional regulatory definitions and requirements are introduced.

Security tokens—what will the securities landscape look like in the future?

Security tokens are bound to be a mainstay of the securities services and value chain of the future: they are technologically superior, safer and more transparent, at least for regulators.

The current security value chain is organized around a number of different intermediaries that act sequentially during the various stages of the security lifecycle.

The introduction of DLT into the current security value chain therefore represents a clear re-shaping and disruption of the business model and of the roles of the various stakeholders in the value chain.

We expect several types of business model to appear in the near future of the security value chain and market infrastructure landscape.

The jungle model—disruptive DLT

Theoretically, a new, open distributed ledger environment may be developed without intermediaries along the security value chain linking issuers directly to investors. Trading venues, CSD, CCP, and other custodian banks would be fundamentally disrupted by a ledger in which participants manage the entire security value chain in real time via security and hybrid tokens.

As we saw with the recent development of the crypto-payment ecosystem, the model may be designed to minimize the regulatory burden. This would mean that the rules of the game would not be entirely clear or understood by investors. The concepts of "no limits" and a "fully open model" would clearly facilitate the emergence of a whole host of new businesses in the early stages but the bubble would often burst or—even worse—chaos would ensue.

This model might be ideal in the case of a single asset, but it would be less functional when there are many different assets at play. Consider an investor with a diversified portfolio of shares and bonds listed around the globe: they may have access to one DLT per digital asset, potentially with little to no compatibility. This scenario means that this model is not very appealing for widespread use. It will not meet the interoperability criterion, which is a prerequisite for success. regulatory framework as far as notary services are concerned.

The zoo model—small pockets of DLT jungles within the legacy ring-fenced environment

Most market participants and regulators recognize the advantages that DLT will have for the security value chain and market infrastructure.

It is also widely understood that the role of these intermediaries (market infrastructure custodians) is essential to guarantee market participants' confidence and the timely execution of transactions.

An option for the future may be to use DLT within a limited section of the security value chain for specific instruments, following the existing security lifecycle organized within the legacy environment.

This option may be useful when assessing the feasibility of the new value chain technology; various regulatory forums supported by national competent authorities are currently taking this approach.

However, we believe this model does not do justice to the potential offered by DLT and tokens.

This model would improve the status quo in some respects but would still be up for debate given the need to find adequate profiles or restructure old banking/custody systems. The benefits may nevertheless be significant, albeit limited to specific assets classes: notably lower collateral or margining.

The nature park model—the richness of DLT wildlife hemmed in by a strong regulatory framework

As so often happens, the ideal situation to aim for in the future is to be found by striking the right balance between the experience of yesterday and the innovation of today.

We believe that security tokens are the asset class of tomorrow.
But to reach this point, two conditions will need to be fulfilled:

Playing by the rules of the game

Without a recognized regulatory framework, the security token will not be able to develop in a sustainable way. As discussed, the interoperability of DLT across digital assets classes is key to attracting widespread interest in the technology. All stakeholders in the security value chain (investors, issuers, infrastructure, regulators, etc.) need to recognize security tokens within an (existing) regulatory framework. Security tokens have to comply with the existing transferable securities definition and the related regulations established over the last 10 years in order to gain the trust of investors and regulators. These different elements will ensure that there are deep pockets in the event of failure and that the distance between current and future legal environments is not too large, as these deep pockets may already have the necessary licenses to operate and the standing to put their money on the line. The only issue is ensuring that often-outdated systems are nimble enough to adapt.

Thinking outside the box

Defining the future security value chain in relation to DLT is not as easy as it may appear if you do not consider using DLT as just another database. Indeed, the difficulty lies in re-shaping a sequential and centralized model into a distributed and shared model.

Even within the existing regulatory environment, managing security tokens in a DLT ecosystem entails:

- Rethinking existing roles including traditional custody/safekeeping of assets (which may disappear)
- Creating new responsibilities for trustees of digital wallets and notaries in relation to token environments and existing assets, etc. (these will appear)
- Launching new products that will be available under new distribution models (UCITS, AIF)
- Leveraging legacy market infrastructure and custodians that form the regulatory bedrock (trading venues, notary functions, etc.) as well as new roles built around the reliability of the DLT network. New players must be sufficiently well-known to be credible and have enough financial strength to be trusted parties. Other stakeholders will connect or have an account with these players.

New entrants will have a role to play in defining a new model through new technological solutions around STO, tokenization, smart contracts for corporate actions, etc. but new entrants will also be required to fulfill new roles as independent trusted agents and to provide assurance as regards digital wallets and smart contracts.

Conclusion

Security tokens are bound to be a mainstay of the future security value chain landscape. The opportunities they offer will help the industry to re-shape an environment that will provide greater efficacy and transparency as regards the security issuance, trading, and post-trading processes.

We have drawn readers' attention to the importance of having a clear definition and understanding of crypto-assets. Indeed, the related regulatory impact can be vastly different if we are talking about a crypto-payment token as opposed to a security token.

Security tokens are globally recognized by academics and security authorities as securities and consequently these security tokens will fall under European securities regulations including the prospectus regulation, MiFID, EMIR, CSDR, MAR, UCITS, and/or AIFMD.

Naturally, issuers may still design tokens to bypass or not comply with the security definition provided by European securities regulations in order to reduce compliance costs.

Nevertheless, we believe that the success and sustainable development of security tokens and related DLT platforms will mainly rely on their compliance with the key principles expounded in the existing securities regulations. This is essential to gain the trust and confidence of investors and regulators.

Central Banks have also clearly understood that the business needs to properly address the payment side of the security transaction with the design and foreseen implementation of Central Bank Digital Currency (CBDC). The Central Banks initiative is also in line with the recent private stablecoins initiatives as an answer to the high volatility of the legacy crypto currencies.

Security tokens and DLT platforms require a new approach and a shift in mindset as we envisage the security value chain moving away from a centralized approach with various intermediaries and towards a distributed platform with instant sharing of information and data.

This new approach will probably disrupt current stakeholder roles and also prompt the development of new ones. We are currently seeing more and more innovative models and new entrants in the securities landscape.

Nevertheless, local regulatory requirements and inherent expertise will provide scope for existing market infrastructure to play a key role in the establishment of the new DLT ecosystem.

Some challenges and constraints remain if we are to set up a safe and trusted DLT environment for security tokens. Nevertheless, it would be an error to bypass the opportunities that security tokens and DLT offer for each stakeholder in the security value chain in terms of efficiency and reduced operating costs.

Strong and sustainable development of security tokens in DLT will rely on a strong and well-balanced ecosystem coupled with a strong, well-defined regulatory framework and compliance with it; a new approach and innovative mindset from new entrants; and expertise and know-how from existing market infrastructure operators.

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