TOKENIZATION OPPORTUNITIES FOR FINANCIAL INSTITUTIONS

REPLY [MTA, STAR: REY] specializes in the design and implementation of solutions based on new communication channels and digital media. Through its network of specialist companies, Reply supports some of Europe's leading industrial groups in Telco & Media, Industry & Services, Banks & Insurance, and Public Administration to define and develop business models, suited to the new paradigms of Artificial Intelligence & Machine Learning, Big Data, Cloud Computing, Digital Media and the Internet of Things. Reply services include: Consulting, System Integration and Digital Services.

www.reply.com

EXECUTIVE SUMMARY

The momentum is steadily building within the financial services sector when it comes to blockchain technology adoption. In 2022, a high number of large, established banks made public announcements of services going live and technologies being implemented. This bodes well for the network effect to take off: the more actors in the value chain are ready, the easier it will be for blockchain based assets to flow across the chain.

Regulations are undoubtedly the main drivers for enabling growth and usage. Despite the lack of regulatory clarity today, the industry is not standing still. This report focuses on blockchain as an enabling technology. A few assets have been tokenized at scale, primarily in controlled, B2B environments. Bonds, intra-day Repo and cross-border payments are the first successful use cases, demonstrating the large-scale benefits of the technology. Most often, the drivers of tokenization are about reducing counterparty risk and increasing transaction speed, but the benefits are much broader once the value chain is fully enabled.

There are a number of no-regret moves any financial institution can implement to support this new technology format for assets. A first requisite is internal education, followed by customer and counter-party education. Next there are opportunities to explore risk management, starting with identifying indirect risks and taking appropriate measures. Finally, there is the opportunity to start working with tokenization and custody, the two main pillars of blockchain use cases.

Overall, what is happening today is the evolution after the dematerialization of assets and money. Gains in efficiency will continue and barriers to access will be lowered further. However, smart contract technology will enable fundamentally innovative services that can be offered by new entrants in financial services. Banks have taken notice and will have to fight to retain their positions in the value chain.

This study has been realized by international Reply experts, led by Atomic Reply, the center of expertise that is focused on Wealth Tech and Digital Assets, providing management consulting and system integration services.

CONTENT

DEMYSTIFYING DIGITAL ASSETS

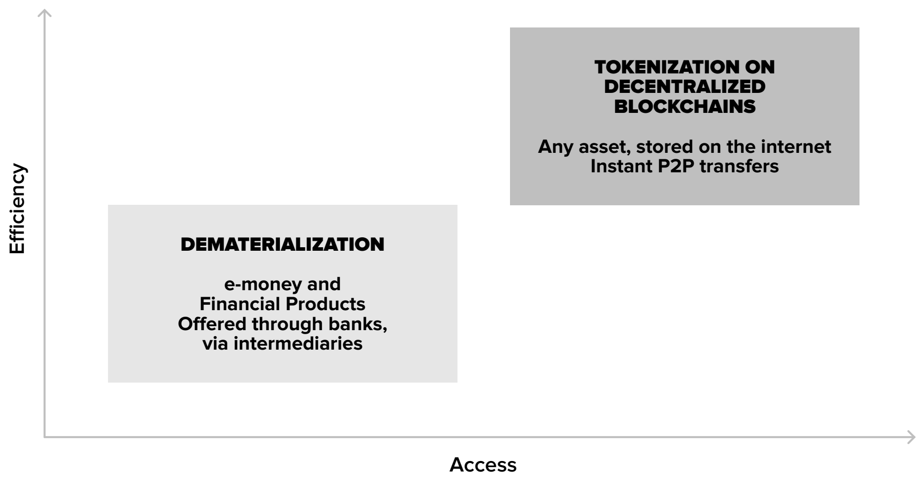
THE BIG PICTURE ABOUT DIGITAL ASSETS

60 years ago, buying a bond was a cumbersome process: manual subscription processes in a bank, a paper certificate, manual coupon redemption etc. The 1980s brought the first wave of dematerialization: shares, bonds and funds were purchased

and traded in electronic format and "e-money" became the dominant form of payment in lieu of cash. Access to these products became easier and efficiencies were gained, but transactions still require many steps and middlemen: payments via different "rails" (e.g. SWIFT), transfer agents, central share depositories and brokers.

The evolution that comes after dematerialization is to tokenize assets on the blockchain. Value is no longer locked up in bespoke accounts but is now stored in a standardized format with bank-grade resiliency in a cloud-based ledger. A crypto wallet today can hold any type of tokenized asset: NFTs representing rights, bonds, currency, etc. Smart contracts can embed rules and lock value under conditions that can make peer-to-peer transactions as fool-proof as the guarantees given by escrow services and brokers today. The efficiency gains by taking middlemen out of transaction chains and the ease by which crypto wallets can connect to any type of financial service is truly disruptive.

The innovation that tokenizing will bring is going to benefit consumers and corporates with more options to manage their assets and finances, new financial products and a lower barrier to entry.



MARKET STATUS

Whilst crypto markets are experiencing high volatility in 2022, Financial Services have continued their progress on building the infrastructure.

However, the billions of dollars that are tokenized are still a very small fraction of the trillions traded each day.

For assets to become mainstream in tokenized format, they need to become easily discoverable and tradable, requiring a critical mass of market places, sellers, buyers and brokers.

The popularity of crypto tokens took off because over 500 exchanges were created, which were able to easily list a wide variety of tokens thanks to the standardization of blockchain technology.

Companies like Revolut became massively popular, adding crypto investing a click away from day-to-day payments. At present, Reply's research estimates that 150M users have opened accounts with exchanges that have documented their onboarding process, which represents about half the crypto wallets in use. Now, with budding forms of digital assets beyond just cryptocurrency, banks are eager to 'play catch-up.'

KEY EVENTS IN FINANCIAL SERVICES

- Goldman Sachs going live with their digital assets platform in January 2023
- Bank of New York Mellon launching a digital asset custody service
- BlackRock partnering with Coinbase
- UBS launching a €375M bond in tokenized format in Switzerland
- Large private equity funds like KKR and Hamilton Lane tokenizing some of their funds
- Banks such as BBVA and DBS launching crypto trading and custody services to wealthy customers
- Fidelity's Digital Assets division opened up ether (ETH) trading for institutional clients and a new Ethereum index fund for accredited investor in Q3-2022

However, in a race to cater to clientele interested in these new digital assets, both traditional banks and tech companies have their obstacles: the traditional finance world will need to develop their technology quickly in order to compete with the services of tech companies who have several years' head start; on the other hand, the newer tech companies, who from the start primarily offered their custodial services only to crypto-native companies, will need to compete for non-crypto-native clientele against traditional banking institutions who already have a wide customer base.

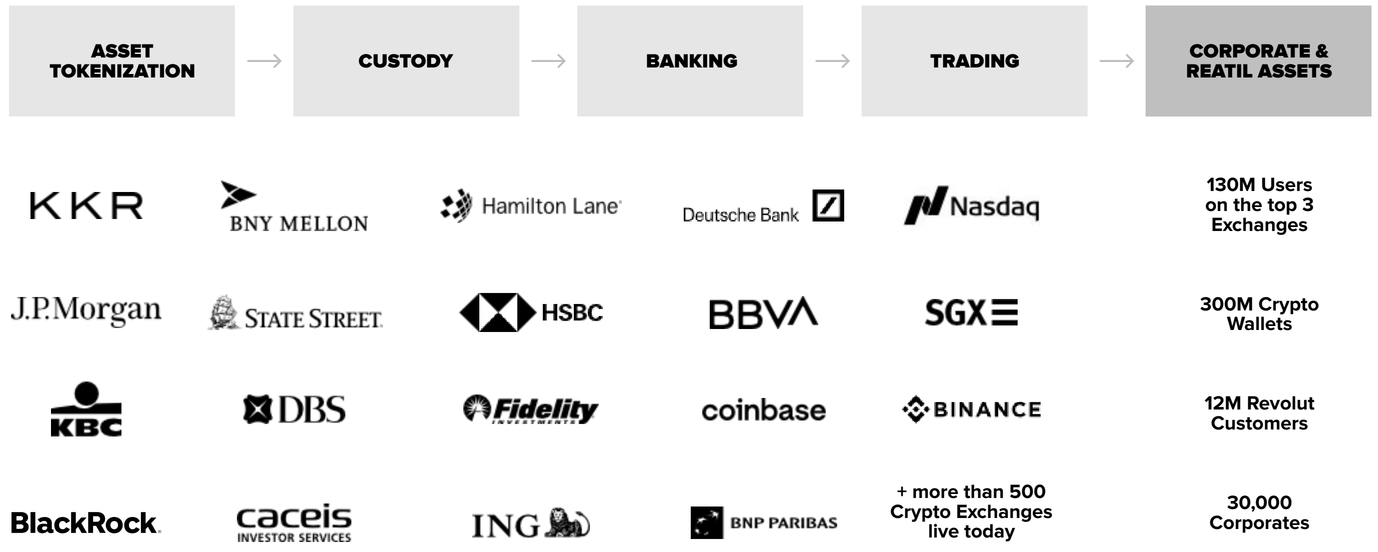
Another critical aspect of the current market trends is the growing talk around the introduction of Central Bank Digital Currencies (CBDCs). Many central banks have already made announcements that they are considering the issuance of such tokens. CBDCs are different from regular cryptocurrencies in that they are issued by central banks; hence, the supply would be controlled by a central bank much like the GBP today. On 23 November 2022, the Bank of Japan reported that they have planned experiments on a digital yen with three of the largest banks of Japan, with a decision to be made on issuance in 2026. This, among other examples around the world, highlights the growing focus of governments and central banks on digital assets.

When it comes to traditional institutions (aka "TradFi"), several actors in the value chain need to be ready to support assets in tokenized format for these assets to flow across the value chain. Free-flowing assets become more readily discoverable and tradable via a growing list of providers.

As mentioned before, custodians play a large role in normalizing digital asset ownership and the new technology stack has made custody more accessible. Many banks have announced their platform choices and competition for the traditional custodians (e.g. BNY Mellon and State Street) will increase as a result.

Finally, trading venues are crucial for facilitating the trade of tokenized digital assets. These currently include at least 500 crypto exchanges as well as several traditional exchanges (e.g. Nasdaq, SIX Swiss Exchange and Deutsche Börse) which have announced that they will support tokenized assets.

A simplified view of the value chain consists of asset owners, custody, banking, trading, and corporate and retail access. Across this value chain, we can see that more than twenty of the largest financial institutions in the world are putting the "plumbing" in place to support assets in tokenized format. As tokenized assets flow across the value chain and more actors are motivated to embrace the change, overall adoption will become increasingly tangible; there is no doubt that each actor will want to achieve an ROI on their investment in digital asset infrastructure and reap the benefits of near real-time settlement and transparency. The following illustration brings the adoption to life visually.



REGULATION ASPECTS OF DIGITAL ASSETS

The technologies behind digital assets and the evolving regulatory framework are inherently complex. One reason why traditional financial institutions did not engage earlier with blockchain technologies was the prior lack of regulation in this field. As regulators in recent years have begun focusing more on DeFi (Decentralized Finance), close attention must be paid to how this will affect opportunities in this field. Adding to the complexities are the variations in regulations across markets (such as money laundering, terrorism financing, illegal trades and cyber-attacks). They could require several revisions or adjustments to operating models, thereby slowing the adoption process.

Most recent legislation in the U.S. context has been centered around determining classification and jurisdiction for regulating digital assets: questions around how to classify these assets and whose authority they fall under have hindered the development of clear regulations in prior years. In May of 2022, the Crypto Assets and Cyber Unit was allocated more resources for detecting securities law violations in various blockchain-based markets, including crypto- asset offerings, crypto asset exchanges, crypto asset lending, staking products, DeFi platforms, NFTs, and stablecoins.

This is likely because the Securities and Exchange Commission (SEC) is making the case that most cryptos are securities and should be regulated.

WHY ARE DIGITAL ASSETS RELEVANT FOR FINANCIAL INSTITUTIONS?

MAIN SOURCES OF NEW REGULATORY REQUIREMENTS

- MiCA in Europe
- FCA in the UK
- SEC in the USA
- FINMA in Switzerland
- BaFin in Germany
- CMF in France
- CONSOB in Italy
- CSSF in Luxembourg
- IMF Regulation of Crypto Assets
- White House Fact Sheet – Digital Assets Framework
- Financial Action Task Force (FATF) Standards on virtual assets and virtual asset service providers
- Basel Committee on Banking Supervision – Treatment of banks' crypto-asset exposures
- IOSCO (International Organization of Securities Commissions)

In December 2022, the EU published its proposal for regulations on Markets in Crypto-asset (MiCA). This would make the European Union the first regulator to issue a comprehensive all-in-one crypto regulation. MiCA regulates activities involving "crypto-assets." The term crypto-asset is broadly defined as any "digital representation of a value or a right which may be transferred and stored electronically, using distributed ledger technology or similar technology".

MiCA would introduce three subcategories for crypto-assets, including:

1. utility tokens which are crypto-assets intended to provide access to a good or a service, and two different types of stablecoins called:
2. e-money tokens meaning a token aiming to reference the value of a fiat currency, and
3. asset-referenced tokens meaning a token purporting to reference the value of several fiat currencies, one or more commodities or crypto-assets or a combination of these.

TOKENIZATION BROADENS THE DIVERSITY OF TRADEABLE ASSETS AND PROVIDES NEW TANGIBLE BENEFITS

When considering digital assets, the main assets that come to mind are crypto assets like Bitcoin and NFTs; but the range of use cases for digital assets covers a broader spectrum than just this, encompassing many assets that even traditional asset classes do not cover. Though cryptocurrency remains the most well-known use case for blockchain technology, other assets, such as tokens, are growing in functionality and versatility.

CORE CONCEPTS ABOUT TOKENS

Simply speaking, a token is a representation of value. It could be an asset having monetary value or data value or identity. The creation of tokens happens through contractual agreements defined by the underlying actors involved in the transaction. This opens the doors to cover a lot of possibilities as tokens can be tangible or intangible. Exchange of tokens through transactions can occur via almost any medium, including person-to-person, machine-to-machine, person-to-machine and machine-to-person, via existing payment systems, a proprietary loyalty or reward system, or a blockchain.

Tokens come in wide varieties. Some tokens are made to represent or embody investment schemes and financial products: these range from carbon reduction credits to commercial paper, insurance, structured products, or securities. Security tokens are one of the most common types of tokenized digital assets and represent traditional investments like stocks or bonds. In more technical terms, tokenization of assets is the process of issuing security tokens (a type of blockchain token) representing real digital tradable assets.

BENEFITS OF TOKENIZATION

There are several benefits to market participants associated with tokenizing assets. Generally, asset Tokenization leads to higher efficiency, transparency and liquidity. In more detail, they include, among many others reaching a broader investor base by removing the limits of fractionalization with real-world assets, increasing geographic reach and reducing transaction times. The available literature covering the benefits of tokenization is well-established.

TOKENIZATION BENEFITS

ATOMIC	PEER TO PEER
TRANSPARENCY	IMMUTABLE
AUTOMATION	FRACTIONALIZATION

Atomic transactions are a fundamental part of the design of blockchain protocols; the instant settlement removes the need to seek out insurance to cover the time of uncertainty that both parties have until transactions settle. Trillions are locked in temporary collateral each day when transactions take 2 to 5 days to settle via traditional infrastructure, covering the risk that one of the parties would default during that time.

The standardization of the technology to represent “value” is very powerful. Any type of token can be held in a crypto wallet, turning the wallet into a universal bank/fund/trading/cash account and vault. This lowers the barrier to get started with any of these assets (e.g. connecting to trading venues or lending/borrowing services).

TOKENIZATION CASE STUDIES

CARBON CREDITS TOKENIZATION

The UN Kyoto Protocol of 1997 established carbon trading to reduce CO_2 emissions. Since then, voluntary and compliance carbon markets growth have reflected a rise in demand for carbon offset credits.

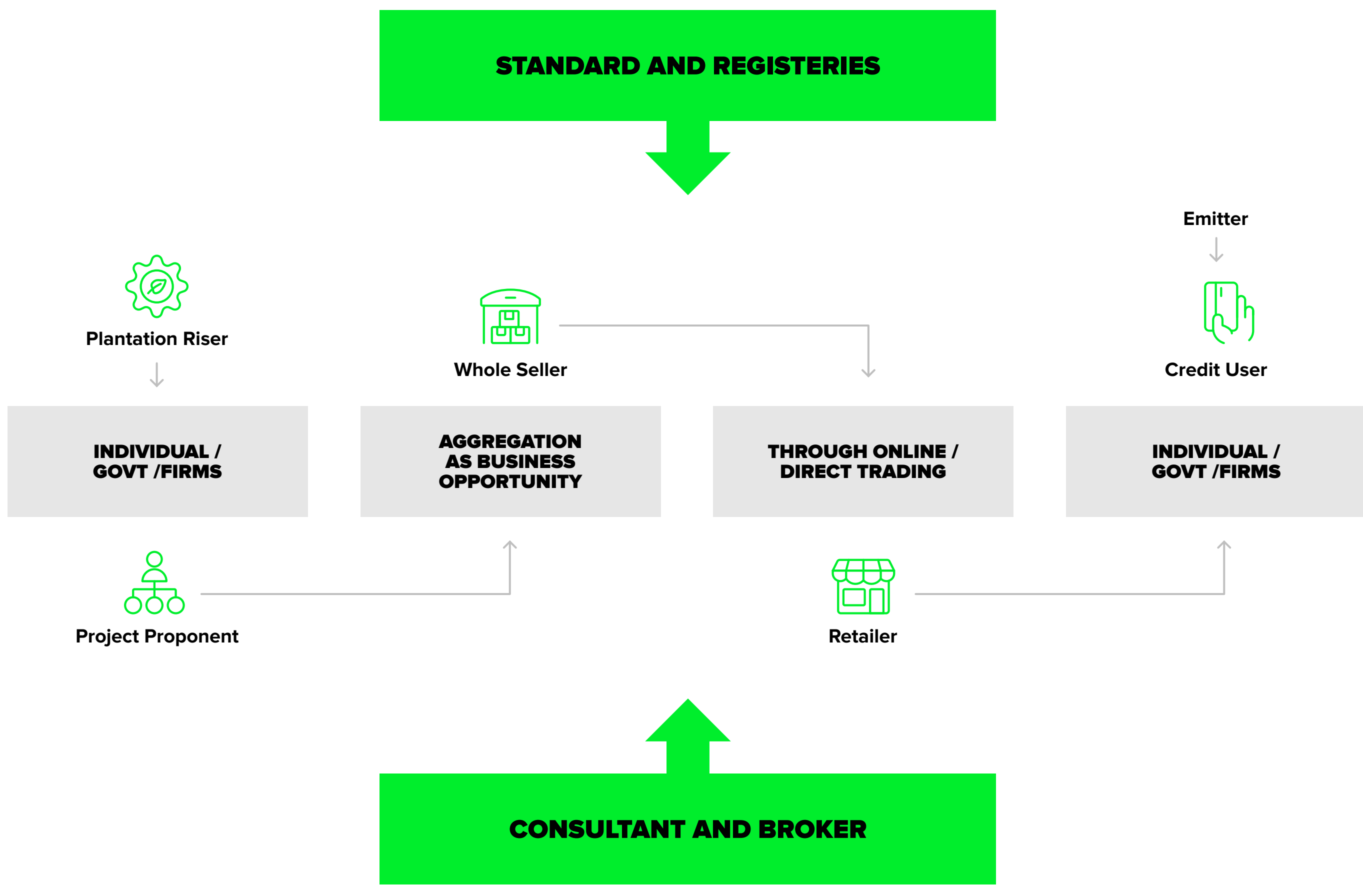
At the center of this growth is the demand for carbon-offset credits from companies looking to reduce their overall environmental impact, whether for business or altruistic reasons. Carbon offset credits may be attained either through avoidance (i.e., reducing emissions) or through reduction/ removal (i.e., counteracting emissions, such as by drawing carbon out of the atmosphere), and once attained may be traded or sold in the carbon market. Companies that seek to achieve carbon-neutral status, but struggle with reducing their carbon emissions fast enough, can use these carbon credits to offset their emissions.

A growing concern is how to create a globalized carbon market that is both transparent and efficient. In regional-based compliance carbon markets (CCM), companies' actions are dictated by government policy which determines emission limits (i.e., allowances, or credits).

The three principal CCMs around the world are the European Union's Emissions Trading System (EU), The California Global Warming Solutions Act (USA), and The Chinese National Emission Trading System (China).

Despite being the smaller of the two markets, voluntary carbon markets (VCM) across the world are developing rapidly and play an equally important role in achieving global environmental goals. They are less restrained geographically and economically, thus holding the potential to affect a larger number of industries. By giving offset credits liquidity, this type of market can encourage more private trading in the carbon market, which could be of great interest to both investors and environmentalists. Though VCMs are growing steadily alongside CCMs, they are often plagued with a lack of transparency and market inefficiencies, which obfuscate the carbon lifecycle: these issues stem from asymmetrical information, fragmentation, and surprisingly poor liquidity. In some cases, these results in offsets that are retired by multiple companies, resulting in skewed data about the amount of emissions actually reduced.

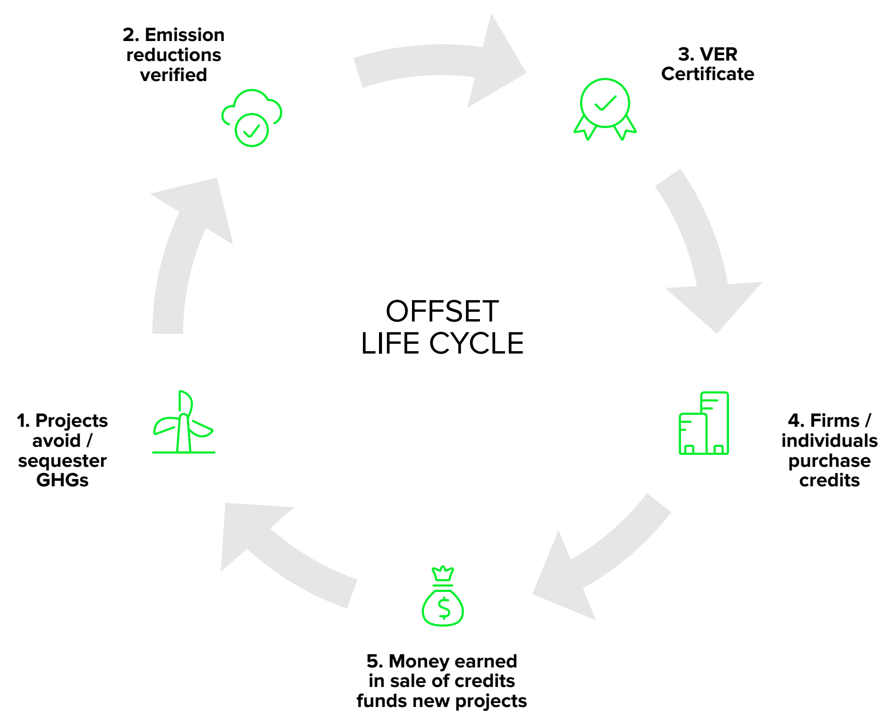
TRADITIONAL VOLUNTARY CARBON MARKETS



This is where blockchain comes in: blockchain technology could revolutionize the monetary part of a carbon offset lifecycle (to start with) by tokenizing carbon credits. A typical lifecycle begins with a company commissioning projects that aim to avoid or sequester greenhouse gases (GHGs). Then an offset registry (e.g., Verified Carbon Standard, International Carbon Registry) evaluates the project to determine its validity, issuing offset credits for each verified ton of CO_2 emission avoidance, reduction, or removal, in the form of Verified Emission Reduction (VER) certificates.

From this point, firms or individuals can purchase these credits from other firms or use the money from any of their own carbon credit sales to fund new GHG emission reduction projects. In a traditional lifecycle, the paper trail of offset purchases may become overcomplicated or fall prey to manipulation; with blockchain technology, manipulation becomes impossible and processing is simplified. As credits are brought on-chain, purchase records are immutably and permanently recorded on the blockchain, resulting in complete transparency throughout the lifecycle of each credit. The diagram depict the simplified, blockchain process.

BLOCKCHAIN-BASED OFFSET LIFE CYCLE



ONE-WAY BRIDGE

Some Carbon Bridge protocols provide a ready-to-use mechanism for bringing carbon offsets from source registries onto the on-chain Registry. The Verra Registry is the most popular one to do so. Any carbon offset/credit in a specific registry can be retired in the registry to be brought on-chain. Once these tokens are generated, they are deposited in a Carbon Pool. These pools only accept carbon tokens that contain a specific set of gating attributes. Once these tokens are deposited into the pool, users receive carbon reference tokens. These tokens belong to a fungible pool with a backing of one carbon token held. Most carbon tokenizers aggregate carbon credits in Carbon Pools, to create liquid carbon tokens.

As fungible tokens with deep liquidity, these carbon reference tokens serve as the carbon building blocks for a dynamic carbon market. The simplified working of a one-way bridge is summarized in the chart below. Since 2021, 22 million Verra (the registry with the most global carbon credits issued) credits were bridged onto the blockchain by retiring the credits, which is equivalent to 4% of all the credits issued. However, this created confusion, as they were not retired in the traditional meaning. Indeed, the trading continued on-chain and as of May 2021, Verra has halted this process not to drive further confusion regarding the retirement of credits.

TWO-WAY BRIDGE

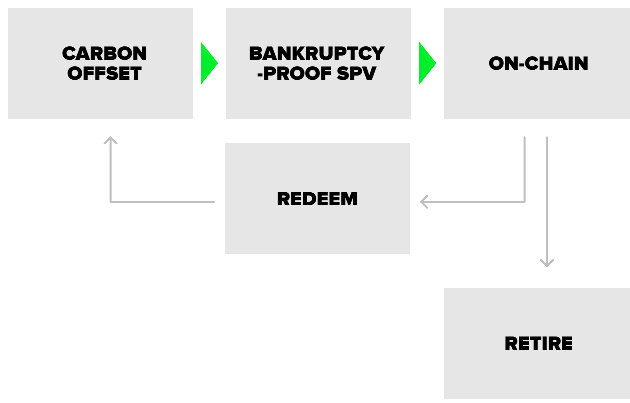
In order to introduce the credits in the blockchain without retiring them in the registry, a Special Purpose Vehicle (SPV) must be put in place to hold the credits and to interact with the registries to retire them on a needs basis of the customers. The ideal scenario would be for the registries like Verra to hold the credits on the blockchain by themselves to enable them to be traded on-chain. A two-way bridge's main advantage is the interoperability between on-chain and off-chain markets to make the overall VCM more efficient. When interoperability exists transparently, arbitrageurs take advantage of any price difference and correct the market price at the earliest.

Although the majority of offset credits currently remain physical, they are being moved on-chain at significant industry levels. Reply intelligence has determined that 4-5% of credits were brought on-chain just in the last year. At the same time, the market is still considered immature, and organizations that wish to prove the value of blockchain solutions will need to continue to improve their technology readiness in the coming years.

ONE-WAY BRIDGE

- Offset is brought on-chain by retiring them in the physical registry
- They are considered retired as per the registries
- Cannot to be converted to physical credits; to be traded or retired on-chain

TWO-WAY BRIDGE

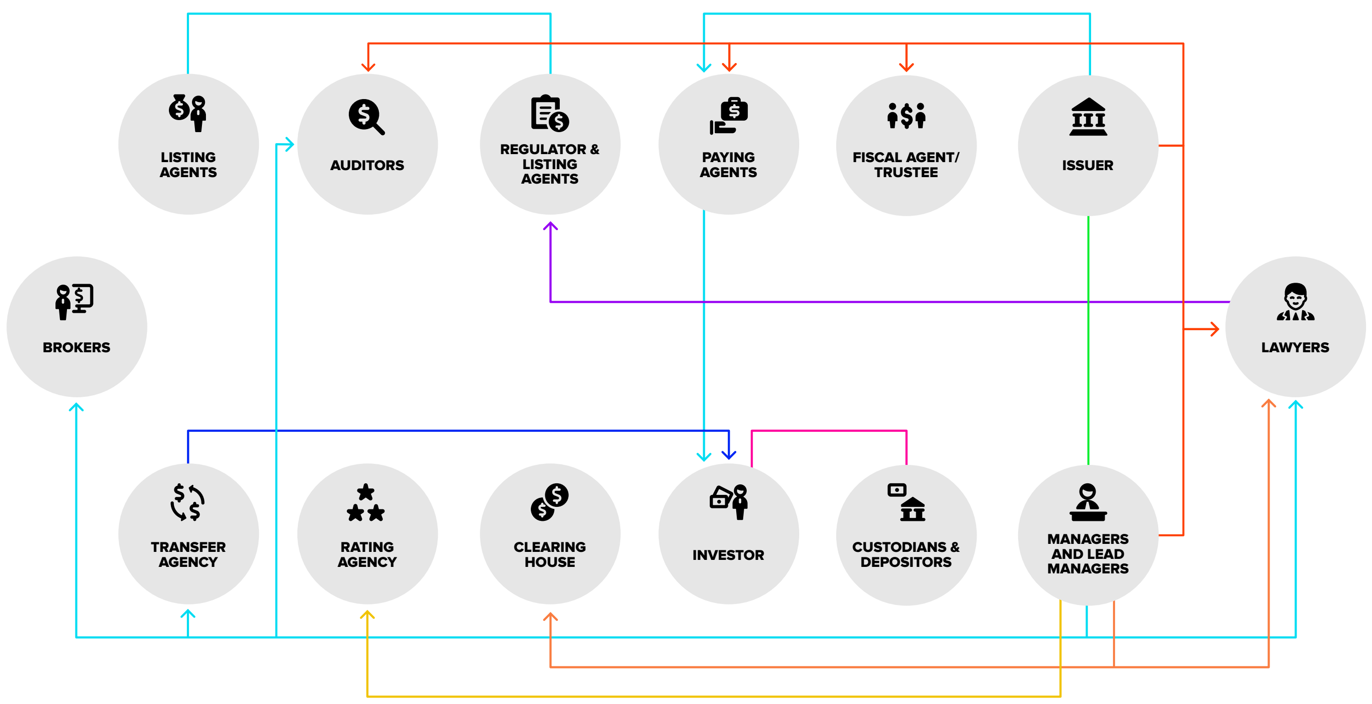


- Offset is not retired in the registry but is held in an Special Purpose Vehicle (SPV)
- They are considered "live" as per the registries
- Can be converted to physical credits to be traded off-chain or can be traded on-chain

BOND TOKENIZATION

The traditional process for issuing financial instruments, such as equities and bonds, has long been complex and inefficient, involving many intermediaries, which squanders waste time and money. A guaranteed bond issuance takes between 1,080 and 2,160 of working hours based on Reply's research. Capitalizing on the benefits of blockchain technology, such as its standardization and transparency, could mean offering a decentralized, interoperable system for issuing, trading and tracking bonds that would have a measurable impact on the cost and efficiency of the process.

TRADITIONAL BOND LIFE CYCLE



- Appointment of parties and due diligence
- Placing the security on the market to find buyers
- Roadshows and pre-selling
- Announcement of issuance
- Finalization and prospectus approval
- Issuance and book building
- Final Document Check
- Post Issuance activities

As it stands, the current bond lifecycle involves many steps and actors, ranging from lawyers, rating agencies to auditors, lead managers, clearing houses and brokers, making it a lengthy process of anywhere from one week to six months. Several interactions and confirmations need to be performed among the parties involved in each of the principal four stages (issuance, pre-trading, trading, and post-trading).

Meanwhile, the issuance lead-time of a digital bond can be reduced to mere hours, with radical adjustments at every stage which help accelerate the process. During the issuance stage, rather than the issuer mandating the lead manager to instruct their lawyers and the clearing system on which bonds will be issued, the lead manager can mint the tokens directly, initiating the digital term sheet and placing them under the custody of the issuer.

Once the issuer finalizes the term sheet, the legal counsel and arrangers are notified in real time and review/approve on their platform operating across the same DLT network. This avoids the lengthy chain of command in the traditional lifecycle and the involvement of excessive intermediary steps which consume time. Post this, data providers can be notified in real-time of the newly issued bonds such that a data stream can be prepared for ongoing reporting and verification of the project.

The DLT bond issuance can integrate with the existing KYC solutions and authentication solutions to verify the investor's (especially retail) identity enabling the placing institutions to pre-screen and approve investors following standard KYC/AML processes.

Additionally, the payment mechanisms can be incorporated into fiat payment rails, which are the commonly used systems to enable timely payment of coupon or redemption based on the investor's preferences.

Next, during pre-trading, the entire role of the sales team, from promoting the transaction to prospective investors, to involving third party intermediaries and lawyers, can be rationalized thanks to the real-time book building process, which controls the minimum and the maximum for investors using smart contracts.

The trading stage can be equally digitized, removing the manual processes of signing (i.e., signing the subscription agreement) and closing (i.e., delivering the bonds to the bondholders and the payment to the issuer). By digitizing these matters and signing and closing on-chain, unnecessary involvement of third parties can be avoided and the entire process is reduced to a matter of minutes.

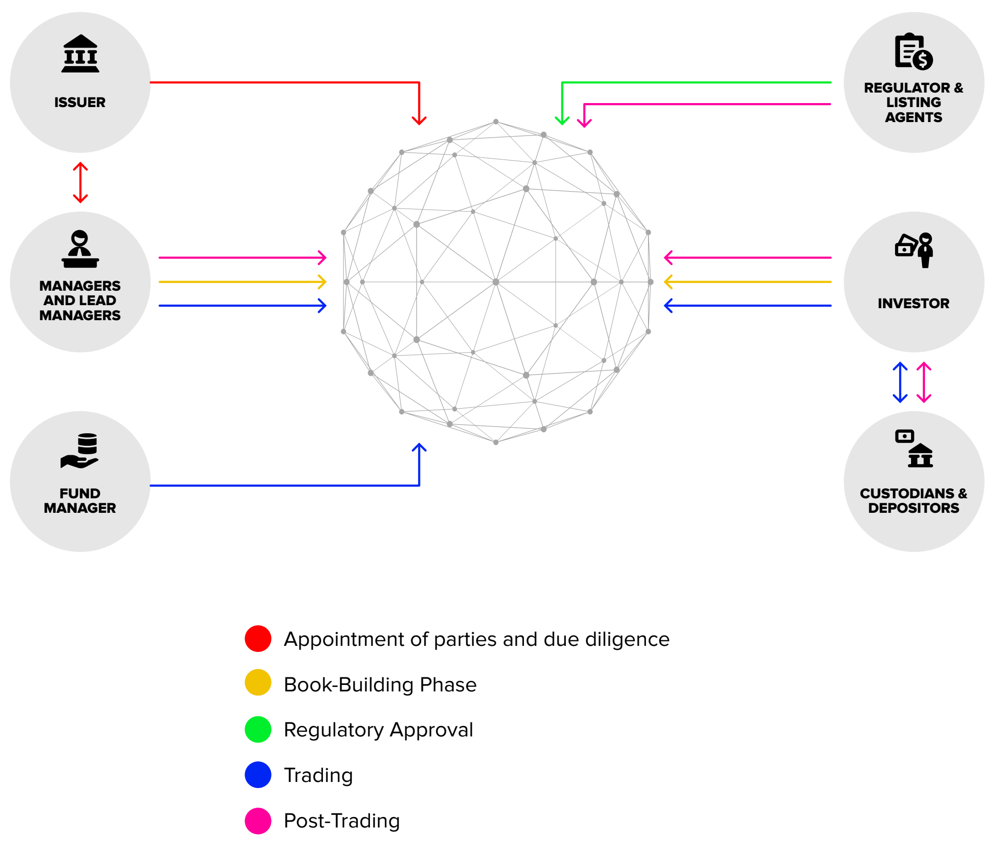
At this point in the workflow, orders can be automatically sent to the central securities depository. Investors receive real-time notification of their final allocation and the amount of expected interest earned on locked cash. Placing institutions receive real-time notification of finalized allocation results for their clients only and summarized across all clients. Arranger(s) receive real-time notification of finalized allocation results for their placing banks only. In the final phase, post-trading, there are traditionally a number of tasks that require action from third parties or parties' lawyers.

The Central Security Depository, the issuer, the paying agents and bondholders, and the lawyers will need to stay involved in order to ensure that regular interest payments are being made correctly from the issuer, through the paying agents, to the bondholders, until the bonds reach full maturity.

Instead, with smart contracts based on-chain, post-trading activities can be executed automatically and in accordance with the latest updates to a bonds' ownership. Even more, having a public ledger guarantees that all data remains publicly accessible to conveniently facilitate live data audits. A DLT engine can aid in creating a secondary market. With smart contracts based on-chain, post-trading activities can be executed automatically and in accordance with the latest updates to a bonds' ownership. Moreover, having a public ledger guarantees that all data remains publicly accessible to conveniently facilitate live data audits. A DLT engine can aid in creating a secondary market, mitigating liquidity risk from the business perspective, improving post-trading processes and atomic settlement, which ultimately lowers the transaction costs considerably.

TOKENIZED BOND LIFE CYCLE

In summary, the main actors in a bond lifecycle reduce from 15 to 6. The fundamental principles of DLT fulfil the role of the actors involved in the as-is process. By exploiting its full potential, the result is a simplified transaction flow between a reduced set of actors.



The simplified transaction reduces the reliance on actors whose role is to bring in issuers and investors onto a single platform. Legal advisors, instead of playing a central role, become more value-added and can focus on advice and negotiations. From a regulatory standpoint, given that all the information is publicly available or can be made publicly available based on the use case, the compliance part is further simplified.

Automation in the process shows a unified view for each process eliminating manual activities thereby increasing data consistency. Additionally, the automation of corporate events internally through pre-defined smart contracts would increase process efficiency to a large extent. Ultimately transparency in the end-to-end bond cycle brings in more value to investors and issuers. DLT provides the issuers with the ability to launch on a permissioned DLT or a shared DLT ensuring the privacy of all actors is maintained while enabling each of them to fulfill their responsibilities.

SOME EXAMPLES OF TOKENIZED BONDS

2021 EIB issues first ever €100M digital bond on public blockchain with Goldman Sachs, Santander and Société Générale.

2021 Six Digital Exchange (SDX), crypto-asset trading venue, launched its first live transaction, issuing a CHF150m digital bond

2021 DBS Bank Singapore issued a S$15m digital bond in its first security token offering

2022 PDS Group launched a tokenized digital bond, issued by UnionBack

2022 OCBC digitized Euro Commercial Paper from issuance to settlement on the Market node platform

2022 BaFin approved an Ethereum-based real estate bond for security issuance firm Fundament Group

2022 MakerDAO approved the integration of Société Générale's Forge (digital asset) subsidiary to its vaults and the IB will now be able to take out an over collateralized DAI loan deposit against a deposit of OFH tokens, which represent covered bonds that have been rated AAA

2022 IDB Group & Davivienda Bank issued Colombia's first blockchain bond

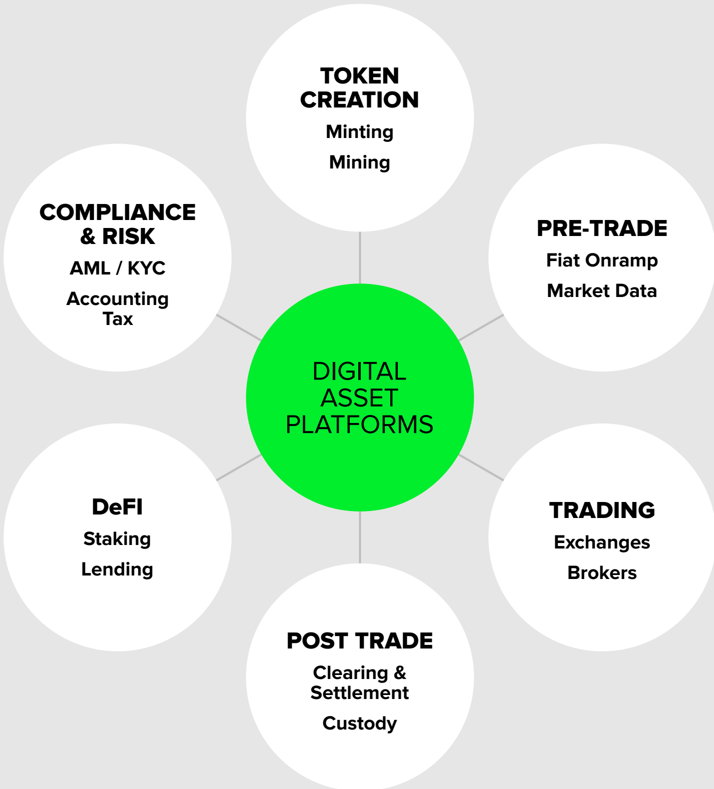
2022 UBS issued a CHF 375 million bond on the blockchain-based platform of SIX Digital Exchange (SDX) while being dual listed and traded on SDX and SIX Swiss Exchange (SIX)

2023 ABN Amro issued a €450k tokenized corporate bond on behalf of APOC Aviation.

WHAT ARE DIGITAL ASSET PLATFORMS?

A NUMBER OF VENDORS ADDRESS DIFFERENT PARTS OF THE INFRASTRUCTURE REQUIRED IN DIGITAL ASSET MANAGEMENT

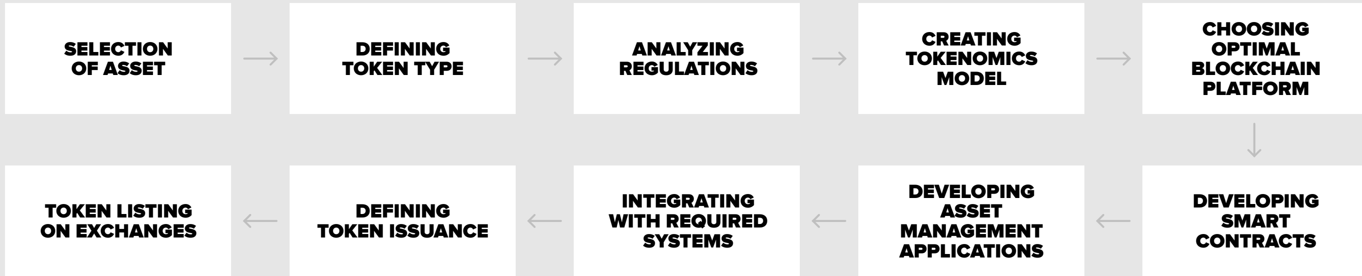
The task of preparing for a growing world of tokenized assets seems daunting for traditional banks. There are a number of new complexities as a result of blockchain technology, including 24/7 markets, smart contract automation and instant settlement. Thanks to billions of venture capital investments, the landscape of solutions providers has grown rapidly. In any product category, there are at least five mid-stage companies, each with a few reference customers and a well-tested platform. The diagram below depicts the ecosystem of solutions that address the different needs of blockchain-based applications.



The two main platforms in focus in this Reply report are Tokenization and Custody. Some vendors provide both and more but fundamentally, there are distinctive value propositions.

TOKENIZATION

Tokenization on blockchain is the process of issuing tokens representing real (tangible or intangible) digital tradable assets. Once issued, these tokens are controlled and executed using a smart contract. The conditions of the parties' agreement are put into lines of code that are stored in containers already present on the blockchain network, making smart contracts self-enforcing and self-executing. Tokenization involves several steps as shown below.



A critical aspect is the choice of blockchain: different blockchains expose different capabilities that can be expressed in the smart contracts used when tokenizing assets. A second aspect is the asset representation model and tokenomics. An asset's unique characteristics are represented by a collection of established functions called the token standard, e.g. the value of several fiat currencies, one or more commodities or crypto-assets or a combination of these:

- Fundamental properties of the asset
- Purpose of Tokenization
- Authorization rights
- Supply and demand characteristics
- Regulatory restrictions
- Smart contract audit
- Asset management tools for issuers and investors
- Crypto wallet
- Payment gateways
- KYC/AML verification services

In view of the critical aspects mentioned above, a typical Tokenization platform will provide the following services: minting, onboarding, servicing, reporting and a digital interface supported by integration.

INTERFACE DESIGN AND INTEGRATION
Digital and functional interface to investors integrating digital securities management portal for investors with ability to be custody agnostic.

REPORT AND MONITOR
Automate the reporting and monitoring processes for real-time transaction and position reports.

SERVICE
Recovery processes, automate token-based sale management processes like Cap table for equity issue, book building for issuance.

ONBOARD
Deploy blockchain identities for your investors, integrate KYC/AML parties of your choice, utilize a self-service and scalable platform.

MINT
Quickly create, deploy and issue compliant security tokens through creation of automated workflows and node architecture based on inputs of the asset to mint tokens on a need based.

CUSTODY

Custody is a well-established function and business model in the financial services value chain. However, this is changing significantly for tokenized assets. The general misunderstanding is that crypto wallets contain tokens. The reality is that token balances are stored on the blockchain and that custody mainly is about managing access to these wallets. Access to digital assets is secured by a public/private key combination.

The private key is the “key” that opens the safe in which your assets are stored. The “safe” is secure due to the inherent cryptographic security provided by the blockchain. Private keys give owners the access to their digital assets and managing these private keys is the primary function of a custodian. The wallet maintains the history of transactions, generates and forwards transactions to respective networks.

There are different ways of safeguarding the private keys. The user acts as a self-custodian or gives this responsibility to a third-party. The custody landscape has evolved to include new start-up tech companies which offer these services.

The type of custody depends on the user preferences and the quantum of assets under consideration. The onboarding process and custody have been greatly simplified for consumers by emerging tech companies.

This is because at the time, traditional banks were hesitant to venture into this new area of offering custody due to lack of strong regulation. Instead, tech companies filled this gap, offering custody via hosted wallets and relieving the users from having to figure out where to store tokens. Over the last few years, digital asset protection has become increasingly important due to the rise in the number and size of cyberthreats and hacks.

A typical set of services offered by a custody platform for institutions are represented below.

BLOCKCHAIN CONNECTIVITY
Operating nodes that connect to different blockchains, to query data and to transfer assets between wallets.

TOKEN FUNCTION SUPPORT
Expose functions that can interact with the smart contracts that are specific to the tokenized asset.

PROCESS ORCHESTRATION
Play a pivotal connectivity point through full trade life-cycle management with customized workflows.

POLICE ENGINE
Flexible configuration to suit the risk policies set by the customers, aligned with the regulatory compliance of the jurisdiction.

SECURITY ARCHITECTURE
Giving its users multiple layers of security. Some of the examples are multi-sig, key sharding and multi-party computation.

STORAGE OPTIONS
Giving its users multiple options between hot/warm/cold storage, on premise, in the cloud or with trading venues.

Currently, there are several types of institutions offering custody services. While some of them are pure technology providers, some are regulated financial institutions, others are hybrid.

It is understandable that banks have been using hardware security modules (HSMs) in their operations for decades. HSMs are tamper-resistant physical devices which are isolated from external systems used to generate and secure digital keys. But with the advent of heavy daily usage by individual users, HSMs are not fit for purpose. They need physical access

deployment, maintenance and configuration which is not ideal for retail users. Additionally, HSMs do not support complex business logic and cannot secure cloud applications or scale without additional hardware. Lastly, HSMs centralize keys, which is contrary to the logic of using digital assets on a DLT platform, thereby creating a single point of failure. On the offside, multi-party computation (MPC) adds in an extra layer of security and splits the access to the keys among multiple trusted parties.

Simply put, MPC allows the use of cryptographic keys without having them in a single place. Although sometimes each part of the key is stored in a less secure environment than under HSM, it would be harder to steal keys from several devices than a whole key from one device. To complete the circle, HSMs are a good way for cold storage for the occasional trader while MPC and other new ways of technologies are well suited for the everyday hot traders. The ideal way would be for financial institutions to use the MPC technology on top of the existing HSM to ensure additional security and a backup of the keys in the event of them being lost. In summary, custody providers must offer simplicity, efficiency and greater security to reduce the overall risk.

NO-REGRET MOVES FOR FINANCIAL INSTITUTIONS

A NUMBER OF STEPS CAN BE TAKEN TODAY TO SERVE AS A FOUNDATION FOR DIFFERENT OUTCOMES

The task of preparing for a growing world of tokenized assets seems daunting for traditional banks. There are a number of new complexities created by blockchain technology, including 24/7 markets, smart contract automation and instant settlement. The barrier to learning this technology is higher than average and few employees seem to take the initiative to learn it on their own.

Moreover, the regulatory frameworks remain unsettled. The option to wait for regulations to be fully defined seems too risky, given that 80% of the largest banks are already committing to infrastructure readiness. Instead, any new infrastructure should be flexible enough to account for various regulatory requirements. Once the regulations are sufficiently defined, an extensive network of actors in the value chain should be ready to scale up quickly. In short, the risk of being left out is real and institutions need to be prepared.

GETTING STARTED WITH DIGITAL ASSETS

For financial institutions that have not started yet, here are some of the no-regret moves possible today: education, risk management and Tokenization. Each have a different risk/ effort profile.

EDUCATION

The first priority is to appoint a handful of team members to become 'fluent' in digital asset technology and markets. This learning can be done through certification programs, POCs and partnerships. Equally important is the education of customers and key counterparties. Private banks can no longer ignore the topic of crypto; a first way to lean in is to offer education to customers, which can not only inform them of the opportunities in this sector but also of the market risks, protecting them from scams and misinformation.

RISK MANAGEMENT

Even if a financial service organization is not active in crypto today, they may be indirectly exposed to risks arising from crypto. This is due to the fact that their counter-parties, suppliers, and customers could very well be active crypto users. Thus, they may be materially exposed to smart contract breaches, new cyber threats and more. A no-regret move would be to come to grips with these risks: start auditing the risk exposure, carry out a remediation program, set up an ongoing monitoring capability, etc. For example, a private bank could start adapting their Enhanced Due Diligence (EDD) procedures to include any crypto holdings.

Beyond protecting themselves in the here and now, this will also give organizations better preparation for the point when they will be more directly involved in digital assets, whether it be through tokenization, custody, transfer, or trading.

TOKENIZATION

One way to get familiar with the sphere of tokenization is to consider tokenizing proprietary assets. HSBC, for example, announced in 2022 that they will tokenize some of their history into NFTs, which will be given to loyal customers. In this way, HSBC will fully control the 'asset' and its value, from custody to the distribution process. The risk is fully under control and the whole exercise forces them to think through difficult aspects such as choice of blockchain, creating the smart contract to codify the tokenization conditions, and solving for custody (at HSBC and for their customers).

CONCLUSIONS

THREATS AND OPPORTUNITIES

Dematerialization into electronic formats brought many benefits in the past century: it became easier to invest, to pay or to procure financial services such as loans.

The next wave undoubtably is tokenization of assets on blockchain, as it increases access and simplifies processes further, whilst enabling innovation via smart contract technology.

The disruptive nature of a crypto wallet, capable of holding any type of assets and of connecting to innovative blockchain enabled services, is going to have a profound impact on how value is accrued and transferred.

Many start-ups have been able to offer financial services that in the past required huge technology investments that only large banks could afford: a small company can now offer Lombard lending whilst relying on public blockchains like Ethereum to provide secure ledger capabilities.

Traditional financial institutions are seeing the threats and opportunities, either from new players or from their own ecosystem. Every financial service has new competition from well-funded start- ups that leverage blockchain technology.

NETWORK EFFECT

In 2022, an industry-wide commitment has been made public, with most of the large actors in the value chain for assets announcing their plans or the launch of a new live service based on blockchain technology. Due to the nature of the technology, all aspects are impacted, ranging from back/mid/front office, operations to risk controls and propositions. This has triggered large-scale transformation programmes. With the value chain fully enabled for tokenized assets, we can anticipate more assets to become available in this format, similar to how e-money for example took off in the past century.

WHY WAIT TO GET STARTED?

With Top 20 Banks, Asset Managers and Custodians implementing the new technology, the momentum is unstoppable for the industry. For those who haven't started yet, the options must be carefully considered. What part of their business model will be most threatened, what products will customers be interested in and how can they differentiate themselves in the next 2-5 years? Tackling the fundamentals of this new technology is a no-regret move. Blockchain impacts operations and all parts of the core infrastructure, requiring diverse teams to assimilate the new concepts and threats. Learning by doing is the most effective way to get started and Reply can help you get started with a number of no-regret moves.