

# The Tokenization of Financial Market Securities – What's next?

Including research report by Greenwich Associates: "Security Tokens: Cryptonite for Stock Certificates"

# Security tokens and blockchain – a consolidated view of the market

Regulatory clarity, increased awareness and adoption by market incumbents has driven the maturity and uptake of digital assets. What have we learned and what comes next?



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After reading Greenwich Associates' report, "Security Tokens: Cryptonite for Stock Certificates" I was pleased to see that it aligned well with the industry research that we have been part of at R3. I wanted to share how the report compares and contrasts with our thinking<sup>1</sup>, along with data from 56 of the world's most prominent securities markets players.

While Greenwich Associates wrote their report, another initiative, the Digital Asset Working Group (DAWG) was in full flight. Its mission was to figure out the trickier aspects of recording assets as tokens on blockchains. The seven-month initiative brought together participants from many of the world's largest and most progressive financial institutions, law firms, and technology providers, mainly from Europe and the US. Two surveys were conducted, one at the start, and the other halfway through, when parties were more comfortable with the subject matter. The findings can be read on r3.com/insights.

The Greenwich Associates report is included after this introduction. We are thrilled that it identified our blockchain platform Corda as the increasingly preferred permissioned blockchain for financial securities.

<sup>1</sup> For further reading I suggest Todd McDonald's post, Securities Tokens: the third blockchain revolution and R3 research paper, Digital Assets: Transforming Capital Markets, 2019

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# Common goals

We found three main similarities across both the DAWG and Greenwich Associates reports relating to the advantages of security tokens.



# 1. The need for transaction and ownership history verification

The most popular advantage of security tokens, as indicated by respondents to Greenwich Associates, was the immutable ledger and ability to trace transaction history. Similarly, 65% of DAWG respondents also indicated that having the ability to identify transaction history of an asset is important to their businesses. Both groups have clearly indicated that with the introduction of digital assets, they would expect risks of transaction history fraud and operational errors to be significantly reduced.

#### Having the ability to identify the history of where an asset has been, back to its creation is appealing to my business:



# 2. Ability to record data onto the asset during tokenization

Both respondent groups highlighted the potential of being able to record additional data onto the digital asset itself. 76% of DAWG respondents agreed that being able to attach key reference data to digital tokens adds value to the way they are processed, moved and settled. Often, the purpose of including ancillary data to transactions is driven by regulatory requirements, typically around antimoney laundering. The ability to create and execute smart contracts<sup>2</sup> to allow regulatory compliance was second on the list of requirements according to Greenwich Associates.

# Attaching data to the asset itself, as opposed to each owner recording data in their own systems, would add value:



**Source:** R3, DAWG Report, July 2019

<sup>2</sup> Accord and R3 describe how relevant legal data can be encoded into blockchain smart contracts here: https://www.r3.com/blog/smart-legal-contracts-on-enterprise-blockchains-a-corda-example/  The agreed business value seen in the ability to shorten the settlement cycle

More than half the DAWG respondents also believed the trade lifecycle can be improved through distributed ledger technology and tokens. Over 70% see this automation of the asset lifecycle as the catalyst to create additional value through greater transparency and fewer disagreements over data. 85% believed that if codified policies could be embedded into digital tokens, it would impact the business positively.

#### Codifying, and digitally enforcing certain behaviors of assets would improve my buisness:



**Source:** R3, DAWG Report, July 2019

# Differences of opinion

Two main differences emerged from the studies.

 Difference in perspectives as to whether the introduction of securities tokens and digital assets are a net benefit on participants' businesses

DAWG respondents provided conflicting views as to how digital assets would impact revenues. On one hand, 50% expected increased revenue opportunities, whereas 17% were concerned about revenue losses that could result from the introduction of digital assets.

# The most important positive impact of digital assets on our business will be:



Over

see this automation of the asset lifecycle as the catalyst to create additional value through greater transparency and fewer disagreements over data.

In the Greenwich Associates report, 14% said liquidity was the most relevant advantage of security tokens, unlocking liquidity premiums in currently illiquid secondary trading markets. Respondents also indicated that the lack of secondary markets for private securities is the single biggest impediment to institutional investors investing in private markets.

In many cases, a revenue for one business model, is a cost for another. A common understanding that survey respondents have subtly indicated is that with the introduction of security tokens, markets will become more competitive, ultimately benefitting the end consumer. If this is the case, agile first movers will benefit.

# 2. Contradictions on the impact of securities tokens on regulatory compliance

Greenwich Associates' report highlighted that being able to comply with regulations was a great reason to use digital assets, in particular for private placements. Despite agreement that digital assets could support end-to-end compliance processes, the DAWG had a more pragmatic view, citing the short-term regulatory reporting hurdles that would need to be addressed. Although seen as a boon to compliance, 63% of Greenwich Associates respondents indicated that regulatory clarity in terms of digital asset treatment has so far been a major challenge in their adoption.

Regulatory hurdles will greatly depend on firms' risk profiles and the approach that they take to represent real-world assets on ledger. Firms such as **HQLAx**, **Ivno** and **SIX** have worked hard to comply with existing regulatory standards. They focus first on digitally representing existing assets with welldefined legal and regulatory structures.

Regulatory bodies and industry participants continue to work together to figure out how to regulate these new products. For example, in Hong Kong in 2018, the Securities and Futures Commission invited industry players to join their regulatory sandbox to determine how token exchanges should be regulated.

Today, we are seeing much greater participation of regulators in the debate. Many new marketplaces are being built under their purview. R3 has had over 200 active engagements with regulators and central banks, taking part in joint projects. Currently there are over 30 regulatory bodies actively participating in our ecosystem.

# Drivers for digital asset adoption

When are respondents planning to go into production? During a DAWG readout day event in May 2019 in Singapore, the audience was polled, with 30% responding "within a year or less" and 37% responding "within 1 to 5 years". In that same poll, 74% also pointed to "tokenized assets" as the most important product for their organization, with "cryptocurrency" at 19% and "neither" at 17%.

# Increasing regulatory clarity

Regulatory clarity will continue to evolve in line with market needs, as businesses develop their crypto and blockchain applications and products<sup>3</sup>. For example, Thailand has merged two royal decrees that previously regulated digital assets separately into one revised act to reduce hurdles to start-up development<sup>4</sup>.

<sup>3</sup> For highlights of Asia regulations as at September 2019, see https://medium.com/inside-r3/the-state-of-security-token-regulations-in-asia-fd2bc65b24b7 <sup>4</sup> https://www.bangkokpost.com/business/1472221/digital-asset-decrees-to-merge Going forward, regulators will need to provide more specific guidelines and rules to facilitate the rapidly growing digital asset ecosystem, especially in the area of custody.

#### Increased awareness

When Greenwich Associates asked which blockchain was most appropriate for security tokens, a surprising number of respondents already had an opinion. Of those who had a preference, 32% chose Corda. This is a significant swing away from Ethereum, and shows good traction for Corda which only came to market in November 2016. In total 62% indicated their preference to use a permissioned blockchain.

# Use of public or permissioned blockchains



# Most appropriate blockchain for security tokens



Note: Based on 105 responses. Source: Greenwich Associates 2019 Blockchain Study

<sup>5</sup> https://www.r3.com/blog/swiss-digital-exchange-innovation-the-swiss-way-powered-by-corda/

### Incumbent adoption

Adoption by influential organizations, such as the Swiss exchange SIX<sup>5</sup>, which chose to build its new Digital Asset Exchange SDX on Corda, have helped boost Corda's visibility and mindshare for security tokens. At R3 we are fortunate to have a network of supportive partners who actively validate the capacity and competence of Corda as a medium of record for digital assets.

# The case for Corda

Despite regulatory uncertainties, early adopters are choosing to build on platforms that give maximum optionality to comply with future regulations. This demonstrates the case for Corda's adoption.

The unique nature of Corda's protocol allows for privacy concerns to be mitigated, assurance of transaction finality, as well as deriving benefits from immutability and ownership history.

As the ecosystem for Corda based digital assets continues to mature, we are seeing a virtuous cycle of benefits accruing to all parties involved. Issuers, issuance platforms, exchanges, custodians, and other solution providers are all building on Corda, and this expands the Corda network and synergistically creates more utility and value for all parties.

The Greenwich Associates' report following this introduction covers in more detail the current market sentiments regarding security tokens, though the industry is changing quickly. You can also continue to track the changes and learnings from our ecosystem at **r3.com**. As the third wave of blockchain continues and as securities tokens mature under the purview of regulators and with the right technical foundations one thing is clear: the internet of value will deliver real value.

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# Security Tokens: Cryptonite for Stock Certificates





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**62%** PERMISSIONED NETWORK IS MOST APPROPRIATE FOR SECURITY TOKENS, BUT WHICH BLOCKCHAIN TECHNOLOGY TO USE IS LESS IMPORTANT

# Executive Summary

Security tokens are the latest innovation in market structure sitting at the intersection of crypto, enterprise blockchain and regulated securities markets. Also known as digital securities, they can enable improved transparency, programmatic compliance and could unlock a liquidity premium in otherwise hard-to-trade assets. This Greenwich Report discusses how security tokens could become blockchain's next killer app.

#### METHODOLOGY

Between March and April 2019, Greenwich Associates interviewed 114 executives active in the blockchain and financial technology space across all of North America, Europe, Asia Pacific, and the Middle East & Africa. Seventy percent of respondents were actively involved in security token initiatives.

In addition, this paper leverages data from the Greenwich Associates 2019 Equity Portfolio Manager Study, including interviews with 56 portfolio managers and analysts located in North America, Europe and Asia.

#### **RESPONDENTS BY REGION**



#### **RESPONDENTS BY ORGANIZATION TYPE**



Note: Based on 114 responses.

Source: Greenwich Associates 2019 Blockchain Study

The price of Bitcoin has jumped by over 120% since the beginning of the year, leading many to conclude that the bear market in crypto is over. The market has not been this frothy since 2017, when we witnessed an extraordinary boom in the price of all crypto assets, as investors poured money into the market hoping to get in early with the next Bitcoin or Ether. At the same time, tech teams dreamt up new use cases for utility tokens that leverage blockchain technology and raised money to fund them via initial coin offerings (ICOs). The bubble burst in early 2018, precipitated by the revelations of fraudulent activity, regulatory action and the reemergence of rational thought by investors. Bitcoin fell by 75% and Ether and other crypto assets were down even more.

While the crypto spring may now be upon us, it does not mean we will see a return to the ICO boom. Since 2017, regulators in the U.S. and around the world have cracked down on these token launches, which they often consider to be unregulated securities offerings. This does not represent the end of tokenization, however. Many companies are now focusing on building technology and an ecosystem for security tokens. These new tokens are digital securities recorded on a blockchain and issued in full compliance with the securities regulations in the jurisdiction in which they are offered. In this way, security tokens can be thought of as the convergence of crypto, enterprise blockchain and traditional finance.

This Greenwich Associates research looks into the emerging market for security tokens, identifying the most promising applications, key advantages and leading players in the space.

# The Security Token Advantage

Security tokens are digital assets that represent an ownership position, a creditor relationship or rights to such. They differ from traditional securities in one crucial way—they are represented digitally on a blockchain as opposed to in physical certificate form or dematerialized form.

A blockchain is a distributed ledger maintained by a network of participating nodes. At any point in time, the blockchain contains a complete record of ownership of assets recorded on the ledger and the entire transaction history of those assets. This can allow—as in the case of Bitcoin—for transactions to be settled on a peer-to-peer basis without the need for an intermediary. In addition, smart contracts can be deployed that can automate securities servicing (such as dividend payments) and embed regulatory compliance (such as controlling transfer of ownership.

#### Dematerialization refers to the substitution of paper-form securities by book-entry securities. This is an indirect holding system where an intermediary, such as a broker or central securities depository, holds a record of the ownership of shares, usually in electronic format. In the U.S. public equities market, securities are not fully dematerialized-rather, the shares are, for the most part, held by Cede & Co., a subsidiary of the DTCC that records which brokers own securities in "street name" on behalf of their clients. In turn, brokers maintain ledgers recording which of their customers are the ultimate owners of the securities.

Security tokens recorded on blockchain technology can confer many advantages. Executives in our study felt strongly that the immutable record of ownership and transaction history is the primary one. The poster child for how this can go wrong in the current system is the case of Dole Food. As a result of a 2013 class-action lawsuit, former Dole shareholders were entitled to a payout. The problem occurred when 49 million shares were submitted as eligible for the payout, while only 37 million shares were outstanding at the time. Theoretically, this would not have been possible if the shares were recorded on a blockchain.

#### ADVANTAGES OF SECURITY TOKENS



Note: Based on 105 responses.

Source: Greenwich Associates 2019 Blockchain Study

It should be noted that an immutable ledger, rapid settlement and clearing, and some other advantages listed are not unique to the security token industry. Enterprise blockchain initiatives, such as those being developed by entities including Digital Asset Holdings, R3 and Hyperledger, have been working on leveraging blockchain technology in financial services since 2015. The key differences between these blockchain movements is that enterprise blockchain initiatives are focused on deploying and customizing DLT into existing market infrastructures, while security token initiatives are more focused on using the technology in alternative asset classes where market infrastructure is less developed or, in some cases, in entirely new asset classes.

In practice, this means that enterprise blockchain companies are partnering with established financial markets participants, such as banks, central securities depositories (CSDs) and exchanges, and need to build interoperability with existing workflows and systems—similar to replacing the plumbing without shutting off the water. In markets such as private equity securities (known as private placements in the U.S.), there is no, or very limited, existing trading and settlements market technology, which means the market structure can be built around blockchain. Indeed, almost 50% of participants in our study rank private equity securities as one of the top three applications. In this market, the challenge is less technological and more about ensuring regulatory compliance. Private securities are often deemed more risky by regulators, who place certain restrictions on investments in these securities, such as the type of investor, the holding period for transactions and other rules around resale. These restrictions and a lack of a public marketplace for these securities means there is hardly any secondary market trading as compared to public equities.

#### BEST APPLICATIONS FOR SECURITY TOKENS



Note: Based on 109 responses. Source: Greenwich Associates 2019 Blockchain Study

# Liquidity and Beyond

This is the problem that blockchain seeks to solve in the context of security tokens. By leveraging smart contracts, the complex compliance rules can be programmed into the token protocol to ensure compliant transactions. For example, the smart contract can verify that a seller has held the security for the required holding period by simply checking the transaction record on the blockchain. In addition, the smart contract can verify that the purchaser is an accredited investor by checking data associated with that investor's wallet address. In this way, frictions can be removed from the secondary market trading process, allowing more liquid marketplaces to develop.

#### **PRIVATE SECURITIES**

There are many more private companies than public companies, and they have similar requirements for equity and debt capital to enable their businesses to grow. By way of example, there were over 37,000 Reg D private placement transactions in 2017, accounting for more than \$1.8 trillion in capital raised in the U.S. alone. This compares to global IPO volume of \$180 billion in the same year.

However, most institutional investors steer clear of private placements. In a recent study of global institutional investors, only 22% were currently investing in private securities markets.

#### **OBSTACLES TO INVESTMENT IN PRIVATE SECURITIES**



Note: Based on 56 responses.

Source: Greenwich Associates 2019 Equity Portfolio Managers Study

Almost two-thirds told us that the main obstacle to investment in these markets was the lack of liquidity in secondary markets. Or to quote one U.K.-based portfolio manager, "The biggest constraint: You need term capital to do private investment—if you don't have term capital, you're an idiot to do it."

This suggests that if digital, blockchain-based securities tokens are able to create a liquid secondary market, there could be a significant increase in institutional interest.

This is why we see programmatic regulatory compliance and a liquidity premium from secondary market trading as the two second-ranked advantages of security tokens. The liquidity premium is unlocked when the asset becomes tradeable in the secondary market, as price discovery improves when there are more buyers and sellers. In addition, the liquidity premium may transfer to the primary market. Investors may be more likely to invest in a private security if it's not a one-way trade. To put it another way, current investors in private securities don't expect there to be a secondary market and, therefore, require additional expected returns to compensate for the liquidity risk.

Other promising applications for security tokens include start-up capital formation. These types of transactions also raise money privately and are similar to private placements discussed above. This also speaks to the success that the ICO market had in crowd-funding new (blockchainfocused) startups. In a security token world, of course, the tokens would need to be fully regulated, unlike most ICOs. (Note that Regulated ICOs ranked sixth).

The creation of new financial products, such as tokens that pay out a percent of revenue is another potential utilization of security tokens. Other ideas proposed along this theme include taking a dividend-paying equity token and peeling off the dividend stream as a separately traded security token. As yet, however, these ideas are more theory than reality.

Many companies in the security token industry are focusing on tokenizing real estate. Real estate is a huge but relatively illiquid asset class. For example, there is approximately \$15 trillion in commercial real-estate assets in the U.S. but only \$1 trillion in market cap of equity REITs—93% of the market is privately held. Proponents of tokenization claim that using blockchain and smart contracts will reduce the costs and complexity of issuing equity via security token and allow developers to raise capital by tokenizing, say, a single Manhattan office building. In turn, investors may be more attracted to the asset class by being able to customize their real-estate portfolio and access a liquid secondary market.

# **Regulatory Challenges**

By far, the dominant challenge to security tokens is the regulatory environment. Regulators around the world have been approaching the emergence of digital securities differently. The ICO boom of 2017 was a wake-up call for regulators, who realized that existing regulations were often inappropriate for digital tokens like utility tokens. Consequently, in some jurisdictions, efforts are underway to define a new class of digital asset that is not a digital security.

On the other hand, U.S. Federal regulators are relying on a 1946 Supreme Court ruling to decide when an offering is a security. Under this rubric, a collective investment in expectation of profit is considered a security, which applies to most offerings.

#### TOP CHALLENGES TO SECURITY TOKENS



Source: Greenwich Associates 2019 Blockchain Study

But even when an issuer decides that their offering is a security and wishes to issue it in digital (blockchain-based) format, the confusion does not end there. Regulators have many questions, such as: How

to regulate a security that exists on a global, decentralized network? Should transactions in securities be confirmed on a blockchain by foreign entities where KYC and AML safeguards are not established? How to prevent a blockchain "fork," resulting in multiple claims on a security? How to reconcile an inherently centralized custody function with an inherently decentralized blockchain?

There can be little doubt that this regulatory uncertainty is hampering the industry, with few successful security token offerings to date.

# Blockchain Technology for Security Tokens

Security tokens are different from crypto. In most cases, they are not utility tokens that power the operation of a decentralized network, and regulations in the jurisdiction in which they are offered place significant constraints on how they may be issued and transferred. As such, it is appropriate to consider what is the most appropriate blockchain technology to use.

On one hand, the open-source public blockchains like Ethereum have the most developers working on the codebase and a large number of open-source applications readily available, including specific security token protocols (e.g., ERC1400, which has many of the restrictions around identity, jurisdiction and asset category already built in). Public blockchains also offer the most reach, as they are accessible to everyone.

At the same time, these advantages can be seen as disadvantages in a security token context. With a decentralized developer base, there is a risk that the blockchain could fork (as happened with Ethereum in 2016 and to the Bitcoin blockchain on several occasions). When a blockchain forks, an identical copy is made at a point in time, and future development continues on both forks independently. This leads to the digital assets also being forked—for example, Bitcoin forked into Bitcoin and Bitcoin Cash. Theoretically, SecurityToken1 could fork into SecurityToken1 and SecurityToken1a.

Another concern would be a so-called 51% attack, where a majority of bad actors take control of the blockchain. There is even a petition to the SEC asking if the verifying of security-token transactions on a public blockchain network is akin to a broker confirming trades—in which case miners could be considered subject to broker-dealer regulation.

Technology and safeguards can be designed to prevent tokens being forked, and the Ethereum blockchain, due to its size, is highly resistant to a 51% attack. Nevertheless, these issues represent meaningful risk factors for regulators and institutional compliance officers. Permissioned blockchains, as are being used in enterprise blockchain initiatives, are a potential solution to these issues. Indeed, major financial institutions decided to build permissioned DLT precisely because of these and similar concerns. Our data reflects this consensus, with over 60% of respondents favoring a permissioned blockchain perhaps not surprising, given the strong representation from regulated financial institutions within our study.

When it comes to the specific blockchain technology that should be used, there is no such consensus. In fact, the most popular response was that it "doesn't matter." This is important, as it tells us a couple of things. First, there are a number of different blockchain solutions on the market that are fit for this purpose. Second, the technology selection is not the determinant of success in this business.

The preferred blockchain as selected in our study is Ethereum. Note that this could refer to the public Ethereum blockchain or a permissioned version. Ethereum is the original blockchain with smart contracts built in and many relevant apps and functionality available via open source. In addition, permissioned versions of the Ethereum network can be created that contain many of the benefits of a public blockchain, while also addressing regulatory compliance concerns. Corda and Hyperledger are other permissioned blockchains that are recommended.

# Security Token Leaders

The security-token ecosystem is global and diverse. Participants include securities exchanges, crypto exchanges, fintech companies, and brokerdealers. Representing this diversity, the top four rated participants in this market include:

#### LEADERS IN SECURITY TOKEN SPACE

# Coinbase Coinbase The leading U.S. crypto exchange. Many crypto exchanges are seeking to register as security token broker-dealer, thus able to trade security tokens. Coinbase Six The Swiss Stock Exchange has announced plans to launch a full end-to-end and fully integrated digital asset trading, settlement and custody service. Coinbase Izero Izero is a subsidiary of online retailer Overstock.com and was one of the firstmovers in the space. Early in security token-a revenue-based payout from the operations of a digital securities trading platform they are building. Coinbase Polymath Polymath is a pure technology company and has been a technology leader in the space, including development of the ERC1400 security token protocol.

Source: Greenwich Associates 2019

#### USE OF PUBLIC OR PERMISSIONED BLOCKCHAINS



Note: Based on 109 responses.

Source: Greenwich Associates 2019 Blockchain Study

#### MOST APPROPRIATE BLOCKCHAIN FOR SECURITY TOKENS



Note: Based on 105 responses. Source: Greenwich Associates 2019 Blockchain Study

#### NOTABLE SECURITY TOKENS

Name		Description	Country
NEUFUND	Neufund	Neufund provides an end-to-end solution for asset tokenization and issuance.	Germany
	tZero	tZero is building a regulatorily compliant security token trading platform.	U.S.
BLOCKEMAIN CAPITAL	Blockchain Capital	Blockchain Capital is a venture capital firm investing in blockchain-enabled technology companies.	Singapore
	Aspen Digital	Aspen Digital offers security tokens representing ownership in the St Regis Aspen resort.	U.S.
<u>L-ttery</u>	Lottery.com	Lottery.com STO enables investors to participate in revenue derived by its gaming platform.	U.S.
<b>B</b> SPICE DENTE	SPICE VC	SPiCE VC is a tokenized venture capital fund focused on investments in blockchain companies and in the tokenization ecosystem.	U.S.
	Science Blockchain	Science Blockchain is a VC fund that works with early stage blockchain companies at the formation stage.	U.S.
22×	22x	A venture capital fund that invests in companies from the 500 startups accelerator program.	U.S.

Source: Greenwich Associates 2019



#### LEADING SECURITY TOKEN COMPANIES

Note: Based on 84 responses. Source: Greenwich Associates 2019 Blockchain Study

# Final Thoughts

Security tokens represent the latest innovation in the field of crypto. Borrowing functionality from enterprise blockchain, crypto and traditional securities markets, security tokens may finally represent the "killer app" for blockchain. Just as digitization has improved efficiency and transparency in other parts of the economy, the same will occur when capital markets move from issuing securities in dematerialized format to natively digital.

Security tokens are not applicable for every market or asset class. Most developed equity markets are already very efficient—with market infrastructures having been built up over many decades (or even centuries)—and are highly liquid, transparent and capable of processing billions of dollars of trading value every day. But for alternative, lessliquid markets, applying blockchain and building new market structure around this technology has the potential to deliver significant benefits to market participants and to investors everywhere, who will gain a wider universe of opportunities to choose from.

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The Corda platform is already being used in industries from financial services to healthcare, shipping, insurance and more. It records, manages and executes institutions' financial agreements in perfect synchrony with their peers, creating a world of frictionless commerce. Learn more at r3.com.

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