

Security token (STO) analysis

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KEY CHART #1

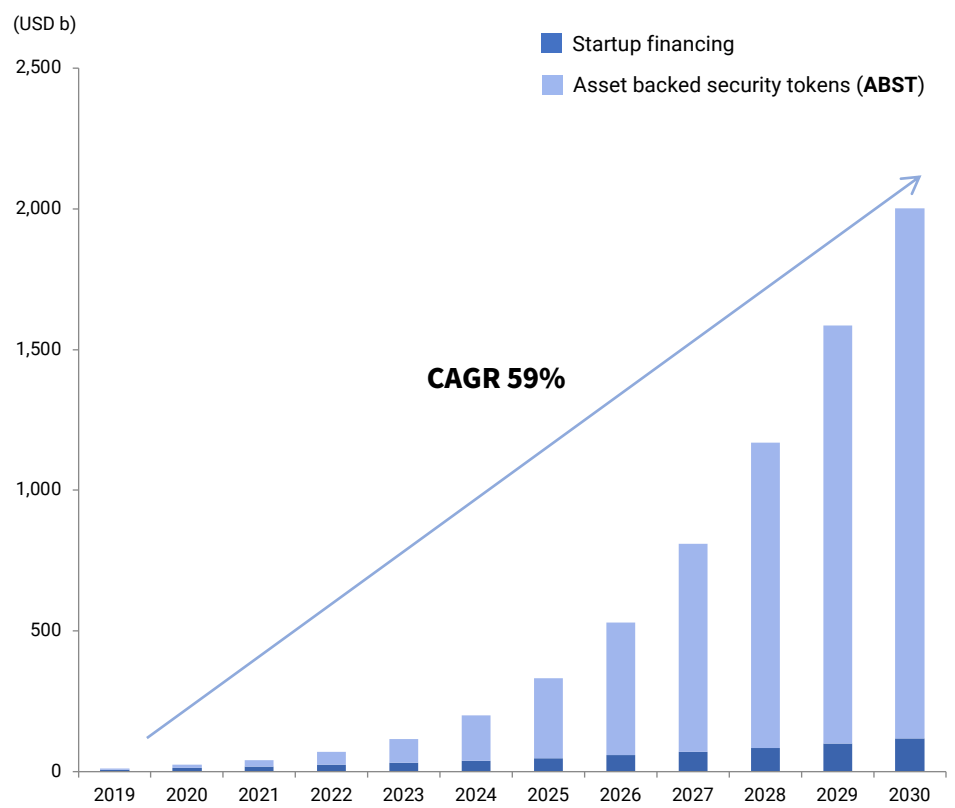
Security token ecosystem



Source: Chain Partners

KEY CHART # 2

Security token market size (accumulated issuance base)



Source: Chain Partners

SUMMARY

We are observing the emergence of a boom in the security token (STO: Security Token Offering) sector of the digital asset market. Although some optimists forecast that the security token market value will reach several trillion dollars within 2-3 years, this is a lofty expectation in our view. Our view is that security tokens still remain at an experimental stage, and 2019 will become the initial period for the appearance of legitimate infrastructure for the institutionalization of digital assets. As security tokens fall under the framework of traditional finance, we believe it is nearly impossible for it to expand into a trillion dollar market without the entrance of financial institutions. (In early 2018 when the majority of the market was utility tokens, the maximum value of the digital asset market was USD 814b). For the institutionalization of digital assets, there needs to be: 1) clear regulations; 2) international standards; 3) legitimate infrastructure; and 4) participation of reputable traditional financial institutions. We believe it may take a long time for the digital asset market to fulfill these standards. We project the security token market size will grow to USD 2t by 2030 with a 59% CAGR during 2019-2030, amid steady improvement of the digital asset ecosystem, toward institutionalization possibly after 2025. The contents of this report are as follows.

- 1. The background of security token boom**
- 2. Security token ecosystem analysis**
- 3. The myth of security token**
- 4. Security token market size analysis**

1. The background of security token boom

Security token is a token that assets are converted into a form of token and has similar features with traditional financial products such as stocks, bonds, and derivatives. Although FINMA specified security token as 'Asset token', the term 'Security token' is more commonly used in the blockchain industry. What makes security token different from payment token or utility token is whether it is regulated by capital market law. To bypass jurisdiction, many ICO projects claimed their tokens were utility tokens and succeeded in easily raising capital despite the fact that every altcoin may be classified as securities based on the Howey Test. (Investment of money, in a common enterprise, with the expectation of profit, solely on the efforts of others).

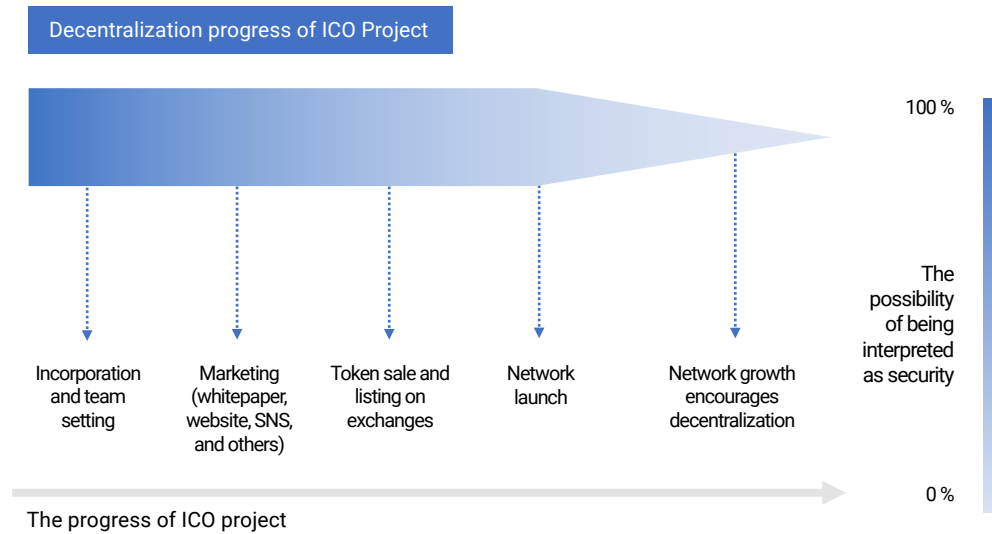
Security token vs. Utility token

Security token	VS.	Utility token
Ownership of asset		Access to protocol
Investor expecting profits		Service buyer
Complicated fund-raising process		Relatively easy fund-raising
Only accredited investors		Allowed to public investors

Source: Chain Partners

The progress of ICO project in business stages

(the possibility of being interpreted as security)





Source: Chain Partners

The reason why security token is gaining attention is strengthened regulation across the world. For instance, G20 announced the agreement on crypto asset regulation in Dec 2018, to resolve money laundry, tax evasion and other issues. Of note, we believe ICO should have been regulated since many investors have lost money unfairly during ICO frenzy in 2017-1H18. Low quality projects that raised funds through ICO spent investors' money on luxury meet ups, rather than the development of product and service. In addition, ICO promoters disappeared after collecting investment funds and gained unfair profits through pyramid scheme.

However, the ICO frenzy is over. The average monthly amount of funds raised in the second half of 2018 was USD 271m, which is 74% lower than 1H18. As regulations intensify, most tokens will likely fall under securities law going forward, in our view. We believe this is positive movement for the digital asset market to become more professional. In fact, regulators in the US, Singapore, Hong Kong, Thailand, Japan, Philippines and other countries have been attempting to properly legalize the digital asset market.

The evolving stance on digital asset by country

Country	2013-2015	2016	2017	2018
Developed countries	 <p>2013 – SEC</p> <ul style="list-style-type: none"> Warned investment of bitcoin and cryptocurrency at "Investor alert" <p>2014 – IRS</p> <ul style="list-style-type: none"> Interpreted digital asset like bitcoin as asset and levied income tax <p>2015 – CFTC</p> <ul style="list-style-type: none"> Recognized digital asset as commodity 		<p>SEC</p> <ul style="list-style-type: none"> In "Report of investigation", announced digital asset with features of securities that are issued or sold on the platform DAO (Decentralized Autonomous Organization) can be regulated under appropriate law At "Statement on crypto currencies and initial coin offering", Jay Clayton announced 11 sample questions that investors should have before investing in 'Crypto currency or ICO' 	<p>Federal Court</p> <ul style="list-style-type: none"> Recognized digital asset as commodities <p>SEC</p> <ul style="list-style-type: none"> Announced "Statement on digital asset securities issuance and trading" Started using the term 'digital asset' instead of 'virtual currency'
	 <p>2015 – Japan Government</p> <ul style="list-style-type: none"> Announced guideline that treats bitcoin as normal commodity after Mt.Gox hacking and bankruptcy 	<p>Japan Government</p> <ul style="list-style-type: none"> In Payment Service Act, legalized utilizing digital asset as a use of payment; defined bitcoin and altcoins as 'Crypto currency' 	<p>FSA</p> <ul style="list-style-type: none"> Gave digital asset a legal authority of a payment method, removed 8% consumption tax, and tried tax exemption <p>Japan Government</p> <ul style="list-style-type: none"> Announced accounting standards that recognize digital asset as asset of corporation; the valuation profit and loss by the price variation of digital asset in company is reflected on financial reports 	<p>FSA</p> <ul style="list-style-type: none"> Conducted a total inspection on digital asset exchanges and took follow-up actions on Coincheck hacking event; In June, FSA delivered an order of business improvement to 6 exchanges. Announced the consideration of changing regulation law from digital asset payment service act from 2017 to financial instrument transaction law Gave over the authority to regulate the industry to JVCEA (Japan's Virtual Currency Exchange Association) Considered changing the term 'Virtual currency' into 'Crypto asset'



FINMA

- Categorized 3 token types (Payment, Utility, Asset) at "FINMA guidance"

President of Central Bank

- Announced an opinion that bitcoin and altcoins are more traditional vehicles, rather than currency

Capital Law & Technology Association

- Released AML standards for digital asset and distributed ledger technology

FINMA

- Approved application for digital asset investment fund business which created an opportunity for more institutional investors to enter the digital asset market
- Asked EXPERT, an association composed of Swiss experts of accounting, audit, and tax, to treat digital asset as "Risky asset"

Stock Exchange

- Published Exchange Traded Products(ETP) that reflects the price of different digital assets.



2014 - Government

- Gave a warning about the risk of bitcoin trade and involvement into money laundry

2015 - Central Bank

- Gave a warning about the risk of bitcoin related investment

Financial Futures Commission

- Gave a warning that digital assets or tokens that conducted ICO can be defined as securities according to Hong Kong securities law

Financial Futures Commission

- Gave a warning about trade in digital asset exchange and ICO investment; sent warning to 7 digital asset exchanges and notified that they will regulate unlicensed exchanges and ICO according to securities law
- In annual report, warned that they will keep eyes on digital asset and ICO
- Announced that they are enforcing regulation sandbox on digital asset exchanges and issuing license for digital asset investment fund management companies



MAS

- Announced that all the issues related to digital asset that can be under securities law will be regulated by MAS
- Executed sandbox for fostering blockchain startups in line with releasing ICO guideline. Categorized token types into Payment token, utility token, security token

MAS

- Announced that MAS and Singapore Exchange (SGX) has co-developed DvP (Delivery versus Payment) for digital assets transaction settlement
- Issued proposal report for solving cross-border payment problem with England and Canada
- Released updated "Guide to Digital Token Offerings" - ICO token sales require investment proposals under local securities law



9.29 Financial Committee

- Announced full ICO ban

12.28 Government

- Announced a special measure for eradicating digital asset speculation - put in force a real-name system for trading by halting issuance of virtual account on major exchanges - announced a review of shutting down all digital asset exchanges

01.12 Ministry of Justice

- Announced that they will use 'Virtual Badge' instead of 'Virtual Currency'
- Announced that they were considering shutting down all exchanges and allowing only P2P trade

05.31 Supreme Court

- Acknowledged bitcoin as property

Emerging countries



2013 – Central Bank

- Banned bitcoin related institutions and payment services

- Established digital currency institute for researching digital asset

Central Bank

- Complete ban on digital asset trading and ICO
- Shut down exchanges

Central Bank

- Applied for total 41 patents by June - Announced "it is getting rid of the border between blockchain-based cryptocurrency and existing currency system"
- Looked for crypto experts in order for cryptocurrency issue plan
- Conducted "the ban on digital asset related events and commercial activities"



2013 – Central Bank

- Illegalized bitcoin and prohibited its trade. halted the business of Taiwan major digital asset exchange Bitcoin Co. Ltd for months

Securities and Exchange Commission

- Announced ICO guidance

Securities and Exchange Commission

- Discussed ICO and exchanges with Vitalik Buterin and OmiseGO (decentralized exchange and payment service)
- Digital asset act into effect: categorized digital asset into crypto currency and digital token
 - set license and investment limit for digital asset related companies
- Issued license to 7 exchanges and brokerage companies for digital asset trading
- Allowed 7 cryptocurrencies (BTC; ETH; BCH; ETC; LTC; XRP; XLM)
- Hosted public hearing in order to relax ICO regulation and listen to voices from the field; goal of making new guide that helps decrease hurdles and protect investors

Bond Market Association

- Said they are researching blockchain technology targeting Bond Coin issue

Central Bank

- Announced they will conduct research on CBDC (Central Bank Digital Currency)



2014 – Central Bank

- Warned bitcoin investment and risk of it

Central Bank

- Released guideline for exchanges

Government

- Appointed Cagayan Economic Zone Authority (Ceza) as special zone
 - Gave digital asset and blockchain companies license
 - Promoted that it is positive on job employment and economic growth
- Planned giving out license to exchanges that treat fiat currency Peso
- Focused on the benefit of making remittance by digital asset for Filipino working abroad

Securities Exchange and Commission

- Released ICO guideline
 - Categorized tokens into Asset token; Payment token; Security token; Utility token

Source: Various articles, Chain Partners

Note: blue letters are positive change and red ones are negative change

2. Security token industry ecosystem analysis

US government once recognized bitcoin and altcoins as 'currency', thereby thought they could threaten the authority of key currency, dollar, in our view. However, as the entire ecosystem grew significantly (particularly China has largely dominated this industry), US framed bitcoin and altcoins as 'Digital Asset' from 2018 and has actively attempted to institutionalize it. Of note, SEC started to strengthen regulation and treat the majority of tokens as securities. For instance, SEC levied a fine on EtherDelta (Decentralized exchange), Airfox (Financial service project), and Paragon (Marijuana project). Thanks to SEC's clear stance and communication with industry participants, US is leading security token ecosystem at the moment.

SEC uses 'Digital Assets' instead of 'Virtual Currencies'

The screenshot shows a webpage titled "Spotlight on Initial Coin Offerings and Digital Assets". The title "Digital Assets" is highlighted with a red box. Below the title is a list of "ICO Updates" with several items highlighted in red and green boxes. The red boxes highlight "Digital Asset", "Digital Assets", "Digital Assets", and "Digital Assets". The green boxes highlight "Cryptocurrency", "Virtual Currencies", "Virtual Currencies", and "Virtual Currencies".

Spotlight on Initial Coin Offerings and Digital Assets

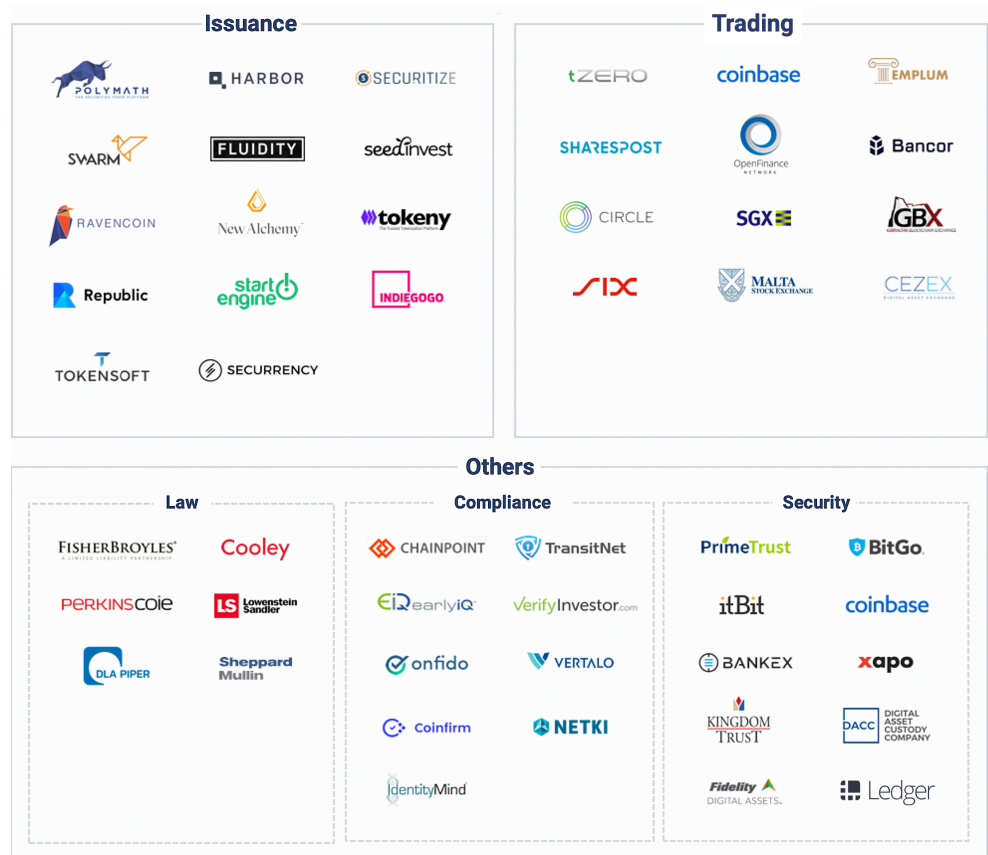
ICO Updates

- Digital Asset Transactions: When Howey Met Gary (Plastic) June 14, 2018
- SEC Names Valerie A. Szczepaniak Senior Advisor to Digital Assets and Innovation June 4, 2018
- SEC Obtains Emergency Order Halting Fraudulent Coin Offering Scheme May 29, 2018
- The SEC Has an Opportunity You Won't Want to Miss: Act Now! (May 2018)
- Chairman Clayton's Statement on Cryptocurrencies and Initial Coin Offerings (Dec. 2017)
 - Sample Questions for Investors Considering a Cryptocurrency or ICO Investment Opportunity (Dec. 2017)
- Statement on NASAA's Announcement of Enforcement Sweep Targeting Fraudulent ICOs and Crypto-asset Investment Products (May 2018) Statement on Potentially Unlawful Online Platforms for Trading Digital Assets (Mar. 2018)
- SEC Halts Fraudulent Scheme Involving Unregistered ICO April 2, 2018
- Chairman's Testimony on Virtual Currencies: The Roles of the SEC and CFTC (Feb. 2018)
- Investor Alert: Celebrity Endorsements (Nov. 2017)
- Statement on Potentially Unlawful Promotion of Initial Coin Offerings and Other Investments by Celebrities and Others (Nov. 2017)
- Investor Alert: Public Companies Making ICO-Related Claims (Aug. 2017) (This investor alert is also available in Spanish, Alerta al inversionista: Las empresas públicas que hacen declaraciones relacionadas a las ICO.)
- Investor Bulletin: Initial Coin Offerings (July 2017) (This investor bulletin is also available in Spanish, Boletín del inversionista: Oferta inicial de criptomonedas.)
- Investor Alert: Bitcoin and Other Virtual Currency-Related Investments (May 2014)
- Investor Alert: Ponzi Schemes Using Virtual Currencies (July 2013)

Source: US SEC; Chain Partners

Among the various participants, we believe the most promising segments in the security token ecosystem are issuance (primary), trading (secondary) and security. Although others such as legal and compliance are also necessary, we believe these core segments will play a key role in the security token ecosystem. The fate of the security token market will depend on the maturity of these segments, in our view. In order for digital asset to grow to a trillion dollar market, trustworthy infrastructure will need to be installed to attract more institutions. Notably, the security segment is gaining attention amid the security token trend and this will be discussed further later.

Security token ecosystem









Source: Chain Partners








Firstly, let's examine security token primary market. The STO platforms such as Polymath, Harbor, Swarm, Securitize and others provide general services on issuing security token. Of note, contrary to ERC-20 which doesn't provide KYC/AML, STO platforms have their own protocols that support KYC/AML. Although protocols vary by platforms (e.g. Polymath: ST - 20, Harbor: R - token, Swarm: SRC - 20, Securitize: DS), they share the same goal which is "complying with regulation" Under STO platforms` protocol, Only verified participants on whitelist are allowed to access security token market. Since security token market is immature at present, it should take time for us to figure out which STO platform will set standard and dominate security token primary market.

Another interesting trend is that equity crowdfunding platforms have made foray into security token primary market. For instance, Indiegogo cooperated with Templum to tokenize Aspen Resort real estate, raising USD 18m fund. In addition, Circle, digital asset oriented financial institution backed by Goldman Sachs, has acquired Seed Invest to enhance presence in security token primary market. Equity crowdfunding and security token issuance are similar in a way that they raise funds from public online investors. It's fair for major equity crowdfunding platforms to consider security token business since they can easily leverage customer base, in our view. It is well known that one of the biggest disadvantages of equity crowdfunding is scarce liquidity. If security token secondary market works well, we believe many equity crowdfunding platforms will jump into security token primary market in the future.

Secondly, regarding security token secondary market, notable companies are exchanges such as tZero, Open Finance Network, Templum, Sharepost, Coinbase and liquidity provider like Bancor. Given the fact that secondary market players (exchange, OTC, etc.) have been most lucrative among various players in utility token era, we believe security token secondary market player will benefit the most in terms of dollar revenue. Of note, the major difference between utility token exchange and security token exchange is that security token exchange has to obtain license to deal with security tokens. We expect rising security token trend to improve quality of market participants and weed out bad actors due mainly to strict hurdles. For instance, ATS (Alternative Trading System) license is necessary for US based security token exchange to operate business properly. This legal hurdle should block many startups and scammers which have limited financial capability. Since it takes much effort to obtain license, lucrative exchanges are starting to acquire and/or make alliance with companies that already own relevant license.

Major security token issuance and distribution platforms

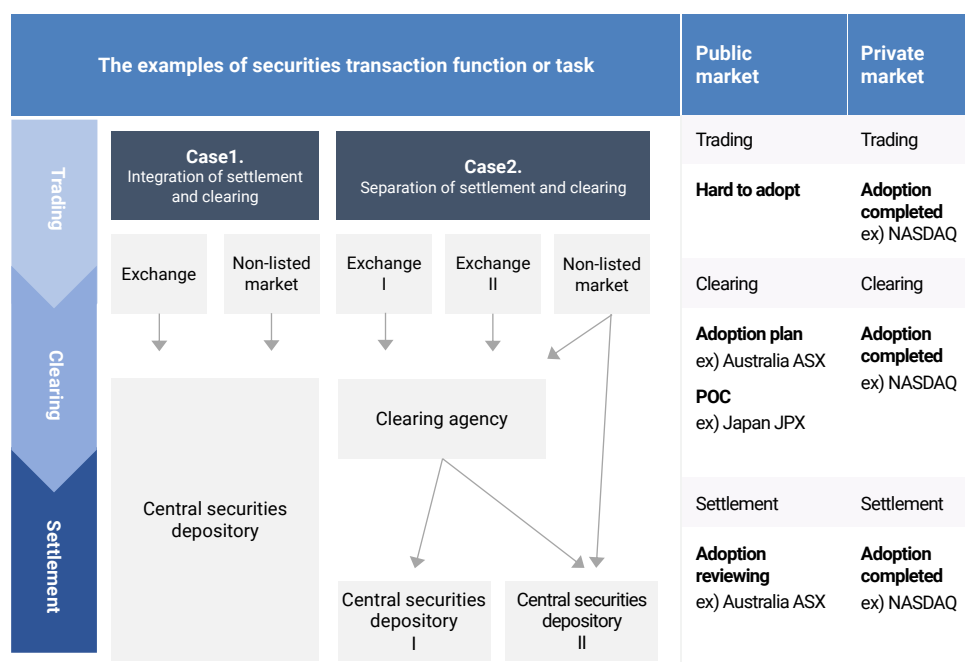
	Companies	Establishment	Features	Fund raising through their own token
Primary market		2017	Polymath <ul style="list-style-type: none"> • Security token issuance platform based on ST-20 • KYC provider, smart contracts, audit, etc. 	0
		2017	Harbor <ul style="list-style-type: none"> • Security token issuance platform based on R-Token • Open source security token platform that traditional institutional investors can easily access • Possible to legally tokenize equity, bond, real estate, and other securities 	0
		2018	Swarm <ul style="list-style-type: none"> • Security token issuance platform based on SRC-20 • Tokenizing assets such as real estate, agriculture, technology, and energy companies company 	0
		2018	Securitize <ul style="list-style-type: none"> • Security token issuance platform based on Digital Securities(DS) protocols • End-to-end security token issuance platform that conducts from investor application to fund-raising for issuer 	X
		2012	Seed Invest <ul style="list-style-type: none"> • Equity crowdfunding platform company • Acquired by digital asset financial company Circle (backed by Goldman Sachs) 	X
		2011	Start Engine <ul style="list-style-type: none"> • Equity crowdfunding platform • Expanded business scope to security token 	X

Secondary market		2017	<p>tZERO</p> <ul style="list-style-type: none"> • Cooperating with Polymath, security token issuance platform based on ST-20 • Subsidiary of Overstock, online retail company • Provides different services such as security token brokerage service and wallet management system for receiving and sending digital assets 	0
		2012	<p>Coinbase</p> <ul style="list-style-type: none"> • Acquired companies that own license from SEC or FINRA - ex: Keystone Capital, Venovate Marketplace, Digital Wealth 	X
		2014	<p>Open Finance Network</p> <ul style="list-style-type: none"> • Security token trading platform • BCAP (Blockchain Capital tokenized VC fund) listed 	X
		2016	<p>Bancor</p> <ul style="list-style-type: none"> • Decentralized network providing blockchain-based assets with liquidity • Enable customers to trade security tokens utilizing Bancor token, BNT 	0
		2017	<p>Templum</p> <ul style="list-style-type: none"> • Platform that owns a system for security token issuance and trading • Gained ATS license through acquiring an exchange, Liquid M in 2018 	X
		2009	<p>Sharepost</p> <ul style="list-style-type: none"> • Originally trading platform specialized in private equity and launched GLASS for entering security token trading platform • Partnered with Securitize, security token issuance platform 	X
		2018	<p>CEZEX</p> <ul style="list-style-type: none"> • Philippines based security token trading exchange • Planning to securitize gold, real estate, bond, stock, and derivatives 	X

Source: Chain Partners

As for security token exchange, not only license but also technological barrier exists. Most utility token exchanges can set up low quality exchanges by simply outsourcing developers, which creates quality issue. Contrary to some low quality utility token exchanges, security token exchanges need to possess skillful developers to implement blockchain technology appropriately. Of note, blockchain technology can be used to potentially reduce operation cost and improve trading efficiency, particularly in post-trading process.

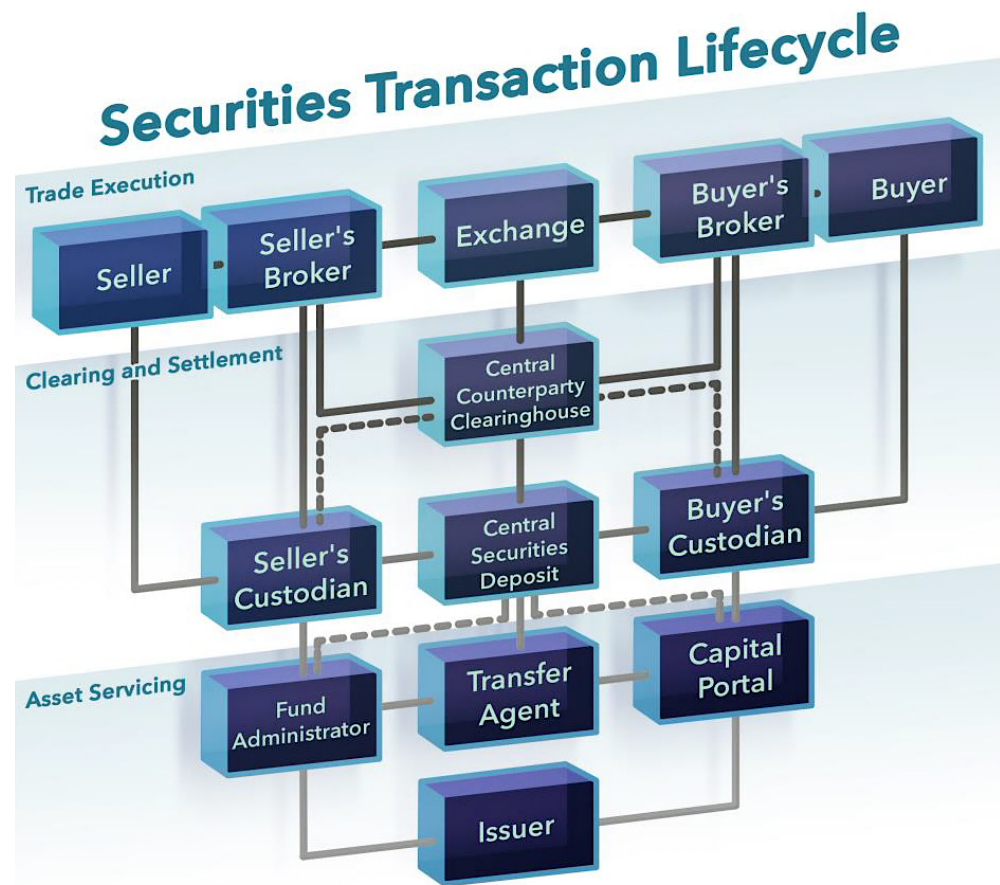
The status of blockchain technology adoption in securities exchange



Source: Financial Supervisory Service of Korea, Chain Partners

To understand how blockchain technology could be implemented at security token exchange, it's necessary to know the process of security trading. After brokers submit client's order, time consuming clearing and settlement are proceeded to complete the transaction. Therefore, it takes several days after the trading day for the final settlement of securities, which is expressed as T + 1, T + 2, and so on. For example, It usually takes 2 days for the settlement of stocks (T+2) in Korea. In other words, when you sell stocks on Monday, you're expected to receive money on Wednesday, assuming there's no holiday between Monday and Wednesday. However, if blockchain technology is adopted so that post-trading process is simplified, it is possible to reduce time gap between trade date and settlement date. For example, when you sell security tokens on Monday, post-trading process can be completed quickly and you're able to get money on the same date. Notably, tZero (Subsidiary of Overstock, security token exchange), has a vision of achieving one day trading, clearing, and settlement and that's why they named their company title as 'tZero'

Securities transaction lifecycle



Source: Open Finance Network

If the security token market size surpasses trillion dollars, existing national securities exchanges should consider entering this market, in our view. In that case, the competition between new security token exchanges and existing securities exchanges is inevitable, which would be a case of David vs. Goliath. In fact, securities exchanges in many countries are studying blockchain technology's potential application. For example, in 2015, NASDAQ launched Linq, which deals with private equities based on blockchain technology. In 2018, Australia securities exchange ASX announced that they will replace their clearing and settlement system with new blockchain-based system by 2021. JPX, securities exchange of Japan, has been trying to implement blockchain technology to the clearing and settlement process of securities after constructing a consortium with finance and IT companies in 2016. In 2018, SGX, securities exchange of Singapore, developed DvP, which is settlement solution for effective digital asset settlement across various blockchain platforms. KRX, securities exchange of Korea, declared in 2016 that they will utilize blockchain technology at KSM, startups over the counter market. SIX and MSE, securities exchange of Swiss and Malta, even announced that they

will build exchanges that deal with security token beyond the level of testing blockchain technology.

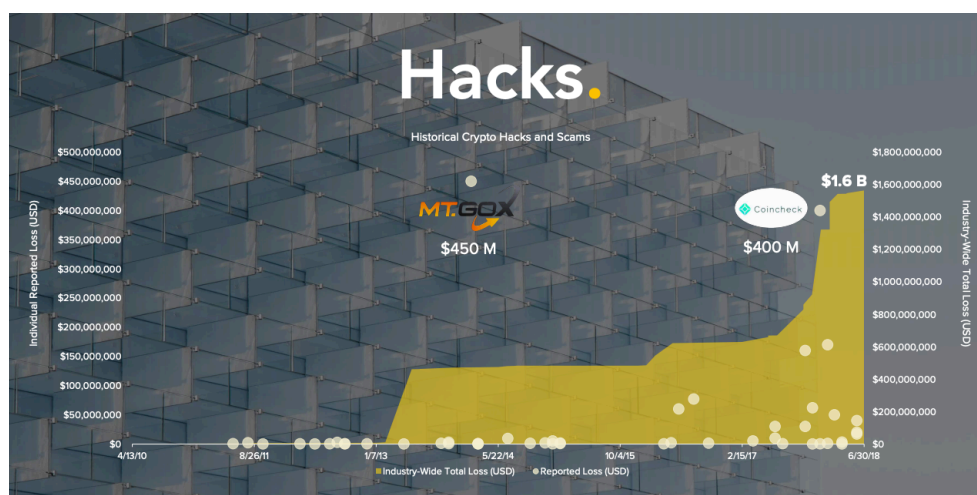
The status of blockchain technology adoption by major security exchange

Exchanges	Country	Adoption of blockchain technology
		<ul style="list-style-type: none"> • Execute margin call through distributed network among deposit provider, recipient, and other intermediaries - Distributed network of Nasdaq is based on PoW • Establish private equity market trading system utilizing Nasdaq Linq based on private blockchain • Attempt to simplify settlement process, cooperating with TMX(Toronto Stock Exchange) and City group
		<ul style="list-style-type: none"> • Aim to replace existing clearing and settlement system of securities with blockchain based system, CHES • Only permissioned participants such as securities can participate in running nodes while exchange manages blockchain nodes.
		<ul style="list-style-type: none"> • Attempt to find projects such as securities trading, trading verification, KYC-AML by creating blockchain consortium with financial company; IT company and others. • Aim to create new finance service that bestow dividend and voting right based on holding period
		<ul style="list-style-type: none"> • Completed an experiment of improving "Delivery Versus Payment(DvP)" system cooperating with SGX, MAS, Nasdaq, Deloitte, Anquan - Succeeded testing a distributed network that can automatize DvP system and let investors trade tokenized securities in various platforms through smart contracts
		<ul style="list-style-type: none"> • Verify documents based on blockchain technology • Reviewed applying blockchain technology to trading, information distribution, clearing and settlement system of EXTURE+ through a informatization strategy planning consulting,
		<ul style="list-style-type: none"> • Promote to develop new trading platform that can tokenize existing securities asset - Poised to launch the first service in mid-2019
		<ul style="list-style-type: none"> • Singed MOU with Binance to develop a platform where security token trading and legal public offering are viable • Singed MOU with OKEx to develop OKMSM which is an institutional grade security token trading platform

Source: Chain Partners

Lastly, we believe it is inevitable for the security segment to gain popularity going forward amid the rising security token trend. Before the digital asset market crash, the primary goal of most exchanges was to maximize profit by boosting the trading volume and protecting investors' assets was out of their concern, in our view. However, a series of hacking events occurred due mainly to vulnerable security systems, and some exchanges lost their customers' money and trust. From the regulator's perspective, the most important matter is investor protection. Therefore, we anticipate regulators to demand security token handling institutions to prepare a regulation compliant system (with KYC/AML monitoring, insurance, research service and others) in order to reduce information asymmetries and protect investors. That is why we believe the security segment, including wallet, custody, insurance and others is set to grow amid intensified regulation across the world.










The history of digital asset hacking



Source: Coindesk

We foresee "Big Blur" (a phenomenon that the border between industries gets blurry) in the digital asset market and some lucrative exchanges will likely lead this trend. After market crash, retail driven trading volume has sharply plunged and many exchanges are putting an effort to diversify revenue streams toward institutional-grade exchanges. To do so, we believe exchanges need to invest in security segments and build up brand reputation. As a matter of fact, Coinbase and Gemini have already started to provide their own custody service. We believe the demand for digital asset specialized security companies such as Ledger and Bitgo will grow. Other than digital asset specialized startups, traditional financial institutions such as Fidelity and Nomura also announced that they will commence digital asset custody service. We believe this is absolutely positive impact on improving quality of digital asset market infrastructure.

The list of digital asset security companies

Opening date	Company	Custody digital asset	Fee
Mar-2014	 xapo	BTC	Free except for deposit and withdrawal
Oct-2016	 GEMINI	BTC, ETH, LTC, ZEC, BCH	Custody fee: 0.40% Withdrawal admin fee: USD 125 Yearly: 0~0.964% Minimum annual membership: USD 100,000
Jan-2017	 DIGITAL ASSET CUSTODY COMPANY	More than 100 kinds of digital assets (including ERC-20)	N/A
Nov-2017	 itBit	BTC, BCH, ETH, LTC, XLM	N/A
Jan-2018	 KINGDOM TRUST	BTC, BCH, BTG, ETH, ETC, LTC, XRP, ZEC, XLM	Monthly account fee - Account fee: USD 20 - Custody fee: 0.07% of total account
May-2018	 BitGo	More than 100 kinds of digital assets (including ERC-20)	Minimum deposit: USD 10,000,000
May-2018	 Ledger	BTC, BCH, HSR, KMD, BTG, DASH, LTC, PIVX, DGB, ETH, POSW, QTUM, XT, STRAT, VTC, VIA, ZEC	USD 60,000 set up fee Yearly: 0.48% Minimum annual membership: USD 48,000
Jul-2018	 coinbase	BTC, BCH, ETH, LTC, ETC, ZRX, BAT, OMG, XRP	USD 100,000 set up fee Monthly: 0.1% Minimum deposit: USD 10,000,000
Aug-2018	 PrimeTrust	BTC, ETH, and ERC20 tokens	Monthly: 0.05-0.1%

Source: Chain Partners

3. The myth of security token

We anticipate security token to lead digital asset market growth, which helps digital asset be incorporated into traditional finance market. We argue it's long-term scenario, predicting traditional financial institutions won't deal with security token anytime soon. Nevertheless, some optimists argue successful security token handling startups will significantly threat traditional financial institutions within a few years amid exponential growth of security token ecosystem. We believe this is one of the biggest myths of security token.

In order for security token market to grow for real, financial institution's participation must be required. To do so, 1) clear regulation; 2) international standard; 3) legitimate infrastructure; 4) participation of reputable traditional financial institutions are necessary and it should take long time to meet all standard, in our view. The reason why we're skeptical about scenario that security token handling startups will dethrone traditional financial institutions is that traditional financial institutions have larger capital, talent pool and most importantly better reputation. Our view it that reputation based upon trust is core of financial institutions and it's something startups can't mimic anytime soon.

While traditional financial institutions at Wall Street are currently observing digital asset market, it doesn't necessarily mean they can't do this business. They're waiting for the right moment. In fact, they are exploring digital asset market by investing in relevant startups and deploying manpower for new business. Therefore, to survive in the long term, digital asset specialized startups should co-operate with traditional financial institutions rather than competing with them, in our view.

Wall Street is making foray into the digital asset market

Source: Chain Partners

Another myth of security tokens is about liquidity. In theory, security tokens seem perfect. The advantages of security tokens, such as 24/7 trading, fractional ownership, operation cost reduction, enhanced trading efficiency, compliance automation, and better access for global capital market are obvious. However, these benefits have not been realized yet. In order for the theory to be of practical use, the security token market should be buoyant, and sufficient liquidity is necessary. Since the security token market is at an early stage, where infrastructure is gradually being installed, it is hard to measure the market depth at the moment and we need to wait and see.

Security token issuance is expected to spread gradually from 2019 as a starting point. However, we'll be able to check the liquidity level of newly issued tokens at least from the year 2020. This is because security tokens require a lock-up period, usually 6 months to 1 year, according to US capital market law. (Since US is leading the security token market, it is necessary to check US rules.) Therefore, it will be at least the year 2020-21 when we will be able to figure out the liquidity of the security token market. In the early stage of the security token market, it is hard to expect there will be enough liquidity because there are not many security tokens currently traded.

US capital law regarding security token

Act	Reg D			Reg S	Reg A+	Reg CF
	Reg 504	Reg 506(b)	Reg 506(c)			
Offer limit	Max USD 5m	Unlimited	Unlimited	Unlimited	Tier 1 Max USD 20m Tier 2 Max USD 50m	Max USD 1.07m
Investors	US			International	US	US
Investor requirements	None	Unlimited accredited investors Up to 35 sophisticated but non-accredited investors	Unlimited accredited investors 1) Collective income of a parent is greater than USD 1m 2) Annual income of an individual for recent 2 years is greater than USD 200k / Income of spouse is greater than USD 300k Non-accredited investors are not allowed	Unlimited foreign investors	Tier 1 None Tier 2 Non-accredited investors 1) Up to 10% of yearly income or 2) Up to 10% of assets	Both accredited and non-accredited investor is allowed In case annual income is less than USD 1.07m ● Allowed to invest USD 2,200 for 12 months or 5% of annual income In case annual income is greater than USD 1.07m ● Allowed to invest up to USD 1.07m for 2 months or 10% of annual income
Lock up period	6 months / 12 months			No lock up / 40 days / 1 year	Tier 1 12 months Tier 2 X	12 months

Source: Chain Partners

If the secondary market will not be activated for the next few years, the theoretical benefits of security tokens could become a moot point. Since security tokens that lack liquidity do not have a practical advantage over equity crowdfunding, limited liquidity may actually hamper the security token market growth, in our view. Of note, the size of year 2017 equity crowdfunding issuance is approximately USD 822m, which is only 0.4% of the size of IPO in the same year, USD 188b. Equity crowd funding market size was too negligible to attract traditional financial institutions, which limits market growth. Unless security token overcome liquidity issue, which is one of the biggest disadvantages of equity crowdfunding, there will be lower chance of institutional money flow in security token market, which may lead muted growth.

Lastly, another myth of security token is related to "decentralization". Decentralization has been regarded as the sacred ideology of blockchain. However, as centralization is positively correlated with business efficiency, decentralized blockchain companies have struggled in their businesses. For instance, the number of daily active users of the top Dapp (decentralized application) is only in the thousands; and for DEX's (decentralized exchange) only 0.4% of the entire trading volume (according to Crypto Compare CCCAGG Exchange Review). Steemit (a decentralized SNS), which appeared as a rising contender of Facebook, dismissed around 70% of their employees.

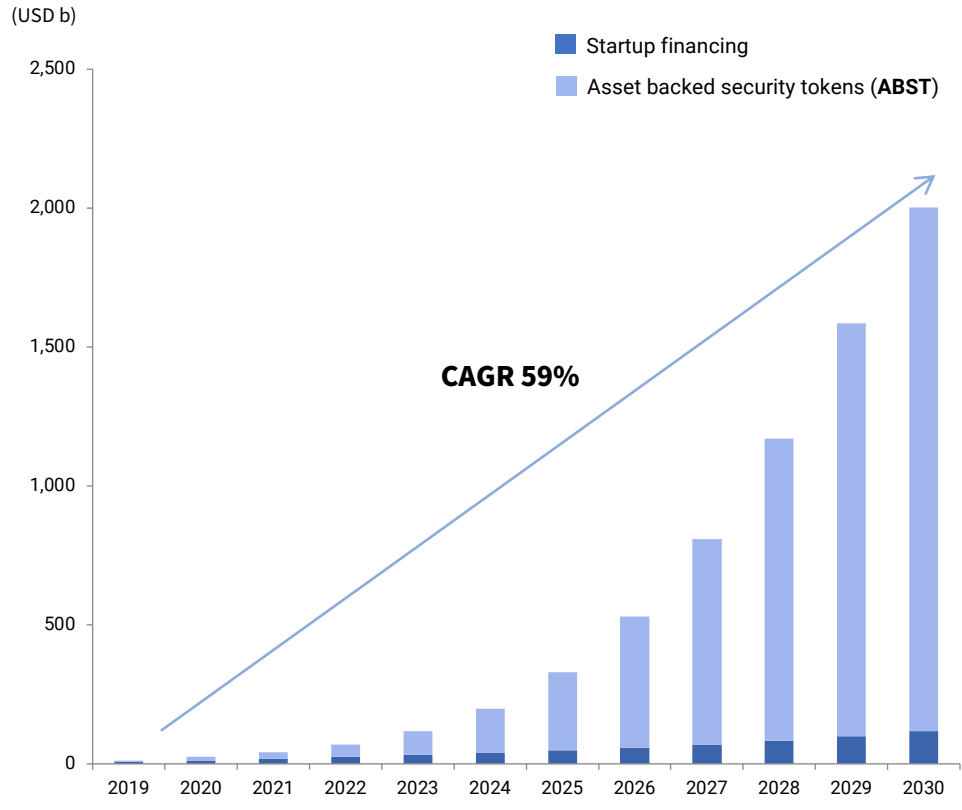
We expect security token trend to accelerate centralization of blockchain ecosystem. As security token market expands, the 'Decentralization to Recentralization' phenomenon in blockchain ecosystem will more broadly appear and this is because security token is part of finance. The essence of financial industry is fundamentally different from that of IT industry. In contrast to financial industry that cares 'safety of service', IT industry pursues 'convenience of service'. The reason why consumers deposit their money at financial institutions is due mainly to its safety and reliability rather than convenience. Therefore, without trustful centralized organization, it's hard for us to see mass adoption of security token in the future.

4. Security token market size analysis

We divide security tokens into two types based on primary characteristics: startup financing and asset backed security tokens (ABST). Of note, it is possible to achieve both objectives through traditional capital markets without issuing a security token. For example, startups which attempt to raise funds can utilize equity crowdfunding and/or venture capital. In addition, ABS (Asset Backed Securities) have been used to securitize assets in the traditional capital market. Therefore, in order for the security token market to grow significantly, it must provide superior benefits beyond existing traditional capital market products and attract high quality market participants. Aforementioned features of security token - improving trading efficiency, cost reduction, automation of compliance and others – are only theoretical benefits which have not been realized yet.

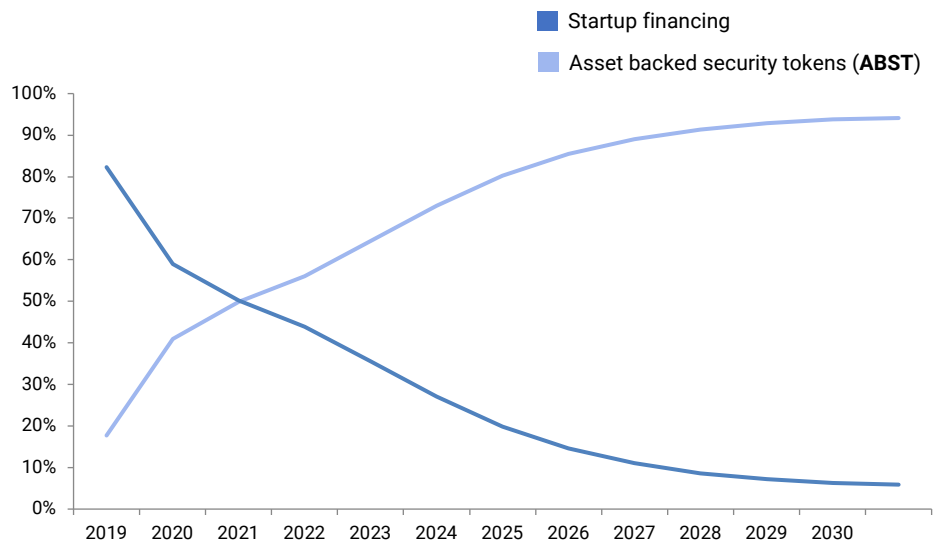
We forecast that the security token market (accumulated issuance base) will grow to USD 2t in 2030 with a 59% CAGR during 2019 to 2030 on the back of institutional money inflows amid the gradual improvement of the security token ecosystem as well as an enhanced regulatory environment. We expect institutions to be engaged in the security token market post 2025 after they monitor, via trial and error, the security token market for the next few years. We expect ABST to lead robust growth of the security token market. (CAGR during 2019-2030 breakdown: 1) startup financing: 12% 2) ABST: 51%) Institutions will likely be more interested in ABST than startup financing, in our view.

Security token market size (accumulated issuance base)



Source: Chain Partners

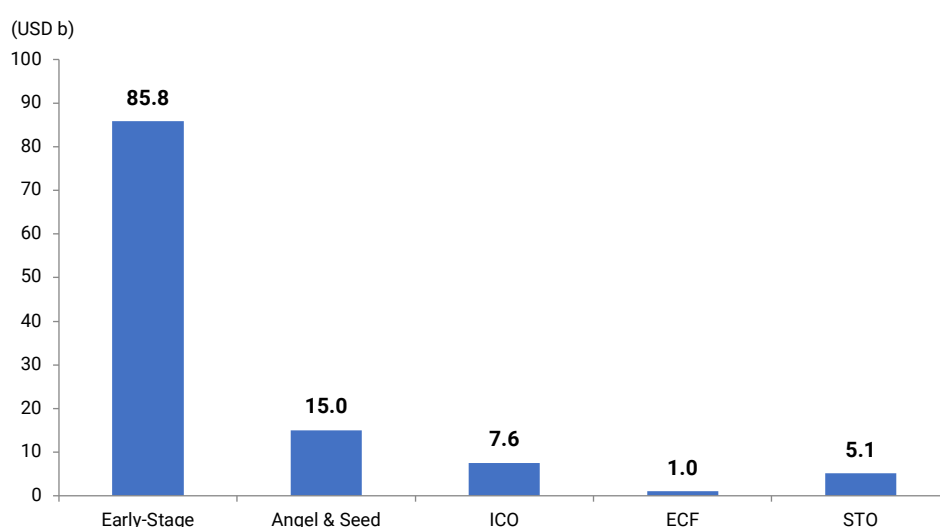
The proportion of security tokens by type



Source: Chain Partners

The rationale behind our estimate is as follows. First of all, the TAM (Total Addressable Market) of the startup financing type of security token is about USD 102b, which is the sum of the early-stage startup financing, such as equity crowdfunding, angel, seed and others. Assuming STO will account for 5% of this segment, the market size of startup financing is estimated to be USD 5.1b. Given the fact that the ICO fund-raising amount in 2017 and 2018 (sum of January to November excluding December) was USD 6.2b and USD 7.6b respectively, our STO (startup financing only) estimate is undemanding, in our view.

The comparison of market size among various startup financing methods



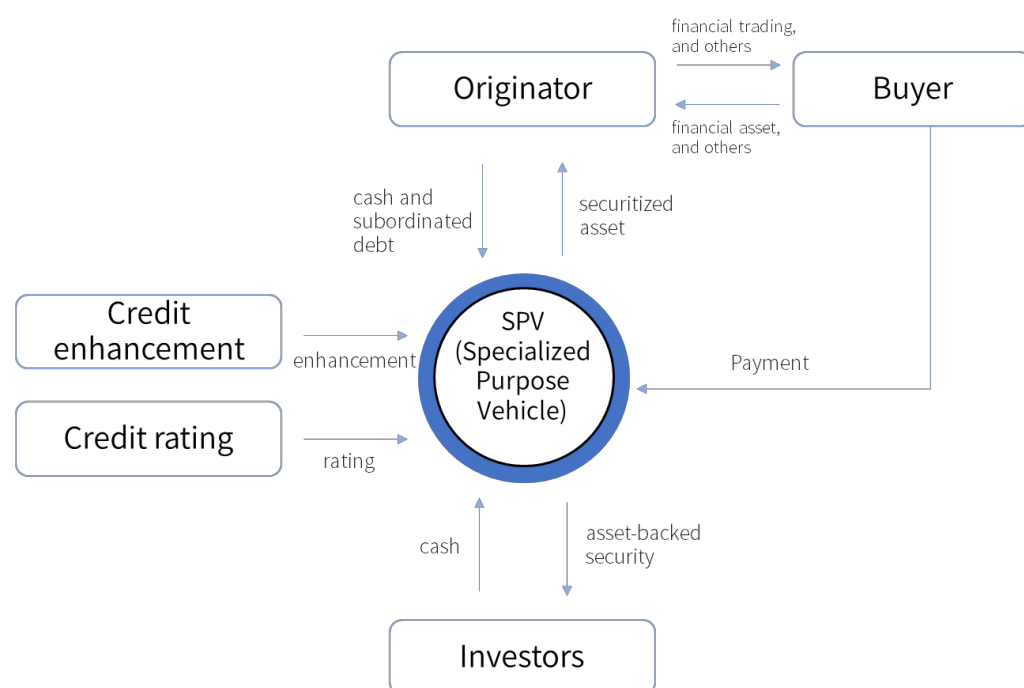
Source: Chain Partners; Icodata; Crunchbase News; Thomson Reuters TAB data
Notes: ICO figure is sum of Jan to Nov 2018

We do not expect the STO growth period to resemble the ICO craze. This is because companies which plan on STO have to comply with strict regulations, which raises entry barriers to block scammers. In addition, contrary to experimental STOs, there are plenty of well-established alternative financings (equity crowdfunding and VC) in the traditional capital market. Meanwhile, companies which are not involved in blockchain will not likely consider STO. Lastly, for those companies which have already raised capital via traditional ways, we believe it will not be easy for companies to convince existing shareholders to proceed with STO, which may dilute shareholder equity. In that sense, we do not foresee dramatic growth of the startup financing type of security token in the future. We project a 12% CAGR of the startup financing type of security token during 2019-2030, assuming mild growth.

We believe ABST is the growth driver of STO. For instance, illiquid assets such as real estate, fine art, venture capital funds and others can theoretically have higher liquidity through tokenization. In fact, Indiegogo and Maecenas tokenized Aspen resort and Andy Warhol's fine art, respectively. In addition, Blockchain Capital and SPiCE VC tokenized their own venture investment fund. However, this is only a couple of cases and ABST still remains at nascent phase.

Understanding ABS market is helpful for figuring out the ABST. ABS is a financial security collateralized by a pool of assets such as loans, leases, credit card debt, receivables and others. In general, the underlying assets of an ABS are illiquid and can't be sold on their own. However, through issuing ABS, pooling the assets together enables the owner of assets to make them marketable securities. ABS Investors are expected to earn relatively higher return. If everything goes as planned without default, ABS gives benefit to both issuer and investor. Of note, there are many middle men involved in ABS market such as underwriter, credit rating, credit enhancement, custody, etc.

The basic structure of ABS issuance

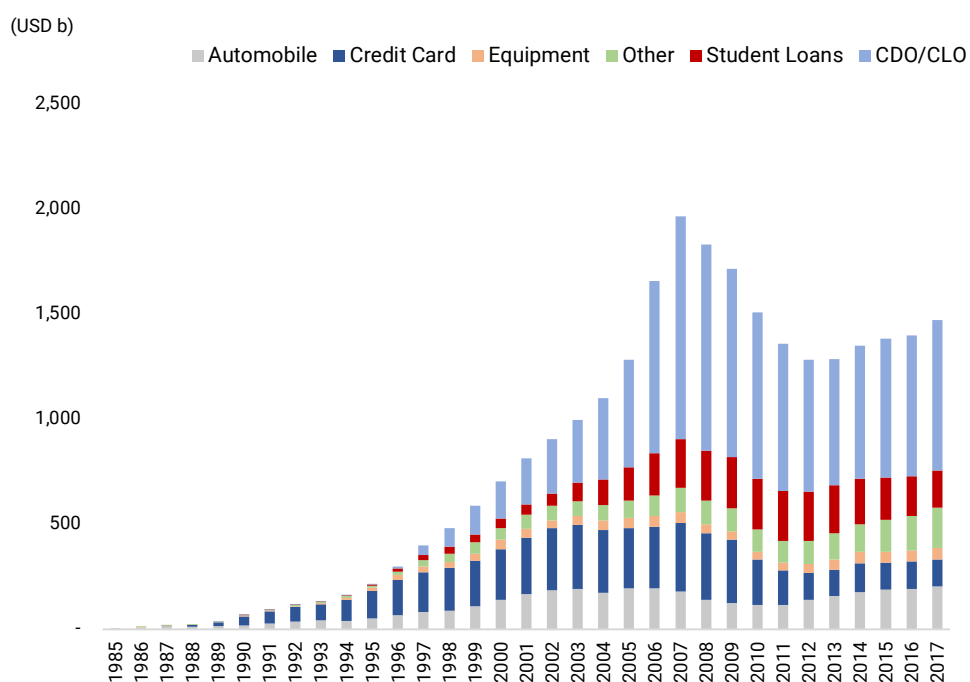


Source: Korea Ratings

ABS gained popularity as an innovative financial tool and showed steady growth. The ABS market size in US grew with a 39% CAGR during 1985 to 2007 before 2008 financial crisis (US account for 53% of the entire global ABS market in 2017). However, MBS (Mortgage Backed Securities, a type of ABS

that collateral is real estate) caused financial crisis and ABS growth halted due mainly to strengthened regulation. Nevertheless, ABS is still a popular financial product used in various fields such as credit card, auto loan, student loan, real estate and more.

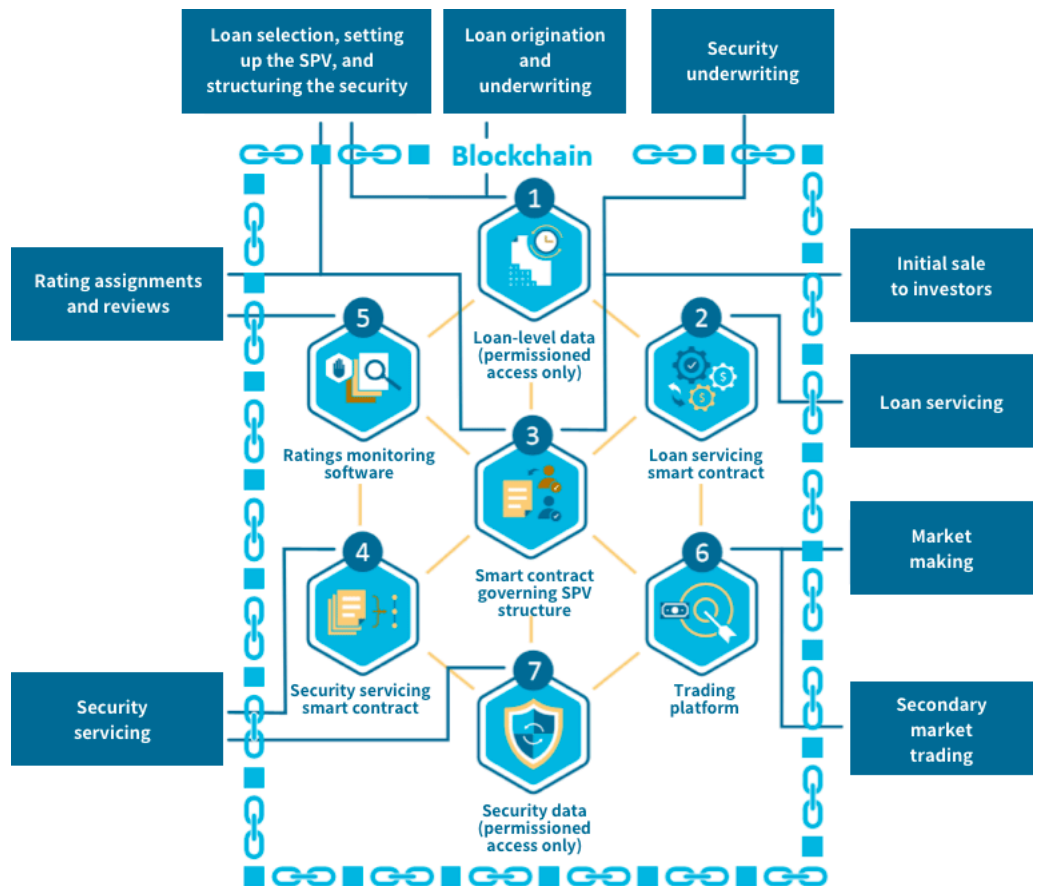
US ABS market growth trend



Source: SIFMA: Chain Partners

Despite ABS and ABST are fairly similar, the major potential benefit of ABST is it's based on blockchain technology. ABS has notoriously complicated product structure, which causes significant information asymmetry. The opaque ABS structure and moral hazard of traditional financial institutions led to the 2008 financial crisis. Blockchain can potentially improve transparency of ABS market. In theory, smart contract could automatically update information and signal warnings if there's any negative issues on underlying assets. Furthermore, it's widely accepted that blockchain technology can be used to save cost and improve operating efficiency by cutting many middle men. Not surprisingly, many traditional financial institutions have already tested potential application of blockchain. In 2016, traditional financial institutions such as JP Morgan, BoA Merrill Lynch, Citi, Credit Suisse, Barclays tested to utilize blockchain technology for the processing of post-derivatives trading.

The potential use case of blockchain in securitization



Source: Deloitte

We believe the ABST market growth will be mainly driven by traditional financial institutions and the majority of ABST will be 'tokenized ABS'. In other words, the ABST market is expected to meaningfully grow only if financial institutions that have dealt with ABS would seamlessly convert ABS to ABST, and after they carefully monitored and tested blockchain adoption. We believe it will take time for conservative traditional financial institutions to fully embrace blockchain and tokenize ABS. That is why we assumed significant institutional money flow into the security token market after 2025. While a limited number of smart startups will survive, traditional financial institutions will play a key role in the ABST market, in our view.

We estimate the market size of the ABST market will be USD 1.9t in 2030, which accounts for 38% of the ABS market size (the total ABS market size is worth USD 4.9t based on SIFMA, S&P 500, and our estimate) in 2018. Having referred to the REIT value out of the total real estate value (REIT value came at USD 1.1t which is 0.5% of the total real estate value worth USD 217t as of

2017), we assumed 0.4% of illiquid assets (real estate, art pieces, VC funds, and others) will be tokenized in 2030. In contrast to alternative assets which generally have low liquidity, traditional assets such as stocks and bonds are typically liquid. Therefore, it is difficult for us to expect traditional assets such as these to become tokenized anytime soon, and thus we have not reflected traditional assets on our ABST estimate.

We highlight that institutions participation is dependent on the maturity of the security token ecosystem. Although our basic assumption for institutions to participate in security token market is post year 2025, inflection point could vary on market situation. Also, tokenization of intangible assets (intellectual property rights, brand, and more) and various derivatives which underlying asset is security token are significant swing factors that lift up security token market size. However, we have not reflected these on our estimate since it is too early to discuss tokenization of intangible asset and derivatives at the moment. We will carefully monitor development progress and provide investors with up to date information on the security token market.



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