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Global Digital Asset Exchange Sector Initiation

Digital Asset – Opportunities for Equity Investors

The digital asset phenomenon is shaped by many forces that profoundly impact our collective futures as equity investors. The global digital asset market capitalization is projected to reach US\$5.1 tr by 2025, driven by secular trends as increasing mainstream adoption, regulatory clarity and technological breakthrough, which will shape long-term investment themes. This report features our curation of expert conversations to help equity investors cut through the noise, dissect the digital asset opportunity, with the overarching goal of assisting them in identifying pockets of opportunities and relevant stock plays. We initiate coverage of Coinbase and BC Technology Group with Buy ratings given their well-integrated ecosystems, best-in-class infrastructure and superior regulatory compliance standards. We believe they are well-positioned to benefit from the digital asset industry's rapidly expanding total addressable market (TAM), and increasing institutional adoption.

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Executive Summary

We are pleased to introduce “Digital Asset– Opportunities for Equity Investors”, the first Decentralized Framework for Crowdsourcing Intelligence

The digital asset phenomenon is shaped by many forces that profoundly impact our collective futures as equity investors and stakeholders of the financial system. The global digital asset market capitalization is projected to reach US\$5.1 tr by 2025 (vs US\$1.6tr in 2020), implying a 2020-25 CAGR of 26%. In this report, we provide a mental model for equity investors to deepen our understanding of the big ideas in digital assets, with the ultimate objective of informing equity investment decisions.

Global digital assets industry to be a US\$5tr opportunity by 2025

As early as 2009, early adopters have started to use Bitcoin, the grandfather of all digital assets, as a medium of exchange (pay for pizza), and store of value (**considered as ‘digital gold’**). The orchestrated rounds of central bank liquidity injections and COVID-19 has caused the trend to accelerate, and the growth seems limitless.

Taking the pulse on the digital assets space through expert interviews

The report features our curation of industry expert discussions, helps equity investors cut through the noise, dissects the digital asset opportunity, with the overarching goal of assisting investors in identifying pockets of opportunities in equities through stock proxies.

Unpacking the digital asset opportunity into a latticework of 8 mental models

Near term

We expect near-term themes to play out within 12 months to benefit equities exposed to the digital asset opportunity.

Theme 1: Sizing up the Digital Asset Economy

The US\$1.6tr global digital asset industry will chalk up robust growth (2020-25E CAGR of 26%) driven by (1) product innovation and infrastructure improvements; (2) regulatory clarity; and (3) increasing institutional participation and mainstream adoption.

Theme 2: Regulation and Institutionalization – Digital assets as an Institutionalized Asset Class

Digital assets made up 0.1% of total AUM (asset under management) among multiple asset classes in 2020. We expect a seismic change on the back of institutional participation and increasing regulatory clarity. Over 70% of institutional investors plan to invest in digital assets within the next five years, according to a study by Fidelity Digital Assets (2021). The increasing allocation to digital assets by institutional investors, who typically have longer-term horizons, will drive the market capitalization of digital assets higher.

Theme 3: CEX and DEX – Allies or Foes

Centralized exchanges (CEXs) are, by far, dominating the trading of digital assets, thanks to its (1) near-instantaneous transaction speed, (2) high liquidity and (3) easy-to-use interface, which offers fiat-to-crypto conversion. However, the rapid growth of decentralized exchanges (DEXs) has called the future dominance of CEX into question. Our view is that the future will see increasing convergence between CEX and DEX, as they take pages out of **each other's** playbooks. For example, CEX may use smart contracts or AMMs to complement their infrastructure.

Theme 4: Cybersecurity – Uncharted Territories for Digital Assets

The rapidly growing digital asset space has made certain digital asset exchanges easy targets for cyber attackers. The sector's reliance on private keys and the centralized nature of certain digital asset exchanges have exposed vulnerabilities to cyberattack risks. In the future, strengthened cybersecurity alliances, enhanced cybersecurity insurance coverage and solutions will further safeguard digital asset exchanges and enhance investors' confidence to gain exposure to related equities.

Medium to longer-term

We expect medium-to-longer-term themes that will play out in the coming 12-36 months to benefit those equities with exposure to the digital asset opportunity.

Theme 5: STOs – The future of Capital Raising

More digital asset exchanges are entering the asset tokenization market, given the abundant opportunities. Asset tokenization adds value by enhancing liquidity with fractional ownership, increasing transaction efficiency and creating all-new secondary markets. Digital asset exchanges stand to benefit, as asset tokenization will broaden their product portfolio and increase trading volume and user stickiness.

Theme 6: DeFi – Democratizing Finance

Decentralized finance (DeFi) offers a rapidly expanding ecosystem with new use cases. In the future, CEX and DeFi protocols will likely form a mutually beneficial relationship. By integrating DeFi protocols, CEX can increase stickiness to their ecosystem and launch innovative products.

Theme 7: NFT – Future of Ownership or Fad

Non-Fungible Tokens (NFTs) have rich use cases spanning multiple fields, and benefits from increasing industry recognition. Defined by their uniqueness and immutability, NFTs are often applied to collectibles, artwork, digital items etc. By providing marketplaces and other derivative services, digital asset exchanges can tap into the NFT's market potential and a broader array of products and services to increase user stickiness.

Theme 8: Mining – Towards a Greener Future

The migration of blockchain's consensus protocols to Proof of Stake (from Proof of Work) is a critical future trend that will provide more opportunities for digital asset exchanges to engage users in the protocols and drive staking revenue.

Equity exposure to digital assets – Prefer pick and shovel plays **with the 'X factor'**

We initiate coverage on Coinbase and BC Technology Group (BCG) with Buy ratings. We believe they are well-positioned to benefit from the digital asset industry's rapidly expanding total addressable market (TAM) with their well-integrated ecosystems, best-in-class infrastructure and superior regulatory compliance standards. Our view is that to focus any discussion of licensed and regulatory compliant digital asset exchanges on commission and margin pressure is overly limiting. Instead, we urge equity investors to take a broader view. In other words, investing in Coinbase and BCG gives investors exposure to the future potential of the digital asset phenomenon, what we call the 'X factor'.

This report will

- Give equity investors insights on the equities that are exposed to the digital asset opportunity
- Share pearls of wisdom from industry veterans to
- Illustrate how the significant opportunities and risks that they see that may potentially reshape the industry
- Curate factual information that is shared with us from third-party experts
-

This report will not

- Provide technical explanations of underlying protocols
- Provide any professional or personal views on digital assets
- Make investment recommendations to equity investors to asset classes beyond equities

Acknowledgements

Crowdsourced Intelligence: Sharing a front-row seat to experience the future of the digital assets economy

Crowdsourced intelligence – The first decentralized insight report on digital assets

In honour of the esprit de corps of the decentralized digital asset and blockchain ecosystem, we crowdsource intelligence from leading industry experts to inform the decisions that equity investors face.

As with all of our projects, we appreciate that our ability to produce high-quality insights is highly dependent on the cooperation of industry veterans. We extend our gratitude to all individuals who have contributed to the publication of this report.

Front row seat to the digital asset revolution

This insight piece is collectively written by leading experts spearheading the digital assets initiative in the investing, legal, cybersecurity, tokenization, DeFi and mining aspects.

Their input was invaluable, and we would like to thank and recognize them for all of their insights.

We hope that the findings captured in this sector initiation report will offer actionable insight into the industry's direction and recommendations for how investors can best position themselves to capitalize on the opportunity through exposure to public equities.

Appreciation to expert contributors

Below is a list of experts (in alphabetical order by last name) who have contributed their insights.

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	Ray Wong CEO, LuTech
Investment	Bowie Lau Partner, True Global Ventures Founder & MD, MaGEHold & MaGESpire
	Michael Wong Managing Partner & COO, Co-founder, MaiCapital
Legal	Katherine Liu Partner, Financial Regulatory team, Stephenson Harwood
	Padraig Walsh Partner, Corporate and Commercial, Tanner De Witt

Global equities with exposure in digital asset

				MktCap	3m Vol	EPS Growth (%)		P/E (x)		P/S (x)		ROE (%)		Ev/EBIT (x)		Net D/E (%)	Total return performance (%)									
Company Name	Ticker	Lcy	Rating	Price	US\$bn	US\$m	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022	2020	1d	5d	1mo	3mo	6mo	ytd	1yr		
Digital Asset																										
HK/China																										
BC TECHNOLOGY GR	863 HK	HKD	BUY	13.56	0.7	2.2	(0.2)	T/A	N/A	1,339.7	15.0	7.6	N/A	0.7	N/A	747.4	95	(6)	(11)	(27)	(28)	(5)	(25)	21		
North America																										
COINBASE GLOBA-A	COIN US	USD	BUY	244.36	51.0	2,018.5	62.1	47.8	25.4	17.2	7.0	5.6	43.1	40.6	20.0	-	(55)	6	1	2	(13)	-	-	-		
Digital Asset-Related Service																										
HK/China																										
HUOBI TECHNOLOGY	1611 HK	HKD	-	10.12	0.4	4.7	-	-	-	-	-	-	-	-	-	-	(29)	1	(4)	(25)	(57)	1	63	102		
OKG TECHNOLOGY H	1499 HK	HKD	-	0.29	0.2	0.5	-	-	-	-	-	-	-	-	-	-	(120)	(0)	0	(5)	(53)	(10)	16	31		
Rest of Asia																										
DBS GROUP HLDGS	DBS SP	SGD	-	30.96	58.8	91.7	42.5	6.3	12.0	11.3	5.4	5.1	11.9	12.0	-	-	(48)	1	2	0	5	24	25	56		
SBI HOLDINGS INC	8473 JP	JPY	-	2,711	6.0	38.5	108.2	(12.6)	7.5	9.1	1.3	1.4	16.9	11.2	9.4	8.5	11	(0)	4	2	(10)	(2)	14	23		
GMO INTERNET INC	9449 JP	JPY	-	2,868	2.9	12	42.9	5.0	21.6	20.6	1.3	1.2	27.6	21.4	7.6	7.2	(16)	(0)	(0)	(3)	(8)	(10)	(3)	(6)		
DIGINEX LTD	EQOS US	USD	-	5.23	0.2	7	-	-	-	-	1,021.1	11.3	-	-	-	-	(84)	1	(1)	(12)	(14)	(71)	(68)	(50)		
Europe																										
ARCANE CRYPTO AB	ARCANE SS	SEK	-	0.27	0.3	1	-	-	-	-	-	-	-	-	-	-	235	(5)	(4)	91	24	21	83	200		
North America																										
PAYPAL HOLDINGS	PYPL US	USD	-	275.50	323.7	1,801	21.5	25	58.5	46.8	12.6	10.2	23.5	23.9	42.4	34.3	(17)	1	(9)	(5)	10	2	18	40		
SQUARE INC - A	SQ US	USD	-	266.42	122.5	2,280	116.5	23	146.5	118.7	6.3	5.7	15.6	19.7	115.4	89.1	(31)	(1)	3	11	15	12	22	95		
CME GROUP INC	CME US	USD	-	208.50	74.9	253	0.4	9	30.9	28.3	15.4	14.4	8.9	9.6	23.7	21.7	9	(0)	(3)	(2)	3	10	16	32		
GRAYSCALE BITCOI	GBTC US	USD	-	33.14	22.9	327	-	-	-	-	-	-	-	-	-	-	-	4	(3)	16	(28)	(13)	4	139		
GALAXY DIGITAL H	GLXY CN	CAD	-	22.13	5.6	31	208.9	(91)	6.4	70.7	5.1	11.8	-	-	9.0	65.2	(8)	8	14	(4)	(37)	65	103	534		
SILVERGATE CAP-A	SI US	USD	-	103.06	2.7	127	113.1	32	35.6	27.0	15.8	11.1	8.7	9.0	-	-	(1,001)	3	(3)	(4)	(1)	(18)	39	631		
BIGG DIGITAL ASS	BIGG CN	CAD	-	1.44	0.2	8	-	-	-	-	-	-	-	-	-	-	-	(1)	1	(4)	(35)	122	182	800		

Source: China Tonghai estimates for Coinbase Global and BC Technology Group, Bloomberg consensus estimates for all others

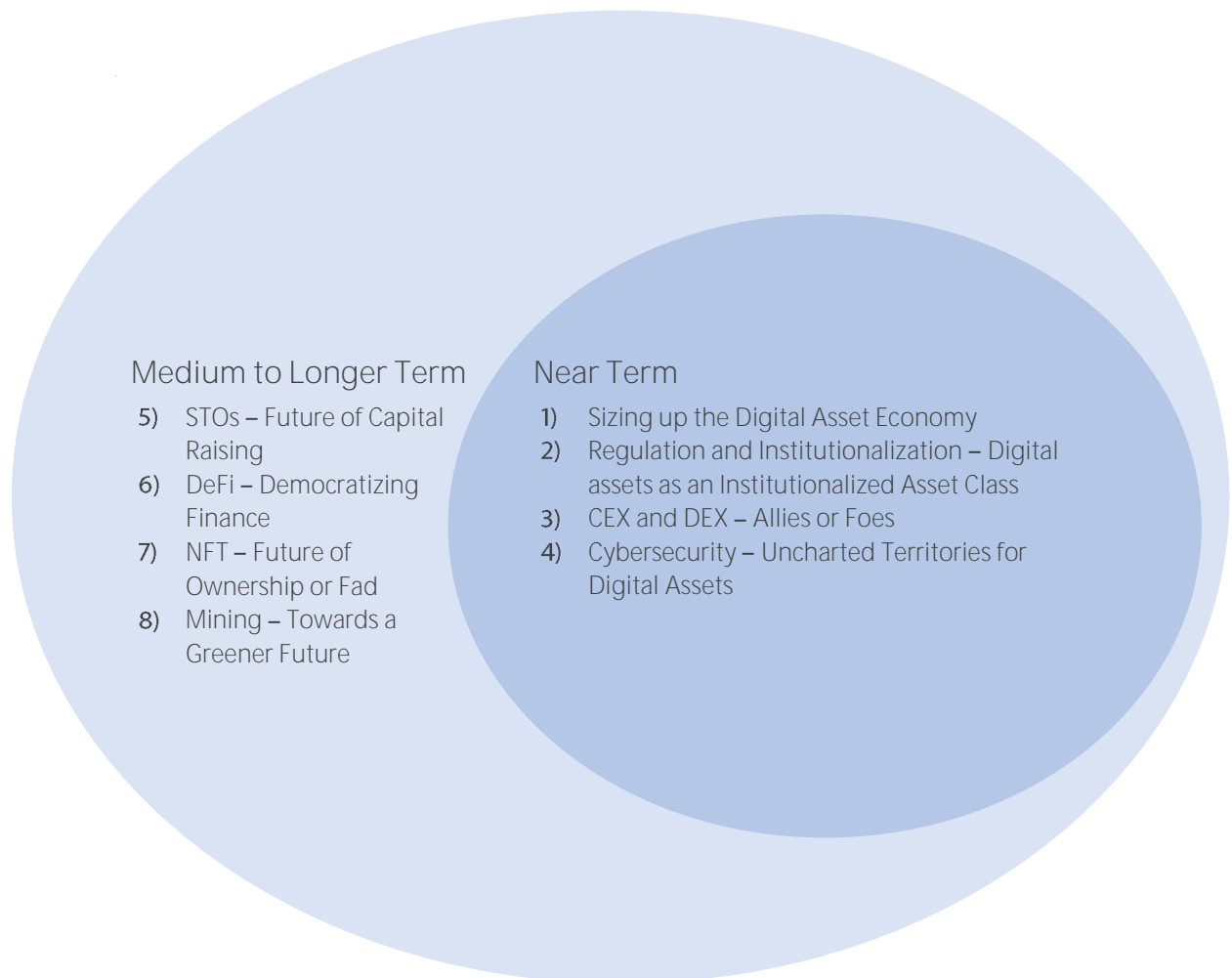
Note: Priced as of 5 Aug 2021 close for HK/ Asia listed equities, 4 Aug 2021 close for all others.

Global equities with exposure in digital asset

				MktCap	3m Vol	EPS Growth (%)		P/E (x)		P/S (x)		ROE (%)		Ev/EBIT (x)		Net D/E (%)	Total return performance (%)								
Company Name	Ticker	Lcy	Rating	Price	US\$bn	US\$m	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022	2020	1d	5d	1mo	3mo	6mo	ytd	1yr	
Mining																									
HK/China																									
CANAAN INC	CAN US	USD	-	7.95	1.4	113.0	-	-	-	-	-	-	-	-	-	-	(93)	2	16	9	(34)	32	34	201	
BIT DIGITAL INC	BTBT US	USD	-	13.07	0.6	84.3	-	-	-	-	-	-	-	-	-	-	(1)	31	64	123	9	(25)	(40)	205	
Rest of Asia																									
OIO HOLDINGS LTD	OIO SP	SGD	-	0.51	0.1	1.5	-	-	-	-	-	-	-	-	-	-	-	4	(10)	(13)	-	-	-	-	
Europe																									
NORTHERN DATA AG	NB2 GR	EUR	-	59.80	1.2	5.7	364.6	43.7	10.3	7.2	2.2	1.6	38.2	36.1	6.8	4.7	-	11	(21)	(28)	(38)	(30)	(22)	23	
ARGO BLOCKCHAIN	ARB LN	GBp	-	127.00	0.7	15.7	1,217.8	0.0	18.7	18.7	8.3	6.9	26.4	23.4	10.9	7.8	22	(5)	(4)	(1)	(29)	31	285	2,017	
North America																									
RIOT BLOCKCHAIN	RIOT US	USD	-	32.71	3.1	577.7	1,165.9	93.1	37.8	19.6	16.2	8.0	-	-	22.5	10.9	(81)	4	3	(10)	(11)	40	93	716	
MARATHON DIGITAL	MARA US	USD	-	28.72	2.9	520.1	2,003.3	38.9	13.3	9.6	12.7	4.8	-	-	12.9	7.1	(45)	6	5	(5)	(14)	28	175	584	
HIVE BLOCKCHAIN	HVBT US	USD	-	2.78	1.1	7.4	-	106.7	23.2	11.2	19.5	7.3	-	-	-	-	(0)	4	17	(9)	(17)	27	47	573	
BITFARMS LTD/CAN	BITF CN	CAD	-	5.94	0.8	13.4	156.3	-	47.4	-	7.9	-	-	-	15.0	11.6	145	9	20	20	(9)	55	138	1,138	
HUT 8 MINING COR	HUT CN	CAD	-	6.56	0.8	15.5	1,677.2	87.1	14.1	7.5	6.4	2.4	-	-	12.9	3.5	20	8	15	3	6	21	88	401	
Holder of digital asset																									
HK/China																									
MEITU INC	1357 HK	HKD	-	1.49	0.8	6	-	-	-	-	-	-	-	-	-	-	(32)	1	(5)	(10)	(37)	(34)	3	(6)	
Rest of Asia																									
NEXON CO LTD	3659 JP	JPY	-	2,121	17.2	60	78.3	28	18.6	14.5	6.2	5.2	13.5	14.7	10.9	8.1	(73)	1	(8)	(14)	(41)	(36)	(33)	(24)	
North America																									
TESLA INC	TSLA US	USD	-	710.92	703.8	17,849	132.4	36	136.6	100.2	14.1	10.3	17.5	19.4	71.6	51.3	(26)	0	5	5	6	(17)	1	139	
MICROSTRATEGY	MSTR US	USD	-	670.93	6.5	466	15.7	4	112.1	107.9	12.8	12.1	-	-	86.8	79.7	94	7	7	6	8	(17)	73	441	

Source: China Tonghai estimates for Coinbase and BC Technology Group, Bloomberg consensus estimates for all others

Note: Priced as of 5 Aug 2021 close for HK/ Asia listed equities, 4 Aug 2021 close for all others.



Contents

Executive Summary	4
Acknowledgements	6
Global comps	7
Megatrends	
1) Sizing up the Digital Asset Economy;	11
2) Regulation and Institutionalization – Digital assets as an Institutionalized Asset Class;	26
3) CEX and DEX – Allies or Foes;	44
4) Cybersecurity – Uncharted Territories for Digital Assets;	61
5) STOs – Future of Capital Raising	68
6) DeFi – Democratizing Finance;	82
7) NFT – Future of Ownership or Fad;	102
8) Mining – Towards a Greener Future	111
Stock initiation	
Coinbase	
BC Tech Group	

MEGATREND 1

Digital Asset Economy – Riding the Crypto Wave

Key Highlights

- Regulators are seeking to fit digital assets into the existing regulatory frameworks.
- Custody, taxation and regulation are primary considerations for an investor to gain exposure to digital assets.
- In the future, increasing regulatory clarity and accelerating institutional participation in the digital asset space will contribute to the significant upside of the industry.

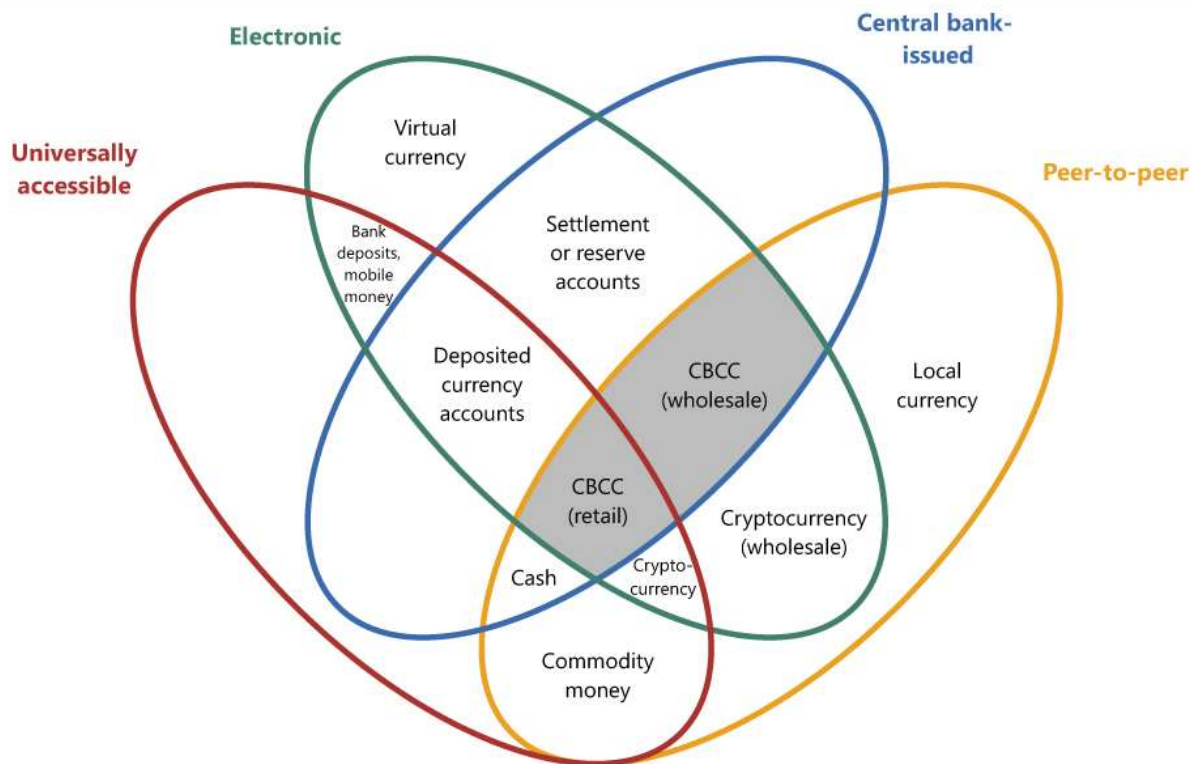
What are digital assets?

Digital assets vs cryptoassets

All cryptoassets are digital assets. But not all digital assets are cryptocurrencies. Crypto assets are digital assets that are stored on distributed ledgers that utilize cryptography for security. Cryptocurrencies and crypto tokens have been a popular examples of digital assets.

The money flower: a taxonomy of money

Graph 3



© Bank for International Settlements

Below we compare the characteristics of digital assets, cryptocurrencies, and tokens to clarify the difference among them.

Figure 1. Digital assets vs Cryptocurrencies vs Tokens

	Digital assets	Cryptocurrencies	Crypto tokens
Definition	Refers to a non-tangible asset that is created, traded, and stored in a digital format. In the context of blockchain, digital assets include cryptocurrency and crypto tokens.	Subclass of digital assets that utilize cryptography. cryptocurrencies are the native asset of a blockchain network that can be traded	Subclass of digital assets that use cryptography. Units of value that blockchain-based projects develop on top of existing blockchain networks.
Examples	APPL tokens, Cryptokitties	BTC, ETH	ERC-20 tokens
Issuance	Digital assets can be issued on a distributed ledger or any other type of medium	Issued directly by the blockchain protocol on which it runs	Tokens are created by platforms that are built on existing blockchain networks
Use	Used as a means of exchange or payment or are used for investment purposes and can be transferred, stored and traded electronically.	Utilized as a medium of exchange and a store of value.	Utilized as a medium of exchange and a store of value; In addition, it can serve multiple functions on the platforms for which they are built, including DeFi
Control	Owners' control over digital assets are reduced to some degree, since they are protected by overarching entities.	Allow the owner to be in full control at all times, with the public and private key system associated with cryptocurrency wallets	Allow the owner to be in complete control at all times, with the public and private key system associated with cryptocurrency wallets
Supply	Can be created indefinitely if needed	Most have a supply limit	Most have a supply limit
Intrinsic value	Have intrinsic value	They are often considered to have no real value behind them	Often considered to have no real value behind them

Source: Gemini¹

Characteristics of digital assets

The unique features of digital assets enable them to complement the existing financial system or even reshape the existing financial services.

Figure 2. Characteristics of digital assets

Characteristics of crypto-assets	Significance
Decentralization	Decentralized, or at least not reliant on a central issuing authority. Instead, cryptocurrencies rely on code to manage issuance and transactions.
Without intrinsic value	Cannot be exchanged for other commodities with intrinsic value
Programmable supply	The supply can be inflationary or fixed. If it is fixed, it will create digital scarcity and stimulate demand; avoids quantitative easing, which can lead to inflation
Trustless	They are built on a blockchain or other Distributed Ledger Technology (DLT), which allows participants to enforce the system's rules in an automated, trustless fashion.
Cryptography	Uses cryptography to secure the cryptocurrency's underlying structure and network system

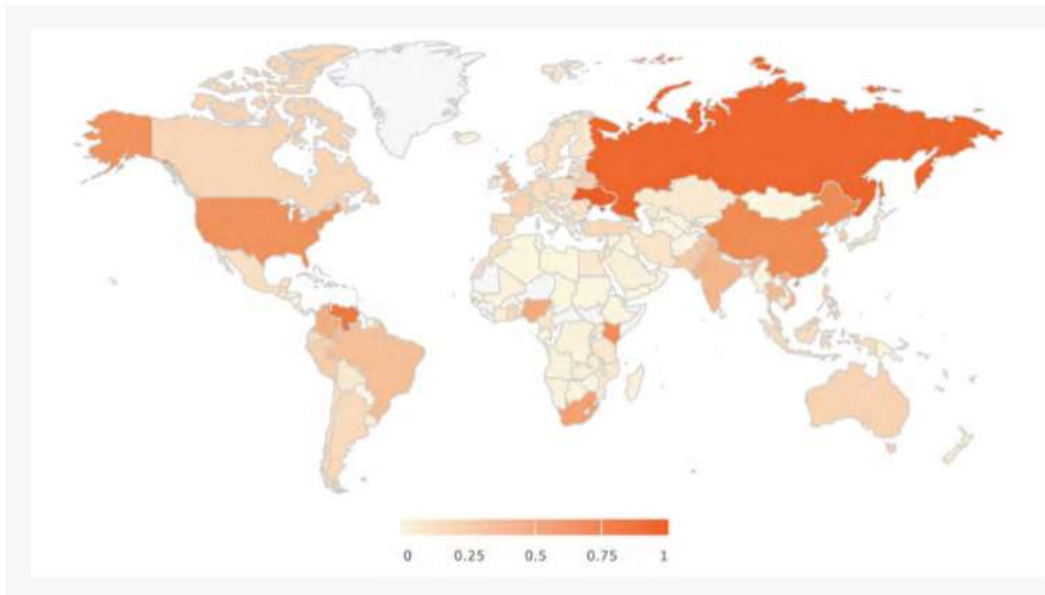
Source: Cointelegraph, Gemini

Global Digital Asset Adoption

The map (Figure 3) illustrates that the prevalence of cryptocurrency adoption has been increasing worldwide. The closer a country's score is to 1, the higher its crypto adoption.

Figure 3. Crypto Adoption Index 2020

The Crypto Adoption Index | Jul '19 to Jun '20



Source: Chainalysis

Note: Time period between June 2019 and June 2020.

Digital assets as an asset class

Valuation approaches to digital assets

The question of how to value digital assets is one of the most complex and challenging issues. Digital assets has a relatively brief history of development, and new use cases continue to crop up.

Applying valuation approaches of traditional asset classes to digital assets pose a few challenges. Digital assets are not cash flow generative, and their limited performance track record makes it difficult to project their future performance. We summarize several common valuation methodologies for cryptoassets.

Figure 4. Common valuation methodologies of digital assets

Valuation methodology	Thesis	Pros	Cons	Remarks
Total addressable market	Estimate and compare the addressable markets with the current market capitalization	Intuitive and straightforward – It provides a solid framework for order-of-magnitude comparisons between cryptoassets and the markets they address.	Not applicable beyond bitcoin and other store-of-value use cases	Most popular valuation approach
Equation of exchange	The equation is borrowed from traditional models of valuing currencies. It is assumed that a currency's value is related to the size of the market it supports and its velocity.	Feasibility – Numbers can be forecasted into the future for a mature market and then discounted into present value.	Small changes in this estimate can lead to significant changes in proposed valuations. It requires estimating the velocity, which is problematic.	$MV = PQ$ M: Total money supply V: Average velocity with which a unit of money is spent P: Price of goods and services Q: Quantity of goods and services
Valuing cryptoassets as a network	This approach is borrowed from technology. It states that the value of a network is proportional to the square of the number of participants.	Intuitive – Given that daily active user is a proxy for the adoption of a cryptocurrency.	Its fundamental limitations are: - appropriate only for relative valuations between cryptoassets. - gives equal weight to each user, which is not an accurate assumption	An essential part is that the value of the network is not linearly related to the number of users. Instead, it is related by a square function.
Cost of production valuation	This approach views bitcoin as a commodity. The cost of producing each marginal bitcoin should align with the price of that bitcoin, according to traditional microeconomic theory.	Supported by empirical backtesting, which shows a relatively strong relationship between bitcoin's price and the marginal cost of production	Little predictive power; Fails to explain the short-term volatility of bitcoin price	Uncertain predictive value - The causal relationship between the cost of production and price is not clear.
Stock-to-flow model	The stock-to-flow ratio measures the scarcity, which is reflected by bitcoin price. The ratio measures the relationship between bitcoin and the amount of new bitcoin being produced.	Intuitive – the price of bitcoin has close historical correlations with increasing scarcity expressed by the stock-to-flow model.	Not applicable beyond bitcoin. The model only appeals to those who see scarcity as the dominating characteristic.	Some are sceptical of this approach, such as academic researchers.

Source: Bitcoin Market Journal, CFA Cryptoassets report

Digital asset in portfolio construction

According to Fidelity Digital Assets, a survey revealed that 70% of global institutional investors plan to invest in digital assets within the next five years.

Figure 5. Digital asset as an asset class in portfolio construction

Characteristics	How to measure	Significance	Trend over time
High potential return	The difference between the potential appreciation in the price and the cost price	Increasing use cases and higher mainstream penetration	Digital assets have massive upside as it is still in the early stage of development, and professional investors have yet to allocate to the space.
High liquidity	Measures the trading volume over a certain period	Easier for investors to trade with minimal price risk	Increasing liquidity over time
High volatility	Measured by the standard deviations of returns	High volatility limits institutional adoption	Volatility is declining but is expected to persist in the future.
Low correlation with traditional assets	Measures the degree to which price moves are correlated with other traditional assets	Market-specific dynamics and investor flows influence returns and correlations.	Correlations are unlikely to rise substantially, given the different return drivers, making cryptoassets a popular means of diversification.

Source: CFA Cryptoassets report

Figure 6. Expected Future Return Drivers By Asset Class

Equities	Bonds	Cryptoassets
Corporate profits	Economic growth	Investor adoption
Economic growth	Interest rates	Millennial wealth
Interest rates	Issuance	Regulatory developments
Productivity		Weakening trust in authorities
		Institutionalization

Source: CFA Cryptoassets report, BitWise Asset Management

Digital assets – Key considerations and risks for investors

Institutional investors ought to evaluate the risks of digital assets, particularly in the context of a multi-asset portfolio. Digital assets have unique risk and return characteristics. Most traditional financial risk models fail to incorporate the idiosyncratic risk of digital assets.

Figure 7. Digital assets – Key considerations for investors

Considerations	Implications	Trend	Best practice
Custody	Highly important for investors to safeguard private keys with secure storage. The ownership of a cryptoasset is established by the private key. Losing the private key would mean losing the cryptoasset.	Professional investors either work directly with regulated crypto custody providers or access them through funds that use these custodians to hold assets.	Hold private keys in “cold storage”, i.e. users can store that password offline
Taxation	With the regulatory landscape of digital assets still fluid, the taxation issue is uncertain for investors.	Increasing regulations on cryptoassets and tax in different jurisdictions	Investors should consult with tax professionals before investing
Regulation	Higher regulatory clarity paves the way for mainstream adoption and acceptance from institutional investors.	The regulatory treatment of cryptoassets is evolving and will likely converge with other traditional asset classes and financial products in the near-to-medium term.	Closely monitor and react to the regulatory developments surrounding crypto

Source: CFA Cryptoassets report

Approaches for gaining exposure to digital assets

With the increasing popularity of digital assets, investors can gain direct exposure by buying and holding digital assets, or indirectly through equities and funds.

The following table (Figure 8) illustrates the available digital asset investment options.

Figure 8. Common approaches for gaining exposure to digital assets

Approach	Details	Advantages	Disadvantages	Future trend	Selected examples
Online or crypto brokerage	Enables users to trade digital assets similar to buying or selling stocks through brokers	Convenient	Security risk; Relatively high transaction fees; Non-competitive trade execution; Unclear compliance status; Delays and limits on withdrawals.	Brokerage apps and websites are increasingly popular among retail investors	Coinbase, Kraken
Passive and active private placement funds	Allows investors to invest in digital assets through funds	Managed exposure to digital assets; Funds provide one-stop services, including custody, trading, reporting, tax, audit etc.	Limited availability (only to accredited investors)	Private funds are increasingly popular with HNWI; registered and hedge funds	Pantera Bitcoin Fund (launched in 2013) offered accredited investors a way to invest in bitcoin
Publicly traded shares	Allows investors to gain exposure to equities that are levered to the digital assets opportunity.	Simple and straightforward	Other factors influence stocks valuations; The variance of premiums and discounts to their NAV.	Increasingly popular with retail and professional investors.	Coinbase, BC Group, Huobi Tech, Riot Blockchain
Direct custodial relationship	Trade digital assets with a custodian	A low-cost way to gain exposure while eliminating intermediaries (fund providers).	Not available to smaller investors; Costly due diligence process.	Increasingly popular with buy-side, venture capital funds, family offices etc.	Hex Trust is a fully licenced and insured provider of institutional-grade custody for digital assets.
Regulated futures markets	Allows investors to access through future	Fully regulated; Allows individuals to use margin.	Complex costs and tax calculations	Increasingly popular with hedge funds and proprietary trading firms.	CME bitcoin futures market
Venture Capital Funds	Allow investors to invest in the equity of cryptoasset startups.	Way to get exposure to digital asset startups	Accessing the top tier of venture capital funds can be difficult; Significant fees; Lack of liquidity.	Increasingly popular with endowments, pensions, and family offices.	Blockchain Capital has funds with multiple-year track records.
ETF	Package crypto inside an ETF or mutual fund	Promising approach	Regulatory uncertainty - Many are pending regulatory approval	More asset managers are filing for cryptocurrency ETF with regulators	Exchange-traded products have been approved in certain jurisdictions (e.g. Switzerland, Germany, and Sweden)

Source: CFA Cryptoassets report

Popular coins

The following table (Figure 9) lists the top 10 cryptocurrencies by market cap.

Figure 9. Top 10 coins by market cap

#	Cryptocurrency	Short name	Category	Mkt cap (US\$bn)	Supply	Basis	Description
1	Bitcoin	BTC	Digital currency	\$641	Fixed	Blockchain technology-based	Bitcoin (BTC) is the original cryptocurrency created in 2009. Additional blocks are created through the proof of work process, which keeps Bitcoin secure.
2	Ethereum	ETH	Smart contracts	> \$307	Fixed	Ethereum-based	Ethereum is a cryptocurrency and a blockchain platform that is popular among developers. Potential applications of smart contracts include non-fungible tokens (NFTs) and dApps.
3	Tether	USDT	Stablecoin	> \$62	Inflationary	Traditional fiat currencies-based	Tether is a stablecoin backed by fiat currency (US dollars) and is favoured by investors who prefer its stability.
4	Binance Coin	BNB	Exchange token	> \$56	Deflationary	Binance chain-based	The Binance Coin is a cryptocurrency that allows holders to trade and pay fees on the Binance exchange. Launched in 2017, its applications include facilitating trades on Binance's exchange platform, trading, payment processing or booking travel arrangements.
5	Cardano	ADA	Smart contracts	>\$51	Fixed	Cardano - based	Cardano was one of the first cryptocurrencies that used proof-of-stake validation. Cardano is similar to Ethereum to enable smart contracts and decentralized applications powered by ADA, its native coin.
6	Dogecoin	DOGE	Digital currency	>\$44	Inflationary	Litecoin - Based	Dogecoin is a meme cryptocurrency with a dedicated community following. Unlike BTC and many other cryptos, there is no limit on the number of Dogecoins that can be created, which leaves the currency susceptible to devaluation as supply increases.
7	XRP	XRP	Digital currency	>\$40	Deflationary	Ripple labs-based	XRP can be used on the Ripple network to facilitate exchanges for fiat currencies and other major cryptocurrencies.
8	USD Coin	USDC	Stablecoin	>\$23	Not fixed	Ethereum-based	Like Tether, USD Coin (USDC) is a stablecoin and is backed by US dollars (aim for a 1 USD to 1 USDC ratio). USDC is powered by Ethereum, and you can use USD Coin to complete global transactions.
9	Polkadot	DOT	Smart contracts	>\$21	Inflationary	Polkadot - based	Polkadot (and its crypto) aims to integrate blockchains by creating a cryptocurrency network that connects the various blockchains to work together. This integration may change how cryptocurrencies are managed. Polkadot was launched in 2020.
10	Uniswap	UNI	Exchange token	Over \$13 billion	Fixed	Ethereum-based	Uniswap is an Ethereum-based token that powers Uniswap, a decentralized crypto exchange that uses an automated liquidity model for trading. Uniswap's open-source platform is powered by smart contracts and pooled user resources, with no central facilitator.

Source: Coingecko, as of 10 am Jul 22, 2021

Digital assets – Industry Risks for Investors and Ecosystem Participants

There is a long list of considerations that investors must consider before getting exposure to digital assets.

Figure 10. Digital assets – Industry Risks

Risk	Meaning	Example	Solutions
Risks to the digital asset industry			
Technical risks	Technical risk and incremental performance challenges are pervasive to digital assets, and the threat is more significant for newer and more complex blockchains.	In 2018, researchers uncovered a bug in the bitcoin code that could have led to significant inflation in new bitcoin issuance.	Emphasize cybersecurity and fix loopholes or bugs in the system
Competitive risks	Digital asset-powered blockchains face rising competition from other solutions.	Advances in industry solutions could challenge the status of digital assets. 2019, US Federal Reserve announced plans to launch a real-time settlement program, "FedNow". Rapid settlement has been a differentiating factor for digital assets.	Release newer versions of blockchain platforms
Malicious actors	Malicious actors could attack blockchains, e.g. 51% attack.	In 2014, the mining pool GHash.IO reached a level of c55% of Bitcoin's hashrate.	Migrate from PoW structures to PoS structures
Regulatory threats	Significant areas of regulatory uncertainty remain	Asset seizure or bans by governments; Enhanced AML/KYC requirements; Blanket or piecemeal ban could impact liquidity.	Closely monitor regulatory changes. Conduct thorough due diligence on the regulatory environment before investing.
Risks to digital asset as an investment			
Market manipulation	Digital asset trading platforms are not as regulated or mature as traditional platforms. Hence, they are more susceptible to market manipulation.	Whales (who hold large amounts of coins) can manipulate the valuation of a cryptocurrency.	Increase trading transparency and trade monitoring
Fraud	Fraudulent entities may steal investors' money as a result of incompetence or malicious intent.	In 2013, My Big Coin founder falsely claimed to secure MBC coins with gold, fabricated figures about the coins' value and siphoned off over \$6 million.	Critical to work with best-in-class partners to avoid fraud; Emphasize the importance of cybersecurity for investors; Increased regulatory and enforcement efforts against cybercrime.
High volatility	Cryptoassets have exhibited extremely high levels of volatility, including multiple instances of substantial drawdowns.	The volatility of the price of bitcoin reached 8% between Oct 2017 and Jan 2018.	Increasing institutional participation, on the back of increasing regulatory clarity and digital asset investment options (e.g. ETF), should reduce market volatility. Institutions are more focused on the long term. Portfolio diversification and volatility hedging tools
Difficulty in performing due diligence	The digital asset industry is relatively new, which increases the difficulty in performing due diligence.	Digital asset expertise is still developing, and participants have limited track records	Digital asset research providers can offer targeted research and analysis; Deeper digital asset expertise as the institutional adoption increases; More mature evaluation system developed by investment firms.
Bubble	It remains unclear whether the valuations of digital assets can be justified	Warren Buffett and George Soros have characterized bitcoin as a "bubble"	Higher vigilance in making investments.

Source: CFA Institute report on cryptoassets

Digital assets – Industry metrics

The digital asset space is rapidly evolving. The following metrics will allow investors to take a pulse on the health and sustainability of the industry.

Figure 11. Digital assets – Metrics for analysis

Metric	What it measures	Drivers	Importance
Whale wallet	Individuals or entities that hold large amounts of bitcoin	Whale investor investment interest; The concentration of coin holdings	The movements of whale wallets are important signals for market volatility and liquidity
Trading volume	The total volume of crypto traded during a given period	- Liquidity - Exchange order execution capabilities - Market performance - Investment interest/ market sentiment	Indicator of crypto market activity and liquidity
Active wallets	The number of active digital wallets that help investors store and trade crypto	- Coin usage - Market demand - Investment interest	Indicator of user participation and market demand
Market cap	The total value of coins mined. Market cap = Total number of coins that have been mined x Price of a coin	- Supply (mining activity) - Demand (coin usage, market sentiment)	Indicator of stability: the larger the market cap of a specific digital asset, the lower the volatility.

Source: Cointelegraph, Coinbase, Coindesk

Digital assets – Timeline of key developments

The phenomenal growth of digital assets is the culmination of many significant breakthroughs. Below is a curation of the key events that played a role in the evolution of digital assets.

Figure 12. Digital assets - Timeline of significant milestones

Period	Event	Details	Significance
Aug 2021	London Hard Fork	The Ethereum 2.0 release includes 5 vital Ethereum Improvement Proposals (EIPs). Among them, EIP 1559 and EIP 3554 are two of the most critical EIPs.	EIP 1559 reduces miner fees to make the system less inflationary. EIP 3554 increases mining difficulty to prepare for the replacement of proof-of-work with proof-of-stake.
Jul 2021	Cardano moved to Alonzo White phase	Cardano has transited to the Alonzo White phase after the Alonzo testnet was forked.	The update will bring more functionalities and increase the number of testers. After the White phase, Alonzo will enter the Purple era in early September, where it will be open to all stake pool operators (SPOs) and pioneers.
Jun 2021	China's crackdown on crypto trading and mining	Reform Commission's Energy Bureau of Xinjiang, Inner Mongolia, Qinghai, Yunnan and Sichuan consecutively announced crackdowns on mining, after PBoC banned cryptocurrency trading	Caused a price plunge for bitcoin, cooling down market sentiment. Since then, global regulatory pressure is mounting
Feb 2021	Canada authorized its first bitcoin ETF	Canadian regulators approved the first Bitcoin ETF. The Purpose Bitcoin ETF is the world's first Bitcoin exchange-traded fund which began trading on the Toronto Stock Exchange under the ticker symbol BTCC.	A milestone moment for digital asset investments, paving the way for institutional adoption
Oct 2020	Paypal accepted bitcoin	PayPal announced that it would allow its users to buy and sell bitcoin on its platform, although not to deposit or withdraw bitcoins.	Digital asset is available on one of the most popular electronic payment platforms
Jan 2018	South Korea regulated bitcoin trading	South Korea regulators required all bitcoin traders to reveal their identity, thus prohibiting anonymous bitcoin trading.	Increases the regulation clarity on digital asset trading
May 2017	Russia announced that it will legalize the use of cryptocurrencies	Russian Deputy Finance Minister told Bloomberg that the authorities hope to recognize bitcoin and other cryptocurrencies as a legal financial instrument to tackle money laundering.	Increasing state regulation could increase the attractiveness of digital asset as an investment for investors who previously shied away,
Apr 2017	Japan started to accept bitcoin as a legal payment method	Japan began accepting bitcoin as legal currency, with major retailers backing the new law	The Japan virtual currency act has likely had a major impact
Feb 2015	The number of merchants accepting bitcoin exceeded 100,000	The number of retailers accepting bitcoin surpassed 100,000. The companies that accept bitcoin payments include Microsoft, Dell, Wikipedia, Twitch, Greenpeace, Expedia and PayPal.	A milestone signalling the expansion of bitcoin adoption and use case
Nov 2013	Ethereum project in a white paper	Vitalik Buterin announced the Ethereum project in a white paper titled, "A Next-Generation Smart Contract and Decentralized Application Platform"	Created a prototype of Ethereum protocol
Oct 2011	Litecoin was released	Litecoin was released. It used scrypt as its hash function instead of SHA-256.	Created one of the key cryptocurrencies
Jan 2009	Satoshi Nakamoto mined the first batch of 50 bitcoins	Satoshi Nakamoto mined the first batch of 50 bitcoins (with the "Genesis Block") , using the CPU chip of his personal computer.	Marked the creation of the first decentralized cryptocurrency

Source: Coindesk, Cointelegraph

Digital assets – Future outlook and key themes

Digital assets sit at the intersection of multiple industries, and the use cases will continue to evolve. Anticipating the future trends will help stakeholders exploit the benefits of digital assets.

Figure 13. Digital assets – Future drivers

Drivers	Description	Significance
Improved infrastructure	The digital asset industry will see more infrastructural improvements. Past examples included the introduction of custody solutions and multi-signature wallets	Enhance confidence and trust that digital asset investments will be handled and safeguarded securely
Issuance of clear guidelines	Future judicial rulings will provide further clarity for industry participants	The clarity in the regulatory framework can protect the interest of participants and encourage institutional adoption.
Increasing institutional participation	Increasing clarity in the regulatory environment and more options for cryptocurrency investment exposure (e.g. ETF) will pave the way for increasing institutional adoption.	Reduced market volatility; Significant long term price benefits as institutions are more likely to be longer-term holders.
Mainstream adoption presents new opportunities	Many significant ecosystem developments have paved the way for digital assets to achieve mainstream adoption.	To ensure utmost diligence around operational controls and reporting

Source: The Block Research

Blockchain Investment Fund Founder Interview with Michael Wong

Key views on the digital asset opportunity

- Regulation and institutionalization will create a virtuous cycle that drives the long term development of the digital assets ecosystem.
- Arbitrage opportunities will continue to evolve as more institutional powerhouses enter this space.
- Polkadot and Cardano could potentially challenge the current position of Ethereum.

**Michael Wong**

Managing Partner &
COO, Co-founder,
MaiCapital

Evolution of the Digital Assets Market

Esme Pau (EP): As a veteran in the crypto hedge fund space, how do you think the markets have shifted in the past few years?

Michael Wong (MW): My view is that the digital assets industry has matured as regulation has also increased.

The virtuous cycle between regulation and institutionalization

A few years ago, there were a wide variety of investment products in the digital asset market, but many were not set up by financial professionals. Hence, these investment products were not set up in the most institutional-friendly way. However, as institutional participation increases, the virtuous cycle of regulation and institutionalization forces service providers to offer more professional products.

I see increasing participation from retail and institutions over the past 12 months and expect it to continue to grow over the next few years. The level of institutional legitimacy, especially on the product side, will also continue to increase.

(EP): Please share with us the background of your fund. Do you take any directional bets, or are you market neutral?

(MW): We currently have two funds.

- Our flagship fund, the Blockchain Opportunity Fund, is mainly a multi-strategy fund. We have a mix of directional as well as non-directional strategies. The purpose is to offer a product that allows investors to capture the upside potential that we see from the growth of the blockchain and the crypto industry. At the same time, we use various strategies to protect the downside, minimize drawdowns as much as we can and reduce the market volatility that we commonly see in this space.
- Our second fund, Bitcoin Plus Investment Fund, is a Bitcoin-themed directional, quantitative hedge fund that aims to track and potentially outperform Bitcoin's performance in various market conditions.

Digital Assets Investment Opportunities Are Rapidly Evolving

(EP): Can you comment on the arbitrage opportunities in the past two years? How do you think it will evolve?

(MW): I think the type of arbitrage opportunities are rapidly evolving. Some of the opportunities that existed a few years ago no longer exist today.

The primary arbitrage opportunities are between exchanges and between funding rates

Five years ago, there were many opportunities between exchanges. Some of these do exist today, but the spread is much thinner now. However, there are other arbitrage opportunities.

Another example is arbitraging between funding rates. Between derivatives or futures versus spot, the funding rates vary quite a lot, especially during strong bull or bear runs. During those times, there would be many arbitrage opportunities that could be captured, even as of today.

We also expect these opportunities to continue to evolve as more institutional powerhouses enter this space to offer their products.

(EP): What other key pockets of opportunities do you see in addition to the arbitrage opportunities you covered?

Bullish on the long term upside potential of digital assets

(MW): Yes. First of all, fundamentally, the blockchain and crypto industry will continue to grow. Thus, there is a bias towards the long-term upside or the long-term growth of this asset class.

Within that, there are particular aspects in the crypto space related to new types of applications, such as Web 3.0-based applications, that are very interesting. These applications will bring their own token economy and associated ecosystem as well.

Also, we are looking at opportunities related to fundamental layer 1 protocols that are driving these applications.

(EP): What other exciting opportunities are you referring to, in addition to the Ethereum upgrade?

Healthy competition among different coins

(MW): I am optimistic about Polkadot, Cardano, and Solana, for example, which are technically up there with the others and could potentially challenge the position that Ethereum has right now.

Ethereum is by far the leading protocol from an ecosystem perspective, and we expect that to continue. However, I also think it is healthy for the industry to have some competition.

There are many arbitrage opportunities which will continue to evolve as more institutional powerhouses enter this space.

There is a bias towards the long-term upside of digital assets.

There are many new, interesting applications that come with their own token economies.

Polkadot and Cardano could potentially challenge the position that Ethereum has right now.

Allocation To Digital Assets As An Asset Class

(EP): How do you see the overall digital assets market trending in the next few years?

The rate of growth in digital assets AUM to accelerate

(MW): I expect the total AUM in digital assets will continue to increase and its rate of growth will accelerate as well.

As more large institutional players enter the space by offering different products or by simply investing in it, it creates a network effect that attracts even more traditional finance participants to enter this asset space.

Investing in digital assets is investing in the future

The past 12 months have already shown the world that digital asset as an asset class that is here to stay. The digital asset market is still at its infancy and it is not uncommon to see the ups and downs in the market. However, the world is moving in the direction where **blockchain will play a growingly prominent role in our world's technological advances**. So this is all about investing in the future.

Thus, if you have the appetite and can bear the risks, it is only prudent to have some exposure in the digital asset class. And this is also consistent from the perspective of modern portfolio theory which recommends any investor to have a diversified portfolio of assets.

The size of allocation to digital assets will depend on your risk versus reward appetite, as well as how you are investing in this asset class, via long-only strategies or more managed type strategies. But regardless, I do not think the allocation to the digital asset class should be zero.

As more large institutional players enter the space, it creates a network effect that attracts even more traditional finance participants to enter this asset space.

The world is moving in the direction where blockchain and digital assets are here to stay.

I do not think the allocation to digital assets should be zero.

Michael is the co-founder and managing partner of MaiCapital Limited, a leading asset management company in Hong Kong that combines SFC-licensed operation with deep technologies to offer a range of funds that invest in blockchain and crypto-related assets. MaiCapital is currently the only company in HK that has over 2 years of track record in operating a Blockchain-themed fund under the HK SFC license. MaiCapital utilizes different investment vehicles such as securities and derivatives that gives exposure to virtual assets return to achieve the fund's investment objectives, while maintaining direct investment into virtual assets to be <10% of the Fund's gross asset value. MaiCapitals' funds are available to qualified Professional Investors only.

Michael also co-founded MaiBlocks Technology, a leading Blockchain service provider in the area of asset tokenization. Prior to co-founding MaiCapital & MaiBlocks, Michael spent 15 years in the wireless technology industry across US and Asia, leading sales, BD & software R&D functions for Qualcomm and Atheros. He is also a US patent holder in a wireless adaptive algorithm. Michael holds a Master's in Electrical Engineering from Stanford University, dual MBA from Northwestern University (Kellogg School of Management) and HKUST, and a BAsC from University of Toronto.

MEGATREND 2

Regulation and Institutionalization – Crypto as an Institutionalized Asset Class

Key Highlights

- Given the rapid evolution of the digital asset sector, regulators are catching up through increasing clarity in the regulatory environment and increasingly playing a role in guiding industry participants.
- As regulations differ from jurisdictions and change rapidly, it is essential for investors to closely keep track of the regulatory changes and details before making investments to avoid the business cost.
- The increasing regulatory clarity will be one of the key drivers for institutionalization since the internal compliance constraints remain roadblocks for institutional investors to gain exposure to digital assets.

Regulatory landscape – digital assets

The digital asset has a relatively short track record, and the global legal approach varies considerably. An investor ought to be mindful of the difference in regulatory standards in multiple jurisdictions. The following table (Figure 1) outlines the highlights of digital asset regulations in selected jurisdictions.

Figure 14. Global regulatory landscape – digital assets

Jurisdiction	Regulatory status of digital assets	Regulatory party	Investor involvement (Retail, professional, or both)	Specific guidance or regulation	Trends
US	Allowed and regulated	SEC (US Securities and Exchange Commission); FinCEN	Both	<p>FinCEN issued a guidance in May 2019 regarding the applicability of the Bank Secrecy Act (BSA) to cryptoasset businesses. Most cryptoasset businesses qualify as money transmitters and must comply with AML/KYC regulations.</p> <p>SEC considers cryptocurrencies to be securities.</p> <p>CFTC recognizes Bitcoin and Ethereum as commodities and allowing other virtual and cryptocurrency derivatives to trade publicly on exchanges that it regulates or supervises</p>	The US Treasury has emphasized an urgent need for crypto regulations to combat global and domestic criminal activities and in the near future, the Justice Department is expected to continue to coordinate with the SEC, CFTC, and other agencies over future cryptocurrency regulations to ensure effective consumer protection and more streamlined regulatory oversight.
Mainland China	Prohibited	N/A	N/A	N/A	There is no indication that China intends to lift or loosen its ban on cryptocurrencies. China has endorsed blockchain technology, extensive testing of the digital yuan, and a joint venture with SWIFT, suggesting that the government intends to position the country as a leader in the space.
Singapore	Allowed and regulated	MAS (Monetary Authority of Singapore)	Both	Payment Services Act 2019 (PSA) brought exchanges and other digital asset businesses under the regulatory authority of MAS from January 2020, and requiring them to obtain a MAS operating license.	MAS is likely to follow up with additional regulations to align its position further and is seeking to introduce more robust AML/CFT standards for digital asset service providers and higher requirements for

technology risk management in financial institutions.

Hong Kong	Allowed and regulated	SFC (Securities and Futures Commission); HKMA (Hong Kong Monetary Authority)	Professional investors only (under proposed VASP regime)	<p>Current opt-in approach for VASP regulation. Future mandatory requirement to be licensed under the proposed VASP regime.</p> <p>In the future, under the more stringent regulatory regime, all cryptocurrency exchanges operating in Hong Kong must apply for a licence with the SFC and only accept accredited professional investors (investors with more than HK\$8 mn) as clients.</p>	<p>The VASP consultation conclusions confirm that there will be a new regulatory framework, which requires VA exchange operating in Hong Kong to be licensed.</p> <p>Tightening regulations will increase potential entry barriers for investors to get into virtual assets, implying a narrowing of the pool of investors.</p>
UK	Allowed and regulated	FCA(Financial Conduct Authority) UK Crypto Asset Task Force	Both	<p>HM Treasury guidance (2021) emphasized the UK's intention to bring certain digital assets under the scope of 'financial promotions regulation' and consider a 'broader regulatory approach' to digital assets.</p> <p>From Jan 2021, all UK digital asset firms (including exchanges, advisers, investment managers) that provide services to UK residents must register with the FCA.</p>	<p>After Brexit, the UK's digital asset regulations will likely remain largely consistent with the bloc in the short term, implementing directives equivalent to the EU's Markets in Crypto-assets (MiCA) and E-Money proposals, along with various Payment directives.</p>
Japan	Allowed and regulated	FSA (Financial Services Agency)	Both	<p>Japan's crypto-asset regulations came into effect in May 2020. The new legislation that amends Japan's Payment Services Act (PSA) and Financial Instruments and Exchange Act (FIEA).</p> <p>Following those regulations, digital asset exchanges in Japan are required to be registered and comply with traditional AML/CFT obligations.</p> <p>The amendments place more significant restrictions on managing users' virtual money and regulate crypto derivatives trading more tightly.</p>	<p>Japan remains a friendly environment for cryptocurrencies. However, AML concerns are drawing the FSA's attention towards further regulatory steps.</p>

Source: Cambridge Centre for Alternative Finance, International Financial Law Review, Comply Advantage

Regulatory landscape – STO

STOs are allowed and regulated in major financial jurisdictions. In the near-to-medium term, security tokens will likely to be considered as "securities" by regulators and subject to the existing securities laws.

Figure 15. Global regulatory landscape – STO

Jurisdiction	Status	Adaptability of existing regulatory framework	Retail investor involvement in STO	Specific guidance or regulation to STO	Regulatory body
Hong Kong	Allowed and regulated	Conditionally adaptable	× (Professional investors only)	Specific circulars, statements, position papers and guidelines. Virtual asset trading platform (VASP) licenses are necessary for issuers or intermediaries. Licenses required are: SFC Type 1 license (dealing in securities); Type 7 license (automated trading services) The license regulates the activities of the operator of a centralized online trading platform in Hong Kong which provide trading in security token.	Securities and Futures Commission (SFC) HKMA (Hong Kong Monetary Authority)
Mainland China	Prohibited	N/A	×	N/A	N/A
Singapore	Allowed and regulated	Conditionally adaptable	√ (Issuers can file for exemption under the Securities and Futures Act)	General guidance issued by MAS. Digital tokens are subject to the same regulatory regime as securities.	Monetary Authority of Singapore (MAS)
US	Allowed and regulated	Conditionally adaptable	√ (Issuers need to be licensed)	Specific statements and guidelines. An individual or a company that engages in Virtual Currency Business Activity requires a BitLicense issued by New York State's Department of Financial Services.	SEC (Securities and Exchange Commission) FinCEN
UK	Allowed and regulated	Conditionally adaptable	√ (Yes if the issuer has an approved prospectus by the FCA. Otherwise, only qualified investors can participate.)	The FCA has published guidance on crypto assets. Security tokens constitute property and requires registration with FCA and compliance with AML (5MLD) /CFT reporting and customer protection obligations.	Financial Conduct Authority (FCA)
Japan	Allowed and regulated	Conditionally adaptable	√ (To be exempt from disclosure requirements, tokens can be offered to qualified investors or a maximum of 50-non qualified investors in a private placement.)	The Japanese securities law FIEA (Financial Instruments and Exchange Act) has been specifically amended to regulate STOs. The Japan STO Association has issued Security Token Offering Guidelines. Issuers are required to file a security registration statement and issue a prospectus. A company that sells, trades, handles the security tokens will need to register as a "Type I Financial Instruments Business Operator". The prospectus must be delivered to investors by any intermediary that markets the security token offering to the public.	Financial Services Agency (FSA)

Source: Cointelegraph, Deloitte

Regulatory landscape – Digital asset exchanges

Regulators are catching up with the growth of digital assets, and centralized exchanges will likely be regulated as traditional exchanges. The question related to the regulation of decentralized exchanges remains open.

Figure 16. Global regulatory landscape – Digital asset exchanges

Jurisdiction	Regulatory status of CEX	Adaptability of existing regulatory framework	Investor involvement (Retail, professional, or both)	Specific guidance or regulation	Regulated Example
US	Allowed and regulated	Conditionally adaptable	Both	Requires registration as a national securities exchange in accordance Exchange Act 3a(1).	Coinbase
Mainland China	Prohibited	N/A	N/A	N/A	N/A
Singapore	Allowed and regulated	Conditionally adaptable	Both	MAS currently regulates market operators under two categories, namely (1) approved exchanges and (2) recognised market operators. The latter grants more flexibility for DEX, which can file for exemption	N/A
Hong Kong	Allowed and regulated	Conditionally adaptable	Professional investors only (under the proposed VASP regime)	HK currently implements an opt-in approach. There will be a mandatory licensing requirement (under the proposed VASP regime).	OSL
UK	Allowed and regulated	Conditionally adaptable	Both	Requires registration with FCA and compliance with AML/CFT reporting and customer protection obligations	CEX.IO Archax, Gemini
Japan	Allowed and regulated	Conditionally adaptable	Both	Requires registration with Financial Services Agency and compliance with AML/CFT. Foreign cryptocurrency exchanges are permitted to register where they can demonstrate an equivalent registration standard in their host country.	Okcoin Japan
Korea	Allowed and regulated	Conditionally adaptable	Both	Requires registration with Financial Supervisory Service (FSS) and compliance with AML/CFT. In 2018, the Financial Services Commission (FSC) imposed tighter reporting obligations on banks with accounts held by crypto exchanges. The new rules allow cryptocurrency trades only from "real-name bank accounts" . Both the bank and the dealer must check the trader's identity in keeping with traditional AML/CFT regulations and with structured transactions reporting requirements.	FSC will issue the first batch of licenses in 3Q21

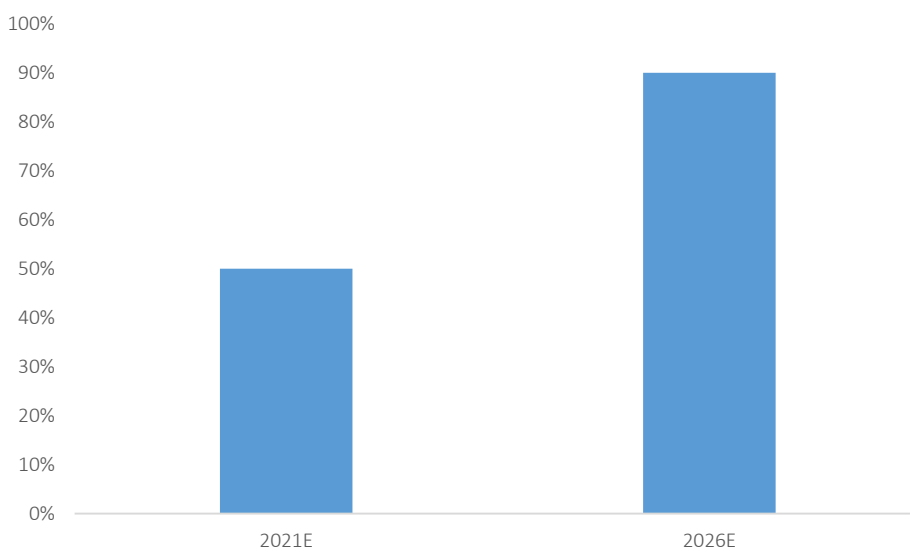
Source: Cambridge Centre for Alternative Finance, International Financial Law Review¹, Comply Advantage, China Tonghai

Digital asset institutionalization

Increasing custody solutions, higher clarity in the regulatory frameworks, and more investment exposure to digital assets will pave the way for institutional investors to adopt digital assets.

According to a survey from Fidelity Digital Assets, over 70% of institutional investors plan to have investment exposure in digital assets in the near term. Over 90% of them plan to do so by 2026.

Figure 17
Expected Institutional Adoption of Digital Assets



Source: Fidelity, HashKey

Legal Expert Interview with Katherine Liu

Key views on regulation and institutionalization

- The blockchain ecosystem faces three regulatory issues in the near to medium term: conflicts between the decentralized nature of blockchain and regulatory oversight, blockchain ownership and title, and the immutability of stored data.
- The centralized exchange (CEX) and decentralized exchange (DEX) models will co-exist in the foreseeable future. Centralized exchanges will look for ways to close the gap to improve their transparency and accessibility.
- **Hong Kong's new regulatory framework for digital assets** is expected to come into effect in 2022, requiring VA exchanges to be licensed and serve professional investors only.



Katherine Liu

Partner, Financial
Regulatory team of
Stephenson
Harwood

Regulatory Issues Related to Digital Assets

Esme Pau (EP): Please identify the top three legal issues that the blockchain ecosystem will face in the coming 12 months.

Katherine Liu (KL): There is no blockchain-specific legislation or regulatory framework in Hong Kong. However, blockchain and DLT (Distributed Ledger Technology) invariably engage existing legal and regulatory regimes to some extent, depending on the particular technology in question.

I have broadly identified three legal issues arising from the use of DLT:

Issue 1 – Conflicts between the decentralized nature of blockchain and regulatory oversight need to be addressed

- 1) There is an inherent conflict between the decentralized nature of blockchain technologies on the one hand, and each government's desire to bring these technologies within its oversight on the other hand (thus rendering the technology less decentralized).

It is inevitable that there will need to be a degree of assimilation of blockchain-backed assets (especially those intended to be used as means of payment or are intended to represent value or rights) into the existing banking infrastructure and government oversight in order for it to continue to have a place in the global economy, and therefore succeed.

However, over-regulation will erode the libertarian and anti-establishment characteristics (and utility) of such technologies. A balance will need to be struck.

A degree of assimilation is needed for blockchain-backed assets into the existing banking infrastructure and government oversight

Issue 2 – Issues of blockchain ownership present challenges to the legal system

- 2) Blockchain technologies present challenges to issues concerning title and ownership. I am not aware of any litigation in Hong Kong over the ownership of digital assets, but it is not difficult to imagine the issues that could be involved.

Blockchain technologies present challenges to issues concerning title and ownership

For example, what would happen if there is a genuine error in the blockchain? If digital assets are stolen and consequently recovered, how would they be re-distributed to victims? In addition, as I will explain further in relation to global jurisdictions, what would be the appropriate jurisdiction to commence proceedings?

There have been two high profile cases of bitcoin theft in the last few months alone –

- (i) the founders of South Africa's largest cryptocurrency exchange have alleged vanished with \$3.6 billion of bitcoin, and
- (ii) the Brazilian "Bitcoin King" was recently arrested over allegedly stealing \$300 million of bitcoin.

These questions will need answers.

Issue 3 – Immutability of stored data may potentially go against the legal requirement

- 3) In some cases, personal data will be stored in the ledger.

In Hong Kong, the handling of personal data is regulated under the Personal Data (Privacy) Ordinance. The accessibility of some DLT platforms means that all nodes may have equal access to all personal data, regardless of whether they need to see it.

Also, the immutability of stored data means that it cannot be amended or erased, which may contravene relevant legal requirements. The cross-border nature of DLT also means that personal data can be stored outside Hong Kong, and potentially there can be different personal data laws in other jurisdictions which apply to the same set of personal data.

The immutability of stored data means that it cannot be amended or erased, which may go against the legal requirement

Digital Asset Regulations in a Global Context

(EP): What are the primary differences in regulatory stance between Hong Kong and other jurisdictions?

How do you think the difference in regulatory strictness in different jurisdictions will drive fund flow and industry growth?

Investor protection and anti-money laundering are the key areas of regulatory focus

(KL): Governments and regulators worldwide are still assessing and working out how, and to what extent, they should regulate the crypto industry. Investor protection and anti-money laundering are always the key areas of concern. Securities regulators have responded in different ways. Some jurisdictions have banned virtual asset activities, and others have created bespoke regulatory regimes for them.

Investor protection and anti-money laundering are always the key areas of concern for regulators

Global regulators are taking a cautious approach

As seen from the news, one of the world's largest crypto exchanges is being probed in the US lately and has been banned from doing regulated business in the UK. It appears that regulators around the world are taking a more cautious approach towards the crypto industry.

Regulators worldwide are taking a more cautious approach towards the crypto industry

Singapore grants exemption to crypto exchanges

Singapore currently allows some crypto exchanges to operate under an exemption, enabling them to serve retail and professional investors. Some global cryptocurrency groups are therefore expanding their presence in Singapore. However, the Singapore government has yet to issue any official license to any crypto company. It remains to be seen how easy or difficult it is to get a license there.

Singapore currently allows some crypto exchanges to operate under an exemption, enabling them to serve retail and professional investors

Striking a balance between investor protection and commercial reality matters

I believe that the ability to deal with retail investors will be a key consideration for market participants. A regulatory regime that can eventually strike a good balance between investor protection and commercial reality will enable the industry to grow in the long run and attract fund flows.

I believe that the ability to deal with retail investors will be a key consideration for digital asset market participants

Regulatory Environment For Specific Digital Assets

The centralized and decentralized exchange models

(EP): Do you see decentralized exchanges (DEX) as a potential threat to centralized exchanges (CEX)?

(KL): DeFi applications will continue to replicate financial structures that are already in place in the traditional financial systems.

However, centralized exchanges are still taking the lead at the moment. My bet is that centralized exchanges will start looking for ways to close the gap to improve their transparency and accessibility. The two models will co-exist, at least in the foreseeable future.

The CEX and DEX models will co-exist in the foreseeable future

Centralized exchanges will look for ways to close the gap such that they can improve their transparency and accessibility

Potential advantages and drawbacks of digital asset regulation

(EP): What are the pros and cons of digital asset regulations?

(KL): I have set out a few examples below:

- 1) Regulation may stifle the flexibility, diversity and creativity of products and the ways that can be offered. However, regulation also means that there should be more investor safeguards in place. A few examples of safeguards include – (1) less volatility, (2) higher chances of recoverability in case of any solvency issues with the coin issuer/crypto exchange, (3) more information available for investors.
- 1)
- 2) Regulation is a means to combat money laundering and terrorist financing. However, regulation naturally results in lessening the libertarian nature of blockchain-backed assets and, in particular, the tradability of digital assets, especially across jurisdictions; and
- 3) Regulation might make digital assets less attractive as a high-risk/high-reward investment option, but it should, in theory, also result in less room for abusive and unscrupulous behaviour such as price and market manipulation.

Advantages of digital asset exchanges regulation include:

- *Safeguard investors*
- *Combat money laundering and terrorist financing*
- *Minimize unscrupulous behaviour such as price and market manipulation*

Drawbacks of digital asset exchanges regulation include:

- *Stifle the flexibility and diversity of products*
- *Lessening the libertarian nature of blockchain-backed assets*
- *Make digital assets less attractive as a high-risk/high-reward investment option*

Low transparency of digital assets pose challenges to regulators

(EP): What are the challenges that arise from the regulation of digital assets relative to traditional asset classes?

(KL): I believe that, from a regulator's perspective, the central issue revolves around transparency, which lends itself to key issues such as accountability, investor protection and anti-money laundering.

Not being a product of the traditional banking system, the transparency of most digital assets will be much lower than traditional investment assets.

The questions surrounding conflict of laws also require a vastly different analysis when compared with traditional assets. The activities and infrastructure surrounding any digital asset (for example, mining, minting, distribution, decentralized record and ledger-keeping, marketing and hot/cold storage) could concurrently concern or involve several jurisdictions. A question to consider is this – in the event of an error with the underlying blockchain, where should an aggrieved holder of a cryptocurrency commence proceedings?

The central issue of digital assets for regulators revolves around transparency, which lends itself to key issues such as accountability, investor protection and anti-money laundering

Another regulatory issue is the conflict of laws, as activities in question may concurrently involve several jurisdictions

Future Of Digital Asset Exchange Regulations

(EP): How do you see the evolution of Hong Kong's regulatory framework for digital assets and exchanges in the near to medium term?

A new law will likely come into effect in 2022 and require VA exchange operating in Hong Kong to be licensed

(KL): Currently, there are a handful of cryptocurrency exchanges operating in Hong Kong, primarily because they can run their businesses without a license in the city. Only exchanges that allow the trading of virtual assets (VA), which amount to "securities" or "futures contracts", require a license by the Securities and Futures Commission.

However, this is going to change. The VASP consultation conclusions confirm that there will be a new regulatory framework for digital assets which are not currently captured by the SFO. Cryptocurrency exchanges will soon require a license to operate their VA businesses in Hong Kong.

The government will prepare an amendment bill to the Anti-Money Laundering and Counter-Terrorist Financing Ordinance based on the consultation conclusions, which is expected to be introduced into the Legislative Council during the 2021-22 legislative session. It is therefore expected that the new law may come into effect in 2022. There will be a grace period of 180 days for existing virtual assets exchanges (VA exchanges) to apply for a licence.

Being licensed in Hong Kong may mean giving up retail clients

Existing VA exchanges with Hong Kong investors will need to start considering whether to cease business, obtain a VASP license or restructure its business model. However, even with a VASP license, cryptocurrency exchanges cannot deal with retail clients. Such retail clients will need to be off-boarded even if the VA exchange obtains a license.

It may inevitably mean that some VA exchanges may decide to cease their VA business in Hong Kong or abstain from actively marketing themselves to the Hong Kong public. On the other hand, given that VA exchanges are not permitted to deal with retail clients, will retail clients, therefore, be driven to use over-the-counter desks or peer-to-peer platforms?

Regulators might reconsider lifting the restriction on retail investors as the industry matures

The SFC has traditionally been a fairly proactive and forward-thinking body, and this is evidenced by their willingness to hold meetings with all manner of prospective virtual assets licensees, their 'sandbox' regime, as well as the establishment of their fintech contact point.

I expect the SFC to keep pace with the constant changes in this space adequately. In addition, I expect the SFC may consider when it will be a good time to lift the restriction such that retail clients can also get involved, which will be a move that many hope to see.

Before the amendment to VASP regulations, cryptocurrency exchanges can run their businesses without a license in Hong Kong

A new regulatory framework for digital assets is expected to come into effect in 2022, requiring VA exchanges to be licensed

Digital asset exchanges with a VASP license cannot deal with retail clients

As a forward-thinking body, the SFC may consider when it will be a good time to lift the restriction such that retail clients can also get involved, which will be a move that many hope to see

Katherine Liu is a partner of the financial regulatory team in Stephenson Harwood. She has extensive experience in advising clients on a wide range of legal issues in the financial services industry, including compliance with financial services laws and regulations and personal data laws. In recent years, she has worked with a number of fintech companies and established financial institutions in establishing or transforming their online businesses.

Katherine is known to be responsive and able to give precise and commercially sound advice. She is recommended in Legal 500 (Asia Pacific) 2021 as "Next Generation Partner (Regulatory)" as a lawyer who "is efficient and authoritative" and "maintains a great balance between legal advice and commercial realities". She was also recognised by Asian Legal Business (2020) as one of the "40 under 40" most outstanding lawyers in Asia and a top 5 finalist for the "Young Lawyer of the Year" award at the ALB Hong Kong Law Awards (2019). She regularly speaks at seminars and conferences on financial regulations, seeks to raise people's awareness on topical issues and considers how new technological and legal developments can impact the financial services industry.

Legal Expert Interview with Pdraig Walsh

Key views on regulation and institutionalization

- Hong Kong has a strong retail component. Investor protection is a cardinal principle underpinning the approach of SFC.
- Hong Kong has a sophisticated and flexible approach to securities regulation, providing some stability in the general application of law to evolving virtual assets.
- Regulators wish to observe whether particular innovations become of systemic concern before they respond with the heavy hand of regulation. Otherwise, regulatory intervention may have unintended consequences.



Pdraig Walsh

Partner, Corporate and
Commercial,
Tanner De Witt

Digital Asset Legislation

Esme Pau (EP): Given the rapid evolution of the digital asset sector, regulators have always been in a catch-up mode. What do you think are the key considerations that regulators seek to balance when laying down and enforcing digital asset regulation?

Balancing considerations of investor protection and flexibility to encourage innovation

Pdraig Walsh (PW): Hong Kong is a good barometer to demonstrate the approach of most regulators towards the digital asset sector.

Hong Kong's current regulatory approach is to balance investor protection with fostering fintech innovation. Fintech is a core part of Hong Kong's evolution as a financial services center. If regulations stifle fintech innovation, then this may reduce the global competitiveness of Hong Kong. That said, innovation in technology often has unintended consequences, and regulation is one of the tools to protect investors from those consequences.

Although Hong Kong is a global financial services center, it has an unusually strong level of retail participation in the markets. Therefore, the protection of investors is a cardinal principle underpinning the regulatory approach of the Securities and Futures Commission (SFC). This is the tension and balance at the heart of regulating fintech innovation.

Taking advantage of the existing regulatory framework

One of the advantages of Hong Kong is the common law principles applied in its legal system. Hong Kong has a sophisticated and flexible approach to securities regulation. This provides some stability in the general application of law to evolving virtual assets. Hong Kong has adopted a responsive regulatory approach to developments. Virtual assets may be new innovation, but by focusing on the substance of virtual assets, the existing legal framework in Hong Kong is already mostly fit for purpose for regulating the area. Apart from the new

Hong Kong is a good barometer in how most regulators would approach digital asset regulation

With the strong retail component within HK market, investor protection is a cardinal principle underpinning the approach of SFC

Given a well-developed common law basis, digital assets can be regulated under the existing regulatory framework without many changes

VASP regime, there has not been a particular need for new laws. Instead, the SFC has used the existing legislative framework, and has published guidelines and circulars to brief the market and give guidance on the expected standards. This has also been the general approach in other similar jurisdictions – such as Singapore and the UK. This provides some degree of flexibility for the regulator to respond to innovation.

The exception is the proposed virtual assets service provider regime, which is proceeding through the legislative process in Hong Kong.

Regulation will follow innovation

Innovation happens first; regulation follows. Regulation looks in the rearview mirror. It has to. Not all innovation will take root, or meet levels of materiality to warrant regulatory attention.

Regulators must allocate resources according to their priorities. Cryptocurrency and virtual assets are significant innovations for the financial markets. However, at the moment, activity in this area is still a relatively small fraction of overall activity in the financial markets in Hong Kong.

It is understandable that regulators wish to observe whether particular innovations become of systemic concern, before they respond with the heavy hand of regulation. Otherwise, regulatory intervention may have unintended consequences.

Regulation is always going to follow technology because regulation is looking in the rearview mirror.

Regulators wait to see whether particular developments become of systemic concern before they respond with the heavy hand of regulation

Proposals To Regulators Around Digital Asset Regulations

(EP): Drawing from your experience, what proposals do you have for SFC or other regulators on digital asset regulation?

Digital assets can be regulated under the same framework as all other assets

(PW): Hong Kong regulators have positioned themselves very clearly in terms of where they fit within the global market.

Regulation – Nimble Vs Sophisticated Securities Regulation

There is a portion of the market involving smaller, often offshore jurisdictions. These jurisdictions are more nimble, and many have introduced customized laws and regulations to provide a regulatory framework that can attract business to their jurisdiction. Jurisdictions such as Bermuda, Gibraltar and Liechtenstein are good examples of this approach.

The approach is different in major international financial centres. In those locations, the regulators have largely applied existing laws and regulations, rather than introducing entirely new frameworks. The perception in these jurisdictions is that virtual assets are another asset class that can fit within an existing sophisticated regulatory framework. Hong Kong is an example of this approach.

Hong Kong has taken its existing sophisticated securities regulation and refined and evolved it for the purpose of virtual assets

Systematic regulatory guidelines will be helpful for virtual assets

Hong Kong regulators to continue to provide guidance to the market regarding licensing requirements. There are useful guidelines in place. More are needed. This will help to converge practices to a more systematic and predictable approach to advising clients on the requirements to become licensed corporations in respect of regulated virtual asset activities, and the ongoing expectations, once licensed. Hong Kong has done well on guidance and information already; more information and guidance are always valuable to the market.

Regulators should continue to educate the market regarding licensing requirements

DeFi As The New Regulatory Frontier

(EP): What do you think are the empty spaces in terms of the global digital asset regulations that need to be filled?

Challenges in regulating DeFi

(PW): The most challenging area will be decentralized finance. If a platform is truly decentralized, it will be difficult to determine a clear regulatory approach. Most regulation follows a jurisdictional matrix.

DeFi regulation is challenging, because operating models are decentralized

At present, many proposed DeFi projects are not truly decentralized, although they may eventually aspire to be. It may be that direct enforcement will be the path forward in respect of DeFi, rather than regulation.

Pádraig's practice focuses on regulatory, corporate and commercial work for businesses in the technology sector. Pádraig's practice includes assisting clients on licensing, regulatory and compliance. His experience in this area has enabled him to advise clients on a number of innovative, complex fintech projects.

He is at the forefront of advising on legal issues for emerging businesses using blockchain technology. This has included regulatory advice in relation to token sale offerings, security token offerings, stable coin listings, and tokenisation of equity and fund interests.

Digital Asset Expert Interview with Ben El-Baz

Key views on regulation and institutionalization

- Institutions are increasingly looking beyond bitcoin and seeking to gain exposure to DeFi. Common forms of exposure include diversified private funds and FoF.
- Different digital assets have varying potential for institutional adoption. Macro factors such as QE and COVID-19 are the main drivers of institutionalization.
- The emergence of licensed digital asset exchanges (under the **new VASP regime**) will improve the industry's competitive landscape and drive overall growth.



Ben El-Baz
Head of Ecosystems,
HashKey Group

Drivers of Institutional Exposure to Digital Assets

Esme Pau (EP): What are the key factors that you believe will drive institutional exposure to digital assets? What level of institutional adoption of digital assets do you expect by 2024?

Macro factors such as quantitative easing are fueling institutional adoption of digital assets

Ben El-Baz (BE): The factors that drive institutional adoption depend on the type of digital assets.

If you are talking about Bitcoin, institutional adoption of Bitcoin is already relatively high this year. If you look at all the events that have happened over the last 12 months, major corporations, particularly innovative ones in the US like Tesla, have been putting Bitcoin on their balance sheet, and some of the world's most significant hedge funds are putting lots of **money in buying Bitcoin**. Fidelity's digital assets group also recently reported that over 52% of the institutions in Asia, the US, and Europe that they surveyed currently invest in digital assets.

I think some of the macro factors fueling institutional adoption relate to COVID-19's effect on the economy, as well as all of the quantitative easing that has been happening.

The value proposition of Ethereum and Bitcoin

Unlike Bitcoin, Ethereum has a different value proposition with a different underlying narrative, and institutions are starting to warm up to Ethereum. I think one of the huge value propositions behind Ethereum is that it is fueling a lot of decentralized finance (DeFi) services, which is currently the most widely adopted use case for blockchain beyond Bitcoin.

We are seeing many financial institutions, including some hedge funds, beginning to look at Ethereum to gain exposure to decentralized financial services.

HashKey Group predicts that more than 50% of institutional and professional investors will have exposure to digital assets in their portfolios by year 2021.

The huge value proposition behind Ethereum is that it fuels a lot of decentralized financial applications.

Digital asset exposure beyond Ethereum and Bitcoin – Private fund, fund-of-funds, venture capital

I think the way institutions are initially gaining exposure to digital assets is by directly buying crypto blue chips like Bitcoin and Ether. Another way institutions are starting to get exposure is by investing in private funds or taking a fund-of-funds approach.

Some institutions have already started investing directly into venture capital funds. For example, in the US market, one of the most prominent venture capital funds, Andreessen Horowitz, just raised US\$2bn for their newest crypto VC fund.

Regulated exchanges will drive institutional adoption of digital assets

Beyond utility coins, a different sector of the digital asset industry are securities or asset-backed tokens. Currently, the market landscape for these types of assets is just beginning to form in Asia, and I think there are good opportunities for early adopters to stake out strong positions.

I believe institutional adoption of these types of assets will definitely increase within the next 24 months. If you look at Asia, specifically in Hong Kong, there is already a regulated exchange that can deal with those assets, and you are going to see more over the next 12 months.

In Singapore, there are already several exchanges that can trade in these types of assets. I think you will start to see more institutions get involved in the market. This is specifically because regulations are improving, service provider fragmentation is improving, and the understanding about how to utilize the technology to create truly unique assets is also improving.

Regulation is critical for driving adoption

I think a critical factor that will drive adoption is regulation. The more licensed players that exist in the market, the more institutional money that you will see coming in. For regulated financial institutions, management has a licensed obligation to thoroughly vet the counterparty risk of industry participants that they work. In my view, working with a licensed **digital asset exchange would materially improve a digital asset exchange's counterparty risk**, potentially leading to more willingness for traditional financial institutions to engage with them. This will drive a competitive advantage for licensed exchanges, which may in turn drive more players to get licensed.

Low correlation between digital and traditional asset classes

Another critical factor in institutional adoption will be portfolio diversification. The low correlation that digital assets have to traditional financial assets will also continue to be one of the vital factors that drive institutional adoption. Everyone wants to build diversified portfolios and get access to different types of risk-adjusted returns. Although Bitcoin had recently exhibited a higher correlation to the S&P500 (0.22 correlation value) in 2020, historically, over the last 8 years Bitcoin has held a near-zero correlation to the S&P500 (0.01).

The other ways that institutions gain exposure to digital assets include the FOF, private fund and VC approach.

Institutional adoption of security tokens or real estate tokens will increase within the next 24 months.

The more licensed players that exist in the market, the more institutional money that you will see coming in.

The low correlation that digital assets have to traditional financial assets will continue to be a vital factor that drives institutional adoption.

(EP): What do you think the level of institutional adoption of digital assets will be at in 2024?

(BE): If you define institutional adoption as licensed financial institutions transacting in digital assets or accepting custody, I estimate 75% in three years.

By 2024, there could be several different ways of exposure. Institutions can buy assets from securities brokerage or distribute ETFs or ETNs with digital assets as the underlying vehicle. You can already see those types of products offered in the Canadian and European markets, but not in the US yet.

I think it is highly likely that up to 75% of global financial institutions will be involved in digital assets in some way within the next three years. And other industry research puts the figure at 90% by 2026.

The level of institutional adoption of digital assets may reach 75% in 2024.

The New VASP Licensing Regime In Hong Kong

(EP): What is your view on the new virtual asset service provider (VASP) licensing regime?

(BE): Investor protection is a primary mandate of the SFC so this initiative makes sense.

Investor protection is a primary mandate of SFC.

The new VASP licensing regime caters to professional investors only

Hong Kong's current regulatory approach is to limit the trading of digital assets to professional (accredited) investors. In my view, there are a host of considerations at play, including the current regulatory treatment of digital assets in the Mainland. It's a complex and evolving balance.

Hong Kong's current regulatory approach is to limit the trading of digital assets to professional investors.

Hong Kong licensing regime is transitioning from an opt-in approach to mandatory

The first step that Hong Kong took was an opt-in approach. If you chose to opt-in, you would only be able to serve professional investors.

More recently, current consultations from Hong Kong's Financial Services and the Treasury Bureau ("FSTB") signalled upcoming legislation that will make licensing mandatory. My view is that Hong Kong regulators will continue to actively assess what the potential risks to investors are and how they should be protected.

Under the new regime, licensing of VASP by the SFC will become mandatory.

As the industry matures, regulators may decide to adapt their approach, but this is still very jurisdiction-specific. In Singapore, for example, under the new Payment Services Act, licensees would be able to serve Singaporean retail investors.

All in all, considerations will be fueled by global regulatory trends.

(EP): Can you share what kind of solutions – such as custody and competitive commission rates – are you offering institutional clients to stay competitive versus other exchanges?

(BE): It is public knowledge that the trading platform operator license in Hong Kong requires that the operator run its custody service as a wholly-owned subsidiary. Hence, in the event HashKey becomes licensed, we will also provide custody service for our clients.

HashKey trading platform will provide custody services and competitive trading fees.

We have not officially announced what the trading fees will be on the exchange, but we aim to position ourselves competitively in the market.

More licensing of digital asset exchanges will increase competition

(EP) How do you think the licensing of more digital asset exchanges will change the landscape in the medium term?

(BE): My view is that competition in the industry is always a good thing because it brings innovation.

When there is only one licensed player in any market, that player might not necessarily have the competitive urge to innovate.

However, when there are several licensed players, competition may put pressure on the competing platforms to release better products and improve service quality to clients. When competitors come out with new offerings, there's always a competitive pressure to match and improve. This improves the industry in aggregate.

When new players enter the market, it is possible that short-term profitability for incumbents goes down. But in the long term, the competitive pressures in the industry may actually drive them to improve their revenue efficiency and increase profitability. Given the number of licensed RMOs in similar jurisdictions like Singapore, I would be surprised if there were not multiple licensed digital asset exchanges in Hong Kong within the next 12-24 months.

The digital assets industry is still nascent with massive upside potential

(EP): If you were to share one nugget of wisdom to the global institutional investor audience, what would it be?

(BE): I would say that the digital assets industry is still in its early days.

Even though we are starting to see growing institutional adoption of digital assets, we are just starting to touch the surface. Once more companies understand how Bitcoin and its underpinning technology works, it will be much easier for them to adopt other forms of the technology, such as asset tokenization.

We are just at the tip of the iceberg. There is still so much information that will come out of decentralized financial technology. Digital assets are a critical area to keep an eye on in terms of asset tokenization, and over time, we will see the integration of other technologies with blockchain to create even more interesting financial assets.

Future use case: Integration of IoT and blockchain

For example, we have seen a few compelling use cases around the integration of the Internet of Things (IoT) and blockchain to create tokenized real-world assets with trusted real-time data. Imagine investing in financial instruments (loans, bonds, commodities, etc.) where the underlying asset is generating real-time key business operational data that is secured on blockchain. This gives you greater granularity about the status of those underlying assets. In my view, some of the most exciting assets may come from asset tokenization opportunities that combine other technologies like IoT and blockchain to create truly innovative value for investors.

The presence of several licensed players will put pressure on competing platforms to launch new products to generate revenue.

When new players enter the market, it is possible that short-term profitability for incumbents goes down. But in the long term, the competitive pressures in the industry may actually drive them to improve their revenue efficiency and increase profitability.

The digital assets industry is still in its early days and we are just starting to touch the surface.

Over time, we will see the integration of other technologies with blockchain to create even more interesting financial assets.

Some of the most exciting assets may come from asset tokenization opportunities that combine IoT and blockchain.

Ben is currently Head of Ecosystems at HashKey Group, a regulated digital assets company. At HashKey, he leads the Group's strategic partnerships, blockchain applications and asset tokenisation projects, and post-investment management of a US-based tokenised securities firm. Ben also leads HashKey's trade finance blockchain partnerships with the Singapore Government and Hong Kong Monetary Authority.

With over 13 years of experience in Silicon Valley, Mainland China, and Hong Kong, he started his career as a derivatives trader, then as a China cross-borders corporate finance analyst, before moving into technology product management and business development, serving Big Tech clients like Microsoft, Google, and Amazon. Ben speaks, reads, and writes Mandarin Chinese fluently.

Ben is a graduate of the Stanford Graduate School of Business, where he earned his Master's degree in Management, led Stanford's largest blockchain applications working group, and co-

Blockchain Investment Fund Founder Interview with Michael Wong

Key views on Regulation and Institutionalization

- It is crucial for industry players to monitor regulatory changes closely and respond promptly to the changing environment.
- Collaboration among all stakeholders is the way forward for the digital assets ecosystem.

**Michael Wong**Managing Partner &
COO, Co-founder,
MaiCapital

Digital Assets Regulation

(EP): What do you think are the critical upcoming regulatory challenges? How do you think regulations will catch up with innovation in the digital asset space?

The key for participants is to stay on top of the regulation

(MW): My view is that the regulators are trying to move with the industry. Since the digital assets industry moves very fast and evolves very quickly, the regulators will always be in catch-up mode. However, they will catch up and they will create new rules and regulations accordingly. My view is that the challenge for any participant is to stay on top of these regulatory updates.

Since the digital assets industry changes very quickly, the regulators will always be in catch-up mode.

For MaiCapital, we are regulated and licensed. However, the rules could change as the space evolves. Therefore, we need to stay on top of the changes and focus on how we adapt when the changes come.

Collaboration is the way forward for the digital assets ecosystem

As a regulated player in this space, we look forward to partnering with other financial institutions with a similar mindset. We are excited that this ecosystem will continue to grow, not just in North America and the Western world (which we see now), but also here in Asia, especially in Hong Kong, a top global financial centre. There is still a lot of catch up to do on the blockchain and crypto side, but I believe players like us will help lead Hong Kong to be one of the top centres, even in this new asset class.

Michael is the co-founder and managing partner of MaiCapital Limited, a leading asset management company in Hong Kong that combines SFC-licensed operation with deep technologies to offer a range of funds that invest in blockchain and crypto-related assets. MaiCapital is currently the only company in HK that has over 2 years of track record in operating a Blockchain-themed fund under the HK SFC license. MaiCapital utilizes different investment vehicles such as securities and derivatives that gives exposure to virtual assets return to achieve the fund's investment objectives, while maintaining direct investment into virtual assets to be <10% of the Fund's gross asset value. MaiCapitals' funds are available to qualified Professional Investors only.

Michael also co-founded MaiBlocks Technology, a leading Blockchain service provider in the area of asset tokenization. Prior to co-founding MaiCapital & MaiBlocks, Michael spent 15 years in the wireless technology industry across US and Asia, leading sales, BD & software R&D functions for Qualcomm and Atheros. He is also a US patent holder in a wireless adaptive algorithm. Michael holds a Master's in Electrical Engineering from Stanford University, dual MBA from Northwestern University (Kellogg School of Management) and HKUST, and a BAsC from University of Toronto.

MEGATREND 3

CEX and DEX – Allies or Foes

Key Highlights

- CEX eyes dominance in the digital asset space while DEX is catching up with rapid growth thanks to improvements in infrastructure and technology.
 - Regulators are strengthening oversight and improving clarity in the legal framework as the digital asset industry expands. However, the decentralized nature of DeFi has led to challenges for regulators.
 - In the future, DEXs will proliferate catalyzed by critical technological breakthroughs, increasing adoption and convergence with centralized exchanges (CEX).
-

What are CEX and DEX?

Digital asset exchanges have facilitated the trading of digital assets and played a pivotal role in the increasing adoption of digital assets. The primary difference between CEX and DEX is the degree of control that users have over their funds.

A centralized exchange ("CEX") is an exchange platform operated by a third-party intermediary to facilitate the buying and selling of digital assets. A CEX is custodial, and investors must deposit digital assets to an exchange account.

A decentralized exchange ("DEX") is typically a non-custodial exchange where the user maintains their digital assets in their own digital wallet and simply utilizes the exchange to execute peer-to-peer transactions without the need for an intermediary.

Characteristics of CEX and DEX

In addition to the varying degree of ownership over assets, investors ought to be aware of the different functionalities to inform their decision to select digital asset exchanges.

Figure 17. Comparison between centralized and decentralized exchanges

	Centralized exchange	Decentralized exchange
Users' control of funds	No – Users relinquish control of their funds to the third-party intermediary responsible for managing the funds deposited.	Yes – DEX users maintain complete control over their assets. Users are at liberty to connect with individuals they want to trade with, as there is no central server.
Anonymity	No – CEX requires users to fulfill KYC and AML procedures, which makes it difficult for an individual to maintain anonymity while trading.	Yes – DEX does not require users to disclose their identity, as trading is done by anonymous financial protocols powered by smart contracts
Cross-chain trading	Unlimited cross-chain trading capacity	Limited capacity in cross-chain trading
Requirement for authentication	Yes – CEX serves as a third-party intermediary to approve all transactions.	No – DEX has smart contracts that allow users to transact without authorization.
Speed	Rapid – Transactions are close to instantaneous.	Low – Speed is determined by the protocol that the DEX uses. E.g. Uniswap (based on Ethereum) is slower.
Security	High hacking risk due to the centralized nature	Low hacking risk as there is no single entry given the decentralized nature. The exception is when there is a bad smart contract.
Transaction/withdrawal fee	High	Low – The exception is when ETH-based DEX is impacted by a high gas fee.
Potential for market manipulation	High	Low – Easy to detect
Trading volume	High – US\$7,565.2bn (1H21)	Lower – US\$632.1bn (1H21)
User interface	Easy to use – Beginner-friendly with many functionalities	Difficult to use – For experienced users
Fiat conversion	Yes – Users can convert fiat to crypto or purchase crypto assets via credit/debit cards	No – Only crypto-to-crypto

Source: The Block Crypto

Top CEX and DEX and market share by trading volume

We compare and contrast the most popular decentralized exchanges and centralized exchanges by several vital metrics.

Figure 18. Top 10 CEX (June 2021)

#	CEX	Number of coins	Number of Pairs	Most Traded Pair	Year Est	Avg bid-ask spread	Fees	% Mkt share By Vol	Description
1	Binance	320	1150	BTC/USDT	2017	0.356%	0.1% (0.075% for BNB holder)	21.97%	Binance is a CEX incorporated in Cayman Islands with the highest market share by trading volume. It is largely unregulated. Futures trading is available
2	Huobi Global	330	909	ETH/USDT	2013	1.072%	0.2%	5.03%	Huobi Global is a CEX under the Huobi Group, and is incorporated in Seychelles. Futures trading is available
3	Coinbase Exchange	75	236	ETH/USD	2012	0.191%	0%-0.3%	2.72%	Coinbase Exchange is a CEX with global operations, listed on NASDAQ and based in US.
4	FTX	257	420	BTC/USD	2019	0.788%	0%-0.07%	2.07%	FTX is a CEX located in Antigua and Barbuda. Futures trading is available.
5	Kraken	76	366	BTC/USD	2011	0.331%	0%-0.26%	1.31%	Kraken is a CEX located in US. Futures trading is available
6	BitMart	298	396	ETH/USDT	2017	4.409%	0%-0.25%	1.18%	BitMart is a CEX located in Cayman Islands.
7	Hotbit	1344	2295	USDC/ETH	2018	4.443%	-0.05%-0.2%	0.82%	Founded in 2018, HotBit is a CEX that develops and integrates various businesses such as spot trading, financial derivatives, cryptocurrency investment and dAPP into one platform.
8	Bitfinex	146	336	USDC/ETH	2014	0.665%	0%-0.02%	0.81%	Bitfinex is a CEX located in British Virgin Islands. Futures trading is available
9	Binance US	53	110	USDC/USD	2019	0.154%	0.1%	0.66%	Binance US is a CEX located in US and is an affiliate of Binance.
10	Gemini	46	65	DAI/USDC	2014	0.241%	0%-0.25%	0.26%	Gemini is a CEX located in US.

Source: Coingecko, as of 10 am Jul 22, 2021

Figure 19. Top 10 DEX (June 2021)

#	DEX	Number of coins	Number of Pairs	Most Traded Pair	Year Est	Avg bid-ask spread	Fees	% Market share By Volume	Description
1	Uniswap (v3)	120	497	USDC/ETH	2018	0.81%	0.05%-1.00%	22.5%	Uniswap is a DeFi (decentralized finance) protocol that exchanges cryptocurrencies and tokens. Uniswap V3 is the third iteration of the Uniswap protocol that has been deployed to the Ethereum mainnet.
2	Mdex	66	1,000	HUSD/HT	2021	13.64%	0.3%	12.8%	Mdex is an Automated Market Maker (AMM) Decentralized Exchange (DEX) on Binance Smart Chain (BSC) and Huobi ECO Chain (HECO).
3	PancakeSwap (v2)	1611	11,495	WBNB/BUSD	2020	-3.64%	0.22%-0.25%	8.2%	PancakeSwap is a BSC-based DEX.
4	Mdex BSC	53	242	USDT/0XE9E...	2021	-23.20%	0.3%	6.9%	Mdex BSC is a BSC-based DEX.
5	1inch	314	326	USDC/ETH	2019	N/A	0%	6.7%	1inch is a DEX aggregator, connecting several DEXs into one platform to allow users to find the most efficient swapping route across all platforms.
6	Kwenta	25	32	SETH/SUSD	N/A	N/A	0.3%	6.1%	Kwenta is a DEX on which users can trade Synths (also traded across multiple DeFi protocols). Unlike other DEXs, the exchange does not have an order book and instead utilizes peer-to-contract trading.
7	Uniswap (v2)	2259	2,638	USDC/ETH	2018	0.59%	0.3%	5.9%	Uniswap V2 is the second iteration of the Uniswap protocol that has been deployed to the Ethereum mainnet.
8	Sushiswap	441	537	USDC/ETH	2020	0.57%	0.3%	5.0%	SushiSwap is a DEX and AMM built on Ethereum.
9	0x Protocol	68	90	USDC/USD	2017	N/A	N/A	3.4%	The 0x protocol is an open protocol that enables the peer-to-peer exchange of assets on the Ethereum blockchain.
10	Curve Finance	24	68	DAI/USDC	2020	N/A	0.4%	3.3%	Curve Finance is a DEX built on Ethereum.

Source: Coingecko, as of 10 am Jul 22, 2021

Digital Asset Exchanges – Advantages and Disadvantages

Digital asset exchanges are critical avenues for investors to gain exposure to digital assets. Their respective trade-off between benefits and risks will be one of the primary considerations for investors.

The key advantages of CEXs include their ease of use, higher liquidity and functionality.

Figure 20. Centralized exchanges – Key advantages

Advantages of CEX	Significance
Faster transaction processing spread	Higher trading efficiency with a centralized database
More scalable	Utilize centralized servers which contribute to scalability
More liquid	High liquidity come with greater platform usage
Margin trading facility available	More options for traders to speculate and hedge their investments
More features	Offer more features and flexibility to add functionality to trading interfaces
Simple user interface	The simplicity of CEX makes it the entry point for new users

Source: Gatehub

The key disadvantages of CEXs include exposure to hacking risks and lack of privacy. CEXs are generally considered less secure than their **decentralized counterpart as they hold users' assets**.

Figure 21. Centralized exchanges – Key disadvantages

Disadvantages of CEX	Significance
Exposed to hacking risks	A centralized network with access to all funds is vulnerable to hacking risk
Requires trust	A centralized network is exposed to multiple risks that can compromise the entire system
Lack of privacy	CEX require KYC procedure, making anonymous trading impossible

Source: Gatehub

DEX benefits users with privacy, security and integration with DeFi and NFT.

Figure 22. Decentralized exchanges – Key advantages

Advantages of DEX	Significance
Secure and nearly impossible to hack <small>Error! Bookmark not defined.</small>	Nodes are distributed globally, thereby reducing the risks of server downtime and the possibility of hacks. <small>Error! Bookmark not defined.</small>
Trustless	Users are not required to 'trust' the DEX or other users of the platform since all transactions occur in a transparent and automated manner. <small>Error! Bookmark not defined.</small>
Low Fees	Trading fees on DEX are significantly lower than CEX, or even free. The only fee for DEX is the gas fee (cost of sending transactions over the blockchain) <small>Error! Bookmark not defined.</small>
Privacy	DEX does not store user funds and personal data.
Free from regulation	DEX is not a legal entity operating in a specific jurisdiction. DEX comprises open-source codes operating on a decentralized network, making it impossible for any government to control.

Source: Cointelegraph

The user interface of DEX is less user-friendly and intuitive, creating barriers for beginners.

Figure 23. Decentralized exchanges – Key disadvantages

Disadvantages of DEX	Significance
No fiat-to-crypto conversion	DEX does not offer a direct way for users to buy crypto with fiat currencies, causing inconvenience to some users.
Not beginner-friendly	DEX is geared towards more experienced users, is more difficult to navigate, and poses a hurdle for broader adoption.
Slower trade processing speed	The decentralized nature of DEX makes it less efficient in processing transactions, leading to scalability issues.
Less liquid	DEX is less liquid and leads to price slippage, which impedes adoption and user growth.
No margin trading facility	DEX has fewer choices for traders to speculate and hedge their investments.

Source: Cointelegraph

Digital Asset Exchanges – Industry Risks

Digital asset exchange is a rapidly evolving space and not sufficiently mature. Investors ought to consider risks and uncertainties before stepping into the opportunity.

Figure 24. Digital asset exchanges – Industry Risks

Industry Risk factors	Details	Solutions
Front running	DEX – The risk that miners or mining pools who validate transactions could potentially participate in market manipulation.	Transaction Ordering; Confidentiality Strategies; Reveal Agent
Regulatory Tightening	CEX – Regulators have been primarily focused on CEX as most of the fiat conversion happens there. DEX – DEX will likely come under increased regulatory scrutiny due to the rising cases of hacks and increasing value of assets locked in DeFi protocols. The decentralized nature of DeFi and regulations will need to be reconciled. For example, DeFi does not require KYC and users remain anonymous.	Closer collaboration and more frequent dialogue between regulators, exchanges and investors.
Lack of liquidity	DEX – The average trading volume on DEX is still a small percentage of CEX.	Automated market makers
Lack of interoperability and scalability	DEX – The fragmented DEX industry raises concerns around interoperability, settlement speed, and transparency related to cost and pricing.	Layer 2 solution; Build more bridges on the smart chain.

Source: Cointelegraph

Path to mainstream adoption

Our view is DEX and CEX would coexist in the future. We anticipate increasing adoption driven by multiple factors. **CEXs are controlling the lion's share of digital asset trading volumes. DEXs are on the rise for digital assets trading and capturing market share.**

Figure 25. CEX – Factors driving mainstream adoption

Factors	Significance
Increasing digital asset adoption by non-technical users	CEX seeks to improve accessibility to digital assets for users of all technical backgrounds.
Better compliance capabilities	CEX are subject to regulations. The verification process of most CEX is a standardized compliance measure for KYC, Anti-Money Laundering and counter-terrorism financing laws and regulations. These security practices discourage illegal transactions and improve wallet security.
Increasing regulatory clarity	The removal of obscurity in regulations will encourage CEXs to better fit into the regulatory framework and strengthen the confidence of institutional investors

Source: Cointelegraph

Figure 26. DEX – Factors driving mainstream adoption

Factors	Significance
Increasing maturity of DEX	For example, scalability, liquidity issues, user experience and functionality of DEX will likely to improve.
Increasing regulatory clarity	Clearer regulations will drive the sustainable development of DEX industry.
Increasing DeFi applications	Innovation in DeFi will create a huge crypto-native user base. E.g. DEX can implement web 3 apps as widgets in games and applications
Emergence of cross chain aggregators	Cross-chain DEX aggregators support a broad range of token types, which help expand the market, and increase liquidity and trading volumes as a result.

Source: Cointelegraph

Digital Asset Exchanges – Key industry metrics

In deciding which digital asset exchange to use, it is important to use different metrics to evaluate their growth and performance. Some metrics are shared for both CEX and DEX.

CEX

The key metrics measure the competitiveness and adoption of centralized exchanges, which we believe are essential for investors to select CEX.

Figure 27. CEX – Key metrics for analysis

Metric	What it measures	Drivers	Significance
Trading Volume	The total volume of digital assets that are traded through certain exchange over a period of time	Order execution capabilities; Liquidity; Number of users; Activity and price trend of digital asset market.	Indicates the level of adoption and investor interest; order execution capabilities of certain exchanges
Number of users	The total number of users on an exchange over a given period of time	Digital asset market activity and investor interest; User experience/ friendliness; Types of services offered; The number of supporting fiat currency and coins; Regulatory compliance.	Indicates the level of adoption, performance, growth, or popularity of certain exchange.
Total Assets on Platform	Assets that are placed under the control of a CEX	Custody reliability and adoption: The total value of digital assets under custody; Trading Volume; Digital asset price and market activity.	Indicates the level of adoption, performance, growth, or popularity of certain exchange and its services (e.g. custody services)

Source: Coindesk

DEX

Compared to CEX, DEX currently has a lower adoption rate by investors, but is rapidly catching up. The entry barriers for DEXs are higher as they are less intuitive. We provide some key metrics for DEX below which will help evaluate their relative merits.

Figure 28. DEX – Key metrics for analysis

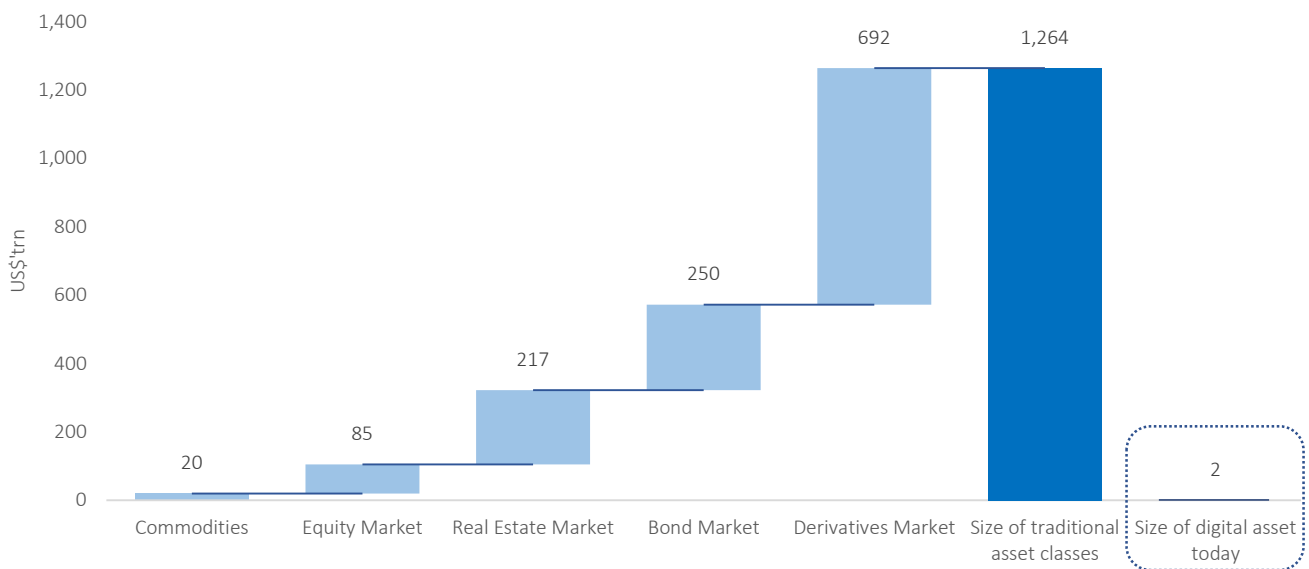
Metric	What it measures	Drivers	Significance
Trading Volume	The total volume of digital assets that are traded through certain exchange over a period of time	Order execution capabilities; Liquidity; Number of users Crypto market's activity, price trend	Indicates the level of adoption and level of investor interest
Number of users	The total number of users on an exchange over a given period of time	Crypto market activity and investor interest; User experience/user friendliness; Types of services offered; The number of supporting fiat currency and coins Regulatory compliance.	Indicates the level of adoption, performance, growth, or popularity of certain exchange.
Total value locked (TVL) in DEX	The value of assets deposited into the exchanges' smart contracts, including order-book type exchanges	The scale of digital asset liquidity; Trading volume; Digital asset price and market activity; Investors' risk appetite.	Indicates the level of adoption, or popularity of certain exchange and market sentiment
Number of traders	Count of unique addresses of trader and market maker	Profitability of orders	Contributes to overall liquidity and trading volume

Source: Duneanalytics

Digital Asset Exchanges – Market sizing analysis

Digital asset market is expected to grow significantly owing to the expanding opportunity sets, and trading volumes of digital assets and increasing institutional adoption.

Figure 29. Digital Asset – Total addressable market



Source: BC Technology Group

Digital Asset Exchanges – Future outlook and key themes

In the future, we expect the digital asset exchanges sector to develop at a rapid pace catalyzed by key technological breakthroughs, increasing institutional investor participation and regulatory clarity.

Figure 30. CEX – Future events/catalysts

Trends	Details and significance
Coverage with DeFi to create a new ecosystem	Centralized exchanges are likely to create a decentralized crypto digital infrastructure to make dApps - decentralized or distributed apps, available to users and improve user experience
Closing the gap with DEX	In the future, centralized exchanges will be likely to take pages out of the playbook of DEX. For example, using smart contracts to complement their infrastructure. They could implement AMMs to allow users to earn a yield on their exchange deposits while providing more liquidity to the exchange itself.
Increasing regulatory clarity	In the future, judicial rulings will provide further clarity for both regulators and industry participants.

Source: Decrypt

Figure 31. Digital asset exchanges – Future drivers

Drivers	Description	Significance
Higher digital asset investment activity in the primary market	Capital invested into digital assets in the primary market will lead to more transactional activity in the secondary market.	Primary market investment will lead to the development of secondary market trading activity.
More advanced computer and network technologies	With technological advances, the infrastructure can automate, facilitate, and promote needs in making a trade	The leading - edge computer and network technologies with sophisticated processes will stimulate productivity, improve efficiency and level up scalability.
Developments in security token (STO)	Security token standards and protocols will create secondary markets	Tokens can be transferred freely across trading platforms and lead to higher liquidity of tokens.
Granting of more licenses and regulatory approvals	More licenses and regulatory approvals will increase competition and foster growth to open a trading platform	Achieve balance between regulation and innovation and, better protect the interest of stakeholders

Source: Stanford Journal of Law & Policy

Digital Asset Expert Interview with Ben El-Baz

Key views on digital asset exchanges

- Increasing regulatory clarity will push more internal compliance teams to review the operation to align with regulations.
- The future will witness more unregulated exchanges to be weeded out by certain jurisdictions amidst the tightening oversight of the regulators.



Ben El-Baz
Head of Ecosystems,
HashKey Group

Digital Asset Exchanges

The dichotomy between regulated and unregulated exchanges

(EP): What are your thoughts on the dichotomy between regulated and unregulated digital asset exchanges? How do you think the regulatory trend will play out in the next few years?

(BE): This is a crucial question. If you go back to 2018, when HashKey first started looking at setting up a digital asset exchange, we had the foresight to see what is happening in the market right now. We knew in 2018 that, given the market risks and the degree of digital asset volatility, regulators were going to impose stricter regulations to ensure that the proper protections are in place for users.

Over the recent three years, we have seen some of the exchanges getting booted out of certain countries and jurisdictions, and we think that will continue to increase. For one exchange in particular, many coordinated regulatory actions were taken against them in the last few months, including from the UK, Japan, the US, and Thailand.

I feel that regulators will continue to scrutinize the top exchanges, especially in times of extreme market volatility. As the legal and compliance teams at these exchanges see regulatory action taken at other exchanges, they will push their internal teams to review their operations.

In the long term, at least within the next 10 years, there will be more industry alignment to regulatory requirements. Otherwise it will be difficult for exchanges to be sustainable in the long-run.

We expect to see more coordinated regulatory actions taken against digital asset exchanges.

In the long term, digital asset exchanges will be more aligned with regulatory requirements.

Ben is currently Head of Ecosystems at HashKey Group, a regulated digital assets company. At HashKey, he leads the Group's strategic partnerships, blockchain applications and asset tokenisation projects, and post-investment management of a US-based tokenised securities firm. Ben also leads HashKey's trade finance blockchain partnerships with the Singapore Government and Hong Kong Monetary Authority.

With over 13 years of experience in Silicon Valley, Mainland China, and Hong Kong, he started his career as a derivatives trader, then as a China cross-borders corporate finance analyst, before moving into technology product management and business development, serving Big Tech clients like Microsoft, Google, and Amazon. Ben speaks, reads, and writes Mandarin Chinese fluently.

Ben is a graduate of the Stanford Graduate School of Business, where he earned his Master's degree in Management, led Stanford's largest blockchain applications working group, and co-authored Stanford's first published research on blockchain applications for ESG and social impact.

Digital Assets and Cybersecurity Expert Interview with Floyd DCosta

Key views on digital asset exchanges

- Compliance and security are the top criteria for investors choosing digital asset exchange. This is particularly true for institutional investors who attach high importance to risk protection.
- Institutional investors generally focus on the reliability of custody services and regulatory compliance when measuring digital asset exchanges' compliance and security levels.
- Given the high volatility in the digital asset space, the liquidity of digital asset exchange is an important consideration for investors.

**Floyd DCosta**

Co-founder at
Block Armour &
Blockchain Worx

Digital Asset Exchanges

Considerations when choosing a digital asset exchange

(EP): How will you rank the importance of value-added services offered on digital asset exchanges (such as custody, liquidity, regulatory licensing) relative to commission rates? How do you cope with counterparty risks?

Security, compliance and liquidity matter most

(FD): When it comes to digital asset exchanges, security and compliance are the two most critical factors. Digital assets are expected to offer higher returns, better commissions, along with other benefits. Liquidity is also a key factor, given the highly volatile nature of digital assets.

However, customers (especially institutions) want to know that they can trade securely and comply with local regulations. Having credible third-party custody and regulatory licensing can help address these concerns. Digital asset-related insurance, although still in its infancy, could significantly help drive wider institutional adoption of this asset class.

The critical factors for digital assets exchanges include: security, compliance, liquidity, third-party custody, regulatory licensing and insurance

Floyd DCosta is the co-founder of Block Armour, a Cybersecurity venture that was accelerated by Airbus and featured among the Top 25 cybersecurity innovations worldwide. He is separately also the co-founder of Blockchain Worx, a Singapore based Fintech-Regtech startup focused on enabling Digital Banking with Blockchain technology and crafting next-gen platforms to enable institutional participation in Decentralized Finance (DeFi) ecosystems.

With a background in Management Consulting, Floyd has over 19 years of professional experience in setting up and growing international business practices as well as advising senior client executives on decisive topics. His previous experience includes eleven years at Capgemini and spans a variety of high-tech industry sectors and technology platforms. A regular writer and speaker at events, Floyd advises multiple organizations on harnessing the potential of emerging technologies for Digital Transformation.

Floyd holds a Masters in Computer Information Systems from ITM, Mumbai, and the Exec General Management Program from IIM-Bangalore. And, when he is not traveling, Floyd enjoys spending time with his family in Singapore.

Blockchain Investment Fund Founder Interview with Michael Wong

Key views on digital asset exchanges

- Regulatory licensing will create a healthy competition landscape for digital asset exchanges in the future.
- When choosing digital asset exchanges, the top criteria include regulatory licensing in a respectable jurisdiction, custodial arrangement, protection mechanisms and insurance coverage.

**Michael Wong**

Managing Partner &
COO, Co-founder,
MaiCapital

Digital Asset Exchange Landscape

(EP): How do you think the competitive landscape of the digital asset exchange sector will change? How will their value proposition to clients like yourself change, particularly for risk management, custody solutions etc.?

The licensing status of digital asset exchanges is critical

(MW): There are many digital asset exchanges out there. However, not a lot of them are properly regulated or licensed in their respective jurisdictions. An exchange having a licensed status is very meaningful for us as the license is not simply a stamp of approval but also ensures that the exchange views risk similar to how we view them and understands how we want to mitigate them.

Having more licensed exchanges is excellent for us, as that offers us more flexibility and options.

A combination of custody and trading flexibility is vital

I think the other important area is the combination of custody and exchange. There is **constant worry relating to the risks that exchanges pose because they hold their clients' assets.**

Many exchanges hold at least some portion of their clients' digital assets in hot wallets, which means the assets are online and prone to online attacks and hacking risks. Thus, these are some of our key considerations when we select an exchange: insurance coverage,

1. level of cybersecurity-related protection on those hot wallet assets,
2. insurance coverage,
3. efficient and secure procedures to transfer assets amongst the exchange's hot/cold wallets

... but is missing in the crypto world

In terms of what is missing in the crypto world today, trading and custody are completely separate since digital asset exchange and custodians offer different things.

In the traditional financial world, prime brokerages take care of both the trading and the custody.

As a fund manager of crypto assets, we need to figure out how to best protect our clients' assets, balancing the need for execution availability while not always leaving the assets on the exchange.

The licensed status is not simply a stamp of approval but also ensures the exchange views risk the same way as how we view them and understands how we want to mitigate them.

The combination of custody and exchange is important, as exchanges hold onto many client assets. As a COO of a crypto fund manager, I need to figure out how optimize our trade execution procedures so we have enough protection for our clients' assets.

A crypto prime brokerage solution, which is currently missing in the market, would provide flexibility in making trades, and keeping crypto assets safe.

If there was a prime brokerage solution, we can keep our assets in custody and execute trades whenever we need to. However, we do not see that being offered very effectively anywhere in the world right now.

(EP): When selecting digital asset exchanges, you have shared some factors that will come to mind, such as custody, licensing status and commission rates. How will you rank these priorities, and what is your rationale?

Compliance and custody are the top two criteria in picking digital asset exchange

(MW): Yes. I would rank owning a license in a respectable jurisdiction as one of the top criteria, and then next is the custodial arrangement.

As I said earlier, how the exchange stores its assets (hot versus cold), the protection mechanisms around the hot and cold wallets, and insurance coverage are also key considerations.

The rationale behind this is quite simple. We can always use trading strategies to mitigate market risks, but we cannot do much to protect against counterparty risk. And counterparty risks could be a one or zero impact on our fund. We could effectively lose everything on an exchange just because an exchange gets hacked or loses its assets. Hence the selection criteria we have listed above.

I think the commission rate is more secondary for us as we are willing to pay more to reduce the counterparty risks as much as possible.

(EP): It is widely expected that the SFC will approve more licenses in the next 12 months. Do you expect to see commission rates come down?

Licensing will create a level playing field among digital asset exchanges

(MW): I think, generally speaking, more competition moves the system forward. I am sure the level of support and features offered by the exchanges would continue to improve as well.

The regulators have imposed a set of basic requirements on any licensed digital asset exchange. This means all licensed exchanges will start on a level playing field. However, once they get licensed, they will begin competing on offering different types of products, features and fees. In our perspective, liquidity and trading volumes will play a more important role than fees when choosing an exchange.

(EP): In the digital asset exchange space, there are pros and cons to regulatory licensing. As a client of digital asset exchanges, how would you rate the importance of them being regulated vs having the flexibility to innovate quickly?

Being regulated is the essential criterion to expand the blockchain space

(MW): From a participant perspective, I think it is more important to be regulated. As an asset manager, we also went the regulated route as our goal is to bring the rest of the world – i.e. the traditional financial world – into this space.

I would rank owning a license in a respectable jurisdiction as one of the top criteria and then the custodial arrangement, protection mechanisms and insurance coverage.

We can use strategies to protect against market risks, but we cannot do much to protect against counterparty risk.

We are willing to pay more [commissions] to reduce the counterparty risk as much as possible.

The level of support and features offered by the exchanges should increase as competition intensifies.

Fees are secondary and liquidity plays a more important role in choosing an exchange.

To attract and bring an untapped segment of the market into our blockchain space, regulation is key.

This is a massive segment of the market that remains largely untapped. But to attract and bring this untapped segment of the market into our blockchain space, there are essential criteria that we have to meet.

And being regulated will be a key criteria here. Being unregulated, being at the opposite end of the spectrum, does allow one to manoeuvre faster and perhaps offer more leading-edge products and features. However, that comes at the expense of bearing more risks, which would deter the entrance of traditional financial participants.

Therefore, this is a delicate balance and also a conscious choice: between having a wider variety of products to invest in versus expanding the market and attracting more participants, we will always choose the latter which means regulation will be key.

Being unregulated allows you to manoeuvre faster and offer more leading-edge features, but that comes at the expense of bearing more risks.

Michael is the co-founder and managing partner of MaiCapital Limited, a leading asset management company in Hong Kong that combines SFC-licensed operation with deep technologies to offer a range of funds that invest in blockchain and crypto-related assets. MaiCapital is currently the only company in HK that has over 2 years of track record in operating a Blockchain-themed fund under the HK SFC license. MaiCapital utilizes different investment vehicles such as securities and derivatives that gives exposure to virtual assets return to achieve the fund's investment objectives, while maintaining direct investment into virtual assets to be <10% of the Fund's gross asset value. MaiCapitals' funds are available to qualified Professional Investors only.

Michael also co-founded MaiBlocks Technology, a leading Blockchain service provider in the area of asset tokenization. Prior to co-founding MaiCapital & MaiBlocks, Michael spent 15 years in the wireless technology industry across US and Asia, leading sales, BD & software R&D functions for Qualcomm and Atheros. He is also a US patent holder in a wireless adaptive

Blockchain and Mining Expert Interview with Ray Wong

Key views on digital asset exchanges

- At present, centralized exchanges (CEX) are more dominant.
- Decentralized exchanges (DEX) are rapidly catching up with CEXs, thanks to improvements in liquidity and leverage.
- CEX and DEX will likely coexist in the future, given their unique advantages.



Ray Wong
CEO of LuTech

Similarities and Differences of CEX and DEX

DEX has lower exposure to infrastructure risk and is catching up with CEX on liquidity and leverage

(EP): How do you see the competition between centralized exchanges (CEX) and decentralized exchanges (DEX)? Please comment in terms of liquidity, spreads, speed of trades, leverage, yield and others.

(RW): At present, centralized exchanges (CEX) are more dominant. I see decentralized exchanges (DEX) catching up.

Liquidity

In terms of liquidity, CEX has a higher trading volume of approximately US\$1trn, given the sector's more extended history and a more significant number of users.

CEX has a higher trading volume and narrower spreads than DEX

On the other hand, DEX has a lower trading volume of approximately US\$100bn, given the sector is more nascent and less beginner-friendly.

In addition, CEX has narrower spreads than DEX.

Leverage

In terms of leverage, CEX offers higher overall leverage. Centralized futures exchanges like BitMex can provide 100x leverage on Bitcoin futures trading.

CEX offers higher overall leverage than DEX, though DEX is catching

In contrast, few decentralized exchanges can keep up with the 100x leverage offered by centralized exchanges.

DEX offers lower leverage but is catching up. Decentralized futures exchanges like dYdX, developer of a leading non-custodial decentralized exchange, only offer 10x leverage. YFX Descartes V1, launched in January 2021, was the first DEX to offer 100x leverage on a perpetual contract.

Yield

CEX offers a lower overall yield compared to DEX. For example, the US 10-year government bond has a yield of 1.4% in July 2021.

CEX offers a lower overall yield compared to DEX

DEX has a higher yield. For example, the estimated annual percentage yield (APY) of DAI on Compound and Aave is 3.18% and 5.65% (June 2021).

Speed of trade

CEX operates at a higher transaction speed. For example, Visa can process 24,000 transactions per second.

CEX operates at a higher transaction speed than DEX

On the contrary, DEX operates at a slower transaction speed but has all-time service availability. For example, ETH can process 20 transactions per second with an average confirmation time of 5 minutes.

Infrastructure risks

The exposure of CEX to infrastructure risks depends on the platform development of the central manager. On the other hand, the exposure of DEX to infrastructure risks is low or even zero due to the distributed nodes.

The exposure of DEX to infrastructure risks is low or near zero due to the distributed nodes

(EP): What is your advice for centralized exchanges (CEX) to better position themselves to embrace DeFi opportunities?

DeFi innovations empower centralized exchanges

Centralized exchanges can incorporate DeFi innovations, such as Automated Market Maker (AMM) that replaces the order-book model of CeFi. CEX can also list and custodize both projects and products related to DeFi.

Centralized exchanges can incorporate DeFi innovations

CCEX resolves regulatory challenges related to DeFi

The challenge in regulating DeFi can be hurdles for CEX to embrace DeFi. Therefore, to embrace DeFi, CEX may need to adapt regulations to make them applicable to DeFi, such as pushing Know Your Customer (KYC) protocols and Anti-Money Laundering (AML) policies.

CEX can help manage regulatory challenges to DeFi

Ray Wong is a blockchain investor and Bitcoin miner. He is CEO of LuTech, an award-winning company that provides Bitcoin mining services to funds, professional investors and the energy industry.

Ray is an HKSF-licensed Responsible Officer (Type 9) of Silver Spring Capital. As a VC advisor in blockchain and sustainability, Ray is also an angel investor in blockchain games and decentralized finance.

Ray was an executive in a publicly listed environmental firm and working at Morgan Stanley and Credit Suisse. He has been invited to speak in conferences globally, such as Crypto Asset Conference, organized by Frankfurt School Blockchain Center, DeFi Summit, a leading DeFi conference and CERAWEEK, a leading conference of the energy industry.

Ray holds a master's degree in Chemical Engineering from Carnegie Mellon University and an MBA degree from Cornell University.

MEGATREND 4

Cybersecurity – Uncharted Territories for Digital Assets

Key Highlights

- Cybersecurity is increasingly important in the digital asset space, as the boom in the industry have made digital assets easy targets for cyber attackers.
- Reliance on private keys and centralization of some digital asset exchanges become the vulnerabilities that expose digital assets to cyber-attack risks.
- In the future, the emergence of innovations in cybersecurity solutions help protect stakeholders from the cyber-attacks and avoid potential loss.

Overview

The overview section sets the baselines for our discussion on cybersecurity. The section defines cybersecurity, outlines its importance to the digital asset space and elaborate on the key categories of cybersecurity attacks.

What is cybersecurity in the context of digital assets?

Cybersecurity is the means of protecting networks, devices, and data from unauthorized access or cyberattacks, through practices of ensuring confidentiality, integrity, and availability of information.

How critical is cybersecurity for digital assets?

The prevalence and trustless nature of digital assets has made them a target of cyberattacks, highlighting the importance of cybersecurity.

Figure 32. Digital assets – Importance of cybersecurity

Reason	Details	Selected examples
Vulnerabilities of digital asset exchanges	Cybercriminals who hack into and steal funds from digital assets exchanges are untraceable.	Cryptocurrency is one of the preferred forms of exchange, e.g. ransomware attacks.
Decentralization of certain digital assets	Cryptocurrencies are fully decentralized. There is no central authority that monitors the transactions and activities.	Regulatory loopholes have provided a haven for cryptocurrency-related crime, such as money laundering, and the amount of losses suffered by victims are typically high. - Jul 2021 - Hong Kong officials identified a virtual currency money laundering scheme that involved US\$155 million - Jul 2021 – UK seized US\$408 million as part of a money-laundering investigation.
The digital assets space is not fully regulated	Regulators are still figuring out the appropriate legal structures to govern the digital assets industry, leaving room for perpetrators.	There are varying degrees of regulatory scrutiny over digital assets across jurisdictions. On one end of the spectrum, China has a blanket ban on cryptocurrencies. On the other end, Seychelles and Malta are considered more digital asset friendly.
Dependence of digital assets platforms on private keys	Digital asset platforms are prone to cyberattacks – cybercriminals can obtain the private key to hot wallets and steal the funds. It is near impossible for victims to recover the total amount of losses.	2019 – Cryptopia's servers were hacked, and approximately NZ\$30mn (US\$21mn) of cryptocurrency was stolen from account holder wallets via private keys.
Increasing value in digital assets and DeFi	As the level of adoption and investor interest increases, digital assets and DeFi see massive growth in performance and TVL (total value locked).	Since 2019, DeFi protocols have lost US\$285mn to hacks and other exploit attacks. This figure is about 0.65% of the adjusted total value locked of the Ethereum-based DeFi market (DappRadar).

Source: Techcrunch, Forkast, DappRadar

Key categories of cyberattacks related to cryptocurrency

Cyberattackers are likely to make advantage of the vulnerabilities in the digital asset transaction system to commit crimes. Here are the different types of vulnerabilities that are frequently targeted by attackers and some specific examples.

Figure 33. Cybersecurity for digital assets – Common vulnerabilities to cyberattacks

Key cybersecurity vulnerabilities for digital assets	Details	Specific example
Digital asset accounts	Digital asset accounts are accessible and secured via private key. However, some users tend to store these keys on their PC, making them easily accessible for hackers.	April 2019 – A thief stole almost 45,000 ETH by successfully guessing weak private keys.
Digital asset exchanges	Certain digital asset exchanges are centralized, which make them vulnerable to hacks and ransomware attacks.	2019 - Hackers stole \$40 million from Binance through phishing
Fraud or scams	Frauds or scams are rampant in the digital assets space, such as in ICOs, fraudulent addresses.	US Federal Trade Commission (FTC) estimated that US consumers lost US\$80 million to cryptocurrency-related scams in the period between Oct 2020 and May 2021; 2021 – South Korea has a crypto fraud case estimated to have involved a total of US\$3.85 billion, taking the country's losses in crypto scams to US\$5 billion over the past five years.

Source: Gemini, Forkast, Crypto Head

Cybersecurity risks related to cryptocurrency exchanges

Cyberattackers adopt various techniques to penetrate digital assets transaction systems, with the end goal of stealing funds. Below are the common types of cyberattacks related to digital assets.

Figure 34. Common cybersecurity risks related to cryptocurrency exchanges

Common cybersecurity risks	Definition	Notable example(s)
Ransomware	<p>A ransomware attack restricts a user from accessing a computer system unless a ransom is paid.</p> <p>First, the attacker hacks into a private network, then encrypts essential files within the network. The attacker demands a ransom from the owner, who otherwise could not access the files.</p>	May 2020 – One of the largest US fuel pipelines Colonial Pipeline paid approximately US\$5mn to the ransomware group that forced the temporary shutdown of all operations.
Phishing	A phishing campaign targets trading platforms with the primary goal of stealing user's credentials that scammers can use to ask for profit or ransom.	2020 – A phishing scam has stolen over 1,150,000 XRP from Ledger users.
Hack of trading platforms	Cybercriminals compromise trading platforms and steal funds.	September 2020 – Singapore-headquartered digital asset exchange KuCoin reported US\$281mn of funds compromised in a security breach
Compromised registration forms	Cybercriminals steal users' information. They then sell it in the black market for profit.	<p>The lack of regulatory oversight has caused the ICO space to be fraught with scams, whereby users are misled by links and popups to fill in personal and financial details.</p> <p>A 2018 report by Satis Research identified 78% of a sample of 1,500 ICOs as scams, collectively valued at US\$1.3bn.</p>
Third-party applications	Cybercriminals use third-party applications to steal user data which is used in further attacks.	As of July 2021, security researchers reported that over 170 fraudulent Android apps purported to offer cloud crypto-mining services have collectively scammed victims \$350,000.
Malware	Cryptocurrency-related malware can be used to steal cryptocurrencies from online wallets. Malware can also enter mining machines and steals the mining resources of the infected computer.	June 2021 – Avast estimated that the scam using Crackonosh, a malware, has cost victims over US\$2mn worth of Monero (XMR).
Cryptojacking	Cryptojacking is the malicious use of an individual or organization's computing power to mine cryptocurrencies without consent	<p>2019 – Two members of hacker Bayrob Group were sentenced after their malware mined crypto on 400,000 infected computers.</p> <p>2018 – Over 2,000 computers of the Aditya Birla Group were reportedly hacked by miners to mine cryptocurrencies.</p>

Source: CryptoSlate, Coindesk

Potential solutions to cybersecurity attacks

Cybersecurity solutions and regulatory controls are critical to an effective cybersecurity strategy for digital assets. Below we discuss some proven ways to prevent cybersecurity breaches.

Figure 35. Cybersecurity for digital assets – Potential solutions to cyberattacks

Potential solutions	Significance
Adopt access controls	Access controls prevent employees from providing customer information to unauthorized individuals who may seek to obtain this information through fraudulent means.
Use threat modelling	Threat modelling conducted by software developers can analyze and mitigate threats.
Encrypt information	The encryption of electronic customer information (including those stored on networks or systems) helps prevent unauthorized individuals from gaining access.
Use attack detection systems	Attack Detection Systems can detect actual and attempted attacks on or intrusions into customer information systems
Adopt cybersecurity audit program	An adequately structured audit program can evaluate cybersecurity risk management practices, internal control systems, and regulatory compliance.
Install response programs	Response programs can specify actions to be taken, make reports to regulatory and law enforcement agencies when the financial institution suspects or detects access by unauthorized individuals to systems.
Install digital asset management software	Digital asset management software helps improve cloud metrics for security by storing assets in a single location and making them available worldwide.
Adopt Two-Factor Authentication	Two-factor authentication (2FA) adds a second method of identity verification to secure accounts and increases security. The first method being password, the added second method being something unique to users, such as a fingerprint.

Source: Deloitte, Mckinsey

How cybersecurity adds value to the existing digital assets ecosystem

The decentralized nature of cryptocurrency is an opportunity for cybercriminals to use digital assets to keep their illicit activities from regulators' radar. Having the appropriate cybersecurity protocols in place can prevent cybercriminals from taking advantage of the vulnerabilities of digital asset systems.

Figure 36. Cybersecurity for digital assets – Value add to the existing financial system

Pain point of financial system	How cybersecurity adds value	Details
Prone to phishing risks	Phishing threat detection tools can detect fraudulent clones of the project website and enable digital asset exchanges to respond to the attack immediately.	Continuous analysis of phishing activity provides immediate alerts that help protect from losses.
Users' lack of security awareness	Cybersecurity firms can educate users to raise awareness.	Examples include training for users to enhance their cybersecurity awareness and skills.
Vulnerabilities in confidential data when involving third-parties	Cybersecurity tools can assess the suspicious third-party applications	When engaging third parties, an application security assessment can detect and fix the vulnerabilities that may lead to the syphoning of confidential data or infiltration of the system.

Source: Kaspersky

Cybersecurity for digital assets – Industry metrics

Cybersecurity metrics convey important information including system security level and security emphasis of the digital asset firms, which we believe provide a brief picture of how they react with potential cyberattacks.

Below we summarize the key metrics that help gauge the cybersecurity and risk-hedging capabilities of industry players.

Figure 37. Cybersecurity for digital assets – Key metrics for analysis

Metric	What it measures	Drivers	Importance
Cyber Insurance coverage	The amount of risk or liability that is covered for an individual or entity by way of insurance services	- Amount of coins that a digital asset exchange has set aside to cover losses in the event of a hack; - The accessibility to the reinsurance market.	The risk-hedging capabilities against thefts targeting online wallets and exchanges
Bug bounty program rewards	The amount of rewards that a digital asset service provider offer to developers for identifying vulnerability	- The level of importance that digital asset service providers attach to cyberattack prevention The more rewards offered, the more likely it is to have Whitehat talent and the more secure it is.	The willingness to incentivize users to find the loopholes and vulnerabilities of its system
The number of hacks historically	The number of times that a digital asset platform has been hacked	- Level of transaction volume attractiveness and popularity to hackers - Level of cybersecurity/ hacking difficulty	Counter-intuitively, digital asset service providers that have been hacked in the past would likely have addressed the loophole and were less vulnerable.

Source: Cointelegraph

Cybersecurity for digital assets – Future outlook and key themes

Cybersecurity is a relatively nascent and radically changing topic in the digital assets space. Below we shed light on key cybersecurity trends that sit at the intersection of digital assets, and provide insights on how the future will look like for cybersecurity for digital assets.

Figure 38. Cybersecurity for digital assets – Future events and catalysts

Future trends	Details	Significance
Strengthening of anti-ransomware systems and cybersecurity alliance	The future will see the further development of a system capable of blocking off ransomware attacks, supported by AI and big data-based infrastructure. Governments are forming cybersecurity alliances with firms in the areas of cloud and web hosting services.	Protect firms against hackers who demand ransom after taking hostage of vital information.
Establishment of insurance companies under digital asset exchanges	Establishment of "captive" insurance subsidiaries wholly owned by the firm being insured to reduce costs and improve access to reinsurance markets.	Partially address the shortage of insurance coverage available to digital asset exchanges.
Zero trust model	Zero Trust is a strategy to protect critical assets by limiting access by role. Zero Trust is a security concept centred on the assumption that organizations should not automatically trust anyone. Instead, it must verify before granting access to its systems.	Addresses the shortcomings of failing legacy approaches by removing the assumption of trust.

Source: Coindesk, Microsoft

Digital Assets and Cybersecurity Expert Interview with Floyd DCosta

Key views on cybersecurity

- Cybersecurity is an urgent issue, as the rapidly growing digital asset industry faces increasingly frequent cyberattacks.
- Despite the decentralized nature of blockchain technology, the somewhat centralized nature of CEX has exposed them to cyberattack risks.
- Modern approaches have gained popularity in digital asset security. For example, Zero Trust removes the assumption of trust.

**Floyd DCosta**

Co-founder at
Block Armour &
Blockchain Worx

Cybersecurity exposure of digital asset exchanges

(EP): Please comment on the extent that decentralized exchanges, regulated exchanges and unregulated exchanges are exposed to cybersecurity risks.

(FD): Cybersecurity is a significant challenge faced by organizations worldwide today.

The year 2020 has been exceptional in this regard. The global pandemic resulted in a grave threat to physical health and gave way to a new wave of cyberattacks. According to reports, there will be, on average, a cyberattack incident every 11 seconds in 2021, twice what it was in 2019 and four times the rate five years ago.

Digital asset exchanges are frequent victims of cyberattacks

Digital asset exchanges have seen their fair share of incidents. The underlying blockchain technology is quite robust and almost impossible to be compromised, except for potential 51% attacks. However, the digital asset exchanges and custody technology providers have been subjected to repeated cyberattacks.

Hackers are reported to have stolen over \$3.8 billion in 2020. Much of this is attributed to the compromise of servers and hot wallets. Breaches have also often been tied to internal causes, either malicious or accidental.

Zero Trust as a way to address cybersecurity risks

Modern approaches like Zero Trust are rapidly becoming the preferred security paradigm for many contemporary 'Digital' enterprises globally.

Based on the premise of 'Never Trust. Always Verify', Zero Trust addresses the shortcomings of failing legacy approaches by removing the assumption of trust altogether. Zero Trust is a powerful strategy to protect critical assets by limiting access by role and a "need-to-know" basis. Zero Trust could prove to be the strategic security initiative that digital asset exchanges require.

The digital asset exchanges and custody technology providers have been subjected to repeated cyberattacks, as servers and hot wallets are compromised

Zero Trust is rapidly becoming the preferred security paradigm

It could prove to be the strategic security initiative that digital asset exchanges require

Floyd DCosta is the co-founder of Block Armour, a Cybersecurity venture that was accelerated by Airbus and featured among the Top 25 cybersecurity innovations worldwide. He is separately also the co-founder of Blockchain Worx, a Singapore based Fintech-Regtech startup focused on enabling Digital Banking with Blockchain technology and crafting next-gen platforms to enable institutional participation in Decentralized Finance (DeFi) ecosystems.

With a background in Management Consulting, Floyd has over 19 years of professional experience in setting up and growing international business practices as well as advising senior client executives on decisive topics. His previous experience includes eleven years at Capgemini and spans a variety of high-tech industry sectors and technology platforms. A regular writer and speaker at events, Floyd advises multiple organizations on harnessing the potential of emerging technologies for Digital Transformation.

Floyd holds a Masters in Computer Information Systems from ITM, Mumbai, and the Exec General Management Program from IIM-Bangalore. And, when he is not traveling, Floyd enjoys spending time with his family in Singapore.

MEGATREND 5

STO – Future of Capital Raising

Key Highlights

- Asset tokenization adds value to the existing financial system by enhancing liquidity with fractional ownership and increasing transaction efficiency through trimming unnecessary intermediaries.
- A wide range of asset classes is tokenizable but with different tokenizable potential.
- STOs are regulated in major financial jurisdictions, and retail investors are allowed to invest in security tokens as long as the issuers are compliant with regulations.

What is asset tokenization?

Asset tokenization is the process of transforming assets into digital tokens on the blockchain. The ownership of the token provides access to ownership of the assets for token owners.

Figure 39. Asset tokenization – Key advantages

Advantages	Significance
Eliminate unnecessary intermediaries	Process automation and disintermediation increases efficiency and lowers transaction costs.
Enhance liquidity by enabling fractional ownership	Increased tradability of illiquid assets by overcoming information asymmetry, high costs and large ticket sizes
Increase market depth	Attract a new breed of investor through the global nature of blockchain. According to a study by Savills and McKinsey, c60% of the world's assets are inaccessible because of traditional market infrastructure.
Expand market breadth	Security tokens give rise to new investment classes and enable these assets to be subdivided and syndicated to a broader group of investors in a more cost-effective way .
Immutable and cannot be changed unilaterally	Enhanced data transparency with an immutable record of ownership and legal rights.
Continuous trading	Blockchain reduces the time between trading and settlement significantly, thus eliminating settlement risk.
Asset interoperability	With the financial ecosystem struggling to achieve interoperability, tokenized assets remove physical barriers and geographical or infrastructural limits.

Source: Cointelegraph

While asset tokenization removes unnecessary intermediaries and facilitates liquidity for issuers, it is also exposed to several risks due to its immaturity, including regulatory obscurity and technological risks.

Figure 40. Asset tokenization – Key disadvantages

Disadvantages	Implications
Technological instability	Existing systems may not be sufficiently robust to manage digital assets, which requires high-grade protection against cybersecurity attacks and capability of bridging with legacy systems easily to ensure smooth onboarding process and asset management.
Regulatory uncertainty	The absence of a common global regulatory framework and the decentralized nature of the blockchain give rise to undesirable risk and pose challenges for institutions and investors to embrace the digital assets opportunity.
Market and operational risks	Tokenization does not eliminate all security risks, in particular, storage risks.

Source: Cointelegraph

What can be tokenized?

Asset tokenization is applicable in a wide range of asset classes. However, each asset class shows a different potential for tokenization, which we believe should be considered by issuers to consider the tokenization feasibility.

Figure 41. Tokenizable assets – Selected examples

Asset Classes	Examples
Real Assets	Oil and Gas, Precious Metals, Real Estate
Consumables	Wine, Automobiles, Pharmaceuticals
Collectables	Fine Art, Virtual collectables
Intangible Assets	Patents, Licenses, Trademarks

Source: EY

Figure 42. Asset tokens – Key categories

Categories	Definition	Examples
Profit-sharing tokens	A right to share in the profit and loss, and value of the company	Private Equity, Stock tokens
Revenue-sharing tokens	A right to a percentage of revenues or fees generated by the platform	Agribusiness (cattle, soybeans, corn, etc)
Debt tokens	A right to interest payments, in proportion with the risk and repayment at the end of a fixed term	Subordinated loans

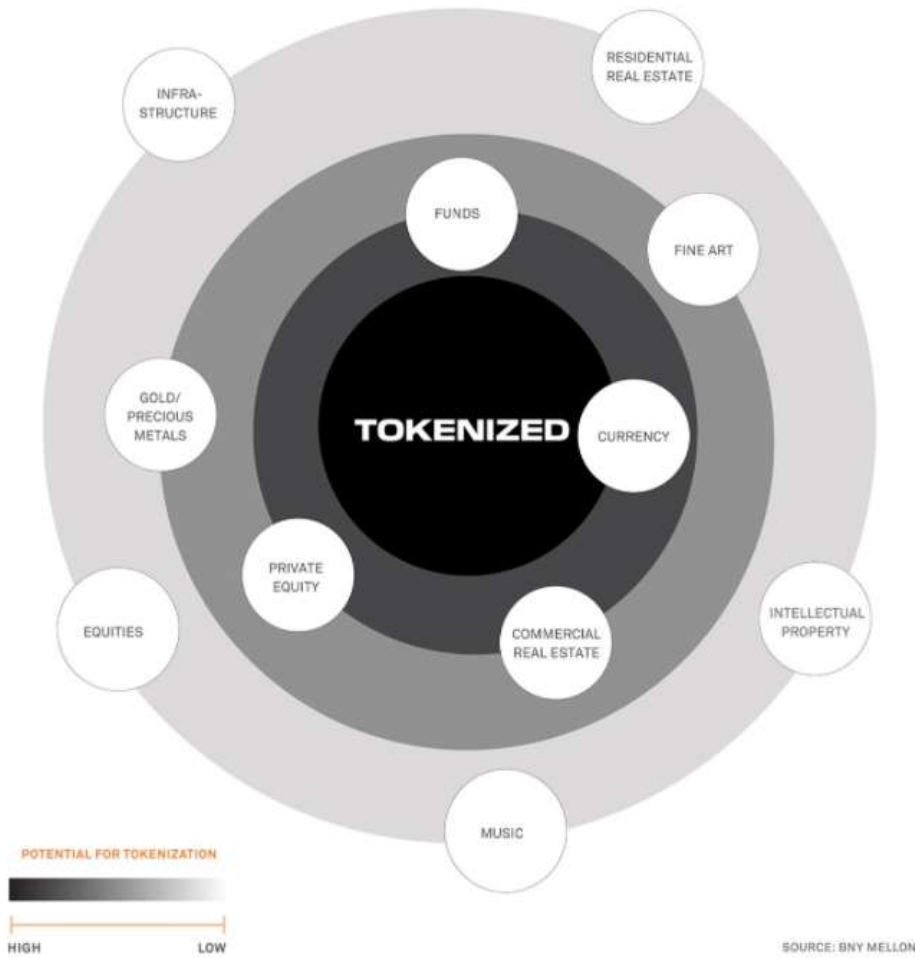
Source: EY

Figure 43. Potential for tokenization – Examples of asset classes

Potential	Asset Classes
High potential	Currency, Private Equity, Commercial Real Estate, Funds
Medium potential	Gold/Precious Metals, Fine Art
Low potential	Equities, Infrastructure, Intellectual Property, Music

Source: OECD

Figure 44. Potential of tokenization – Asset classes



Source: BNY Mellon

Examples of tokenizable assets

Asset tokenization sees extensive applicability in different asset classes. Despite its infancy, the industry has witnessed breakthroughs by first movers.

Fig 45. Examples of tokenized assets

Asset Classes	Examples	Details
Stock tokens	Apple (AAPL); MicroStrategy (MSTR); Coinbase (COIN)	Stock tokens track the performance of listed shares. Investors are allowed to trade fractionalized units of the share tokens, with minimum trade sizing set at one one-hundredth of a token.
Bond tokens	SGX digital bond (OLAMSP 4 02/24/26 MTN)	The first pilot digital bond issuance on behalf of Olam International. - Replicated a traditional S\$400 million 4% 5.5-year public bond issue and a follow-on S\$100 million tap issue. - Utilized DAML (the smart contract language created by Digital Asset) and HSBC's on-chain payments platform
	EIB digital bond	An Ethereum-based €100 million two-year bond. Investors purchased and were paid with traditional fiat.
Fund tokens	The Elephant Token	The first security token backed by shares of privately held unicorns and raised US\$18mn.
	Mapletree Europe Income Trust (MERIT)	Mapletree is a Singapore-based private fund which is backed by SGX and designed to provide stable and resilient income. - Raised US\$1mn in total with US\$100 per token, starting from Mar 17, 2021
Commodities tokens	Gold	Deployed to tackle the challenges and inconvenience of trading and transportation
	Oil and gas	Used to satisfy the funding needs of smaller projects and avoid high management costs in dealing with many small investors

Source: Financeasia, Cointelegraph

ICO vs. STO vs. IPO

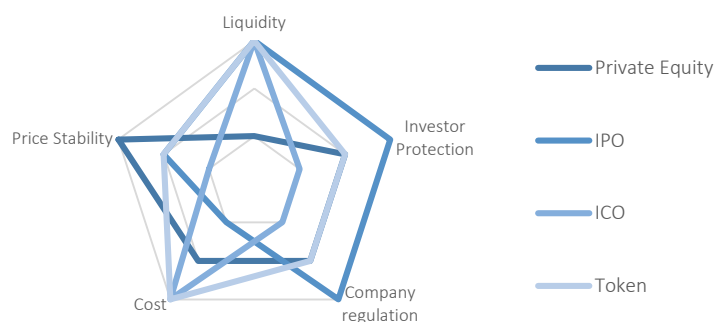
As an alternative to initial public offering (IPO) and initial coin offerings (ICOs), security token offerings (STOs) have provided capital to small and medium-sized enterprises (SMEs). Investors need to consider both the advantages and disadvantages of each method before deciding which way to use.

Figure 46. Key comparison of ICO, STO and IPO

	ICO	STO	IPO
Full Name	Initial Coin Offering	Security Token Offering	Initial Public Offering
Platform	Digital asset platform or exchange		Regulated Stock Exchange
Mechanism	Enables fund raisers to finance a project. In exchange, the investors will receive utility tokens that represent future access to a project's product or service.	Similar to ICO, but involves more regulatory requirements and offers more guarantees	Offer shares of a corporation to the public. Investors have ownership of the company in proportion to the shares they own.
Issuer	Start-up, private or public company	Start-up, private or public company	Public company
Regulation	Lack of oversight and investor protection from fraud and speculation	Subject to rules and regulations	Subject to strict rules and regulations
Costs	Simple, fast and cheap for fundraisers	Cost, speed and barrier of entry is in between ICO and IPO	Time-consuming and costly
Future and trend	In decline	Significant growth	Stable growth
Issued	Utility token	Security tokens	Shares
Participation	Generally via a third party such as Coinlist	Directly	Generally, via Broker (e.g. Bank)
Accepted Funds	Fiat and/or crypto-assets	Fiat and/or crypto-assets	In general, fiat only
Initiated	In general, direct launch to the public without a centralized third party (except if IEO)	In general, direct launch to the public without a centralized third party (except if IEO)	In general, investment banks underwrite the IPO
Documentation requirements	Whitepaper, website	Prospectus, filings, registration with the regulator, website	Prospectus, filings, registration with the regulator
Investor rights	Generally, limited to digital access to service/application	Generally, voting rights, dividends (if structured similar to shares)	Generally, voting rights, dividends
Controlling authority	None	Regulator	Regulator
Underlying	None	Asset	Asset

Source: EY

Figure 47. Comparison – Asset tokens and selected asset classes



Source: Cointelegraph

STO - Traditional vs token value chain

Tokenization adds value to the securities value chain with unique features. Below, we compare the process between traditional and tokenizable securities to provide insights into how tokenisation reshapes the financial system along the value chain.

Figure 48. Traditional vs tokenized value chain

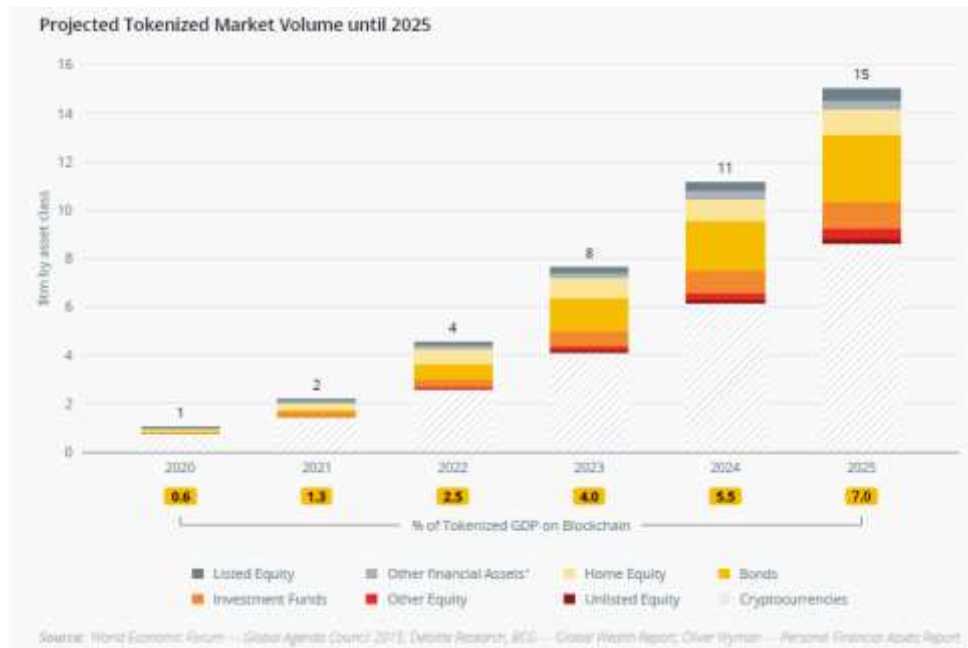
	Primary market		Secondary market			
	Issuance	Distribution	Trading	Execution	Settlement	Clearing
Traditional securities lifecycle	Time consuming and costly; Investment banking dominate the process	Manual distribution	Limited time frames	Handled by centralized institutions	Settlement is based on contractual obligations	Clearing system ensure trading contract is fulfilled
Tokenization securities lifecycle	Lower entry-barriers for issuers, such as start-up, public company, SMEs	No-intermediaries and higher efficiency in distribution	Non-limited trading time frames	No intermediaries and allow peer to peer transaction	Instantaneous settlement	No need for clearing system

Source: Cointelegraph

STO - Projected tokenized market volume

The tokenized market sees ample room for growth, as it provides access to financing for companies of all sizes with increasing long-tail financing needs. By 2025E, the projected tokenized market volume is estimated at US\$15trn, according to World Economic Forum.

Figure 49. Projected tokenized market volume 2020-2025E



Source: World Economic Forum

STO - Ecosystem

The STO ecosystem is supported by platforms spanning issuance platforms, exchanges, custodians, issuers, and banks, etc.

Figure 50. STO ecosystem, Jun 2021



Source: Cointelegraph

Primary Considerations for STOs

STO is early, full of uncertainties for issuers and investors in reporting, insurance, issuance, regulation, etc. Industry participation and involvement will be inevitably affected by the following considerations.

Figure 51. STO – Primary considerations

Consideration of STO	Target	Requirement	Example
Tax and accounting	Issuer	Taxation	How will income generated in the token sale be treated for tax purposes?
	Issuer	Reporting requirement	Requirements for reporting and withholding?
Insurance	Investor	Insurance coverage	Does the firm have adequate insurance or other coverage for investment risk exposure?
Asset tokenization platform	Issuer	Record and tracking	How are token holders of record tracked during secondary trading?
	Issuer	KYC/AML	Can the platform provide necessary tools for KYC/AML in both pre- and post-issuance of the tokenized security?
Regulations	Issuer/ Investor	Jurisdictional differences	What are different advantages and restrictions from different jurisdictions?
Technology	Issuer/ Investor	Lack of technological maturity	Does the underlying blockchain system mature enough to resolve e.g. scalability issues?

Source: Cointelegraph

STO - Future outlook and key themes

We expect to see different key themes in security tokenization, which benefit from ongoing innovation and maturity of the regulatory environment.

Figure 52. STO – Key drivers

Drivers	Implications
Increasing long-tail financing needs	STO provides access to financing for companies of all sizes
Innovation-friendly stance in certain jurisdictions	Provides an attractive hub for innovative endeavours
Technological advances	Addresses shortcomings of the existing financial services system

Source: Coindesk

Figure 53. STO – Future outlook and key themes

Key future themes	Details
Push into uncharted territory	Token design can lead to multiple options, such as products/services, pricing, structure. Tokenization has the potential to lead to possibilities that have not been conceptualized yet.
Create new platform business models which are fully automated	Asset tokenization will create new types of platform business models which work with both humans clients and machines. The potential for an increasing pool of clients and lowering of costs can substantially increase profitability.
Simplify and streamline the execution process	Tokenization as a business logic will help streamline the complex execution process, resulting in higher efficiency and lower costs. The process will be automated in the execution stage (delivery, payment and record-keeping), leading to cheaper and more reliable offerings.
Increasing regulatory clarity	Legislation and judicial rulings targeted to STOs will provide further clarity for both financial institutions and industry participants.

Source: Cointelegraph

Digital Assets and Cybersecurity Expert Interview with Floyd DCosta

Key views on STO

- Asset tokenization will experience significant growth in market capitalization driven by increasing demand and improving infrastructure.
- STOs – the digital representation of various asset classes on distributed ledgers – could liberate trillions of dollars worth of non-liquid assets, raise new capital, and create all-new secondary markets on the blockchain.
- Tokenization digitalizes the traditional capital markets and addresses the pain points of the existing systems.

**Floyd DCosta**

Co-founder at
Block Armour &
Blockchain Worx

Opportunities in STO

(EP): How do you see the opportunities in the STO space in the near to medium term?

Tokenization could create liquidity and all-new secondary markets

(FD): The tokenization of securities can quickly revolutionize the traditional world of finance. The digital representation of various asset classes on distributed ledgers could help liberate **trillions of dollars' worth of non-liquid assets**, raise fresh capital, and create all-new secondary markets on the blockchain. Digital tokens could represent all forms of traditional securities and facilitate the creation of new, innovative and inclusive digital financial products.

The massive potential of the asset tokenization market

The World Economic Forum forecasts that, by 2027, 10% of the world's GDP will be tokenized — with an estimated market capitalization of US\$24 trillion. In addition to promising innovation, the benefits include lower costs and efficiency gains driven by automation and disintermediation, improved transparency, enhanced liquidity and tradability of otherwise illiquid assets, improved settlement times and the ability to have 24/7 markets.

With blockchain technology poised to transform the underlying trading and settlements infrastructure, tokenized securities could truly lead global capital markets into the Digital Era.

Floyd DCosta is the co-founder of Block Armour, a Cybersecurity venture that was accelerated by Airbus and featured among the Top 25 cybersecurity innovations worldwide. He is separately also the co-founder of Blockchain Worx, a Singapore based Fintech-Regtech startup focused on enabling Digital Banking with Blockchain technology and crafting next-gen platforms to enable institutional participation in Decentralized Finance (DeFi) ecosystems.

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Floyd holds a Masters in Computer Information Systems from ITM, Mumbai, and the Exec General Management Program from IIM-Bangalore. And, when he is not traveling, Floyd enjoys spending time with his family in Singapore.

Legal Expert Interview with Pdraig Walsh

Key views on STO

- STO regulation is in place. For the STO area to gain traction, STO projects need to move past proof-of-concept exercises to projects that have a genuine potential of delivering investor returns.
- Real estate is a well-suited area for security token offerings and targets a different segment of investors to current investment offerings.



Pdraig Walsh

Partner, Corporate and Commercial,
Tanner De Witt

Regulatory Approach To STO

(EP): What are the primary legal issues that are facing the STO and asset tokenization space right now?

Adequacy of experienced participants and high-quality STO projects matter

(PW): The main concerns are practical for the time being. Firstly, a key industry issue is to have sufficient businesses with the appropriate experience and licenses to support a sophisticated security token offering. Another vital concern is the quality and the calibre of projects presented for security token offerings.

For the STO area to really gain traction, STO projects need to move past proof-of-concept exercises to projects that have a genuine of delivering investor returns. STOs should evolve to capture the promised cost efficiencies of the underlying technology. However, the market has not yet reached this stage and is still immature.(EP): How do you think regulation will change in the STO space in the near to medium term?

Inflection point is still some distance away, with high quality projects and STO expertise as the primary catalysts

STO regulation is in place – however, the industry has yet to see high-quality projects

(PW): In theory, the regulation and licenses are already available. It is important to consider, firstly, licensing needs and secondly, the quality and calibre of the projects in question.

Regulation for STO is available. The need is for high calibre projects

STO Use Case: Real Estate Tokenization

Real estate is one of the areas well suited for security token offerings and targets a different segment of investors to current investment offerings. Other asset classes that could be the subject of an STO are more exotic. They include art, wine and whisky. However, real estate has genuine potential and looks optimistic. Also, there is a benefit in sourcing projects in traditional asset classes that people understand, but may have difficulty accessing.

There is a space in the market for real estate tokenization

Approaches To Encourage Higher Buy-Side Adoption

(EP): For STOs, the sell-side appears to be moving faster than the buy-side, implying a disconnect between sell-side and buy-side appetite. What do you think needs to change for there to be more buy-side participation and adoption?

STOs may fall outside of the mandate of institutional investors

(PW): Factors that contribute to this imbalance include project quality and the conditions for particular investors to enter the market. For example, institutional investors may not participate because of their internal constraints and guidelines. Virtual assets and tokenized assets may fall outside their investment mandate, which means they will not be permitted to invest. This narrows the pool of potential investors. STOs involving real estate may be the first to cause investment mandates to change, as real estate is a traditional asset class. Tokenisation constitutes an innovation layer on top of a traditional asset class. This is somewhat more approachable than, for instance, investing in cryptocurrencies. So, the considerations for investments in a real estate tokenization may differ from, for example, trading in Bitcoin, Ether or other cryptocurrencies.

Tokenized assets may fall outside of what they are permitted to invest in, narrowing the pool of potential investors

Factors that would move the needle for increased buy-side participation in STOs

Apart from restrictions in investment mandates, the investing financial institution needs the internal technical skills, resources and controls to participate. So, there are significantly more hurdles to overcome on the buy-side side before participation.

There are significantly more hurdles to overcome before the buy-side can participate.

On the sell-side, it will be a strong signal if traditional market participants start to use security token offerings as one of their means of sale and distribution. Presently, most projects are brought forward by new entrants. These may find it difficult to inspire the confidence of traditional buy-side institutional investors.

Pádraig's practice focuses on regulatory, corporate and commercial work for businesses in the technology sector. Pádraig's practice includes assisting clients on licensing, regulatory and compliance. His experience in this area has enabled him to advise clients on a number of innovative, complex fintech projects.

He is at the forefront of advising on legal issues for emerging businesses using blockchain technology. This has included regulatory advice in relation to token sale offerings, security token offerings, stable coin listings, and tokenisation of equity and fund interests.

MEGATREND 6

DeFi – Democratizing Finance

Key Highlights

- The promises of DeFi to users and investors include eliminating intermediaries, increasing accessibility of financial markets and creating new investment opportunities.
- The use cases for DeFi are rapidly increasing and spans a broad spectrum from lending to banking. The DeFi user community is poised to increase drastically with more intuitive interfaces, enhanced interoperability and scalability.
- With the overall convergence of DeFi and CeFi, regulatory requirements on traditional finance (such as anti-money laundering and counter-terrorism) may apply to DeFi in the future.

What is DeFi?

Decentralized Finance (DeFi) refers to a group of decentralized applications (dApps) primarily running on the Ethereum and other smart contract ecosystems that provides blockchain-based financial services without intermediaries (Cointelegraph). The use cases for DeFi are rapidly increasing and spans a broad spectrum from lending to banking.

DeFi – Advantages and disadvantages

From a user perspective, DeFi has many advantages compared to traditional financial services, such as accessibility, lower fees, and privacy.

Figure 54. DeFi – Key advantages

Advantages	Details and Significance
Easily accessible	Accessible and affordable, making it possible for everyone to experience banking services;
	Users have complete control of their assets/funds and can move between protocols frictionlessly.
Lower fees by eliminating intermediaries	DeFi relies on smart contracts and requires no intermediaries to process transactions, thus, minimizing transaction fees.
Governed by users	Decentralization means that every user can take part in voting on platform governance decisions with governance tokens.
Global availability	DeFi platforms and protocols' distributed nature makes them available across the world, facilitating international financial transactions.
Enhanced privacy and anonymity	Users can begin using the platforms without disclosing personal information, thus, guaranteeing privacy and anonymity.
Open source and community-driven	DeFi communities create value through usage and organic marketing. Many DeFi applications and protocols are open-source, meaning that community developers can add features and build new apps. Projects can be "forked" to launch alternative versions of the original product.

Source: Cointelegraph Consulting, *DeFi Adoption 2020: A Definitive Guide to Entering the Industry*

Figure 55. DeFi – Key risks and disadvantages

DeFi Key disadvantages	Details and Significance
Reliance on core development team	DeFi protocols rely heavily on the core development teams to improve features and functionality. If a DeFi protocol is “orphaned” or the development team has moved on, the DeFi protocol will be susceptible to vulnerabilities.
High entry barriers for amateurs	DeFi has high operational barriers for new users. New users can lose their funds if they do not operate properly.
Susceptible to cyberattacks	The anonymity of participants in DeFi transactions makes it vulnerable to cyberattacks and may lead to funds theft or loss without any regulated recourse.
Need for infrastructural developments	The code infrastructure underlying DeFi applications is crucial as it avoids vulnerabilities that may expose the entire project to the risks in loss of funds.
Limited scalability	DeFi is prone to creating a ‘whale only’ ecosystem, where increasing transaction fees would only be accepted by those making high-value transactions, impeding wide adoption of DeFi.

Source: Cointelegraph

Value add of DeFi

DeFi delivers smart contracts and interoperability to financial services, which significantly increases applications and business activities. DeFi is based on blockchain technology, which implies that it inherits the advantages of blockchain.

Figure 56. DeFi – Value add to the existing financial system

Pain point of current financial system	How DeFi adds value	Details
Lack of credibility of centralized oracles	Decentralized oracles rely on multiple external sources	DeFi increases the credibility of the data provided to the smart contracts. At present, centralized oracles function as a single entity providing data from an external source to a smart contract.
Centralized Finance (CeFi) has custodial responsibility for users’ funds and information	DeFi sticks to a non-custodial approach	DeFi reduces information security risks as users have complete control over their assets and information.
Lack of transparency in financial transactions	DeFi functions on blockchain technology, meaning that all transactions are transparent to everyone.	The high level of transparency enhances trust among users. All transactions are visible to everyone in the network.
Higher potential hacking risk of CeFi	DeFi has lower exposure to hacking risk as there is no single-entry point in smart contracts.	Users’ funds in DeFi are more secure since users do not need to rely on the platforms for custody.

Source: Coindesk

DeFi – Use case

DeFi presents infinite possibilities. It is possible to create a DeFi version of most financial services

Figure 57. DeFi – Selected use cases

Categories	Use cases	Details
Trading and exchanges	Decentralized exchanges (DEX)	DEX users can connect a third-party wallet to a website interface without depositing or withdrawing funds.
	Derivatives	Some advanced DEX offers decentralized derivatives in which their values are based on underlying assets (such as currency, equity, index, or commodity).
	Yield Farming	Yield farming creates a symbiotic relationship between the DEX, traders, and liquidity providers. When users use the liquidity of yield farmers to execute trades, DEX rewards and incentivizes yield farmers with trading fees.
Financial services	Lending	DeFi lets users lend and borrow directly without intermediaries. For example, a smart contract transfers assets as collateral and deducts interest rates when the preset conditions are met.
	Insurance	DeFi investors use insurance protocols to protect their funds. These protocols protect against technical, liquidity and administration risks.
Digital assets	Stablecoins	Stablecoins are pegged to the value of fiat currencies and used as a hedge to protect against extreme market conditions. An investor can lock in profits by converting cryptocurrencies into stablecoins.

Source: Delta Exchange

Figure 58. DeFi – Selected examples by category

Categories	Institution	Details
Decentralized exchanges	IDEX	IDEX is an advanced DEX that combines a centralized exchange (CEX) performance with the safety of a DEX. Users can trade with advanced features with guaranteed trade execution and from a custody solution of their choice.
Derivatives	Synthetix	Synthetix is a decentralized platform on Ethereum for creating Synths, i.e. on-chain synthetic assets that track the value of real-world assets.
Lending	Aave	Aave is an Ethereum-based, DeFi protocol that lets users lend and borrow cryptocurrencies without intermediaries.
Insurance	Nexus Mutual	Nexus Mutual enables users to share and pool insurance risk without the need for an insurance company.
Stablecoins	Dai	The Dai stablecoin is used to purchase NFTs in multiple sectors and is compatible with museums, and art-auction platforms that accept cryptocurrency payments.

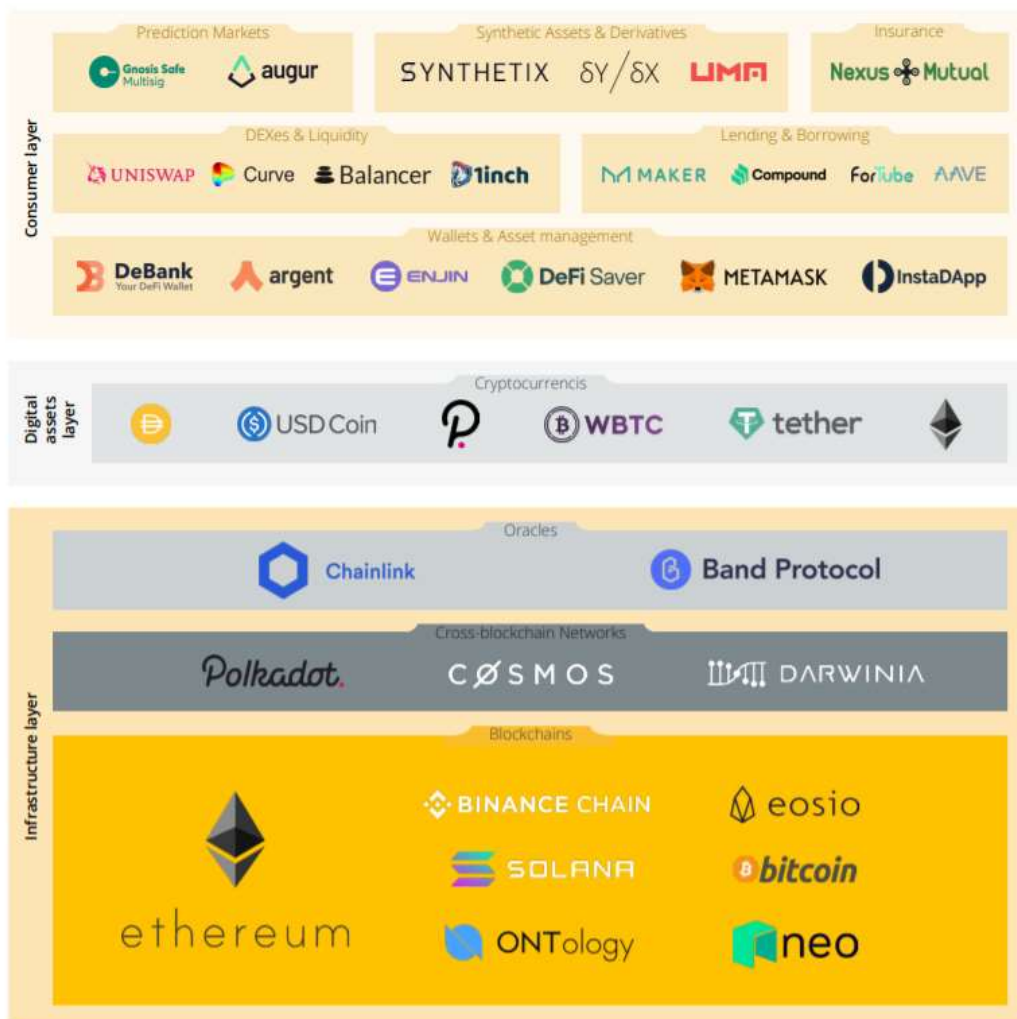
Source: Crunchbase, Wharton Blockchain and Digital Asset Project

DeFi – Ecosystem

DeFi is a concept of a financial ecosystem (and having typical financial services such as borrowing, lending and trading) on a public network that is accessible to all.

Below we list different categories that comprise the DeFi ecosystem.

Figure 59. DeFi Ecosystem, May 2021



Source: Cointelegraph Consulting. DeFi Adoption 2020: A Definitive Guide to Entering the Industry

DeFi – Industry Challenges

DeFi is at an early stage despite its phenomenal growth. Further developments will require overcoming several critical challenges.

Figure 60. DeFi – Key industry challenges

Industry Risk factors	Details	Solutions
Limited interoperability	The lack of interoperability across blockchains and with traditional financial services leads to settlement difficulties.	Layer 2 solution; Build more bridges on smart chain
Low liquidity	Lack of liquidity may lead to losses during extreme price fluctuations. When a user goes to withdraw tokens from a DeFi protocol, if the price per token has dropped while being locked up, they've suffered a loss	Yield Farming
Immature technology and risk of system failure	The DeFi industry is relatively new. The technology for the management of high-value assets is not fully established.	Releases of newer versions of DeFi platforms; DeFi insurance; Smart contracts audits
Unintuitive interface	Most user interfaces for DeFi are unfriendly to non-professional users, creating operational barriers	New user interface updates and new front-end releases which make interacting with the protocols easier
Compliance issues and potential for financial crimes	There is no central authority in DeFi to monitor the transactions. The decentralized nature of DeFi makes it susceptible to financial crimes such as money laundering.	Elevate regulatory oversight of cybercrime in DeFi; Empower cybersecurity systems; Increase fund tracing capabilities
Hacking risks	DeFi projects have proven to be hacking targets.	Develop sandboxes; Clear dispute resolution framework.

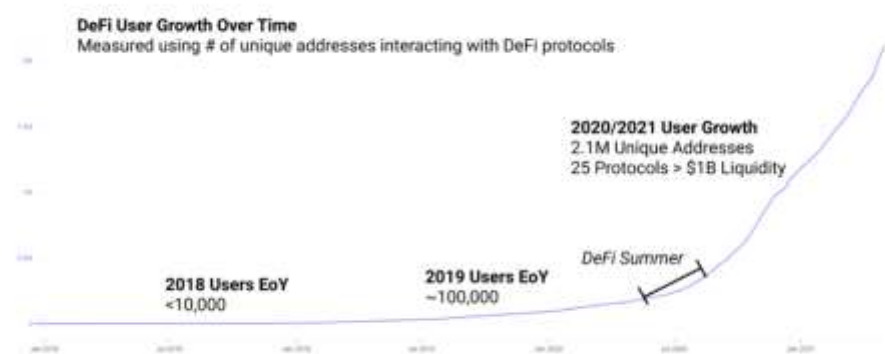
Source: Crunchbase, Wharton Blockchain and Digital Asset Project

DeFi – Outlook for mainstream adoption

The DeFi user community is poised to increase drastically as more intuitive interfaces are developed, interoperability and scalability issues are overcome.

Figure 61

NFT segment distribution by number of transactions, Mar 2021



Source: Fusible

DeFi – Key industry metrics

DeFi protocol functionality is the core in the industry, highlighting the importance of measuring each protocol's operation efficiency and scalability. Below we list several key metrics to track the development pace of the DeFi industry and the operation of DeFi protocols.

Figure 62. Key metrics for analysis

Metric	What it measures	Drivers	Importance
Total Value Locked (TVL)	The aggregate amount that is locked in the smart contracts of DeFi platforms	<ul style="list-style-type: none"> - The total number of tokens held by a protocol - The token value - Usage of yield farming 	Indicates the adoption of DeFi protocols and transaction market activity
Daily active user of DeFi dApps	The number of unique addresses interacting with each DeFi platform	<ul style="list-style-type: none"> - The interest and useability of DeFi features to users 	Indicates the activity and usage of a DeFi protocol
Market Cap	The total market value	<ul style="list-style-type: none"> - The total number of tokens in the platform - The token value current market price of the token 	Indicates market sentiment and activity on a DeFi platform
Average gas price by protocol	Cost of trade execution set by traders	<ul style="list-style-type: none"> - Supply and demand for the computational power of the network needed to process transactions. 	Indicates the supply-demand balance of computational power needed for the network and the transaction execution speed
Gas usage	Actual amount of gas that was used for transaction execution.	<ul style="list-style-type: none"> - Effectiveness of the smart contract code 	Indicates the effectiveness of smart contract mechanism.

Source: Coindesk

DeFi – Future outlook and key themes

Despite its brief history, DeFi has evolved rapidly and we expect ongoing evolution of the industry in the future, driven by changing dynamics and development.

Figure 63. DeFi – Future trends

Trends	Description	Significance
Increasing complexity of DeFi platforms	Newer versions of DeFi platforms will likely grow in complexity, stimulated by intensifying market competition	The platforms will become increasingly innovative in product design, with higher returns, better user experience and efficiency.
Sharding	Sharding, which comes with Ethereum 2.0 allows for multiple blockchains that check-in with each other via a beacon chain	It will be vital to increasing the scalability of the ecosystem and transaction speed while reducing the costs of using the platform
Release of barrier to entry	Before Ethereum 2.0, soaring gas fees make the platforms built on Ethereum more costly to use.	The introduction of Ethereum 2.0 will stop the increase in fees, removing the major roadblock for DeFi user growth.
Retail-focused DeFi	Most DeFi platforms have retail-focused strategies.	This will increase the adoption of DeFi and expand use scenarios.
Agile development teams	Typical DeFi platforms are similar to early-stage startups, and team development is vital.	The DeFi industry is fast-moving – teams and platforms typically have agile approaches to building products.
Traditional financial institutions enter DeFi landscape	Traditional financial institutions enter the promising DeFi industry. Governance tokens that give token-holders voting rights of an underlying DeFi protocol become more important.	The entry of traditional FIs into DeFi will reshape the existing financial system. The future will see more integration of DeFi and traditional financial institutions.
Cross-chain technology to solve scalability issues	Many DeFi projects are starting to offer cross-chain functionality to address the scalability issue. Cross-chain technology allows transactions and smart contracts to cross over from one chain to the next. The scalability issues of Ethereum lead to rising transaction costs, a slower network and limits user adoption.	Cross-chain functionality allows DeFi platforms to scale easier than on the Ethereum network.

Source: Cointelegraph

Digital Asset Expert Interview with Ben El-Baz

Key views on DeFi

- DeFi and DEX may pose a certain degree of threat to less-regulated CEX but not to well-regulated ones.
- In the future, traditional financial institutions will likely embrace DeFi in a more regulated way.



Ben El-Baz
Head of Ecosystems,
HashKey Group

DeFi Opportunity

(EP): How do you see the DeFi opportunity? How potent will a competitive threat decentralized exchanges (DEX) be to centralized exchanges?

(BE): Those of us in the digital assets and blockchain industry like the developments in DeFi. Anyone who has experience trading on DeFi, like borrowing and lending with collateral, feels it is fascinating to do this.

DEX does not compete directly with regulated, centralized exchanges

I do not necessarily see DeFi and DEX as direct competitors to centralized exchanges. It may be a direct competitor to less-regulated retail exchanges. However, DEX is not a pure competitive threat to regulated exchanges, as I feel that institutions right now are still more comfortable trading on regulated venues with legal protections compared to trading with smart contracts with less legal protections.

We do see much longer-term demand for bridging institutions with the potential upside and opportunities from DeFi. Many institutions are still going to want to use a regulated digital asset exchange in most cases. They want to use a regulated intermediary or gateway to help build that bridge. When I look at it, I see DeFi more as an opportunity space; overtime you are going to see more of the traditional firms and institutions trying to figure out how to gain exposure and, in a less risky way, to the suitable counterparty.

DEX is not a competitive threat to regulated exchanges.

There is a much longer-term demand for bridging institutions with the potential upside and opportunities from DeFi.

Ben is currently Head of Ecosystems at HashKey Group, a regulated digital assets company. At HashKey, he leads the Group's strategic partnerships, blockchain applications and asset tokenisation projects, and post-investment management of a US-based tokenised securities firm. Ben also leads HashKey's trade finance blockchain partnerships with the Singapore Government and Hong Kong Monetary Authority.

With over 13 years of experience in Silicon Valley, Mainland China, and Hong Kong, he started his career as a derivatives trader, then as a China cross-borders corporate finance analyst, before moving into technology product management and business development, serving Big Tech clients like Microsoft, Google, and Amazon. Ben speaks, reads, and writes Mandarin Chinese fluently.

Ben is a graduate of the Stanford Graduate School of Business, where he earned his Master's degree in Management, led Stanford's largest blockchain applications working group, and co-authored Stanford's first published research on blockchain applications for ESG and social

Blockchain Venture Capitalist Interview with Bowie Lau

**Bowie Lau**

Partner, True Global
Ventures
Founder & MD,
MaGEHold & MaGESpire

Key Views on the digital asset opportunity

- DeFi and blockchain in gaming are areas with high growth potential. However, these areas are not without risks that need to be carefully mitigated.
- The primary criteria for selecting blockchain investments include audit reliability, compliance capabilities and commercial feasibility. The red flags include an unrealistic business model, lack of security audit, and lack of safeguards against fraud.
- The global blockchain investment landscape is changing as more next-generation wealth in Asia will seek further exposure to this sector.

Investment Opportunities in Blockchain

Esme Pau (EP): Where do you see the pockets of opportunity in blockchain investments?

DeFi and blockchain for gaming are poised for massive growth

Bowie Lau (BL): DeFi is a promising area that transforms and liberalizes traditional finance and increases accessibility and user involvement. However, I am cautiously optimistic about the DeFi sector as there are plenty of risks that need to be carefully studied and mitigated.

Another area that is booming is blockchain for gaming.

(EP): What are the main drivers in the blockchain space?

(BL): Use cases in cryptocurrency is driving awareness and interest in blockchain technology. Blockchain has massive applications in business models that involve consortium and shared but permissioned ledgers. An example is trade finance.

(EP): As an experienced blockchain VC, how do you expect the markets will shift in the near to medium term?

NFTs will take a more prominent role in digital ownership

(BL): I believe the NFT (non-fungible token) space will see massive growth.

Blockchain has enabled the freedom of expression for all art forms, such as traditional literature, music, sports, or even movies. Any moment that signifies an important point in history can now be captured for eternity by turning it into an NFT.

DeFi is a promising area that liberalizes traditional finance but is not without risks that need to be carefully mitigated

Essential Considerations When Picking Blockchain Investments

(EP): Compared with a generalist VC, how is the set of investment criteria used by blockchain-specialized investors different?

A blockchain-specialized VC is more risk-tolerant and open to token rewards

(BL): A blockchain-specialized VC is more open to the risks of blockchain projects which involve tokens, as long as the fundamental tokenomics model is economically sound and justifiable.

Blockchain VCs are not shy of being rewarded for their efforts in tokens rather than traditional equity or cash. It is always about having high conviction regarding the value of tokenized product offering of a blockchain startup alongside taking an equity interest that make Blockchain VCs more endearing to a blockchain startup than regular VCs.

(EP): Please name three red flags that concern you when analyzing investments. How do you expect them to change going forward?

Security, compliance and commercial feasibility are important

(BL): Unrealistic business model, lack of security audit, and lack of safeguards against fraud are always red flags to me. These are three kinds of projects that I avoid:

- A blockchain project that does not have a security audit or smart contract audit perform.
- A blockchain project that does not have a well-defined multi-signature wallet and governance safeguard against fraud.
- A blockchain project that is led by technically savvy people but has unrealistic expectations about business potential.

(EP): Name the all-time best blockchain investment you made. What was the rationale underpinning your investment decision then?

(BL): The Sandbox (sandbox.game) is one of the best blockchain investment decisions that True Global Ventures has made that I was part of. In fact, the Sandbox has gone from strength to strength, hitting various impressive milestones in establishing themselves as a leading player in the gamified virtual world space. They recently announced a strategic partnership with the iconic South China Morning Post that would capture the essence of historical moments in a series of priceless NFTs and bring an authentic series of cultural experiences to its open gaming metaverse (July 19).

The Sandbox is a virtual game platform where players can play, build, own, and monetize their virtual experiences.

Shared deal flow underpins the quality of investment projects

Established in 2019, True Global Ventures is an investment fund like no other. The money raised by this venture capital company does not come from institutional investors but the fund's partners. It is not a fund organized around a pyramid of general partners. We invest our own money and share our deal flow.

Given this unique model, we can get the best deals among our partners. Yat Siu, Co-founder & Chairman of unicorn startup Animoca Brands is also a partner of TGV. He had introduced The Sandbox (also a subsidiary of Animoca Brands) deal to TGV. We foresaw the potential of blockchain and NFTs in the market and decided to invest in the sector two years ago.

A blockchain VC is more tolerant of the risks of blockchain projects as long as the fundamental tokenomics model is economically sound and justifiable

I always avoid projects with unrealistic business model, lack of security audit, and lack of safeguards against fraud

The Sandbox is one of the best blockchain investment decisions that TGV has made that I was part of

(EP): Cybersecurity and regulatory risks are among the two most critical risks for blockchain startups. To what extent do you agree with this statement? How do you **evaluate and mitigate a blockchain startup's exposure to such threats?**

Blockchain is prone to cyberattacks and money laundering

(BL): I partially agree with this statement. Cybersecurity affects all businesses in today's world with a heavy dependence on networks, be it the internet or intranet.

If adequately implemented, compared to a centralized data-based network, blockchain-based systems have the advantage of decentralization, i.e. without a single point of failure. On the other hand, if not implemented properly, blockchain could be exposed to multiple points of entry for attack vectors.

The cryptocurrency use case of blockchain, 'the code is law' concept of smart contracts are disrupters that will face challenges concerning law and regulations.

For example, cryptocurrency has made payments cheaper, faster and provided financial inclusion for those without access to traditional finance. However, cryptocurrency has become a convenient tool for money laundering. As with wine, every technology ages better with time.

(EP): How has the exit valuations of blockchain startups changed in the recent year? What is your expectation for the future?

Blockchain projects have the potential for high exit valuations

(BL): The blockchain industry has started to mature. People are beginning to understand its potential and risks better. There is positive discrimination in the market for more promising blockchain ventures, reflected by high valuation exit and public listing, either through IPOs or SPACs.

Blockchain if well implemented has the advantage of decentralization but if not, could be easily exposed to multiple points of entry for attack vectors

There is positive discrimination in the market for more promising blockchain ventures, reflected by high exit valuations and public listing

Changes To Global Blockchain Investment Landscape

(EP): How do you expect the global competitive landscape for blockchain and crypto to evolve in the medium to long term?

Potential for increasing blockchain investments in Asia

(BL): There will be higher participation from Asia. Traditionally, the crypto space was dominated by miners in China, while the US and Europe drove most of the investment and trading activities.

I expect this pattern to change as next-generation wealth minted in Asia will seek further exposure to the blockchain sector.

The global blockchain investment landscape is changing as more next-generation wealth in Asia will seek further exposure to this sector

Bowie Lau is Founder & Managing Director of MaGEHold - An early-stage Technology Angel Investment Firm nurturing innovative startups that leverage Emerging technologies like AI, Big Data, Blockchain, Cybersecurity and IoT.

She is also the Founder of MaGESpire - A technology education & advisory group enabling fintech ventures in areas of Strategy, Architecture & Business Development.

Further, she is a partner of True Global Ventures 4 Plus - A first-of-its-kind Global Decentralized Venture Capital Fund focused on investing into promising early-stage & late stage Tech startups.

She is passionate about giving back to the society and runs MaGESpire Community - a knowledge enhancement forum where she conducts lots of educational events/talks focusing on emerging technologies, family offices and investments related topics.

She is also Executive Committee Member at GIFT (Global Impact FinTech Forum), leading the North Asia chapter.

Digital Assets and Cybersecurity Expert Interview with Floyd DCosta

Key views on DeFi

- DeFi has a significant potential for broader application, as it replicates existing financial services and helps address the pain points in the traditional system.
- The future will see an accelerating pace of institutional adoption of DeFi, thanks to the integration between DeFi and the traditional system.



Floyd DCosta

Co-founder at
Block Armour &
Blockchain Worx

Opportunities in DeFi

Esme Pau (EP): How do you see the opportunities in DeFi space in the medium to long term?

Floyd DCosta (FD): Decentralized Finance or DeFi is an exciting new phenomenon developing at the intersection of blockchain technology, digital assets, and financial services.

DeFi promises next-gen finance without the need to have intermediaries or centralized institutions. It harnesses open protocols and decentralized applications, powered by smart contracts, to enforce agreements, facilitate trades and record transactions immutably on the blockchain. With this, DeFi has the potential to genuinely put control back into the customers' hands and power the digital transformation of financial services to a whole new level.

DeFi has promising use cases to replicate and augment existing financial services

Although still in the early development stages, many working protocols replicate existing financial services. They enable anyone to transfer currencies, earn a yield on deposits, lend, borrow, trade derivatives, and beyond – all in an open, interoperable, and transparent way. Moreover, this space is rapidly growing, with more and more people being drawn to this new decentralized economic system.

Increasing institutional participation in DeFi

Institutions are now starting to sit up and take notice. Integrating decentralized finance applications with traditional systems could open up a plethora of opportunities and provide a secure and compliant way forward for institutions and consumers to participate in the emerging world of decentralized finance. The opportunity is right here and now.

DeFi will present enormous opportunities for the innovation-minded investor

The underlying infrastructure comprising DLT networks, protocols, and DApps is still in its infancy and has a long way to go towards maturity. Investing and actively participating in building the DeFi infrastructure presents a unique opportunity for the innovation-minded investor and institution ready to bet on the decentralized future of financial services.

*With blockchain, DeFi could genuinely put control back in the hands of the customer and power the digital transformation of financial services to a whole new level
Investing and actively participating in building the DeFi infrastructure presents a huge opportunity for the innovation-minded investor and institutions*

Floyd DCosta is the co-founder of Block Armour, a Cybersecurity venture that was accelerated by Airbus and featured among the Top 25 cybersecurity innovations worldwide. He is separately also the co-founder of Blockchain Worx, a Singapore based Fintech-Regtech startup focused on enabling Digital Banking with Blockchain technology and crafting next-gen platforms to enable institutional participation in Decentralized Finance (DeFi) ecosystems.

With a background in Management Consulting, Floyd has over 19 years of professional experience in setting up and growing international business practices as well as advising senior client executives on decisive topics. His previous experience includes eleven years at Capgemini and spans a variety of high-tech industry sectors and technology platforms. A regular writer and speaker at events, Floyd advises multiple organizations on harnessing the potential of emerging technologies for Digital Transformation.

Floyd holds a Masters in Computer Information Systems from ITM, Mumbai, and the Exec General Management Program from IIM-Bangalore. And, when he is not traveling, Floyd enjoys spending time with his family in Singapore.

Blockchain and Mining Expert Interview with Ray Wong

Key views on DeFi

- Convergence and interoperability of DeFi and CeFi will bring more investment opportunities and drive higher adoption in the DeFi space.
- Low user-friendliness and technical hurdles are the major impediments to DeFi adoption. These are critical issues for DeFi players to address in the future.
- Managed funds are a good way for institutional investors to gain exposure to DeFi. When deciding which DeFi projects to invest in, tokenomics and project economics are essential criteria.



Ray Wong
CEO of LuTech

Overview of Defi Landscape

Esme Pau (EP): How will you rank the three most important drivers of the DeFi space?

Ray Wong (RW): My view is that the three most critical driving forces behind DeFi are self-custody, high yield, and availability across all time zones and geography.

1. Self-custody. Users have complete control over their assets with non-custodial wallets, such as Metamask.
2. High Yield. DeFi enables crypto holders to earn high interest rates through “staking” tokens across platforms. Stablecoins staking provides stable and low-risk interest (for example, 4% USDC annual interest rate in Compound Treasury). In contrast, institutions in CeFi charge administrative and transaction costs.
3. Availability across all time zones and geography. In DeFi, smart contracts are widely deployed and automatically executed. In CeFi, services or operations run at a limited time and at a relatively slow speed. Each CeFi tends to have a clientele highly concentrated in certain limited geographic localities.

Lending is the No.1 use case in DeFi

(EP): What are the best use cases of DeFi that you have seen?

(RW): I have witnessed increasing use cases in DeFi, especially in lending. I expect DeFi to be further deployed in other use cases such as operational risk management, regulatory collaboration and deposits.

I expect DeFi to be further deployed in use cases such as operational risk management, regulatory collaboration and deposits

1. Lending: As measured by total value locked (TVL), Lending will grow further with higher efficiency and transparency on the blockchain.
2. Operational and market risk management: Previously, I managed a lending portfolio in an investment bank. A lot of the operational and market risk management can be streamlined and expedited with blockchain.
3. Facilitation of regulatory collaboration: DeFi can enhance collaboration with CeFi with a broad customer base and extensive experience in dealing with regulators.
4. Deposits: DeFi presents further opportunities, particularly for deposits.

(EP): Let us fast forward to a year later. How do you expect DeFi use cases to change?

Asset tokenization and NFTs

(RW): A significant trend that I see is that all assets – both tangible and intangible – can be tokenized. Recently, there has been a growing demand for tokenizing artwork and collectibles in the form of NFTs. I foresee that many financial assets, such as real estate and stocks, can be tokenized with faster value transfer globally.

Many financial assets, such as real estate and stocks, can be tokenized with faster value transfer globally.

Here are a few examples in the real estate and insurance space.

- 1) Real Estate
RealT digitalizes property ownership, enabling fractional ownership in real estate on Ethereum. They plan to partner with Aave, a leading DeFi lending platform that enables fractional shares of real estate as collateral for borrowing.
- 2) Insurance
For example, Risk Harbour opts for a pre-programmed set of criteria that triggers an automated payout when met.

Deployment of DeFi in KYC evaluation system

Another trend I see is that digital Identity on blockchain helps identify and ensure participants in DeFi comply with KYC and AML requirements. Borrowers' profiles with credit ratings allow for the evaluation of their repayment ability.

Success Factors for DeFi Projects

(EP): What are the prerequisites or success factors for DeFi projects?

User-friendliness and accessibility are the key to the success of DeFi projects

(RW): There are generally two prerequisites for the success of DeFi projects.

- 1) Degree of user-friendliness
Good User Interface (UI) and User Experience (UX) that can accommodate the needs of everyone are vital.
- 2) Accessibility
Software should be able to run on different devices and operating systems. For example, Metamask is a wallet that can operate on multiple platforms and interfaces, phone and computer applications and browser add-ons.

User-friendliness and accessibility are the two prerequisites to a successful DeFi project

Pledge and REVV are two of the best DeFi projects

(EP): Please name two promising DeFi/NFT projects that have caught your eye.

(RW): Pledge and REVV are two of the best DeFi projects I saw.

- 1) Pledge
I am a seed investor of Pledge, the first fixed interest rate lending and borrowing platform on Binance Smart Chain. Currently, most DeFi projects offer variable yields. Compared to most projects built on the Ethereum chain, Binance Smart Chain is a cost-effective and efficient option. The core team possesses experience in Microsoft, Stanford, Berkeley, AWS and IBM. The project is also supported by professors from Stanford University, UC Berkeley and the University of Chicago.
- 2) REVV
REVV is a blockchain-based game that is created in partnership with Formula 1 and Atari. The game allows users to collect, trade, configure and race Formula 1 cars. The collectibles can be traded on secondary markets. **Recently, NASCAR's former champion Joey Logano signed on as REVV Motorsport brand ambassador.**

Convergence of DeFi and CeFi

(EP): How do you think DeFi will disrupt the traditional financial services sector?

Increasing acceptance of DeFi among traditional financial players

(RW): Driven by the growing demands of clients and shareholders, traditional financial institutions, such as major banks and hedge funds, are seeking to increase their exposure to the DeFi space. The principles underlying DeFi are gaining more acceptance amongst traditional firms.

Traditional financial institutions, such as major banks and hedge funds, are seeking to increase their exposure to DeFi

(EP): How do you think the relationship between traditional financial services and DeFi will be in the short to medium term?

The future is about increasing integration between DeFi and CeFi

(RW): I believe in the convergence and integration of CeFi and DeFi.

For integration, traditional financial companies would be responsible for customer-facing activities such as acquiring customers and providing them with a user-friendly interface. DeFi would power the back-end to reduce transaction and settlement times, lower costs and increase transparency.

The convergence of DeFi and CeFi will see DeFi powering the back-end to reduce costs and increase transparency, while CeFi will be responsible for customer-facing activities

(EP): Which verticals in financial services are most ripe for disruption by DeFi?

(RW): As far as I see, lending and deposits would be most ripe for disruption. DeFi can enhance financial inclusion through increased automation and reduced operations.

Adoption of DeFi

(EP): Please name two significant hurdles that need to be overcome before DeFi can reach mass adoption.

Lack of user-friendliness and technical risks are significant hurdles for DeFi adoption

(RW): I consider low user-friendliness and technical risks as major impediments of DeFi adoption.

Lack of user-friendliness

DeFi requires users with a solid understanding of blockchain technology for smooth operation. The current user experience for DeFi is not friendly enough, and limited functionalities are available.

Technical risks

Technical risks, such as bugs in smart contracts and infrastructure, are challenging to detect because of the novelty of these approaches. By design, false or fraudulent transactions are irreversible on the blockchain.

(EP): What do you estimate to be the rate of DeFi adoption now vs future? What is driving the change?

The rapid growth of DeFi as measured by user base and Total Value Locked (TVL)

(RW): The DeFi sector is expected to grow substantially as more institutional and individual investors, borrowers, and asset holders adopt it as a proper investment and personal finance option.

The total value locked (TVL) in DeFi grew significantly from \$0.7 billion in 2020 to \$67 billion in TVL in 2021. Over 2 million users are estimated to participate in the DeFi space, represented by unique crypto wallet addresses. I would expect DeFi to grow rapidly in both the user base and TVL.

My view is decentralized banking increases the accessibility of financial services. Everyone deserves access to financial services globally. With minimal infrastructure requirements and automation, DeFi enables many traditional financial services to be available to us.

DeFi adoption is driven by its integration with CeFi

When integrating DeFi and CeFi, traditional financial institutions (CeFi) would work on customer-facing activities such as acquiring customers and providing them with a user-friendly interface. DeFi would power the back-end to reduce transaction and settlement times, lower costs and increase transparency.

The major impediments of DeFi adoption are low user-friendliness and technical risks

The DeFi sector is expected to grow substantially as more stakeholders adopt it as a proper investment and personal finance option.

DeFi is an enabler that increases the accessibility of financial services globally, with minimal infrastructure requirements and automation

Significant Risk Exposures of DeFi (Cybersecurity and Regulation)

(EP): Cybersecurity and regulation are two major risk factors for DeFi. How much truth do you see in this statement? What is your outlook?

(RW): I pick some headline risks regarding cybersecurity and regulations to outline significant risks in DeFi

- 1) The first is *DeFi Protocol EasyFi Reports Hack, Loss of Over \$80M in Funds (April 2021)* – The hacker transferred as much as US\$75mn of EASY tokens and US\$6mn from its liquidity pools. As a result, EASY token took a hit, and the token-related services were suspended, serving as a reminder of the adverse impact of cyberattacks;
- 2) The second is *The attacker uses flash loans in \$24.5 million exploits of DeFi protocol xToken* – The attacker took advantage of a vulnerability in the xBNTa contract, which highlights the importance of cybersecurity defence for developers;
- 3) The third is *US Regulators Divided on DeFi Regulation* – Given the complexities of regulating DeFi, US regulators have yet to reach a consensus on what regulatory direction they should follow, indicating the regulatory challenges in the crypto space.

Both technical and regulatory risks of DeFi can be mitigated

Technical and regulatory risks will slow the growth momentum of DeFi. However, technical risks can be mitigated through DeFi insurance. Close collaboration with traditional financial institutions can control regulatory risks.

Traditional financial institutions possess extensive experience in dealing with regulators, a large clientele and risk management expertise to overcome those regulatory challenges that DeFi encounters.

DeFi Insurance

DeFi insurance is available to mitigate risks and emergencies related to – but not limited to – smart contracts and hacking.

For example, Nexus Mutual and Cover Protocol are decentralized insurance platforms that mitigate technical risks, including smart contract risks. It stabilizes the turbulent DeFi space by instilling confidence and trust between protocols and their users.

DeFi insurance can mitigate technical risks

Close collaboration with traditional financial institutions can minimize regulatory risks

Regulatory Landscape of DeFi

(EP): DeFi is the next frontier of regulation. How do you think DeFi will likely be regulated?

Entities and individuals that work closely with DeFi will likely be targeted by regulations

(RW): In the near term, I believe regulators will target centralized entities interacting with DeFi ecosystems and users alleged of illicit cryptocurrency uses.

- 1) Centralized entities interacting with DeFi ecosystems

The first target of potential DeFi regulations is the centralized entities interacting with DeFi ecosystems (exchanges and wallets). The SEC, FinCEN (Financial Crimes

I believe regulators will target centralized entities interacting with DeFi ecosystems and users alleged of illicit cryptocurrency uses

Enforcement Network), and CFTC have all played a role in pushing Know Your Customer (KYC) protocols and Anti-Money Laundering (AML) policies across all exchanges operating within US borders.

2) Users alleged of illicit cryptocurrency uses

The second target of potential DeFi regulations is individual users alleged of illicit cryptocurrency uses. Blockchain analytics companies such as Elliptic and Chainalysis have already created solid partnerships with law enforcement in many countries to track down illicit cryptocurrency uses and reveal the identities behind the transactions.

China cryptocurrency crackdown

Recently, China banned financial and payment institutions from cryptocurrency operations. Banks and online payments channels must not offer clients any service involving cryptocurrencies, such as registration, trading, clearing and settlement. Financial institutions in China are prohibited from providing savings, trust, cryptocurrency pledging services, or issue financial products related to cryptocurrency.

China has banned financial and payment institutions from cryptocurrency operations

(EP): What considerations will regulators be mindful of when drawing up regulations to avoid conflicts with the existing financial system?

Regulations in DeFi are complex, with jurisdiction and taxation as the key issues

(RW): There is a balance between financial innovation and regulations. Digital assets have proven their strength in remittance and financing. However, concerted efforts in regulations are complex due to the following considerations:

There is a delicate balance between financial innovation and regulations

Jurisdiction: Digital assets flow freely across the globe. Regulations that encompass different jurisdictions require global coordination.

Regulations for DeFi involve complex regulations

Taxation: How should digital assets be taxed? Where are the assets located?

(EP): What level of oversight is needed before DeFi can reach mainstream adoption?

Regulators should focus on KYC and AML to facilitate wider adoption of DeFi

(RW): I believe regulators should put more focus on oversight in the areas of KYC and AML.

1) Know Your Customer (KYC)

In DeFi, platforms do not require user information, and users enjoy anonymity across the DeFi space. User anonymity is something that regulators brought an end to in the CeFi space, particularly in regulated jurisdictions.

KYC will be a regulatory focus for DeFi

2) Anti Money Laundering (AML)

Virtual Asset Service Providers (VASP) are regulated for AML. Owners of DeFi platforms and apps will need to institute KYC processes for users that operate on their networks – or face the threat of regulatory sanctions.

Users enjoy anonymity across the DeFi space

AML is another regulatory focus for DeFi

Future Opportunities in DeFi

(EP): Please name three game-changing opportunities for DeFi in the medium to longer term.

DeFi services, tokenization and blockchain-empowered entertainment will be game-changers

(RW): I see three major themes in DeFi are decentralized financial services, asset tokenization and blockchain-empowered entertainment.

- 1) Decentralized financial services
Everyone deserves access to financial services globally. With minimal infrastructure requirements and automation, DeFi makes many traditional financial services available to us.
- 2) Asset tokenization
The tokenization (or digitalization) of all assets for seamless value transfer.
- 3) Blockchain-empowered entertainment
Blockchain-empowered entertainment includes music, games and movies. Affiliated collectibles and IPs can be traded.

With minimal infrastructure and automation, DeFi enables many traditional financial services to be available to all of us.

Investor Exposure To DeFi

(EP): What is the best way for institutional investors to get exposure to DeFi?

Managed funds are one of the best ways for investors to get DeFi investment exposure

(RW): The best way for investors to get exposure to DeFi is through asset managers. Currently, the hot topics are lending/deposit protocols and liquidity mining. The whole digital asset universe (including DeFi) evolves very rapidly, and institutional investors may not have the expertise to invest in the space and handle operational and market risks.

The best way for investors to get exposure to DeFi is through managed funds

(EP): What is your advice for institutional investors when choosing which governance tokens to invest in?

Digital asset space evolves rapidly and requires expertise in managing risks

Investors should choose the tokens that integrate blockchain technology and viable business models

(RW): An experienced team can best incorporate blockchain technology into viable business models. Projects that provide superior financial returns also require collaboration with promoters/KOLs and different digital assets exchanges.

Projects that provide superior financial returns can incorporate blockchain technology into viable business models, and collaborate with promoters and digital asset exchanges

Project economics and tokenomics are important financial metrics

In terms of financial performance, project economics and tokenomics are important metrics. Project economics reflect the benefits users enjoy. Tokenomics reflect the management team's understanding of investors' behaviour and appetite.

In terms of financials, project economics and tokenomics are important metrics

Ray Wong is a blockchain investor and Bitcoin miner. He is CEO of LuTech, an award-winning company that provides Bitcoin mining services to funds, professional investors and the energy industry. Ray is an HKSFC-licensed Responsible Officer (Type 9) of Silver Spring Capital. As a VC advisor in blockchain and sustainability, Ray is also an angel investor in blockchain games and decentralized finance.

Ray was an executive in a publicly listed environmental firm and working at Morgan Stanley and Credit Suisse. He has been invited to speak in conferences globally, such as Crypto Asset Conference, organized by Frankfurt School Blockchain Center, DeFi Summit, a leading DeFi conference and CERAWEEK, a leading conference of the energy industry.

Ray holds a master's degree in Chemical Engineering from Carnegie Mellon University and an MBA degree from Cornell University.

MEGATREND 7

Non-Fungible Tokens – Future of Ownership or Fad

Key Highlights

- NFTs are applicable in a wide range of use cases given their uniqueness, immutability and security.
- Despite multiple benefits, NFTs also face risks of volatility, fraud and environmental costs.
- More NFTs are adopting the layer 2 mechanism, which helps reduce the gas fees for minting standard tokens and addresses scalability issues on the blockchain.

What is an NFT?

A non-fungible token (NFT) is a digital asset whose uniqueness and ownership can be demonstrated and verified using distributed ledger technology (DLT).

NFTs can be used to create a tokenized proof of title to a unique digital version of an underlying digital asset (such as images, videos or other digital content) or physical asset (such as paintings, sculptures or other tangible assets).

Fungible vs. Non-Fungible

Each NFT is unique. In contrast, most other cryptoassets, are fungible items, i.e. each token is interchangeable with and indistinguishable from another.

NFT – Advantages and Disadvantages

The key advantages of NFT include trading via decentralized marketplaces, uniqueness, and immutability, which ensure the security and collectability of works.

Figure 64. Asset tokenization – Key advantages

Advantages	Significance
Decentralized marketplace	NFTs allow creators to make money directly from their work. NFTs eliminate agents/intermediaries and allow the artists or the original creators to interact and transact directly with their customers. This model further benefits the creators by allowing them to earn a commission each time the NFT exchanges hands.
Unique	NFTs are rare in that only one of them can exist and cannot be easily forged. It is, therefore, safe to assume that an owner of an NFT will be one of the few individuals that would own these collectibles
Potential value appreciation	NFTs are unique; as only one of each can exist, their value will likely appreciate over time.
Resellable	NFTs are tradeable on secondary markets. It is possible to invest in NFTs for their resale value.
Immutable	The metadata on the NFT token cannot be altered or erased by anyone from the blockchain, which gives them high collectability and value.
Copyright	The NFT technology allows artists and content creators to retain their full copyright, which allows them to still generate revenue without giving up their copyrights. This is uncommon in most licensing agreements.
Security	NFTs are stored on decentralized blockchains, meaning that always an identical record of the database at each of the nodes.

Source: Cointelegraph

Although NFT has unique benefits that add value to the existing system, the budding space is also exposed to value volatility and quality uncertainty risks and may cause an adverse environmental impact.

Figure 65. NFT – Key disadvantages

Disadvantages	Significance
Physical art cannot be digitized	The reasons to own physical art and the reasons to own digital art are different. It is not possible to digitize physical art. NFT tokens will not provide the satisfaction of seeing a one-of-a-kind painting.
Uncertain value	The value of NFTs are uncertain. The ownership of a NFT is not the same as purchasing the copyright to the art; it is merely owning a record that one owns the token behind the original asset. The real question is, "How much value is there in owning an asset one does not actually control?" Depending on how collectors answer this question in the future, those who invested into these tokens may be left holding a digital record that is not worth much.
Volatility in NFT value	NFT values suffer from massive volatility. There are not any mechanisms in place yet to help people price assets.
Varying quality of NFT tokens	Anyone can create an NFT out of literally anything, which means there is a long tail of tokens with varying qualities.
Potential for fraud	Examples of dishonest practices in NFTs: Anybody can theoretically mint an NFT out of a file that does not belong to them and pass it off as their own. NFT markets can be manipulated, such as wash trading (when someone artificially pumps up the price of an asset by opening multiple accounts and trading with themselves).
Environmental cost	An NFT is a record entered into the blockchain that takes significant computing power and energy usage.

Source: Coindesk

NFTs reshape the existing financial system by removing friction, releasing liquidity, and reducing fraud.

Figure 66. NFT – Key value adds to the existing financial system

Pain point of the existing financial system	How NFT adds value	Details
High friction for transactions	Reduce the friction for transactions	NFT provides near real-time transactions and analysis of market conditions, greater security through transparency, and a higher level of customization for financial products and services.
Lack of liquidity	NFTs unlock liquidity and reduce illiquidity premium for certain assets (e.g. art work and collectibles)	DeFi startups and NFT projects are offering new services based on NFT trading. As more digital assets become NFTs, this could create entire new asset classes and change investor behaviour.
Risk of fraud	Fraud protection	Fake items are eliminated as the origin is instantly verifiable

Source: Global Trade Review

NFT - Use cases

NFTs are applicable in various use cases, including collectibles, gaming, art, virtual assets, tokenizing real-world assets. They also create a new way to help users protect and control the information related to identity.

Figure 67. NFT – Key use cases

Categories	Prominent examples	Details
Collectibles	CryptoKitties, CryptoPunks;	NFTs can be used to create new kinds of digital collectibles. More traditional collectors' items such as baseball cards and stamps are also being tokenized.
Gaming	Tradeable in-game items (Fortnite or CS:GO), Turn-based battle or trading card games (Axie Infinity or Gods Unchained)	Most NFT implementations revolve around turn-based battle or trading card games. With NFTs, games with vibrant item economies may support on-chain item trading in the future.
Digital Art	Pixel Art, Digital Photography, 3D Digital Painting	NFTs allow artists to monetize their artwork and protect their copyright. Artists receive royalties every time their NFTs change hands.
Virtual Assets	Domains (eth and crypto domain names), Real estate in virtual worlds (Decentraland, Cryptovoxels)	The Ethereum Name Service and Unstoppable Domains have turned .eth and .crypto domain names into NFTs. Real estate in virtual worlds has also been tokenized into NFTs.
Real-World Assets	Nike's system to tokenize shoes; OpenLaw's system to trade real estate using ERC-721 standard	NFTs is used to tokenize real-world assets that can be traded.
Identity	Medical histories, birth certificates	With NFTs, users would be better able to protect and control their personal information.

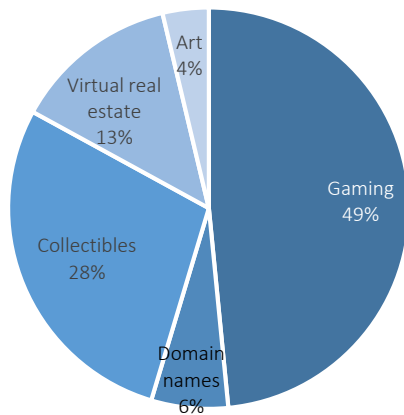
Source: Crypto.com

Figure 68. NFT – Key examples

Categories	Period	Example	Details
Collectibles	Apr 2021	Avatars	Users can mint and collect avatars
	Feb 2021	Meme	Farming tokens which can be used to redeem limited edition collectible NFTs
	Mar 2017	CryptoPunks	Collectible characters that were algorithmically generated, created by Larva Labs.
Gaming	May 2019	Sorare	Fantasy football game where users can collect, trade, and field player cards
	Feb 2018	Axie Infinity	Collect, raise, and breed Axies to take into battle
	Oct 2017	CryptoKitties	Purchase, breed, trade, and collect unique digital cats
Virtual World	Feb 2020	Decentraland	Virtual world based in Ethereum, where users can trade virtual real estate
	2019	Cryptovoxels	Buy land in this virtual world, build stores and art galleries, and host events
Domain Names	2018	Unstoppable Domains	Platform to register blockchain domains for your crypto wallets
	May 2017	Ethereum Name Service	Register a named .eth domain to receive payments
Marketplaces	Late 2019	Rarible	Marketplace for digital collectibles. Trade on Rarible to farm RARI token
	Apr 2018	SuperRare	Marketplace for digital art
	Dec 2017	OpenSea	P2P marketplace for all NFTs
DeFi	Mar 2021	Aavegotchi	Own and trade avatars backed by interest-bearing tokens representing loans on DeFi lending platform Aave
	Jun 2020	NFT	Use NFTs as collateral for a loan

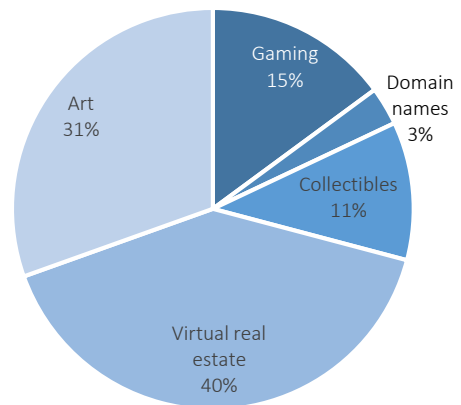
Source: Crypto.com

Figure 70
NFT segment distribution by number of transactions, Mar 2021



Source: Woodstock Fund

Figure 69
NFT segment distribution by value of transactions, Mar 2021



Source: Woodstock Fund

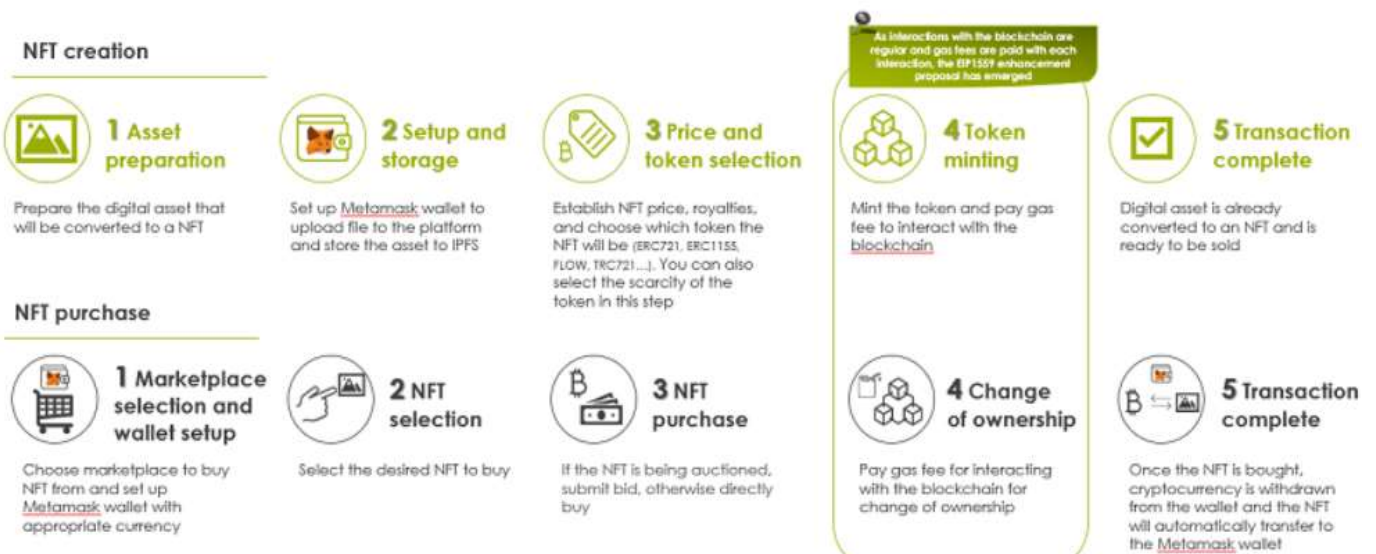
NFT - Value chain

In addition to the different categories of the tokenizable assets for NFTs, investors should be aware of how NFTs are created to know the operation mechanism behind and protect themselves from the potential risks in each step.

Figure 71. NFT – Value Chain

Creating and buying an NFT

Regardless of the platform where an NFT can be issued and the blockchain network that holds the NFT, there are several **common steps** that must be followed in order to **create or to purchase an non-fungible token**.

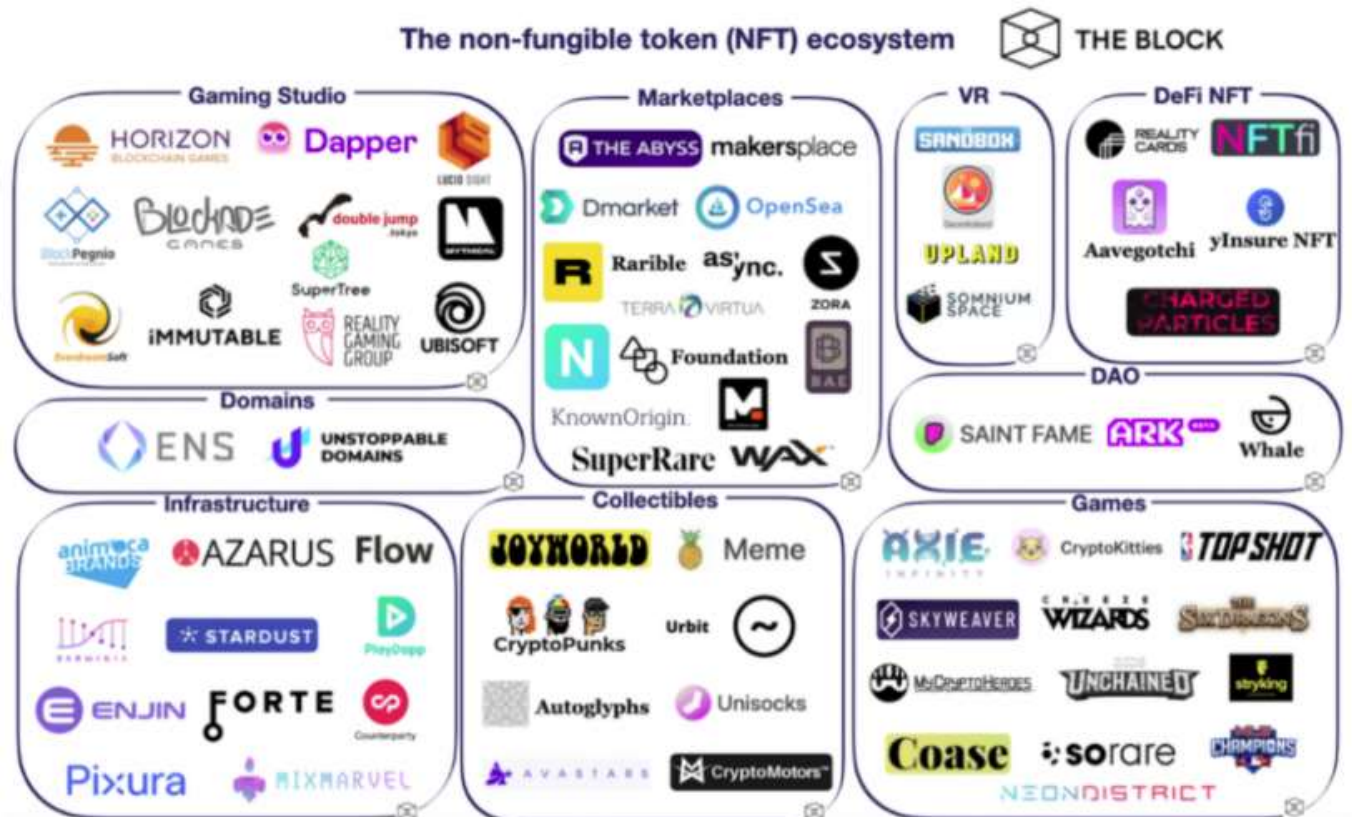


Source: UK nftdata

NFT – Ecosystem

As one of the digital asset space sub-segments, NFT is applicable in a wide range of industries. The ecosystem comprises gaming, marketplaces, VR and collectables, etc.

Figure 72. NFT – Ecosystem, September 2020



Source: Theblockresearch

NFT - Industry Risks

Although the NFT market is eventually maturing and seeing increasing adoption, new collectors should consider some risks and uncertainties in the emerging space.

Figure 73. NFT – Industry Risks

Industry Risk factors	Details	Potential solutions
Data and storage risk	NFTs are hosted on a DLT platform. If the digital asset is stored on a conventional server, there is a risk that the file could be changed or deleted, hence breaking the link between the asset and its corresponding NFT.	NFT are stored in an immutable, distributed, decentralised storage system, guaranteeing the reliability and security of the asset storage
Litigation risk	NFT sellers and buyers are exposed to the risk of misrepresentation when selling digital assets.	Increased regulatory clarity as to whether NFT owners have any rights in relation to the underlying asset
Market volatility risk	NFT values suffer from massive volatility.	NFT issuers need to be clear with purchasers about the risk of market volatility.
Environmental cost	The execution and validation of NFT transactions on a blockchain rely on proof-of-work validation, which is computationally and energy-intensive.	The migration of Ethereum to "proof-of-stake" from "proof-of-work" validation will lower the amount of energy required for validation. Alternative platforms may offer issuers more sustainable solutions.
Reputational risks	If an issuer's NFTs significantly reduce in value, there is a big risk of brand devaluation. There may be reputation risks tied to possible downstream illicit activity (e.g. AML).	Choose a reputable and reliable trading platform

Source: Blockchain technology

NFT - Industry metrics

Key metrics outline the market condition and participation, which are essential for investors to decide whether to step into the NFT market. Below we select some crucial metrics to help investors to analyze the market.

Figure 74. NFT – Metrics for analysis

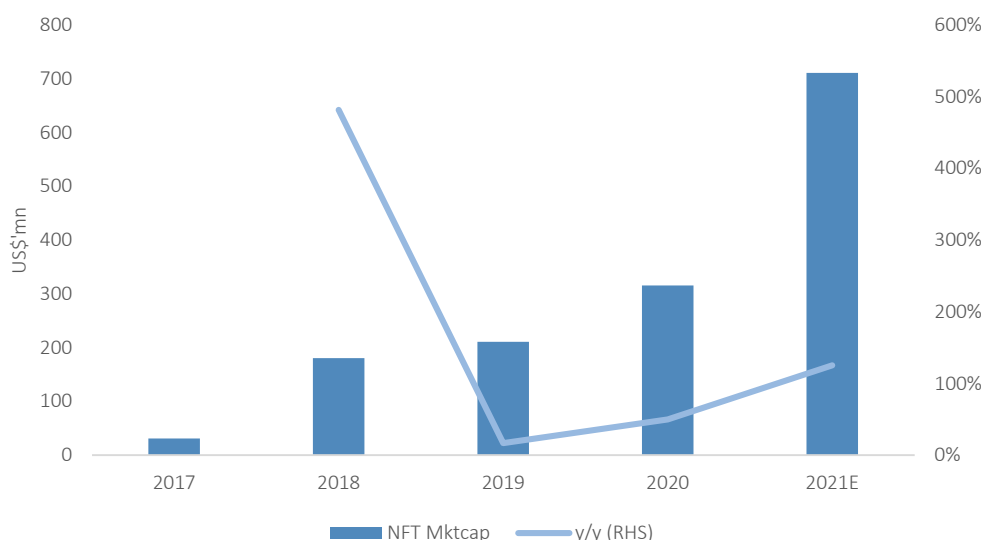
Metric	What it measures	Drivers	Importance
Number of NFT sales	The number of NFTs sold over a period of time	- NFT Supply - NFT Demand - Efficiency of NFT marketplace in facilitating trades	Measures the market activity, i.e. NFTs attracts more buyers — so it could continue to become worth even more in the future.
Trading volume of NFT sales	The trading volume of NFTs over a period of time	- Average prices per transaction affected by market demand (interest and willingness of buying)	Measures the demand and supply forces
The number of active wallets	The number of digital wallets that help investors store and trade NFT	- Participation of investors - Trading activity	Measures the extent of investor activity
Market cap of NFTs	Represents the total value of all NFTs	- The number of NFT sales - Value of NFT sales	Measures the market size of NFTs

Source: Blockchain Research Lab

NFT – Market sizing analysis

NFT market is in infancy, with significant growth potential, and in the future, it is expected to witness a meteoric rise in popularity. By 2021, the market capitalization is estimated at US\$710.9mn (+125% y/y), according to Fusible.

Figure 75
NFT segment distribution by number of transactions, Mar 2021



Source: Fusible

NFT- Future outlook and key themes

In the future, we expect the dynamics and trends such as spanning to digital items, booming marketplaces, and layer two evolutions will drive the industry.

Figure 76. NFTs – Future industry drivers

Drivers	Description	Significance
Shift from mere physical assets to digital items	Music is an example of widespread NFT adoption. The music industry is anticipating a massive change where rare collectibles will be transformed from mere physical assets to digital items.	Signals potential for wider adoption of NFTs to different asset class
Potential marketing opportunities of NFTs	Big brands are getting into NFTs, driven by potential marketing opportunities.	Signalling the entry of NFTs into the mainstream and increased market awareness
Increasing number of NFT marketplaces	The launch of new platforms will stimulate market interest.	Increase the liquidity and tradability of NFT
Issuance of clear NFT guidelines	Judicial rulings will provide further clarity for both regulators and industry participants.	Industry participants can better fit into the regulatory framework and investor interest can be better protected.
NFT moving to layer 2	In the future, there will be more NFT moving to layer 2, which refers to a secondary framework or protocol that is built on top of an existing blockchain system, and is aimed to address the blockchain scalability problem	Reduce the gas fee required for minting a ERC-721, a token standard on Ethereum for NFT

Source: CB Insights

Digital Assets and Cybersecurity Expert Interview with Floyd DCosta

Key views on NFT

- NFTs reshape the monetization of digital works by removing intermediaries and lowering transaction costs.
- The potential of NFT is not limited to the traditional art world. For example, brands are using it to improve client experience.
- The improvement in the required infrastructure will become one of the key drivers of increasing participation and adoption of NFT.



Floyd DCosta

Co-founder at
Block Armour &
Blockchain Worx

Opportunities in NFT

(EP): How do you see the future opportunities in the NFT space?

Similar to financial securities, digital tokens could represent everything of value – physical goods, in-game assets, real estate, creative productions (such as works of art, music), collectibles, and many more.

Of late, non-fungible tokens (NFTs) are garnering much attention. For example, NFTs offer artists and content creators a unique opportunity to monetize their works without relying on agents, galleries, auction houses, and other intermediaries.

The creators can sell directly to the buyers allowing them to keep a more significant chunk of the profits. Separately, they can program in royalties to receive a small percentage of sales whenever their artwork is resold to a new owner, ensuring future revenue.

NFTs are not just for artists. Brands are now leveraging this new medium to create novel digital experiences, drive greater engagement and even augment traditional revenue.

NFTs appeal to a new investor demographic

NFTs are only just starting to make an impact. The novelty and initial euphoria is already attracting amateurs and professionals from across different sectors.

NFTs are also witnessing interest from a new investor demographic who are keenly interested in alternate asset classes and eager to make their mark in a digital-first world. According to reports, NFTs have already generated over \$2.5 billion in sales in the first half of 2021.

The potential is limitless, and we will soon see the required infrastructure (networks, protocols and platforms) rising to support the rapidly growing global demand. Participating and investing in building the infrastructure is an attractive opportunity in itself today.

NFTs are witnessing interest from a new age of investors who are eager to make their mark in a digital-first world

Floyd DCosta is the co-founder of Block Armour, a Cybersecurity venture that was accelerated by Airbus and featured among the Top 25 cybersecurity innovations worldwide. He is separately also the co-founder of Blockchain Worx, a Singapore based Fintech-Regtech startup focused on enabling Digital Banking with Blockchain technology and crafting next-gen platforms to enable institutional participation in Decentralized Finance (DeFi) ecosystems.

With a background in Management Consulting, Floyd has over 19 years of professional experience in setting up and growing international business practices as well as advising senior client executives on decisive topics. His previous experience includes eleven years at Capgemini and spans a variety of high-tech industry sectors and technology platforms. A regular writer and speaker at events, Floyd advises multiple organizations on harnessing the potential of emerging technologies for Digital Transformation.

Floyd holds a Masters in Computer Information Systems from ITM, Mumbai, and the Exec General Management Program from IIM-Bangalore. And, when he is not traveling, Floyd enjoys spending time with his family in Singapore.

MEGATREND 8

Crypto mining – Towards a Greener Future

Key Highlights

- PoS was created as a consensus algorithm to PoW, to address the energy-intensive nature of the latter
- The volatility in digital prices, changing regulatory environment and initial capital investment are major considerations for crypto miners in conducting mining activities
- As one of the important industry drivers, Ethereum 2.0 upgrade will reshape the way ETH is mined and rewarded to miners for validating transactions on the network

What is Mining?

Mining refers to the use of specialized mining equipment that solves complex mathematical problems in order to receive rewards in the form of cryptocurrencies.

For example, bitcoin miners receive Bitcoin as a reward for completing "blocks" of verified transactions, which are added to the blockchain.

Consensus mechanisms

Consensus mechanisms regulate how transactions between users are verified and added to a blockchain's public ledger. The two most widely used consensus mechanisms are Proof of Work (PoW) and Proof of Stake (PoS).

Common types of consensus mechanisms – Proof of Work (PoW) vs Proof of Stake (PoS)

Figure 77. Common types of consensus mechanism

Categories	Proof of Work (PoW)	Proof of Stake (PoS)
Definition	A decentralized consensus mechanism which requires members of a network to expend effort to solve an arbitrary mathematical puzzle	An alternative to PoW, refers to mining or validating block transactions based on the number of coins that a miner holds.
Use	Used widely in cryptocurrency mining to validate transactions and mine new tokens.	Used to validate transactions of specific cryptocurrencies (such as Polygon, Tezos, Polkadot, EOS); PoS will be widely used in Ethereum 2.0 projects.
Method of adding a new block	Miners must compete to solve a complex puzzle using their computers' processing power	No competition as the block creator is chosen by an algorithm based on the user's stake (i.e. the percentage of coins held).
Energy usage	Energy-intensive – Requires enormous amounts of energy.	Energy-efficient - Reduces the network's energy demand by around 99% compared to PoW.
Reward to miner	The first miner to solve the puzzle is given a reward for their work	The reward is based on the percentage of coins held by a miner
Risk of malicious attack	Riskier. PoW structures compensation in a way that makes an attack more advantageous for the miner.	Less risky. PoS structures compensation in a way that makes an attack less advantageous for the miner. To add a malicious block, the individual has to own 51% of all cryptocurrency on the network.

Source: Coindesk¹, Lexology¹, IRENA¹ and China Tonghai

Proof of Stake was created as an alternative to PoW

Proof of Stake (PoS) was created as an alternative to Proof of Work (PoW), the original consensus algorithm used to confirm transactions and add new blocks to the chain. Both PoW and PoS have their unique benefits and disadvantages.

Figure 78. Proof of Work – Key advantages

Key Advantages of PoW	Significance
Easy to implement	Unlike PoS, there is no need to have a positive balance of cryptocurrency to begin.
Safe and long track record	PoW has a long proven track record of being a consensus mechanism that has kept Bitcoin and Ethereum secure and decentralized.
Key Advantages of PoW	Significance

Source: Coindesk

Figure 79. Proof of Work – Key disadvantages

Key Disadvantages of PoW	Significance
Environmentally unfriendly	PoW uses up a massive amount of energy which brings adverse impacts to the environment.
Need for specialized equipment	A miner needs to acquire specialized bitcoin mining computers (CPU/GPU/ASIC mining).
Mining pool leads to concentration risk	Due to increasing computation demand, mining pools could potentially dominate the mining industry, leading to centralization and security risks.

Source: Coindesk

Figure 80. Proof of Stake – Key advantages

Key Advantages of PoS	Significance
Lower resource consumption	PoS removes high-powered computing from the consensus algorithm.
More secure	Less hacking risks, as PoS structures compensation in a way that makes an attack less advantageous for the miner. If a hacker buys 51% of the total number of coins, the market will react to rapid price appreciation.
Reduced hardware requirements	Staking does not require considerable investments in hardware or energy. An individual can join staking pools if he does not hold enough coins to stake.

Source: Ethereum.org, Kraken

Figure 81. Proof of Stake – Key disadvantages

Key Disadvantages of PoS	Significance
Short track record	PoS is less battle-tested compared to PoW. As PoS cryptocurrencies gain prominence, their security models will likely come under pressure.
Monopoly problem	Validators with a higher amount of coins get more power over the network and earn higher rewards, causing the monopoly problem, undermining the decentralized structure.

Source: Ethereum.org, Kraken

Mining Ecosystem

Mining is one of the core verticals of the digital assets industry that generates significant revenues. The value chain spans foundries, IC manufacturers to mining pools and cloud mining.

Figure 82. Mining Ecosystem



Source: Token Insight

Mining - Key considerations

There are several key considerations from a mining standpoint, primarily due to the volatility in digital asset prices, fluid regulatory environment and large initial capital outlay.

Figure 83. Mining – Industry Risks

Industry Risk factors	Details	Solutions
Volatility in digital asset price	Miners are affected by the price of digital assets. When digital asset prices rise, the unit economics of mining operations improves.	Automatic hedges with smart contracts
Change in regulations	Each country has a different regulatory stance towards mining and digital assets. Change in regulations (e.g. bans) could wipe out mining investments.	Conduct thorough research about each jurisdiction before investing.
Cybersecurity risk	Institutions and individuals are exposed to cybersecurity risks. For example, cryptojacking is the unauthorized use of someone else's computer to mine cryptocurrency .	Train IT team to detect cryptojacking; Use anti-crypto mining browser extensions; Disable javascript to block mining code; Use ad-blockers to block malicious code in online ads.
Increase in mining cost	Mining costs increase as mining difficulty/hash rate/electricity price rises if more miners and equipment are added to the network.	Use of renewable energy such as wind power.
Financial risk	Refers to the risk that the return on the initial investment in mining equipment can be zero or negative.	This risk can be mitigated by joining mining pools.
Adverse environmental impact	The growth of mining network is outpacing technological progress, leading to concerns about the environmental impact and carbon footprint of Bitcoin mining.	Migration to PoS, renewable energy sources, and/or more powerful equipment.

Source: Cointelegraph, Coindesk

Mining – Key industry metrics

The mining industry evolves rapidly, highlighting the importance of keeping track of the delta of key forward-looking indicators. Below we list several key metrics that are frequently used to analyze the mining market.

Figure 84. Important metrics for analysis

Metric	What it measures	Drivers	Importance
Miner revenue	Total value of block rewards and transaction fees paid to miners Daily bitcoin miner revenues = (Block reward x Hash/second x 86,400 seconds per day) ÷ difficulty x BTC price + transaction fees	Block reward BTC price Transaction fees Mining difficulty	Indicates a miner's efficiency in solving a block over a certain period, factoring in BTC price performance and transaction fee situation.
Hashrate	Measures the total computational power that is being used to mine and process transactions on a PoW blockchain	The number of miners and equipment dedicated to adding blocks.	Assesses the strength and security of a blockchain network; The more machines dedicated to discovering the next block, the higher the hash rate and the harder it becomes for malicious actors to disrupt the network.
Fee to revenue	Measures bitcoin transaction fees as a % of total miner revenue Fee to revenue ratio = Bitcoin transaction fees ÷ Total miner revenue	Transaction fees (influenced by the congestion on the bitcoin network, the size of the bitcoin transaction, personal priority of the transaction) Miner revenue	A significant contributor of mining revenue
Profit margin	Measures a miner's profit margin. Net profit margin = ((revenue - costs) + revenue) x 100	Revenue: the total earnings for the time period; Costs: comprise 1) Capital expenditures, which represent 45% of hashers' total costs on average (e.g. purchase of mining equipment, infrastructure development costs); 2) Operational expenditures (e.g. electricity bills, maintenance, workforce). This figure varies slightly based on the type of coins mined.	Measures the relative profitability of miners by accounting for the costs involved.
Coin earnings	Measures the approximate earnings (in native blockchain currency) from bitcoin mining over a certain period Daily bitcoin miner earnings = (Block reward x Hash/second x 86,400 seconds per day) ÷ difficulty	Block reward Mining difficulty Network size	Indicates a miner's efficiency in solving a block over a certain period.
ROI	Measures the amount of time it takes to cover the initial ASIC investment costs with monthly income. ROI = Net monthly income ÷ initial purchase price	The costs to buy and to operate the ASIC Monthly income that an ASIC miner generates	Evaluates the returns of an ASIC investment when taking investment payback period into account.

Source: Cointelegraph, Coindesk,

Mining - Future outlook and key themes

The overall mining industry will continue to boom, and there will be new dynamics and challenges driving the industry.

Figure 85. Mining – Future drivers

Drivers	Description	Significance
Global shift in dynamics	China's crackdown on crypto mining has led to a global reshuffle of miners, with many China-based miners migrated overseas.	Before China's crackdown, c60% of the world's circulating bitcoins were mined in China. The migration will likely cause seismic shifts in the global crypto mining landscape and impact the mining policies of different jurisdictions.
Ethereum 2.0 upgrade	Ethereum 2.0 upgrade, also known as Eth2 or "Serenity" , is an upgrade to the Ethereum blockchain. The upgrade aims to enhance the speed, efficiency, and scalability of the Ethereum network to process more transactions and ease bottlenecks.	The upgrade will affect the way ETH is mined and rewarded to miners for validating transactions on the network.
Cloud Mining	Cloud mining is an innovative model that has emerged which enables individuals to participate in mining.	Cloud mining lowers entry barriers for miners. Users are allowed to purchase and rent cloud computing power for mining without buying the mining machine or setting up the mining farm.
Switch to energy efficient means	The future trend is to switch to more energy-efficient means and to decarbonize PoW.	Mining will be more energy efficient. The energy efficiency of miners from different regions will vary, suggested by the spread of regional distribution for the share of renewables.
Higher regulatory clarity	Certain jurisdictions will likely provide further financial support through preferential treatment. The overall trend is that mining activities might attract greater regulatory scrutiny in the future.	Government incentives through subsidies and tax exemptions will likely reduce hashers' operational costs and attract more hashers, reshaping cryptocurrency mining geographical landscape

Source: Genesis Block, Cambridge Centre for Alternative Finance, Tokeninsight

Blockchain and Mining Expert Interview with Ray Wong

Key views on mining

- The geographical landscape of crypto mining has been shifting following China's ban, which is likely to drive a more decentralized global bitcoin mining network.
- Ethereum's upgrade will accelerate the process of replacing PoW with PoS. However, PoW will likely continue for the bitcoin network.
- Hardware improvements and substitution with renewable energy will drive a greener future for crypto mining.



Ray Wong
CEO of LuTech

A Greener Future For Crypto Mining

(EP): How do you see the possibilities of powering bitcoin mining with green energy entirely?

Ample room for growth of green energy-driven crypto mining

(RW): Green energy would largely – but not entirely – power Bitcoin in the future. Some reports suggested that renewable energy powers over 50% of Bitcoin mining activities - and I would expect that proportion to grow.

Green energy would largely - but not entirely - power Bitcoin mining in the future.

Why is the price of clean energy low? It is under-utilized. Much clean energy, especially hydroelectricity, is currently not put to work. In the future, bitcoin mining may consume renewable energy that would minimize its carbon footprint.

(EP): How do you expect the global bitcoin mining landscape to evolve in the next 1-3 years, given that multiple jurisdictions place restrictions on mining?

China's crypto mining ban shifts the geographic landscape and drives decentralization of bitcoin network

(RW): We see a significant geographical shift in the distribution of global bitcoin **mining activities following China's ban**. Bitcoin mining activities in China – as measured by hash rate – were almost decimated from a global market share of over 70% previously. More than 90% of China's bitcoin mining capacity is estimated to have shut down.

The bitcoin network will become more decentralized when Bitcoin mining activities are more spread out globally. Some preferred geographies for the shift in mining are characterized by stable (or legal) and energy-rich jurisdictions, such as North America, Kazakhstan and Indonesia.

The global bitcoin network will be more decentralized.

(EP): To what extent do you think greener alternatives to proof of work protocol (e.g. proof of stake, proof of space-time) will dominate? Why or why not?

Proof of work will likely continue for the bitcoin network

(RW): “Proof of work” protocol is here to stay, primarily for Bitcoin. Bitcoin represents a storage of value, and a tremendous amount of energy is required for proof-of-work mining which safeguards the Bitcoin network.

Proof of work works well with Bitcoin but not for many other projects

New consensus mechanisms would unlikely utilize proof-of-work protocol. **Ethereum’s** upgrade aims to eventually replace proof-of-work mechanism by adopting a proof-of-stake mechanism as soon as this year. Energy consumption by the PoS protocol and thus the projects built on the upgraded ethereum network would be drastically reduced.

The projects built on the proof-of-work network would reduce drastically

(EP): What is your take on bitcoin halving? How will it affect the crypto mining market? Do you think that the shrinkage in block rewards of crypto networks will indirectly affect the decentralization of the market shares of miners and mining pools?

Halving decreases bitcoin mining profitability

(RW): Historically, Bitcoin mining profitability would increase after “halving” that happened every four years. With the scheduled Bitcoin production, the amount of newly mined Bitcoins per day will be halved.

The industry goes after stable, inexpensive power sources

The industry constantly searches for efficient energy sources that are under-utilized, and develops energy-efficient Bitcoin mining equipment. However, some players with high power costs would drop out.

Energy-powered Bitcoin network would remain decentralized as it would utilize diverse untapped energy sources - in various forms and geographies.

Payback period, vintage, energy efficiency and machine lifespan are the major criteria for clients to choose mining machines

(EP): What are the key criteria considered by institutional clients when choosing mining equipment?

(RW): The first criterion is payback period. Assuming current market conditions, an estimated payback period for new equipment is about 8 months, and an estimated ROI is over 100 percent each year.

An estimated payback period for new mining equipment is about 8 months with an estimated ROI of over 100%

Vintage is also an important criterion for institutional clients. Given the recent mining ban in China, we have sourced validated second-hand machines under warranty for clients. While the machines are cheaper than new ones, they may require more maintenance needs in the future.

Since power costs are an important part of mining costs, clients also take the energy efficiency of hardware into consideration. They prefer machines with high energy efficiency — the higher the energy efficiency, the lower the dependency on cheap power.

Clients also consider machine lifespan as one of the key criteria. A typical machine's average lifespan is three to five years. Newer models are expected to have at least five-year lifespans.

For example, it is not uncommon for mining farms to still use Antminer S9 model, which was originally launched in 2016. Other quality machines like the Antminer S19, Whatsminer M20, and Whatsminer M30 are expected to last several years if operated in a good facility easily.

Innovations in energy and mining hardware are key industry drivers

(EP): Please name two of the most significant innovations that are taking place in the mining space?

(RW): Innovations in energy and mining hardware would drive the industry in the future.

Concerning energy, integration with energy production facilities would enable the utilization of excess energy, which is particularly effective for wind and hydropower. Waste heat from mining can also be recycled for greenhouses or household heating.

Energy efficiency is driven by chip design and external cooling.

A significant innovation of mining hardware will improve energy efficiency. Energy efficiency is driven by chip design and external cooling. We previously developed energy-efficient immersion-cooling turnkey systems for Bitcoin mining data centers, mainly for energy producers and various climates.

Ray Wong is a blockchain investor and Bitcoin miner. He is CEO of LuTech, an award-winning company that provides Bitcoin mining services to funds, professional investors and the energy industry.

Ray is an HKSF-licensed Responsible Officer (Type 9) of Silver Spring Capital. As a VC advisor in blockchain and sustainability, Ray is also an angel investor in blockchain games and decentralized finance.

Ray was an executive in a publicly listed environmental firm and working at Morgan Stanley and Credit Suisse. He has been invited to speak in conferences globally, such as Crypto Asset Conference, organized by Frankfurt School Blockchain Center, DeFi Summit, a leading DeFi conference and CERAWEEK, a leading conference of the energy industry.

Ray holds a master's degree in Chemical Engineering from Carnegie Mellon University and an MBA degree from Cornell University.

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Company Section



Coinbase Global

Growing by leaps and bounds; Initiate with Buy

Initiation of Coverage

We initiate coverage of Coinbase Global (Coinbase) with a Buy rating and 12-month SOTP-derived target price of US\$302.62. As one of the largest digital asset trading platforms with a broad suite of value-added services, we believe Coinbase will benefit from the expanding TAM of the cryptoeconomy, which will drive revenue and user growth. We see current valuations (17.2x 2022E P/E) as attractive relative to its robust growth profile and leading position in the digital asset industry. Our 12-month PT implies a potential upside of 23.8% to current levels.

Company description

Coinbase is one of the largest regulated digital asset exchanges for global retail and institutional investors. It provides users with transaction services, subscriptions, and other services, including custody, staking, payment, etc.

Valuation

Our 12-month SOTP-derived target price for Coinbase of US\$302.62 implies 21.3x 2022E P/E and is at a discount to the global exchange market peer group average of 27.2x. We believe Coinbase's shares exhibit an attractive risk-reward profile, justified by the robust revenue growth (2020-23E CAGR of 64.2%), riding on the rapid crypto market growth and user base expansion.

Outlook

The main drivers for Coinbase's growth story include 1) diversification in product and services portfolio driven by increasing institutional adoption and innovative product launch roadmap, 2) margin expansion thanks to economies of scale, and 3) user base expansion of its ecosystem. In 2023, we forecast Coinbase's digital asset platform trading volumes to reach US\$942bn (2020-23E CAGR of 69.6%), supported by a verified user base of 80mn.

Catalysts

(1) New product launch which increases user stickiness; (2) Stronger-than-expected margin expansion; (3) Development of Coinbase ecosystem.

Key downside risks

(1) 'Crypto winter'; (2) Intensifying market competition; (3) Regulatory risks.

Coinbase's Key Financials

(USD'mn)	FY19	FY20	FY21E	FY22E	FY23E
Revenue	534	1,277	3,757	4,536	5,659
y/y growth	N/A	139%	194%	21%	25%
Operating profit	-46	409	1,467	2,004	2,892
y/y growth	N/A	993%	259%	37%	44%
Adj. attributable profit	22	407	1,255	1,855	2,685
y/y growth	N/A	1715%	208%	48%	45%
Adj. diluted EPS (USD)	0.37	5.92	9.60	14.19	20.54
P/E (x)	668.4	41.2	25.4	17.2	11.9

Source: Company Data, China Tonghai estimates

Equity Research
Digital Assets Exchange

6 Aug 2021

Ticker	COIN US
Stock Rating	BUY
Industry View	POSITIVE
Price Target (US\$)	302.62
Price (4-Aug-2021)	US\$ 244.36
Potential	24%
Upside/Downside	Upside

Market Cap (US\$bn)	51.0
Shares Outstanding (mn)	141.8
Free Float (%)	83.5
3M Avg Daily Turnover (US\$mn)	1,993

52 Week range US\$ 208.0-429.54



Source: Bloomberg

China Internet

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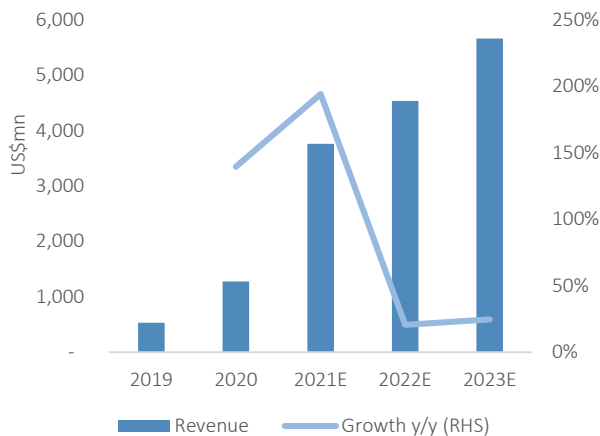
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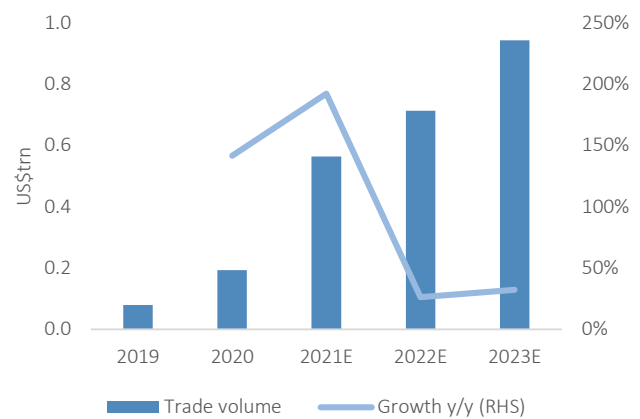
COINBASE– KEY CHARTS

Fig 1. Coinbase– Revenue growth, 2019-23E



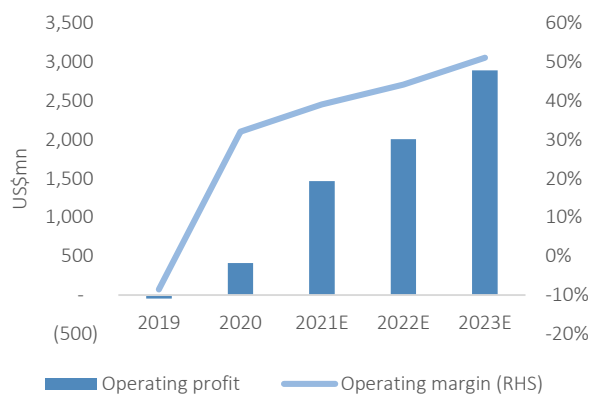
Source: Company data, China Tonghai Securities estimates

Fig 2. Coinbase– Total trading volume, 2019-23E



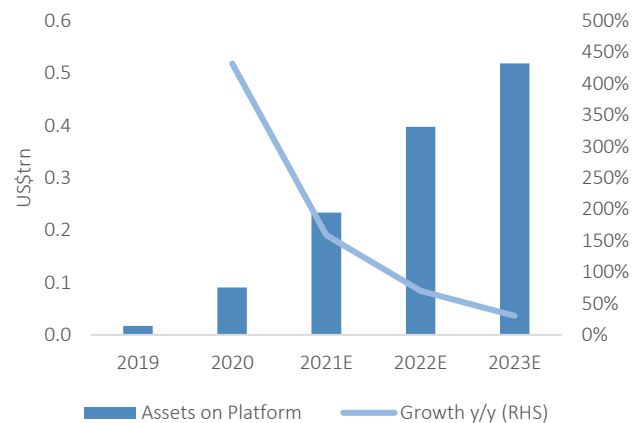
Source: Company data, China Tonghai Securities estimates

Fig 3. Coinbase– Operating profit and margin, 2019-23E



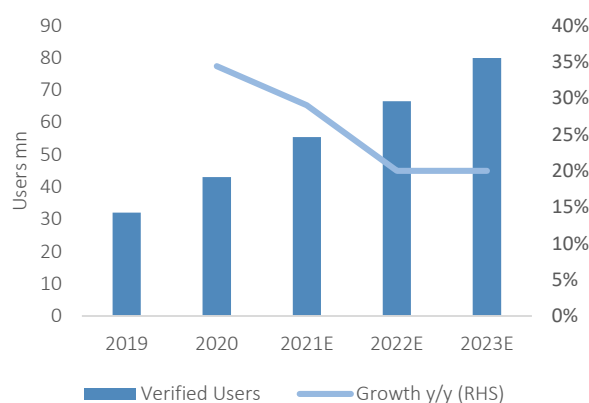
Source: Company data, China Tonghai Securities estimates

Fig 4. Coinbase – Assets on platform, 2019-23E



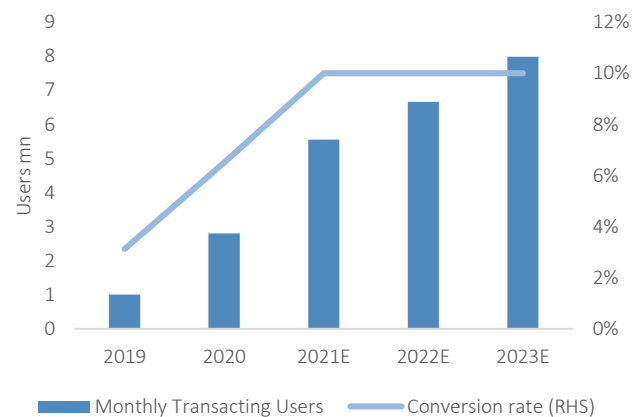
Source: Company data, China Tonghai Securities estimates

Fig 5. Coinbase – Verified users, 2019-23E



Source: Company data, China Tonghai Securities estimates

Fig 6. Coinbase – Monthly transacting users, 2019-23E



Source: Company data, China Tonghai Securities estimates

INVESTMENT SUMMARY

Coinbase is a visionary leader in digital assets

As a visionary leader in digital assets, Coinbase empowers users with easy access to financial services and a seamless experience with the crypto-economy.

Trusted and easy-to-use platform

Coinbase empowers its users with safe and easy-to-use products and services to transact in cryptocurrency. Its robust back-end infrastructure combines blockchain technology and traditional finance to support real-time cryptoasset trading. Thus, customers treat their Coinbase accounts as their primary cryptocurrency accounts. Coinbase's ecosystem connects with third-party applications to enable users to access the latest products and services.

Coinbase's vision is to develop the industry's most trusted products and services. To this end, the company adopts the following strategy:

- **Places utmost importance on compliance:** Coinbase proactively liaises with regulators and applies for licenses even before required.
- **Institutional-grade custodian solution:** Coinbase has a custodian solution to secure customers' cryptoassets, with investments in cybersecurity, novel key storage mechanism, and cybercrime insurance policy.

Unique customer-centric approach

Coinbase's flywheel model creates positive feedback loops for retail and institutional investors, as well as ecosystem partners. The stakeholders of Coinbase's ecosystem benefit from innovative products and services, secure storage of assets and liquidity. Coinbase also helps ecosystem partners connect with millions of global customers, enhancing its platform's value and user stickiness. Coinbase facilitates innovation by investing in proprietary technology built on well-established engineering, cybersecurity and compliance standards. Coinbase also enhances engagement on its scalable platform with a deep understanding of customers' needs in customized products and services.

Robust long-term outlook

Coinbase is committed to delivering the best-in-class experience to users in the cryptoeconomy. The company is focused on ramping up its scale to achieve the potential of its business model by building a portfolio of innovative products and services. Coinbase's broad offerings span stablecoins, privacy coins, security tokens, reward tokens, governance tokens, and smart contracts etc. Coinbase has achieved success with its early product and services and reinvests the profits into innovations that will facilitate long term growth.

Key downside risks

1) Crypto winter; 2) Intensifying market competition eroding its pricing power; 3) Adverse regulatory changes.

COINBASE BUSINESS MODEL

Entry point to the cryptoeconomy

Founded in 2012, Coinbase is a cryptocurrency platform built upon the rapidly developing cryptoeconomy.

The product offering on Coinbase's crypto trading platform is tailored to retail and institutional customers. Its businesses cover 1) Transaction business, where users can send, receive, invest, spend cryptocurrency; and 2) Subscription and service business, such as payment, distribution, store, saving, borrowing & lending, staking, and building.

Fig 7. Coinbase service roll-out



Source: Company data

As of March 2021, the platform has enabled 6.1mn Monthly Transacting Users (MTUs) to access the cryptoeconomy.

Fig 8. Coinbase product offerings

	Retail	Institutional
Crypto transaction	Coinbase: Provides a simple solution with a user-friendly interface for investors to transact in cryptocurrency; Coinbase Pro: A complete set of services for experienced crypto investors/traders. In addition to basic functions (e.g. buy, sell, send and receive orders), Pro provides options like stop-order, limit order, and margin order.	Coinbase Prime: The prime brokerage service for professional investors such as institutional investors, corporate or high net-worth individuals. Service coverage includes 1) crypto prime brokerage platform and professional investing tools (e.g., custodian, exchange or OTC desk, asset management), and 2) real-time analytical tools, such as chart services which visualize data across themes across spot, future, options.
Crypto asset storage	Coinbase Wallet: Provides secured service to store digital assets in web Wallets, Desktop Wallets, Paper Wallets, and Brain Wallets. Users can connect the wallet to the DeFi application and access self-custody assets.	Coinbase Custody: A qualified custodian as an independently operated business to Coinbase and a fiduciary under New York State Banking Law. The service coverage includes cold wallets, insurance, and staking service.

Source: Company data, China Tonghai Securities

Fig 9. Coinbase mobile app interface



Source: Company data

MULTI-YEAR GROWTH STORY — FLYWHEEL STRATEGY

We are bullish on the multi-year growth story of Coinbase on the back of its flywheel strategy, which, in turn, drives positive feedback loops.

Successful flywheel strategy

Coinbase tailors a depth and breadth of assets and innovative financial products for users, which helps acquire user traffic and data, and further drives the platform's ability to innovate.

More customers

Coinbase's secure and user-friendly platform acquires traffic from retail and institutional investors. In addition, Coinbase provides education services to drive product adoption rates, enhance engagement and monetization.

Depth and breadth of assets

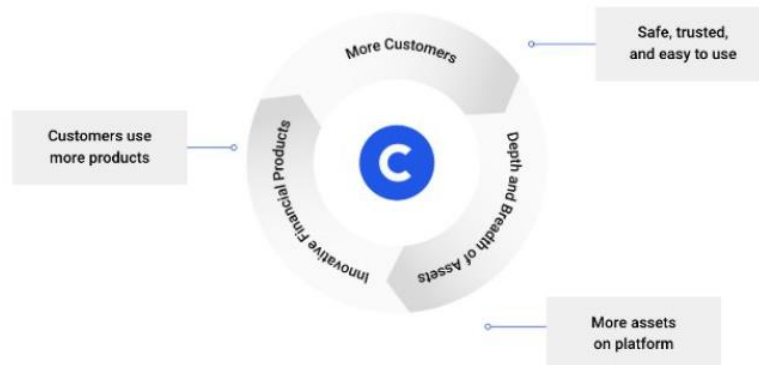
Coinbase achieves growth in transaction volume on the back of the full range of cryptocurrency offerings. The network effect provides liquidity and new users. Coinbase effectively builds up an ecosystem where merchants, issuers, and developers can participate and serve millions of users. User growth enables Coinbase and ecosystem partners to innovate in:

1. User data protection, machine learning and private keys based on advanced cybersecurity and cryptography technology, and
2. Monitoring system to analyze and pinpoint suspicious transactions in real-time to maintain robust crypto compliance infrastructure.

Innovative financial products

The circle is complete as more products and services push the user growth further. For instance, Coinbase partnered with PayPal (PYPL US) to offer conversion services between fiat and cryptocurrencies. As of December 2020, the company serves customers in over 100 countries, with US contributing 76% of revenue and Europe contributing 24%.

Fig 10. Coinbase Flywheel effect



Source: Company data

Fig 11. Coinbase – Overview of product portfolio

	Retail	Institutions	Ecosystem Partners
Transaction Business			
Invest	√	√	
Spend	√		
Send & receive	√	√	√
Subscription & services business			
Store		√	√
Save	√		
Stake	√	√	
Borrow and lend	√	√	
Distribute			√
Build			√
Pay			√

Source: Company data, China Tonghai Securities

KEY STRENGTHS

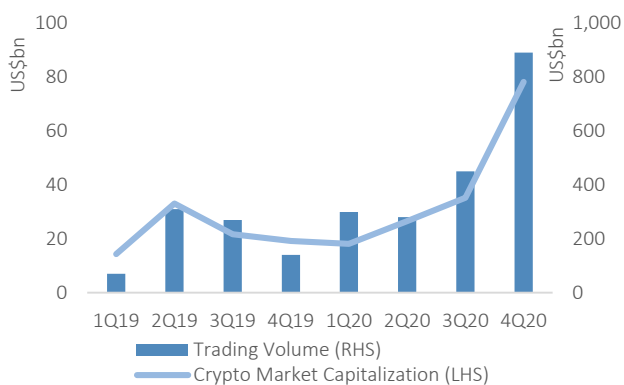
One of the leading global crypto trading platforms

An early mover in the crypto market

As an early mover in the space, Coinbase recorded an enormous growth in trading volume, which is highly correlated to the increase in cryptocurrency market capitalization.

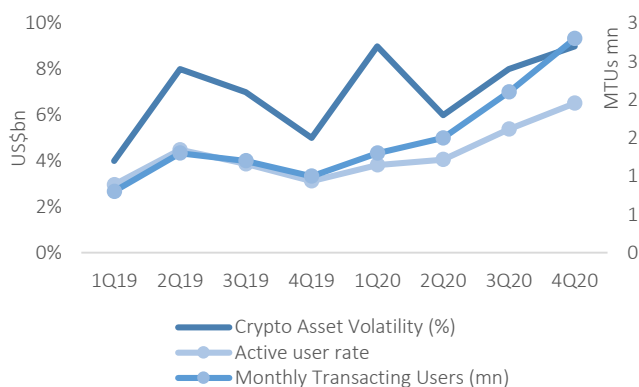
Coinbase's total trading volume increased 141.7% y/y in 2020, driven by the higher commission rate of retail trading volume and growth in MTU (Monthly transacting user). Coinbase's retail business accounted for the most significant portion of transaction service revenue at 81.4% in 2020. We believe the volatility of cryptoassets is a critical driver of growth in active user and engagement. Coinbase charge retail users a higher fee rate of 1.425% (vs institutional clients at 0.047%).

Fig 12. Coinbase – Crypto market cap and trading volume



Source: Company data, China Tonghai Securities

Fig 13. Coinbase – Crypto volatility and monthly transacting users



Source: Company data, China Tonghai Securities

Preferred crypto trading platform with user-friendly interface

As of June 2021, Coinbase is ranked second in terms of web traffic, according to Similarweb. We attribute Coinbase's leading market position to the user-friendly interface, which positions Coinbase as the preferred crypto trading app. New users can make crypto investments with a simple onboarding process.

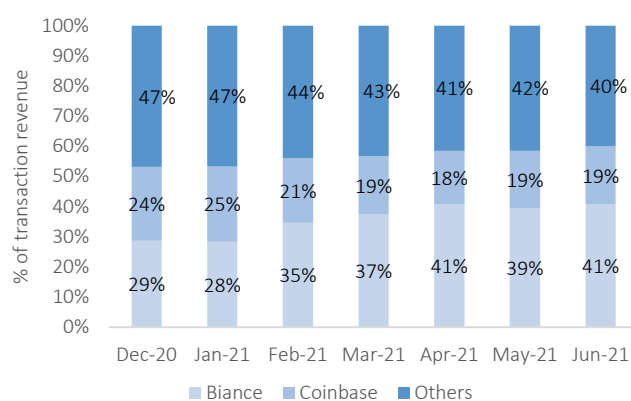
The research & development-first approach makes the platform highly scalable. As of December 2020, Coinbase has custodial assets of over US\$90bn, accounting for 11.1% of total crypto market capitalization (vs. 4.5% in 2018 and 8.3% in 2019).

Fig 14. Comparison of Coinbase, Coinbase Pro and Binance

	Binance	Coinbase	Coinbase Pro
User interface	The integrated interface provides multiple trading options and commands	Easy-to-use interface to place basic orders such as buy and sell	Intuitive interface with real-time data tools such as order books, charting tools, trade history
Trade options	Buy, sell, deposit, withdraw, market order, limit order, stop-loss order	Buy, sell, send & receive, exchange	Buy, sell, deposit, withdraw, market order, stop order, limit order
Supporting cryptocurrencies	>500	51	52
Transaction fees	0.02%-0.1% per trade, 3.5%/ US\$10 for credit or debit card, whichever is higher	0.5% spread and additional fee from US\$0.99-US\$2.99 per trade, 3.99% for credit card/ debit card	0.00%-0.5% per trade
Security	Two-factor authentication (2FA), FDIC-insured US\$ balance	2FA, traffic runs over encrypted SSL (https), Wallets and private keys are encrypted using AES-256, FDIC-insured US\$ balance	2FA, traffic runs over encrypted SSL (https), Wallets and private keys are encrypted using AES-256, FDIC-insured US\$ balance

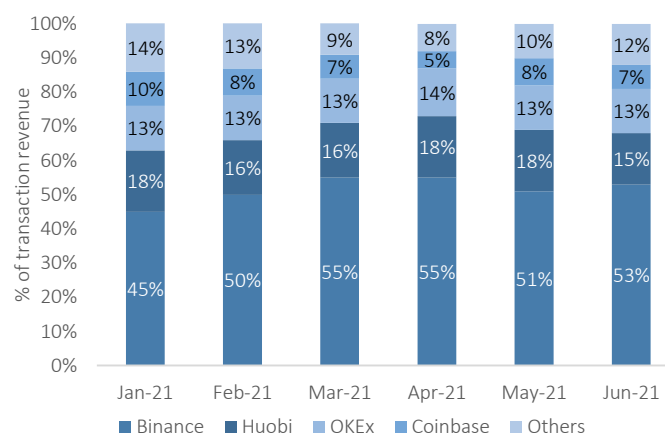
Source: Media, Company data, China Tonghai Securities

Fig 15. Market share of top 3 cryptocurrency exchanges in terms of web traffic, Dec 20 – Jun 21



Source: Similarweb, China Tonghai Securities

Fig 16. Market share of top cryptocurrency exchanges in terms of spot trading volume, Jan – Jun 21



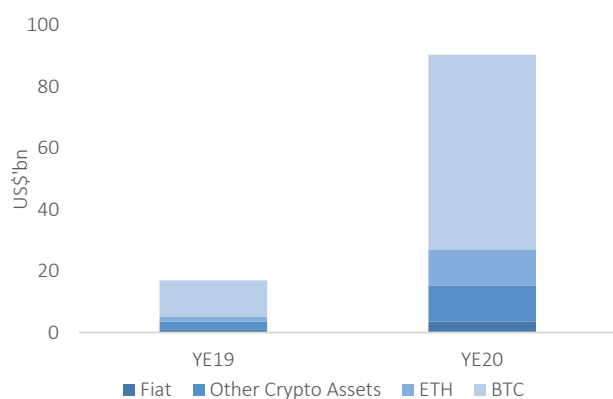
Source: Coingecko, China Tonghai Securities

Multi-asset strategy creates cross-selling opportunities

Coinbase has a diversified portfolio of crypto assets. Coinbase supported over 90 crypto assets for trading or custody, and 45 assets are available for investments as of Dec 2020. The abundant offerings keep users engaged and drive cross-selling opportunities. In 2020, 21% of active retail users also used other non-investment related products (e.g. Distribution, stake, save, spend and borrow & lend).

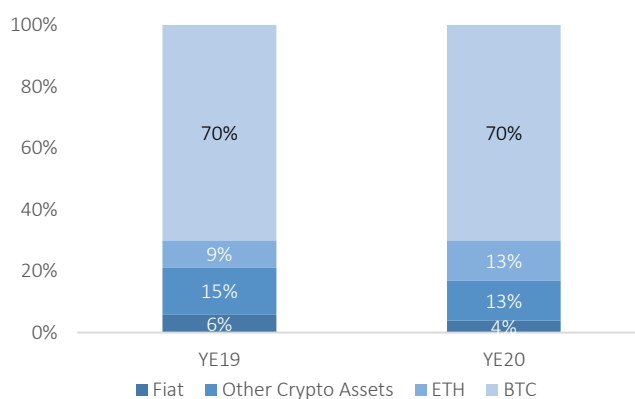
We expect the proportion of ETH on the platform to further increase in the future (vs 13% in 2020, and 9% in 2019). The introduction of Ethereum 2.0 and migration to the more energy-efficient proof of stake protocol will lead to more opportunities for the digital asset exchange sector and Coinbase.

Fig 17. Coinbase – Platform asset value by cryptocurrency



Source: Company data, China Tonghai Securities

Fig 18. Coinbase – Assets on platform concentration



Source: Company data, China Tonghai Securities

A trusted cryptocurrency exchange

Cybersecurity: Coinbase is a trusted cryptocurrency exchange built on advanced technology, with a culture of trust and security. Since its launch in 2012, Coinbase has not reported a single case involving lost funds due to security breaches, and its multi-layer insurance approach provides additional protection. In terms of the trust score of global cryptocurrency exchanges, Coinbase ranks in second place with a score of 10 (out of 10).

Coinbase made significant investments in building a trusted platform that offers safe and trustworthy service.

Regulatory compliance: Coinbase is a licensed entity in US. Coinbase obtained the BitLicense issued by the New York State Department of Finance Service (NTSDFS). A Bitlicense grants license holders the rights to operate virtual currency activities (transmission, storing, holding, maintaining custody, buying and selling as a customer, exchange service, etc).

KEY CHALLENGES

Concentration in Bitcoin

The degree of dependence of Coinbase's financial performance on Bitcoin exposes the company to concentration risk. The price appreciation of Bitcoin drove Coinbase's prior growth. Between 2019 and 2020, Bitcoin accounted for 41.0% of total trading volume while the top two traded cryptocurrencies (BTC and ETH) made up over 50%.

We are convinced that Coinbase will continue to play a dominant role in the longer term, based on the following reasons:

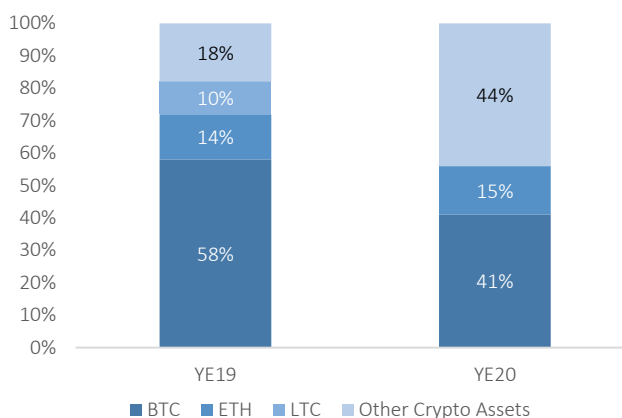
- **Coinbase is adding more cryptocurrencies:** Coinbase has lowered its dependency on Bitcoin by diversifying the supported assets on its platform. The proportion of ETH on the Coinbase platform increased to 13.0% in 2020 (from 9.0% in 2019).
- Coinbase occupies a central role in the cryptoeconomy, which is here to stay.

Fig 19. Bitcoin - Proportion of total crypto market cap, 2015-20



Source: Coinmarketcap, China Tonghai Securities

Fig 20. Coinbase – Trading volume concentration

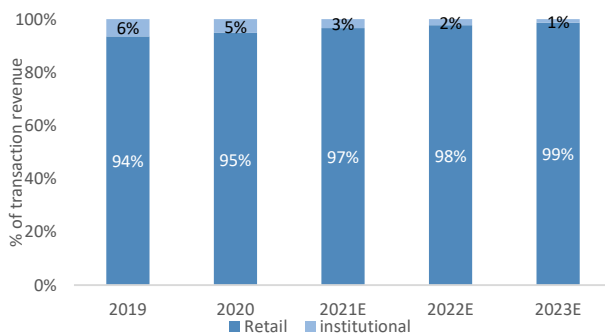


Source: Company data, China Tonghai Securities

Coinbase has a high retail composition

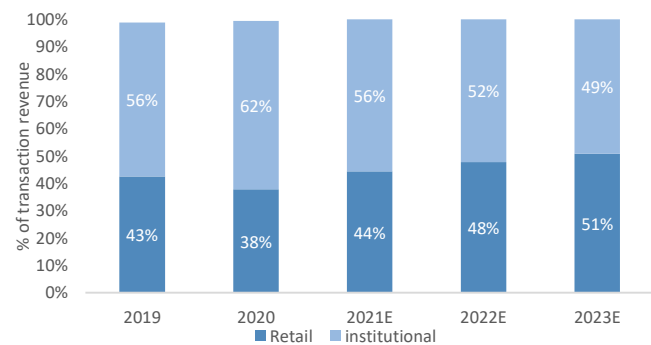
Compared with institutional clients, retail users have higher price sensitivity and place less emphasis on value-added services (such as custody solutions). Hence, the pricing pressure and increasing competition from Coinbase's peers will likely limit the company's fee commission growth. For example, Coinbase charged a 0.5% spread vs Binance 0.02%-0.1%.

Fig 21. Coinbase – Proportion of transaction revenue by type of customer, 2019-23E



Source: Company data, China Tonghai Securities estimates

Fig 22. Coinbase – Proportion of trading volume by type of customer, 2019-23E



Source: Company data, China Tonghai Securities estimates

Regulatory change

Crypto trading platforms are subject to a rapidly evolving regulatory landscape in US and other jurisdictions. Crypto exchange platforms face increasing regulatory scrutiny over potential financial crimes such as terrorism, money laundering, and fraud.

- As US's first licensed crypto exchange, we are confident that Coinbase will work closely with the authorities to comply with law and regulations.

OUTLOOK

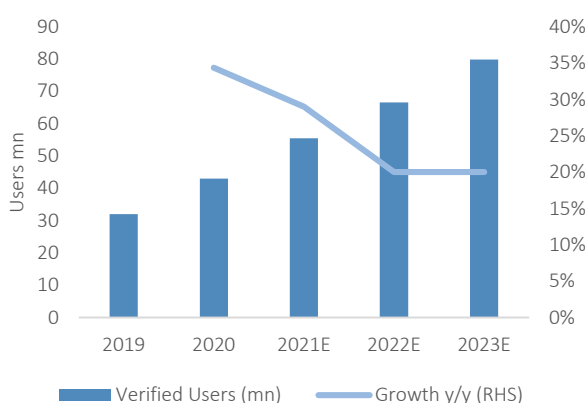
Leveraging its well-established trading platform, we expect Coinbase's future robust growth to be driven by a rapidly expanding cryptoeconomy, further expansion in user base and supported assets and the launch of innovative products.

User base expansion

We forecast Coinbase's monthly transacting users (MTU) to reach 8.0mn in 2023E, representing a 20-23E CAGR of 41.8%. In addition, we expect Coinbase's verified users to reach 80mn by 2023E (vs 43mn in 2020), on the back of its strong branding, expansion into overseas markets and new product offerings.

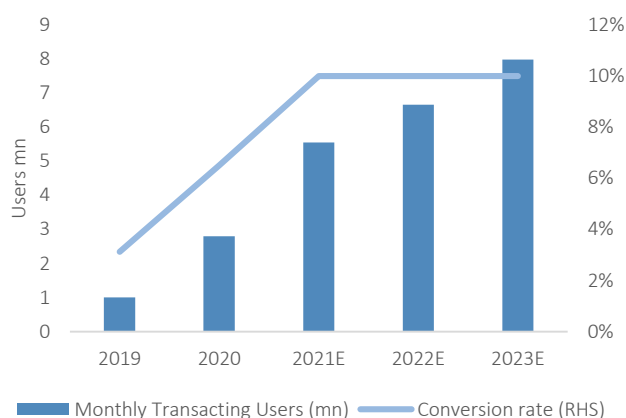
Strong brand awareness: As a market-leading brand in the cryptoeconomy, Coinbase has an intuitive user interface for its mobile app, which reduces the complexity of crypto trading and is a preferred choice for new users into the crypto world.

Fig 23. Coinbase – Verified users, 2019-2023E



Source: Company data, China Tonghai Securities estimates

Fig 24. Coinbase – Monthly transacting users, 2019-2023E



Source: Company data, China Tonghai Securities estimates

Trusted platform: Coinbase is one of the most secured financial technology providers and services over 100 countries. Coinbase has not recorded a single case of lost funds due to a security breach, thanks to its proven track record.

Expansion of supporting crypto assets

Coinbase has been adding more cryptocurrencies on its platform to lower its dependency on Bitcoin. During the 1Q21 earnings call, Coinbase management emphasized that the platform will accelerate the pace of adding assets on its platform.





















Diversified portfolio: Coinbase's diversified portfolio supported over 90 crypto assets for trading or custody, while 45 assets are available for investments (as of Dec 2020).

Launch of new products

Innovative technology platform: Coinbase has a deep understanding of the cryptoeconomy. Its innovative technology platform is dedicated to creating more opportunities for customers to engage in new crypto-based financial transactions. Coinbase's product development efforts help facilitate the connection between ecosystem partners and users.

Addition of new products to drive revenue growth: Coinbase has a successful track record in developing new subscription services and marketing efforts to drive higher adoption and revenue growth. When retail users engaged with at least one non-investing product, the average net revenue per retail user increased by c90%, in the four quarters ended Dec 2020.

Fig 25. Coinbase – product offerings

FOR INDIVIDUALS	FOR BUSINESSES	FOR DEVELOPERS
 Coinbase Buy, sell, and use crypto	 Prime The prime brokerage platform	 Connect Enable users to buy, sell, and store crypto
 Wallet The best self-hosted crypto wallet	 Commerce Accept crypto from anyone	 Bison Trails Pioneering blockchain infrastructure
 Earn Learn and earn crypto	 Exchange Direct access to our exchange	 Commerce Accept crypto from anyone
 Card Spend crypto, earn crypto rewards	 Asset Hub List your asset on Coinbase	 WalletLink Link your DApp to mobile wallets
 Private Client For trusts, family offices, and UHNWIs	 Custody Institutional-grade offline storage	 Pro Programmatically manage crypto
 USD Coin Crypto with a stable price	 Analytics Power your crypto compliance	 Rosetta Integrate your blockchain everywhere
 Pro Advanced crypto trading	 Ventures Raise money for your crypto startup	

Source: Company data.

FINANCIAL FORECAST AND ANALYSIS

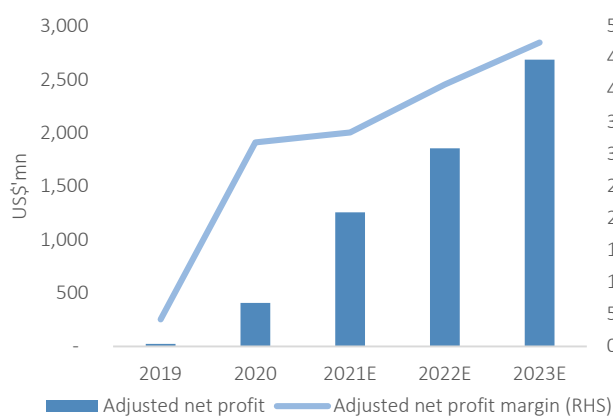
Coinbase will register strong earnings growth on the back of the economies of scale and optimized operating leverage.

Adjusted net profit CAGR of 87.6% in 2020-23E

Excluding non-recurring items, we expect Coinbase to register robust adjusted net profit growth (2020-23E CAGR of 87.6%) to US\$2.7bn in 2023E. The primary earnings drivers include strong economies of scale and optimized operating leverage.

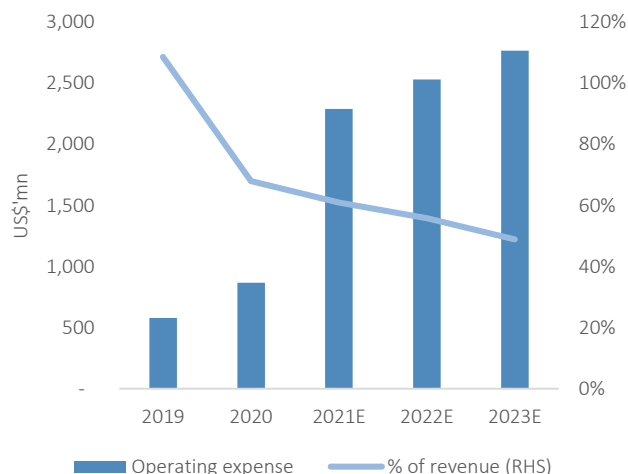
- As a percentage of total revenue, we forecast total transaction expense to fall to 9.0% in 2023E (from 10.6% in 2020), and total operating expense to 49.0% in 2023E (from 68.0% in 2020).

Fig 26. Coinbase – Adjusted net profit, 2019-2023E



Source: Company data, China Tonghai Securities estimates

Fig 27. Coinbase – Total operating expense, 2019-2023E



Source: Company data, China Tonghai Securities estimates

Revenue CAGR of 64.2% in 2020-23E

We expect total revenue to reach US\$5.7bn in 2023E (representing 2020-23E CAGR of 64.2%), driven by the growth in crypto asset value and transaction volume.

- By segment:** In 2023E, we expect transaction service to account for 88.9% of total revenue; subscription and service revenue to account for 3.7%; and other businesses to account for 7.4%.

Furthermore, Coinbase is poised to benefit from higher user engagement given the rapid development of the cryptoeconomy.

- We forecast monthly transacting user (as a proportion of verified users) to rise to 10% in 2023E (vs. 6.5% in 2020).

Transaction service (88.9% of 2023E revenue)

Outlook

We expect the transaction service business to remain the primary revenue contributor in 2023E, supported by trading volume growth, thanks to increasing market participation and user engagement in the Coinbase ecosystem.

Forecasts

We expect transaction services revenue to make up 88.9% in 2023E (vs. 85.8% in 2020) on strong revenue growth (2020-23E CAGR of 66.2%). As a proportion of transaction revenue, we expect the transaction expense ratio to further decrease to 10.0% in 2023E (vs 12.4% in 2020) on higher economies of scale.

Our calculation for transaction revenue is based on a 2023E overall monthly transaction users of 8.0mn and 2023E average monthly trading volume of US\$942.4bn. We assume moderate user price sensitivity and expect the average fee rate to remain stable at 53.4bps in 2023E (vs 56.8bps in 2020).

- **Retail users:** Our forecast average fee rate for retail customers is estimated at 122.5bps from 142.5bps in 2020, while trading volume is forecasted to grow at 75.8% 2020-2023E CAGR to US\$396.4bn. Thus, revenue from retail transaction business is US\$4.9bn.
- **Institutional users:** We expect 2023E institutional transaction revenue to reach US\$175mn, implying a 2020-23E CAGR of 46.2%. We expect 2023E trading volume to reach US\$546.0bn, implying a 3-year CAGR of 66.2%. Fee rate for institutional clients will fall to 3.2bps in 2023E (from 4.7bps in 2020).

Fig 28. Coinbase – Transaction service operating metrics

	FY19	FY20	FY21E	FY22E	FY23E
Monthly Transacting Users (mn)	1.0	2.8	5.5	6.7	8.0
y/y growth		180.0%	98.1%	20.0%	20.0%
Average Trading Volume per monthly user per month (US\$m)	6,659	8,469	8,478	8,922	9,832
y/y growth		27.2%	0.1%	5.2%	10.2%
Average monthly number of transactions	329,790	312,051	297,140	283,310	270,181
y/y growth		-5.4%	-4.8%	-4.7%	-4.6%
Est. volume traded per user (US\$ monthly)	20,191.1	27,140	28,533	31,491	36,391
y/y growth		34.4%	5.1%	10.4%	15.6%
ARPMU (US\$)	38.6	32.6	50.6	50.0	52.5

Source: Company data, China Tonghai Securities estimate

Description

Transaction service revenue is mainly generated through transaction fees charged on the platform. Coinbase acts as an agent to provide matching services in transactions between users who buy, sell, or convert crypto assets.

- **Products:** Coinbase, Coinbase Pro, Coinbase Prime

Subscription service (3.7% of 2023E revenue)

Outlook

Subscription revenue is a function of multiple business lines, including 1) custodial fee, 2) staking, 3) earn campaign, 4) interest income and 5) other subscription and services. Segment growth will largely increase in tandem with the user growth.

Forecasts

Despite the relatively small revenue contribution, we forecast subscription and service revenue growth (2020-23E CAGR of 66.8% to US\$209mn in 2023E) to outpace overall revenue growth.

Description

Custodial fee is mainly generated by the monthly fee charged to customers using Coinbase's cold storage solution. The monthly fee is based on the daily value of assets under custody.

Staking: Coinbase users earn rewards participating in the network with proof-of-stake consensus algorithms. Revenue is based on the number of tokens received post block creation or validation.

- **Products:** Wallet, Custody, Coinbase Earn

Other services (7.4% of 2023E revenue)

Outlook

Coinbase's other revenue mainly comprises 1) Crypto asset sales and 2) corporate interest income. We expect other revenue to reach US\$419mn in 2023E, implying a 3-year CAGR of 45.4%.

Forecasts

Crypto asset sales revenue: We forecast 2023E crypto asset sale revenue of US\$415mn, implying 20-23E CAGR of 45.8%. We assume the 2023E asset on platform of US\$518.5bn in 2023E (vs US\$90.3bn in 2020).

Corporate interest income: We expect interest income to stay at a relatively low level in 2021-23E.

Description

Crypto asset sales revenue is generated from crypto assets sold to fulfil transactions.

Corporate interest income represents the revenue generated from corporate interest income.

VALUATION

We base our Buy rating on Coinbase on its leading position as a regulated cryptocurrency exchange, expanding TAM of cryptoeconomy and solid growth in user base and trading volume. Our SOTP-derived target price of US\$302.62 implies 21.3x 2022E P/E and 23.8% upside to current levels.

Initiate with Buy rating with 12-month TP of US\$302.62

Our 12-month target price for Coinbase at US\$302.62 is based on SOTP valuation as we believe this method best reflects the intrinsic value of its multiple business lines.

We arrive at our SOTP valuation of US\$39.6bn, which comprises of the following:

- 1) US\$26.2bn for crypto transaction services, based on a 15.0x 2022E P/E;
- 2) US\$551mn for subscription and services business, on 4.0x 2022E P/S;
- 3) US\$787mn for other businesses, based on 2.0x 2022E P/S;
- 4) US\$12.1bn for net cash.

Crypto transaction services

Our US\$26.2bn valuation is based on 2022E target P/E multiple of 15.0x, which is at a discount to the global exchange market peers average of 27.2x, and the FinTech peers average of 29.4x. Considering the potential risk in the industry, we value the company at a discount to other traditional exchange and trading related peers. On the other hand, we believe the target multiple is justified as Coinbase is backed by 1) 43.0mn verified users (as of December 2020) who are using the platform to trade cryptocurrency and 2) US\$193.1bn trading volume in 2020.

Subscription and services business

The valuation at US\$551mn is based on target 4.0x 2022E P/S. Our target multiple is similar to the financial software peers' average of 4.3x 2022E P/S.

Other business

We value other business, mainly sales of crypto assets, at US\$787mn on target 2.0x P/S multiple given its business nature.

Fig 29. Coinbase– SOTP valuation

US\$'mn	Valuation basis	Metrics	Assigned multiple (x)	Segment as % of total	Valuation
Transaction revenue	2022E P/E	Target P/E of 15.0x	15.0	66.1%	26,153
Subscription and services	2022E P/S	Target P/S of 4.0x	4.0	1.4%	551
Other revenue	2022E P/S	Target P/S of 2.0x	2.0	2.0%	787
Net cash		2022E net cash of US\$12.1bn		30.5%	12,060
Total equity value					39,552
Target price (US\$)					302.62
Upside (%)					23.8%
Implied 2022E P/E (x)					21.3

Source: Company data, China Tonghai Securities estimates

DCF approach implies a fair value of US\$306.52

We cross-check our SOTP-derived TP with the DCF approach as our secondary valuation methodology.

We arrive at a fair equity value of US\$40.1bn, based on the following assumptions: 15.0% WACC; and 5.0% terminal growth rate. Our DCF-derived fair value of US\$306.52 per share.

Fig 30. Coinbase— DCF valuation

US\$'bn	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E
Total CFO	3,611	4,368	5,081	5,437	5,709	5,880	6,056	6,238	6,425	6,618	6,816
Interest expense	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Capex	(938)	(1,192)	(1,359)	(1,495)	(1,644)	(1,809)	(1,990)	(2,089)	(2,194)	(2,259)	(2,327)
Total FCF	2,670	3,173	3,719	3,939	4,062	4,068	4,064	4,146	4,229	4,356	4,486
y/y growth	8.8%	18.8%	17.2%	5.9%	3.1%	0.2%	-0.1%	2.0%	2.0%	3.0%	3.0%
Terminal growth rate	5.0%										
WACC	15.0%										
Terminal Value	44,864										
Enterprise Value (US\$'mn)	28,003										
less debt	271										
add cash	12,331										
Equity Value (mn)	40,062										
Number of shares (mn)	131										
DCF-arrived target price (US\$)	306.52										
Current price	244.36										
Upside (%)	25.4%										
Implied FY22E P/E	21.6										

Source: Company data, China Tonghai Securities estimates

We perform a sensitivity analysis to gauge the extent to which changes in terminal growth rate and WACC will affect our DCF-derived TP of US\$306.52.

Fig 31. Coinbase – Sensitivity of DCF valuation to assumptions of terminal growth rate and WACC

WACC/TGR	14.25%	14.50%	14.75%	15.00%	15.25%	15.50%	15.75%
4.25%	316.49	311.20	306.17	301.37	296.79	292.41	288.22
4.50%	318.52	313.09	307.93	303.01	298.31	293.83	289.55
4.75%	320.66	315.08	309.77	304.72	299.91	295.32	290.93
5.00%	322.91	317.17	311.71	306.52	301.58	296.88	292.39
5.25%	325.30	319.37	313.75	308.41	303.34	298.51	293.91
5.50%	327.81	321.69	315.90	310.40	305.19	300.23	295.50
5.75%	330.48	324.15	318.17	312.50	307.13	302.03	297.18

Source: Company data, China Tonghai Securities estimates

Fig 32. Coinbase – Peer valuation comparisons

Company Name	Ticker	Lcy	Price	MktCap US\$bn	3m Vol US\$m	EPS Growth (%)		P/E (x)		P/S (x)		ROE (%)		Ev/Ebit (x)		Net D/E (%)
						2021	2022	2021	2022	2021	2022	2021	2022	2021	2022	2020
COINBASE GLOBA-A	COIN US	USD	244.36	51.0	1,993	62.1	47.8	25.4	17.2	7.0	5.6	43.1	40.6	20.0	-	(55)
Financial Exchange																
HKEX	388 HK	HKD	522.00	85.1	319	26.4	15.3	45.3	39.3	27.9	24.2	28.8	31.6	19.3	16.4	(358)
INTERCONTINENTAL	ICE US	USD	119.53	67.3	278	8.5	7.2	24.4	22.8	9.7	9.4	13.5	12.2	22.0	22.5	83
LONDON STOCK EX	LSEG LN	GBP	7,474	57.9	66	30.6	14.0	27.6	24.2	6.0	5.6	6.3	8.9	19.9	17.0	6
DEUTSCHE BOERSE	DB1 GR	EUR	142.70	32.1	75	(0.2)	8.8	21.8	20.0	7.8	7.2	18.2	17.9	6.2	5.7	31
NASDAQ INC	NDAQ US	USD	189.36	31.7	128	17.7	3.4	26.0	25.2	9.4	9.0	18.4	17.8	-	-	47
B3 SA	B3SA3 BZ	BRL	15.94	18.9	132	14.5	8.3	19.1	17.7	10.7	9.9	20.2	22.5	14.6	13.2	(44)
JAPAN EXCHANGE G	8697 JP	JPY	2,510	12.3	29	8.0	(3.8)	27.5	27.2	10.4	10.1	14.8	15.5	19.2	17.4	(53)
BC TECHNOLOGY GR	863 HK	HKD	13.56	0.7	2	(0.2)	T/A	N/A	1,339.7	15.0	7.6	N/A	0.7	N/A	747.4	95
Average						13.2	7.6	25.7	27.2	10.0	8.8	14.1	4.5	16.9	15.4	(43)
FinTech Peers (Trading)																
INTERACTIVE BROK	IBKR US	USD	61.96	25.9	59	22.6	0.4	20.3	20.2	9.6	9.7	10.0	11.6	-	-	4
TRADEWEB MARKE-A	TW US	USD	87.84	20.4	55	23.6	13.3	54.3	47.9	19.2	17.3	8.0	8.7	46.9	41.3	(15)
FUTU HOLDING-ADR	FUTU US	USD	107.05	15.7	810	137.2	40.0	34.3	24.5	15.3	10.0	29.4	30.0	31.7	24.6	53
GALAXY DIGITAL H	GLXY CN	CAD	22.13	5.6	31	208.9	(90.9)	6.5	70.7	5.1	11.8	-	-	-	-	(8)
VIRTU FINANCIA-A	VIRT US	USD	24.46	4.6	43	(30.1)	(32.2)	6.1	9.0	2.6	3.3	41.3	23.0	9.0	13.6	264
UP FINTECH H-ADR	TIGR US	USD	16.85	2.7	190	5,778.4	58.6	38.3	24.1	8.2	5.2	23.4	31.7	26.3	21.6	64
STONEX GROUP INC	SNEX US	USD	64.04	1.3	4	9.9	1.0	9.3	9.2	1.1	1.1	-	-	-	-	157
Average						878.6	(1.4)	24.1	29.4	8.7	8.3	22.4	21.0	28.5	25.3	74
Financial Software peers																
MULTIPLAN CORP	MPLN US	USD	7.72	5.2	23	-	10.4	32.2	29.1	4.9	4.6	-	-	-	-	175
RIOT BLOCKCHAIN	RIOT US	USD	32.71	3.1	571	1,165.9	93.1	37.8	19.6	16.2	8.0	-	-	27.1	11.0	(81)
GREEN DOT CORP-A	GDOT US	USD	45.52	2.5	21	5.1	23.0	20.5	16.7	1.8	1.8	11.8	13.9	-	-	(241)
EVO PAYMENTS-A	EVOP US	USD	26.78	2.2	6	31.9	20.0	31.7	26.4	4.5	4.1	22.0	23.3	38.7	34.7	62
CSG SYSTEMS INTL	CSGS US	USD	44.47	1.5	8	-	-	-	-	1.5	1.5	-	16.2	-	-	54
Average						298.2	30.6	30.6	23.0	6.4	4.3	(7.9)	(9.3)	32.9	22.8	(17)
Brokerage peers																
SCHWAB (CHARLES)	SCHW US	USD	67.67	127.6	507	29.4	8.1	21.3	19.7	7.0	6.8	11.4	11.9	15.0	14.5	(46)
JEFFERIES FINANC	JEF US	USD	33.37	8.2	65	83.0	(37.0)	6.9	10.9	1.2	1.6	14.7	8.6	-	-	0
BGC PARTNERS-A	BGCP US	USD	5.13	2.9	22	6.9	14.5	8.3	7.2	1.4	1.4	-	-	-	-	131
Average						39.8	(4.8)	12.2	12.6	3.2	3.3	13.0	10.2	15.0	14.5	28

Source: China Tonghai Securities estimates for Coinbase and BC Group, Bloomberg consensus estimates for all others

Note: Priced as of 5 Aug 2021 close for HK/ Asia listed equities, 4 Aug 2021 close for all others.

Key catalysts

We highlight the key share price catalysts that will likely cause Coinbase's shares to reach new high in the next 12 months, including:

Diversification in business drivers: Fueled by increasing institutional adoption, we expect the subscription and services segment to be a key growth driver. We expect new launches and expansion for its products and services portfolio, beyond custody and staking.

Stronger-than-expected margin expansion: The roll-out of higher-margin products and services and increased operation efficiency thanks to economies of scale could drive a stronger-than-expected margin expansion.

Development of Coinbase ecosystem: The build-up of the Coinbase ecosystem that connects the third-party dApps with accounts is expected to increase user engagement and contribute to user base expansion.

Key Risks

The key downside risks to our Buy rating for Coinbase include:

Crypto winter: An unexpected and long term decline in the digital asset prices may dampen investment interest and lead to a decline in trading volume, undermining the transaction services business (which is the main revenue contributor for the company).

Intensifying market competition: The rapid expansion of the digital assets industry has attracted new market entrants, putting pressure on commission rates.

Regulatory risks: Global regulators may tighten oversight in the digital asset space, hampering the company's business expansion efforts and increasing compliance costs.

COINBASE COMPANY PROFILE

Company description

Established in 2012, Coinbase, Inc. is a leading provider of end-to-end financial infrastructure and technology in the crypto economy for global users. It provides retail users with financial crypto accounts services and the marketplace to trade crypto assets with ample liquidity on the back of its infrastructure and technology. As of March 2021, Coinbase has recorded 56mn verified users and 6.1mn monthly transaction users. Meanwhile, the value of assets on the platform reached US\$223bn, accounting for 11.3% of the market share of crypto assets. Coinbase went public via a direct listing on Nasdaq in April 2021, with a reference price of US\$250 per share.

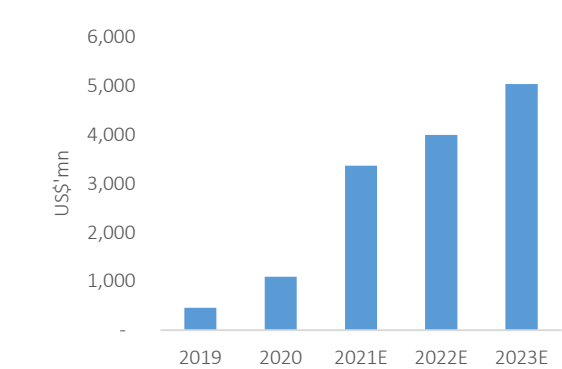
Fig 33. Coinbase— Company milestones

Date	Event
Jun-12	Coinbase was founded by Brian Armstrong and Fred Ehrsam
Oct-12	Launched the services to buy and sell bitcoins through bank transfers
May-13	Received a US\$5mn Series A investment led by venture capital firm Union Square Ventures
Dec-13	Received a US\$25mn investment from the venture capital firms Andreessen Horowitz, Union Square Ventures (USV), and Ribbit Capital
Jan-14	Coinbase Global, Inc. was incorporated in Delaware as a holding company for Coinbase
Jan-15	Received a US\$75 mn investment, led by Draper Fisher Jurvetson, the New York Stock Exchange and USAA
May-16	Added retail support for Ethereum.
Mar-17	Obtained BitLicense from NYDFS
Dec-17	Listed Bitcoin Cash
Apr-18	Announced the form of its early-stage venture fund
Aug-18	Launched Prime service for institutional customers
Feb-19	Acquired Neutrino, a blockchain intelligence platform startup
May-20	Announced to become "remote-first" with no formal headquarters
Oct-20	Announced the launch of a Visa debit card program
Apr-21	Coinbase went public via a direct listing on Nasdaq
Jun-21	Added Dogecoin as tradable assets to the trading platform
Jul-21	Revealed the plan to roll out a "crypto app store" to provide users access to innovative decentralized apps (dapps). Offered institutional clients more trading pairs and payment options via fiat currencies

Source: Company data, media reports.

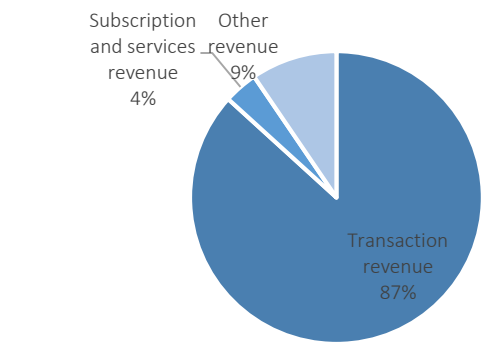
Revenue segments

Fig 34. Coinbase– Revenue by segment, 2019-23E



Source: Company data, China Tonghai Securities estimates

Fig 35. Coinbase– Revenue by segment, 2022E



Source: China Tonghai Securities estimates

Stock Rating: BUY

Active users					
Verified Users (mn)	32	43	55	67	80
Monthly Transacting Users (mn)	1	3	6	7	8
Conversion rate	3%	7%	10%	10%	10%

Note: Fiscal Year End Dec

Rating Definitions	Disclaimer and Risk Statement
BUY We expect the stock to have a total return of > 10% over the next 12 months	This document is published by China Tonghai Securities Limited ("Tonghai Securities"), a licensed corporation (central entity number AAC577) regulated by the Securities and Futures Commission in Hong Kong. This document is for distribution in Hong Kong only to persons who are "Professional Investors" as defined in Part 1 of Schedule 1 of Securities and Futures Ordinance (Cap 571) of Hong Kong and any rules made thereunder. This document is not intended for distribution to or use by, any person or entity who is a citizen or resident of any jurisdiction where such distribution or use would be contrary to applicable law or regulation within such jurisdiction. This document does not constitute an offer or a solicitation of an offer to buy or sell any securities. This document is circulated to addressees solely and may not be reproduced or redistributed to any other person or published, in whole or in part, for any purpose. Tonghai Securities has no investment banking relationship with the issuer within the preceding 12 months from the date of publication of this document. The research is based on information obtained from sources believed to be reliable, but Tonghai Securities does not make any representation or warranty as to its accuracy, completeness or correctness. Opinions expressed are subject to change without prior notice. Any recommendation does not have regard to specific investment objectives, financial situation and particular needs of any specific addressee. Tonghai Securities accepts no liability whatsoever for any direct or consequential loss arising from any use of this document. Tonghai Securities and its affiliates as well as persons associated with any of them from time to time may or may not have interests in the securities mentioned in this document. The prices of securities may move up or down, and past performance is not an indication of future performance. Investors shall consider seeking separate legal or financial advice before making investment decisions.
HOLD We expect the stock to have a total return of < 10% and > -10% over the next 12 months	
SELL We expect the stock to have a total return of < -10% over the next 12 months	
Disclosures	Analyst Certification: The following analysts hereby certify that their views about the companies and their securities discussed in this report are accurately expressed and that they have not received and will not receive direct or indirect compensation in exchange for expressing specific recommendations or views in this report: Esme Pau (C.E. No. ATP176), Zhang Jinyao (C.E. No. BQW387), the authors of this document and their associates declare that as of the date of the publication of this report, they do not hold any financial interest in the company.



BC Tech Group

Pushing the envelope in institutional digital asset; Initiate with Buy

Initiation of Coverage

We initiate coverage of BC Tech Group (BCG) with a Buy rating and 12-month SOTP-derived target price of HK\$18.53. We believe BCG's shares offer investors exposure to the structural theme of rising institutional demand for digital assets trading and investment solutions. As one of the few publicly listed and licensed players in the digital asset exchange industry, we expect BCG to benefit from strong revenue growth and earnings breakeven in 2022E. We view current valuations (7.6x 2022E P/S) as attractive relative to its regional and global peers given its robust revenue growth. Our 12-month PT implies a potential upside of 36.7% to current levels.

Company description

BCG is one of Asia's leading licensed, Big 4-audited digital asset exchange and technology companies for institutional and professional investors. BCG provides SaaS, brokerage, exchange, and insured custody services under its OSL digital asset and blockchain platform. BCG has a strong regional presence, and is expanding into North Americas and Europe.

Valuation

Our 12-month SOTP-derived target price for BCG of HK\$18.53 implies 10.4x 2022E P/S and is at a premium to the average of global exchange peer group's 10.1x and FinTech peer group's 8.3x. We believe its forward P/S premium is justified, given its robust revenue growth (2020-23E CAGR of 71.1%), rapid institutional client uptake and unique value as Asia's only listed digital asset exchange.

Outlook

The main drivers underpinning BCG's structural growth story, include: 1) rapid expansion in TAM, 2) increases in trading volume driven by institutional clients' uptake, 3) new product launches (such as SaaS), and 4) geographical expansion. OSL's digital asset platform trading volumes is forecasted to rise sharply (2020-23E CAGR of 49.7%) to RMB501.0bn in 2023E.

Catalysts

(1) Higher-than-expected institutional client adds; (2) Earlier-than-expected profit turnaround; (3) Higher-than-expected digital asset price and volatility levels.

Key downside risks

(1) Regulatory risk; (2) Intensifying competition from digital asset trading platforms; (3) structural decline in digital asset price levels.

BC Tech Group's Key Financials

(RMB'mn)	FY19	FY20	FY21E	FY22E	FY23E
Revenue	165	217	316	624	1,085
y/y growth	13.6%	31.5%	46.1%	97.2%	74.1%
Operating profit	-207	-224	-235	9	338
y/y growth	61.0%	8.6%	4.9%	T/A	3839.9%
Adj. attributable profit	-244	-250	-260	4	272
y/y growth	50.8%	2.5%	4.1%	T/A	7581.5%
Adj. diluted EPS (RMB)	-0.92	-0.80	-0.62	0.01	0.65
P/E (x)	N/A	N/A	N/A	1,339.7	17.4

Source: Company Data, China Tonghai estimates

Equity Research
Digital Assets Exchange

6 Aug 2021

Ticker	863 HK
Stock Rating	BUY
Industry View	POSITIVE
Price Target (HK\$)	18.53
Price (5-Aug-2021)	HK\$ 13.56
Potential	37%
Upside/Downside	Upside
Market Cap (HK\$m)	5,690.8
Shares Outstanding (mn)	419.7
Free Float (%)	49.7
3M Avg Daily Turnover (HK\$m)	15.22

52 Week range HK\$ 8.90-22.65



Source: Bloomberg

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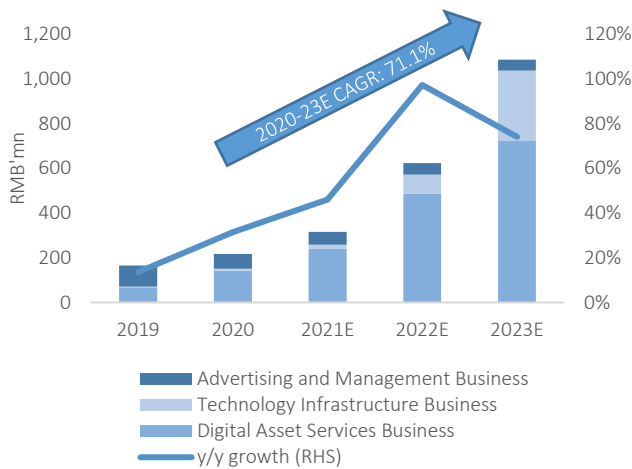
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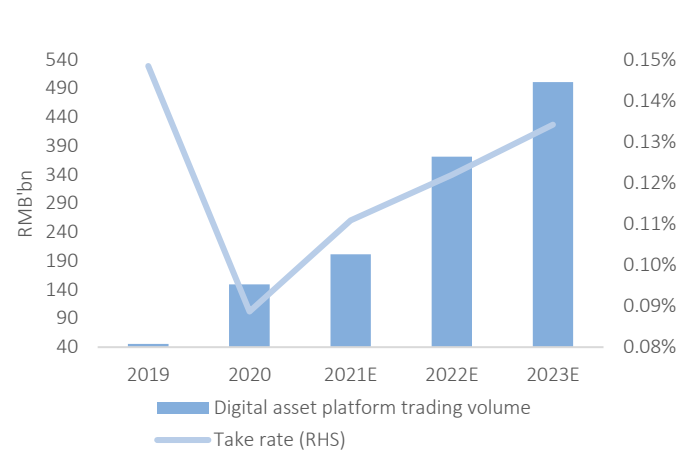
BC TECH GROUP – KEY CHARTS

Figure 1. BC Group – Revenue by segment, 2019-23E



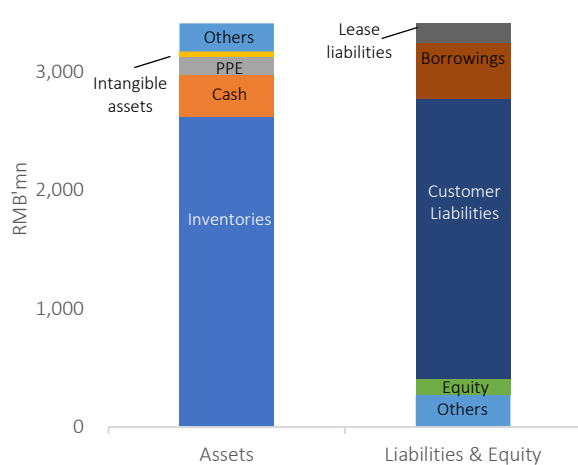
Source: Company data, China Tonghai Securities estimates

Figure 2. OSL – Trading volume & take rate, 2019-23E



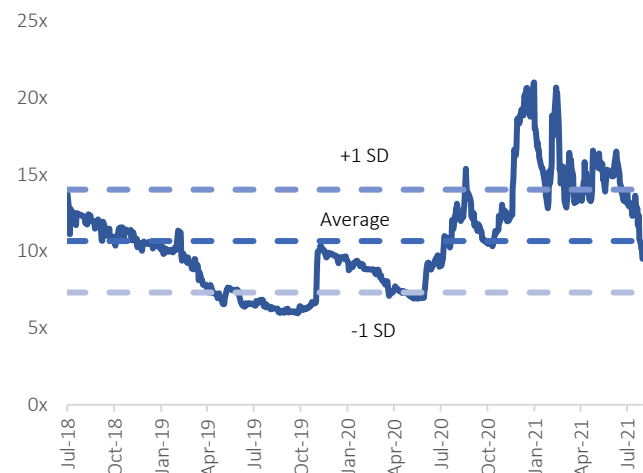
Source: Company data, China Tonghai Securities estimates

Figure 3. BC Group – Balance sheet, YE20



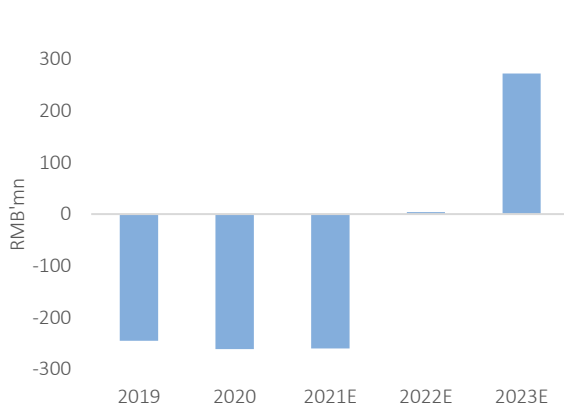
Source: Company data, China Tonghai Securities

Figure 4. BC Group – Forward P/S



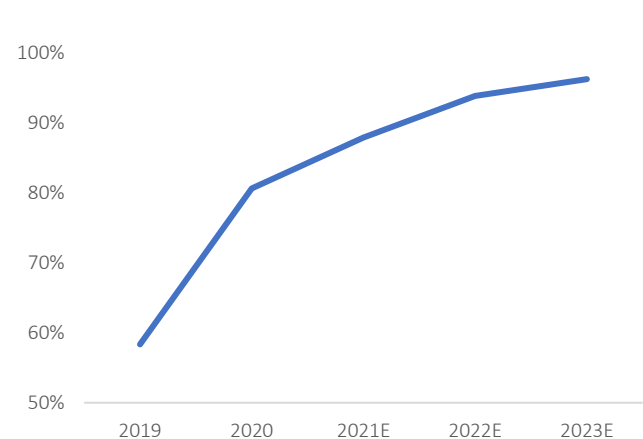
Source: Bloomberg, China Tonghai Securities estimates

Figure 5. BC Group – Attributable net profit, 2019-23E



Source: Company data, China Tonghai Securities estimates

Figure 6. BC Group – Gross margin, 2019-23E



Source: Company data, China Tonghai Securities estimates

KEY INVESTMENT VIEWS

Rapidly expanding total addressable market as a tailwind

Asia's leading player in the digital asset exchange industry

BCG is one of Asia's leading players in the digital asset exchange industry and is poised to benefit from higher institutional adoption of digital assets. The trading volumes of OSL digital asset platform under BCG is forecasted to rise sharply (2020-23E CAGR of 49.7%) as digital assets, as an asset class, gain traction among financial institutions and institutional investors.

Key drivers include: 1) the structural growth of digital assets, which is aligned with institutions' changing preference; 2) Increasing clarity as global regulatory and compliance authorities set more precise rules that will guide industry development; 3) active digital asset ecosystem which is defined by product innovation to expand coverage of institutional demand (e.g. custody, insurance coverage).

We expect Asia will catch up with US in relation to the institutional adoption of digital assets

In our view, institutional adoption of digital assets in Asia will catch up with US peers, evidenced by a shift to more progressive rhetoric among the region's institutional investors. We expect more financial institutions (FI) to offer institutional investors broader exposure to digital assets, such as ETF, managed funds, custody, and digital asset trading in the near to medium term.

- **More FIs to follow the footsteps of DBS and StanChart into digital assets:** Several FIs has partnered with OSL to seize the digital asset opportunity. DBS has launched a digital asset exchange targeted at institutional investors via OSL's SaaS solutions. SC Ventures under StanChart has partnered with OSL to launch a digital asset exchange in Europe.
- **More traditional institutional investors to enter digital asset investments:** The increasing institutional participation is expected to be driven by 1) the easing concerns over market manipulation with growing liquidity on regulated exchanges and 2) the development of fundamental analysis and valuation framework. According to a survey conducted by Fidelity Digital in July 2021, 70% of institutional investors intend to invest in digital assets in the near future, and over 90% plan to do so by 2026.
- **More companies to invest digital assets in corporate treasury function:** Such as Meitu (1357 HK), MicroStrategy (MSTR US), Tesla (TSLA US).

Rapid institutional client uptake powered by best-in-class infrastructure for digital assets

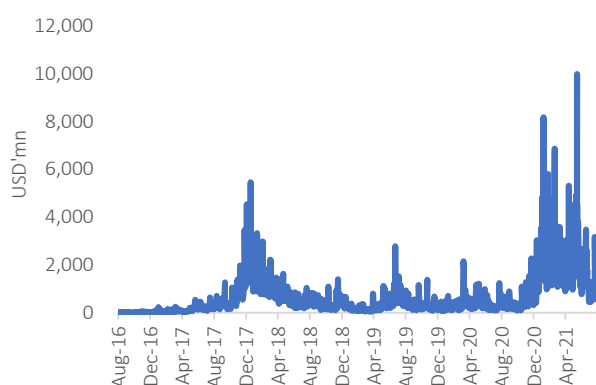
Strong global institutional interest in digital assets has confirmed the viability of BCG's business model and strategy

BCG's prior investments focused on its platform's robustness, scalability, and compliance have laid a solid foundation for future growth. Such a foundation has led to receiving regulatory licenses and partnerships with reputable financial institutions (such as StanChart and DBS). The launch of the scalable SaaS offering in 2Q2019 will dramatically increase its addressable market.

We believe future growth will take the form of:

- Innovations – CBDC (Central Bank Digital Currencies), STO (Security Token Offerings) that enable the tokenization of traditional and previously illiquid assets;
- New products – E.g. mobile app;
- New customers – BCG is pivoting its strategy to aggressively grow its market share in the near to medium term.

Figure 7. Bitcoin liquidity



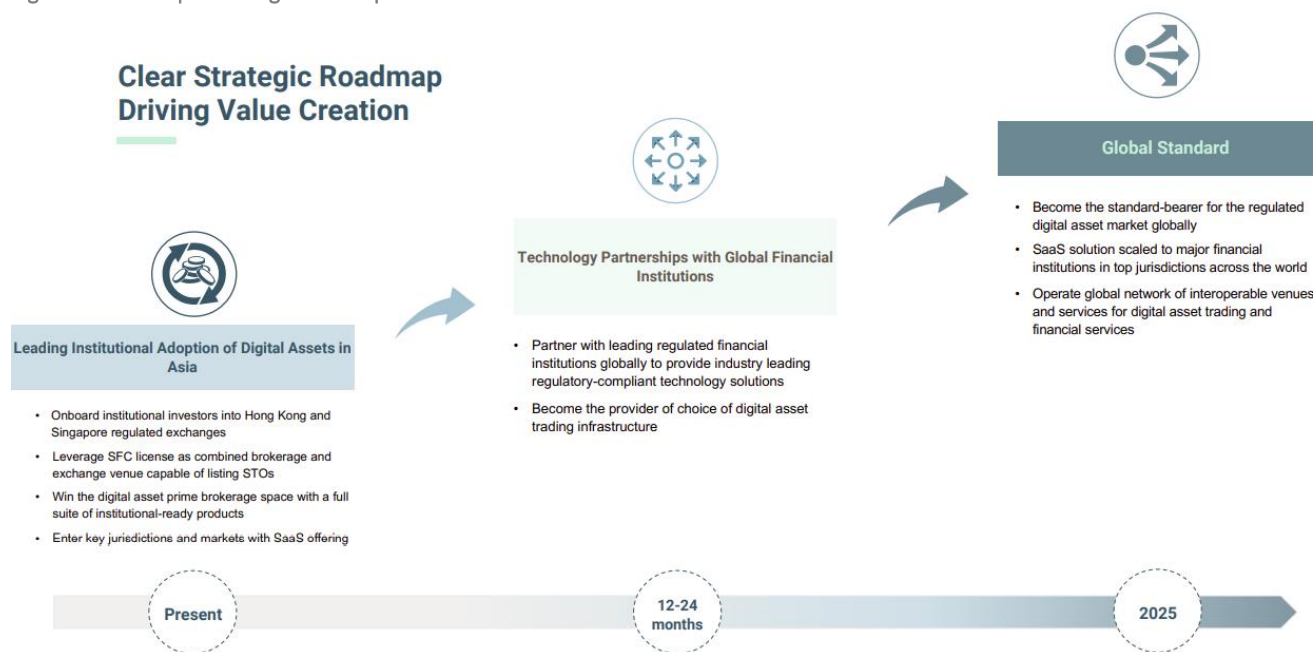
Source: Bitcoinity, China Tonghai Securities

Figure 8. Selected examples of digital asset custodian solutions for institutional investors

Company	Details of custodian solution	Year of launch
Gemini	- "Gemini Fund Solutions" Provides fund managers with custody, clearing, trade execution and other capital markets services all in one place	2021
Coinbase	- Coinbase Custody is an independent and NYDFS-regulated entity that offers clients access to the secure and institutional-grade offline storage solution. - It became the largest digital asset custodian in the world after acquiring Xapo in Aug 2019.	2018
PayPal	PayPal entered the digital asset custody market through the acquisition of Curv, a Tel Aviv-based provider of cloud-based infrastructure for digital asset security	2021
Komainu	- Komainu is a Jersey-based regulated institution-grade digital asset custodian that brings together global banking, blockchain technology, and asset management capabilities. - It raised US\$25mn in series A in Mar 2021	2018

Source: Company websites, China Tonghai Securities

Figure 9. BC Group – Strategic roadmap



Source: Company data

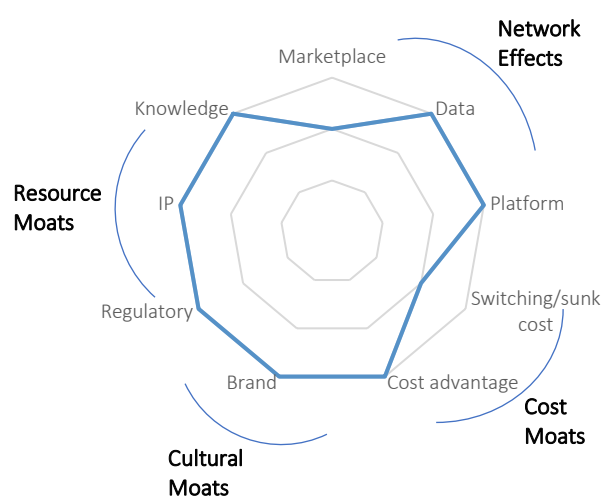
Regulatory licensing as a near-term competitive moat

OSL is the first SFC-licensed, digital asset wallet-insured, Big-4 audited digital asset trading platform for institutions and professional investors

As the first digital asset exchange licensed by SFC, regulatory licensing is a competitive moat that sets BCG apart from its competitors. OSL offers institutional clients secure and compliant trading access to digital assets and demonstrates a proven ability to secure contracts with top-tier financial institutions.

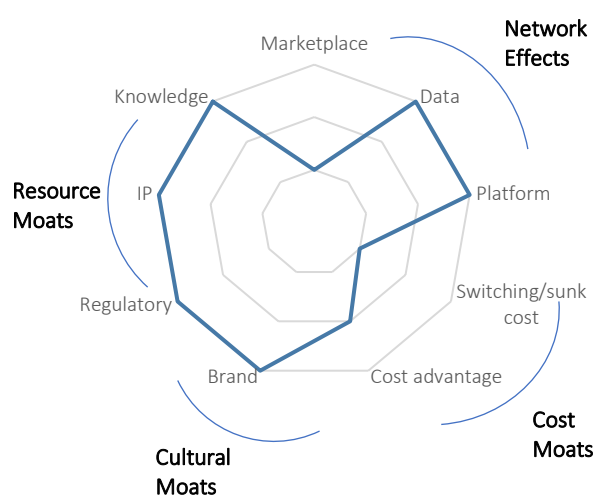
In Dec 2020, BCG's OSL Digital Securities unit became the first firm to receive a license from HK SFC to conduct Type 1 (dealing in securities) and Type 7 (automated trading service (ATS)) regulated activities.

Figure 10. BC Group – Competitive moats (short-term)



Source: China Tonghai Securities

Fig 11. BC Group – Competitive moats (mid to long-term)



Source: China Tonghai Securities

Figure 12. BC Group – Competitive moats

Category	Type of moat	Digital asset exchange		BCG		Remarks
		Near term	Mid to LT	Near term	Mid to LT	
Network effects	Marketplace	√√	√	√	√√	Digital Asset Exchange: An exchange's value to its users increases in proportion to (1) the usage frequency and (2) the number of users on the platform. The market share of unregulated exchanges will come under pressure as global regulators tighten control. BCG: Benefits from the virtuous cycle of network effects and economies of scale. BCG can more effectively aggregate demand and supply as institutional users increase with scalability (SaaS) and a global distribution strategy.
	Data	√√	√	√√	√√√	Digital Asset Exchange: Centralized exchanges have the upper hand in user data given their more robust KYC and AML process. Decentralized exchanges (DEX) lack a competitive edge in user data due to user anonymity on their platforms. BCG: More data lead to better algorithms and more robust products. For example, OSL has custody, exchange, brokerage and SaaS solutions.
	Platform	√√	√√	√√	√√√	Digital Asset Exchange: New products increase user engagement in its ecosystem (e.g. new coin listing, DeFi, STO). BCG: We expect BCG's new product pipeline to reinforce its core products' value proposition and engage users in its ecosystem.
Cost moats	Switching/sunk cost	√√√	√√√	√	√√	Digital Asset Exchange: Switching cost is generally low. Digital assets are easily portable across platforms. BCG: Near-term switching cost is high given its licensed status. If more exchanges are licensed in the future, we see long term switching costs as low to medium given its product innovation roadmap (e.g. SaaS).
	Cost advantage	√√	√√	√√	√√√	Digital Asset Exchange: Costs (commissions) will come down with economies of scale BCG: Benefits from scale - the more quality institutional clients there are, the more cost-effective it is.
Cultural moats	Brand	√	√	√√√	√√√	Digital Asset Exchange: Successful branding will easily attract users to participate in its ecosystem; negative headlines and hacks will adversely impact the reputation. BCG: The firm fosters a corporate culture of high ethical standards and a proven execution track record.
Resource moats	Regulatory	√	√√	√√√	√√√	Digital Asset Exchange: The industry is susceptible to regulatory risk; in the past, certain exchanges fell foul of regulations had to shut down or halt services. BCG: BCG has cultivated solid relationships with regulatory authorities, thanks to their strong legal and compliance team and infrastructure. In the near term, we expect more digital asset exchange to be licensed. Longer-term, the regulatory moat - in the form of intangible relationships with regulatory and compliance authorities - will be difficult, if not impossible, for peers to replicate.
	IP	√√	√	√√√	√√√	Digital Asset Exchange: Those with solid IP will stand out since many exchanges lack exclusive and innovative patents. BCG: BCG has a considerable portfolio of self-owned modules, codes and technology.
	Knowledge	√	√√	√√√	√√√	Digital Asset Exchange: Technical know-how in digital assets is fundamental to adapting to rapidly developing digital asset industry changes. BCG: The management team has a profound understanding of digital assets and traditional finance and strong relationships in the financial and regulatory industry.

Source: China Tonghai Securities

Product innovation and network effects will determine the next phase of growth

BCG has demonstrated its ability to offer a full suite of products, spanning core digital asset products and systems to trading and custody services. It is also servicing both the liquidity and technology needs of large global financial institutions.

Figure 13. BC Group – Product and service launch pipeline

	2018		2019		2020		2021		Long term
	1H	2H	1H	2H	1H	2H	1H	2H	Emerging Tech
Digital Asset Service	Launched OSL Brand		Insured Custody Solutions	Bitcoin payment settlement	OSL Digital Exchange, open for STO		Cap intro services	BCAP Tokens Trades Institution-grade trading platform in Europe	Upgrades leveraging facial recognition and machine learning STO ESG DeFi NFT CBDC Mobile App
Technology Infrastructure			SaaS trading and trading-related system services		Comprehensive SaaS product for digital asset trading	On boarded DBS as client			
Partnership				Deloitte	Fidelity	DBS	standard chartered Fidelity	聚安國際 ZA International	

Source: Company data, China Tonghai Securities

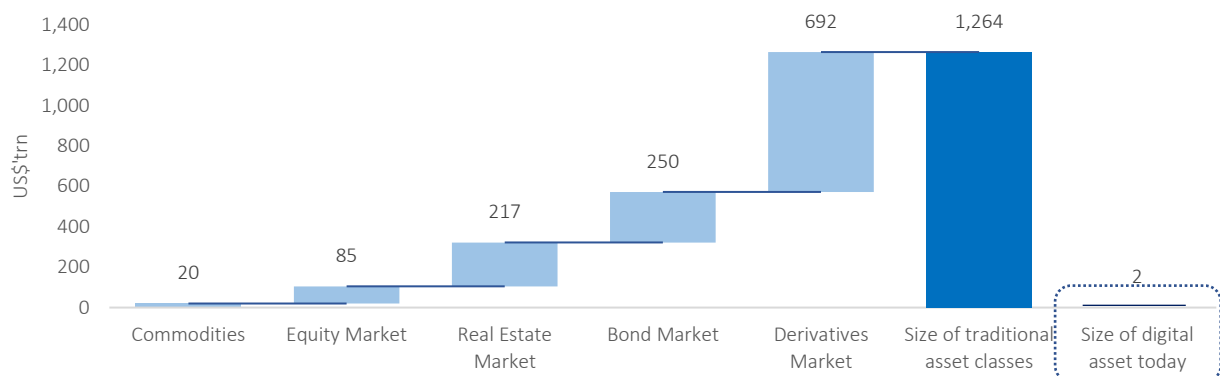
Robust TAM growth of the digital asset economy

The company's long-term growth is tied to the TAM of the digital asset economy

Positioned as the entry point for institutional clients into the digital asset economy, BCG effectively captures institutional investor demand for exposure to the digital asset economy.

- In part, BCG's near-term revenues will be tied to transaction fees, correlated with digital asset prices (led by blue-chips, such as bitcoin and ether).

Figure 14. Digital asset market opportunity – Total addressable market



Source: Company data, China Tonghai Securities

CORE COMPETENCIES

Increasing trading volume driven by solid product innovation

We expect its digital asset platform trading volumes to grow at a 2020-23E CAGR of 49.7%

We expect BCG to achieve significant growth in trading volume and assets on platform. We forecast the overall digital asset platform trading volumes to grow at a CAGR of 49.7%, from RMB149.4bn in 2020 to RMB501.0bn in 2023E, driving by the increased global interest and investment into digital assets. Its assets on platform is expected to grow from RMB2.6bn in 2020 to RMB7.4bn in 2023E (CAGR: 41.5%), given its leading position in the market with the licenses from the SFC to conduct regulated activities related to digital assets.

Figure 15.BCG – Digital asset platform trading volume

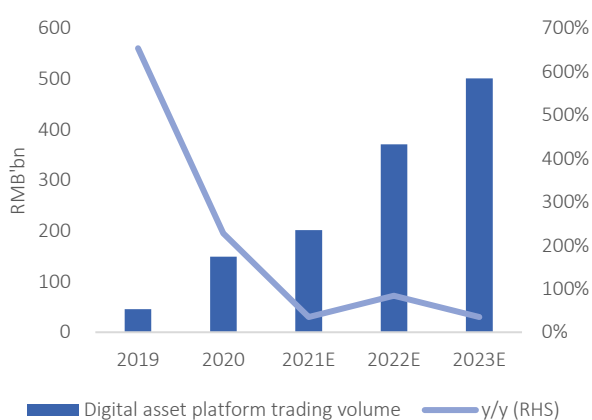
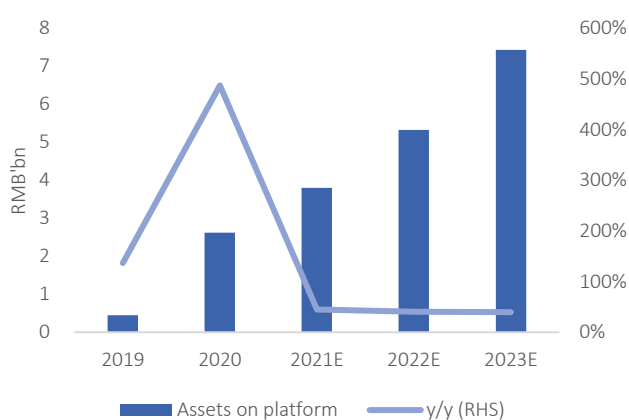


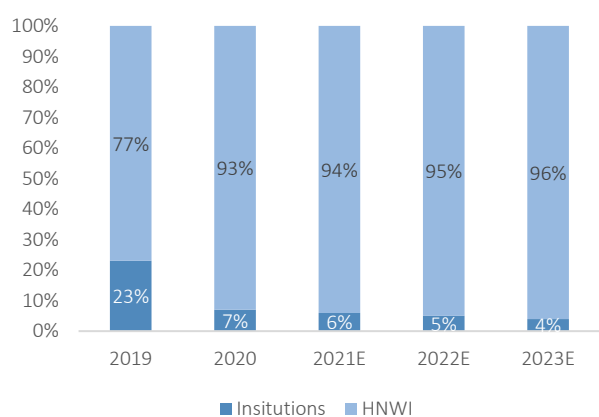
Figure 16. BCG – Assets on Platform



Source: Company data, China Tonghai Securities estimates

Source: Company data, China Tonghai Securities estimates

Figure 17.BCG – Digital asset trading volume mix



Source: Company data, China Tonghai Securities estimates

Tapping into global demand to drive long-term growth

We believe BCG will continue to tap into global pockets of demand for digital assets to drive long-term growth.

Figure 18. BCG – Examples of overseas expansion

Countries/Regions	Partner	Developments
Hong Kong, China	ZA International	- Established partnership with ZA International to leverage its advanced technology in facial recognition and machine learning to improve user experience in OSL trading platform in Jul 2021.
Singapore	DBS	- OSL set up Singapore office in Jul 2019; - OSL submitted a license application to the Monetary Authority of Singapore (MAS) in Jul 2020 to expand its business in Singapore; - Onboarded DBS bank as a technology client in Dec 2020 and became its strategic technology partner
Europe	Standard Chartered	- Started R&D in the European market - Partnered with Standard Chartered to establish a European-based Institutional Digital Asset Trading arm in Jun 2021

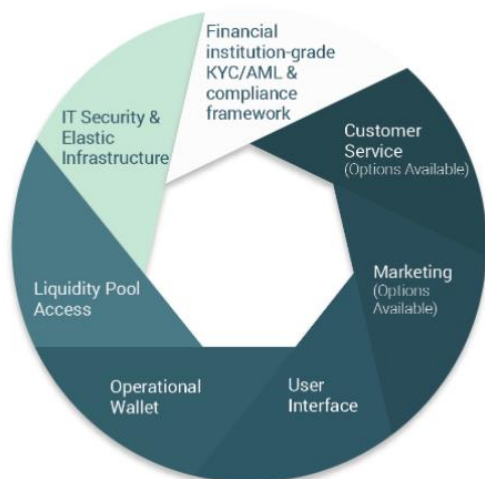
Source: Company data, China Tonghai Securities

SaaS trading platform enhances scalability

OSL SaaS solution to increase scalability

OSL's SaaS solution will increase the scalability of its institutional digital asset solution and drive robust SaaS revenue growth. In 2Q 2019, OSL launched the SaaS platform, which is positioned as an entire suite of white-label plug-and-play solutions to effectively onboard professional investors and institutions.

Figure 19. OSL – SaaS offering



Source: Company data

Figure 20. OSL – SaaS Capabilities

OSL SaaS Solution	Details
Market matching	Best in market matching engine technology with 190,000 transactions-per-second and 99.8% uptime;
Shared order book technology	Provides instant daily liquidity up to US\$500 million;
Digital asset support	Supports top digital currencies, G10 fiat currencies and ERC20 tokens - guaranteed price scaffolding on top-10 digital asset pairs;
Service management	A fully managed service covering up to 70% of operating costs;
Partnership	The best partnership support and middle office in the industry;
Institutional-grade solution	Institutional-grade solution with immediate executable liquidity;
Customer services	Complete 24/7 customer services support for security, wallet services, accounting, reconciliation and technical compatibilities;
Compliance	Integration of compliance, KYC/KYB and AML toolkits

Source: Company data

KEY DEBATES

Increasing industry competition

OSL faces competition from other digital asset exchanges (Coinbase, Binance), decentralized exchanges (Uniswap, Sushiswap) and other financial institutions pivoting into the digital asset opportunity. OSL's licensing status (first and only SFC licensed Type 1 and 7) has shielded it from direct competition with all other unregulated digital exchanges.

Our view is BCG will retain its leading position in the regional institutional digital asset exchange industry on the back of its solid technological expertise and relationships, innovative product roadmap and sophisticated compliance process.

Fast evolving digital asset regulatory environment

Global regulators maintain stringent oversight over digital asset industry developments to keep the overall risks of the financial and investment system in check. Any potential regulatory changes will likely delay the company's new products or services launch. OSL's overseas ambitions will also expose it to regulations of other jurisdictions, which has different regulatory stances to digital assets.

In addition, OSL primarily adopts an AUM-based and transaction-based revenue model, which exposes the platform to potential changes in regulations and institutional receptiveness to digital assets.

BCG's strong relationship with regulators and additional revenue streams will enable it to adapt well to the evolving regulatory landscape

Given its strong relationship with the regulators, we are confident of BCG's ability to adapt to the rapidly changing regulatory environment. In addition, the recurring revenue model of its SaaS model will also lead to the smoothing of future revenue streams.

Short operating track record

Unpredictability and limited visibility that defines the digital asset economy are important factors underpinning the analysis of companies with short operating track records, such as OSL.

Momentum begets momentum. Our view is BCG has the institutional and infrastructural setup to rise above the uncertainties.

VALUATION

We initiate coverage on BC Group's shares with a Buy rating. We believe the company is a leading beneficiary of the solid growth in digital assets trading volumes and institutional participation. Our SOTP-derived TP of HK\$18.53 implies 10.4x 2022E P/S and represents 36.7% upside potential.

Buy rating and 12-month TP of HK\$18.53

We set our 12-month price target for BC Group at HK\$18.53 based on SOTP methodology, which we believe best reflects its intrinsic value. Our Buy rating reflects our positive view for the rapidly expanding TAM, higher institutional adoption, our expectation for solid digital asset trading volume growth and 2022E breakeven.

Target multiples for each segment

We arrive at our SOTP-derived TP of HK\$18.53 by applying the following target multiples to the respective business segments:

- 11.0x 2022E P/S for the digital assets and blockchain platform business, which is at a premium to global exchanges group average of 10.1x 2022E P/S, and FinTech peers' average of 8.3x 2022E P/S;
- 6.0x 2022E EV/EBIT for advertising and business park area management services.

Figure 21. BC Group – Target P/E valuation

RMB'mn	Valuation basis	Metrics	Assigned multiple	Segment as % of total	Valuation
Digital assets and blockchain platform business	2022E P/S	2022E Segment rev. RMB571mn	11.0	97%	6,283
Advertising and business park area management services	2022E EV/EBIT	2022E EBIT RMB22mn	6.0	2%	130
Net cash	2022E			1%	62
Total valuation					6,476
Total diluted shares (mn)					419
RMB-HKD					1.20
Target price (HKD)					18.53

Source: China Tonghai estimates

Share price trading pattern

BCG relative to its own trading history

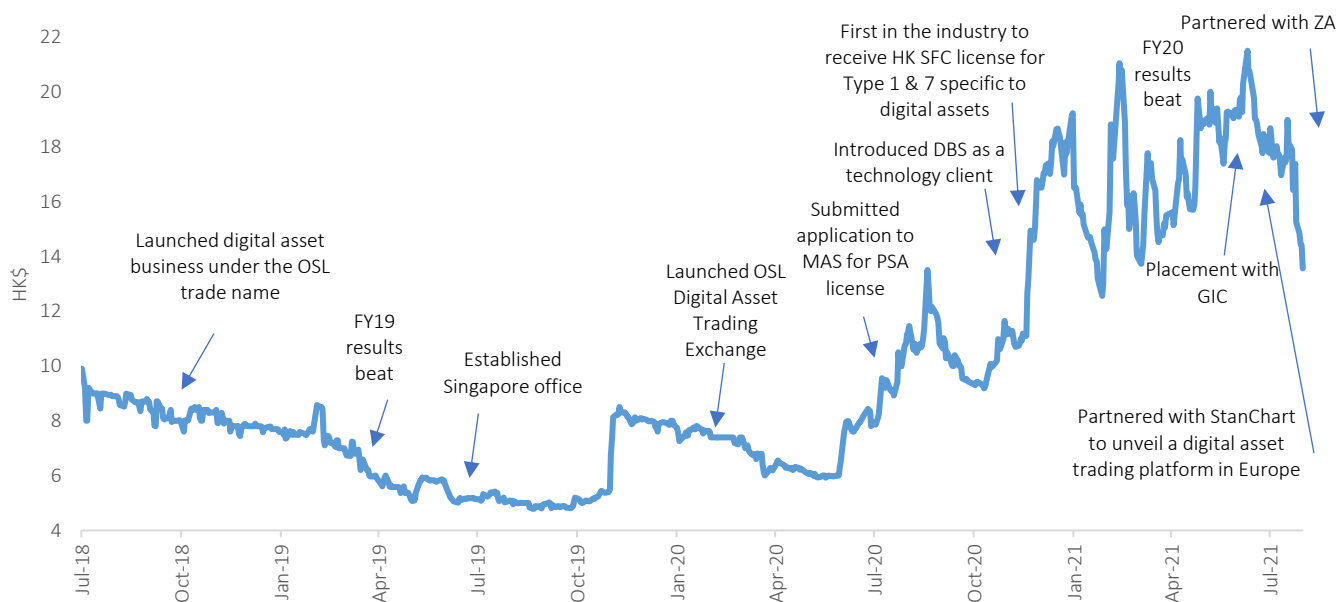
BCG's shares currently trade at 9.5x 2021E P/S, slightly below its recent 3-year average forward P/S of 10.7x.

Figure 22. BC Group – Forward P/S



Source: Bloomberg, Company data, China Tonghai Securities estimates

Figure 23. BC Group – Share price performance chart



Source: Bloomberg, Company data, China Tonghai Securities estimates

Fig 24 BC Technology Group – Peer valuation comparisons

Company Name	Ticker	Lcy	Price	MktCap		3m Vol		EPS Growth (%)		P/E (x)		P/S (x)		ROE (%)		Ev/Ebit (x)		Net D/E (%)
				US\$bn	US\$m	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022	
BC TECHNOLOGY GR	863 HK	HKD	13.56	0.7	2	(0.2)	T/A	N/A	1,339.7	15.0	7.6	-	0.7	N/A	747.4			95
Financial Exchange																		
HKEX	388 HK	HKD	522.00	85.1	319	26.4	15.3	45.3	39.3	27.9	24.2	28.8	31.6	19.3	16.4			(358)
INTERCONTINENTAL	ICE US	USD	119.53	67.3	278	8.5	7.2	24.4	22.8	9.7	9.4	13.5	12.2	22.0	22.5			83
LONDON STOCK EX	LSEG LN	GBP	7,474	57.9	66	30.6	14.0	27.6	24.2	6.0	5.6	6.3	8.9	19.9	17.0			6
COINBASE GLOBA-A	COIN US	USD	244.36	51.0	1,993	62.1	47.8	25.4	17.2	7.0	5.6	43.1	40.6	20.0	-			(55)
DEUTSCHE BOERSE	DB1 GR	EUR	142.70	32.1	75	(0.2)	8.8	21.8	20.0	7.8	7.2	18.2	17.9	6.2	5.7			31
NASDAQ INC	NDAQ US	USD	189.36	31.7	128	17.7	3.4	26.0	25.2	9.4	9.0	18.4	17.8	-	-			47
B3 SA	B3SA3 BZ	BRL	15.94	18.9	132	14.5	8.3	19.1	17.7	10.7	9.9	20.2	22.5	14.6	13.2			(44)
JAPAN EXCHANGE G	8697 JP	JPY	2,510	12.3	29	8.0	(3.8)	27.5	27.2	10.4	10.1	14.8	15.5	19.2	17.4			(53)
Average						21.2	12.0	27.2	24.2	11.1	10.1	20.4	20.9	17.3	15.4			(43)
FinTech Peers (Trading)																		
INTERACTIVE BROK	IBKR US	USD	61.96	25.9	59	22.6	0.4	20.3	20.2	9.6	9.7	10.0	11.6	-	-			4
TRADEWEB MARKE-A	TW US	USD	87.84	20.4	55	23.6	13.3	54.3	47.9	19.2	17.3	8.0	8.7	46.9	41.3			(15)
FUTU HOLDING-ADR	FUTU US	USD	107.05	15.7	810	137.2	40.0	34.3	24.5	15.3	10.0	29.4	30.0	31.7	24.6			53
GALAXY DIGITAL H	GLXY CN	CAD	22.13	5.6	31	208.9	(90.9)	6.5	70.7	5.1	11.8	-	-	-	-			(8)
VIRTU FINANCIA-A	VIRT US	USD	24.46	4.6	43	(30.1)	(32.2)	6.1	9.0	2.6	3.3	41.3	23.0	9.0	13.6			264
UP FINTECH H-ADR	TIGR US	USD	16.85	2.7	190	5,778.4	58.6	38.3	24.1	8.2	5.2	23.4	31.7	26.3	21.6			64
STONEX GROUP INC	SNEX US	USD	64.04	1.3	4	9.9	1.0	9.3	9.2	1.1	1.1	-	-	-	-			157
Average						878.6	(1.4)	24.1	29.4	8.7	8.3	22.4	21.0	28.5	25.3			74
Financial Software peers																		
MULTIPLAN CORP	MPLN US	USD	7.72	5.2	23	-	10.4	32.2	29.1	4.9	4.6	-	-	-	-			175
RIOT BLOCKCHAIN	RIOT US	USD	32.71	3.1	571	1,165.9	93.1	37.8	19.6	16.2	8.0	-	-	27.1	11.0			(81)
GREEN DOT CORP-A	GDOT US	USD	45.52	2.5	21	5.1	23.0	20.5	16.7	1.8	1.8	11.8	13.9	-	-			(241)
EVO PAYMENTS-A	EVOP US	USD	26.78	2.2	6	31.9	20.0	31.7	26.4	4.5	4.1	22.0	23.3	38.7	34.7			62
CSG SYSTEMS INTL	CSGS US	USD	44.47	1.5	8	-	-	-	-	1.5	1.5	-	16.2	-	-			54
Average						298.2	30.6	30.6	23.0	6.4	4.3	(7.9)	(9.3)	32.9	22.8			(17)
Brokerage peers																		
SCHWAB (CHARLES)	SCHW US	USD	67.67	127.6	507	29.4	8.1	21.3	19.7	7.0	6.8	11.4	11.9	15.0	14.5			(46)
JEFFERIES FINANC	JEF US	USD	33.37	8.2	65	83.0	(37.0)	6.9	10.9	1.2	1.6	14.7	8.6	-	-			0
BGC PARTNERS-A	BGCP US	USD	5.13	2.9	22	6.9	14.5	8.3	7.2	1.4	1.4	-	-	-	-			131
Average						39.8	(4.8)	12.2	12.6	3.2	3.3	13.0	10.2	15.0	14.5			28

Source: China Tonghai Securities estimates for BC Group and Coinbase, Bloomberg consensus estimates for all others

Note: Priced as of 5 Aug 2021 close for HK/ Asia listed equities, 4 Aug 2021 close for all others.

Key catalysts

Below, we highlight the key share price catalysts that will likely cause BCG's shares to test new peaks in the next 12 months, including:

- **Stronger-than-expected trading volume growth:** Stronger-than-expected trading volume growth will drive digital asset services business revenue above our forecasts;
- **Better-than-expected take rate on trading volumes:** Better-than-expected take rate on trading volumes will increase monetization and drive digital asset services business revenue above our forecasts;
- **Higher-than-expected infrastructure demand from institution:** OSL's continued global roll-out of its market-leading SaaS, higher-than-expected institutional demand will drive its revenue from its technology infrastructure business above our forecasts;
- **Earlier-than-expected profit turnaround:** New product launch and monetization improvement could drive an earlier-than-expected earnings breakeven. Our base case is for the company to reach earnings breakeven in 2022E.
- **The release of positive operating metrics will affirm our investment thesis for digital asset's TAM expansion:** As the institutional digital asset adoption story plays out, the release of positive operating metrics for OSL in 2H21 and 1H22 – such as significant growth in trading activity and SaaS client onboarding – will likely drive shares up;
- **Faster-than-expected overseas expansion:** Positive developments of OSL's overseas expansion will catalyze share price appreciation.

Key risks

The key downside risks to our Buy rating and price target for BCG include the following:

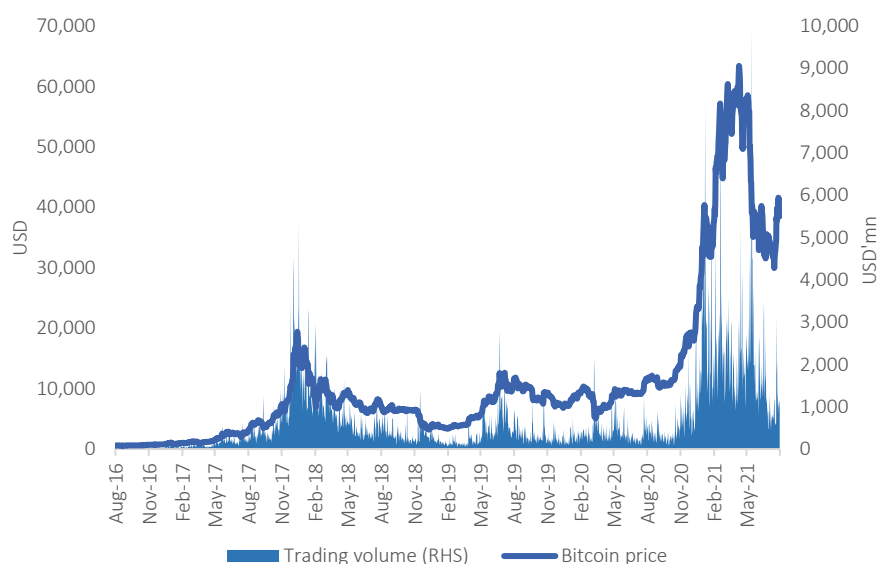
Regulatory risk

Regulatory changes in the jurisdictions that OSL operate in – namely, Hong Kong, Singapore, US and Europe – may lead to cost overruns to ensure regulatory compliance. In addition, adverse regulatory environment may dampen clients' appetite in adopting BCG's digital assets solutions and cause revenue to fall below our forecasts.

A structural decline in trading volume

Digital assets represent massive opportunities and volatility. A sudden dry up in volatility and/or a long term downward price trend could cause operating performance to miss our estimates. The majority (78% in 2022E) of BCG's revenue is derived from transaction fees on its platform OSL (either a flat fee or ad valorem).

Figure 25. Bitcoin price and trading volume



Source: Bitcoinity, China Tonghai Securities

A slowdown in digital asset economy growth

Bad actors and a technological impasse could limit the appeal of OSL's products for a wider institutional audience and hinder the growth of the digital asset ecosystem, ultimately representing speedbumps for the otherwise meteoric rise of the digital asset economy.

Bitcoin, the grandfather of all digital currencies, was unveiled in 2009. Blockchain technology was introduced in 2008 and is still nascent. The usage of digital assets represents an evolving paradigm subject to various factors such as the development of new technologies for mining, rewards and transaction fees, cybersecurity issues etc. Failure to resolve any risk that arises could adversely affect the development and growth of the digital asset economy.

Intensifying competition from other digital asset exchanges and traditional finance institutions

Competitive pressures and BCG's failure to innovate to keep abreast with rapid industry changes may limit its growth profile.

Our expectation for solid revenue growth (2020-23E revenue CAGR of 71.1%) and trading volume (2020-23E CAGR of 49.7%) depends on the company's ability to innovate, launch and monetize new products and services. However, market demand and regulatory requirements may pose difficulty in launching new products to support growth.

Relative to most digital asset exchanges, OSL's core competitive edge is the blessing from regulators (in the form of licenses) and institutional support (GIC, DBS, StanChart etc.).

Delay in profit breakeven

While BCG is still at a rapid growth phase with double-digit revenue growth, we expect the company to remain loss-making through 2022E.

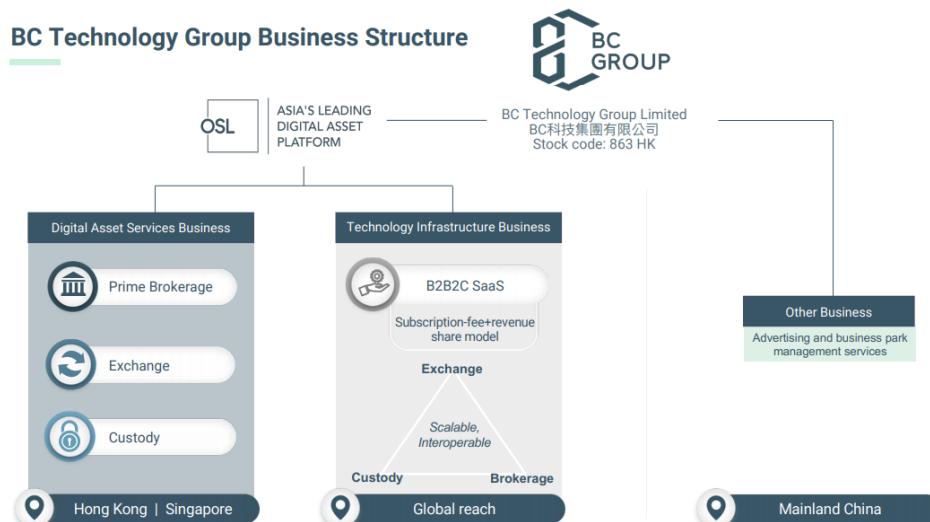
COMPANY BACKGROUND

BC Technology Group Ltd is an investment holding company. Its wholly-owned subsidiary OSL Digital Securities is the first company to receive a license from the SFC to conduct Type 1 (dealing in securities) and 7 (providing automated trading services) regulated activities related to digital assets.

The OSL platform directly provides interoperable institutional-grade financial services to professional counterparties for digital asset brokerage, automated trading (i.e. exchange), and custody. It also builds customized SaaS technology solutions for customers such as banks and other large financial institutions with a B2B2C model, including any combination of the OSL's digital asset financial services, driving scale and distribution.

BC Group also provides China-focused advertising and business park area management services (a legacy business).

Figure 26. BCG – Business structure



Source: Company data

Figure 27. BC Group – Company milestone

Date	Event
Aug-18	Launched digital asset business under the OSL brand
2Q19	Started SaaS trading and trading-related system services
Jul-19	Set up Singapore office
Nov-19	1st in the industry that applied Hong Kong SFC for digital asset trading platform license in Hong Kong
Mar-20	Launched OSL Digital Asset Trading Exchange
2H20	Submitted application to Monetary Authority of Singapore (MAS) for PSA license
Dec-20	<ul style="list-style-type: none"> - 1st in the industry that received Hong Kong SFC license for Type 1 & 7 regulated activities specific to digital assets - Introduced DBS Bank as a technology client
Jun-21	<ul style="list-style-type: none"> - Raised HK\$543mn via share placement with GIC - Partnered with Standard Chartered-backed SC Ventures to unveil a digital asset trading platform in Europe

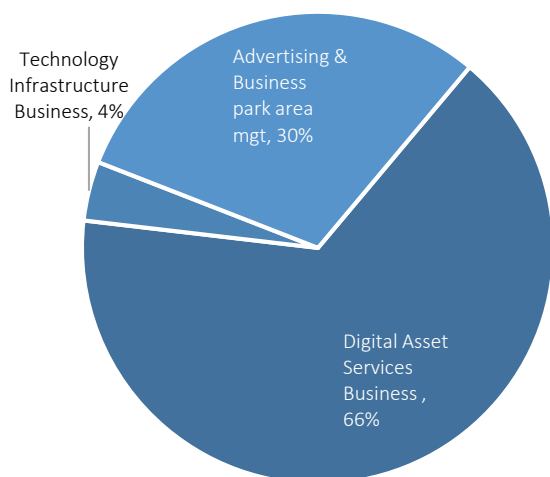
Source: Company data, China Tonghai Securities

Figure 28. Institutional interest in digital assets – Selected examples in Asia

Institution	Type	Partnership with BCG	Significance	Date
GIC	Financial investment	GIC took a 7.62% stake in BCG via a placement. The net proceeds of c.HK\$535mn will be applied to: (1) platform technology enhancements (37%); (2) working capital (44%); and (3) overseas expansion in UK, Singapore, US (19%).	GIC's investment in BCG is an implicit endorsement of the future potential of digital assets in Singapore and overseas markets.	Jun 21
DBS	Digital exchange launch	DBS is one of the technology services clients of BCG.	DBS Digital Exchange launch is in lockstep with asset digitalization opportunities in Singapore. Its partnership with BCG implied its recognition of the BCG brand and technology.	Jan 21
Standard Chartered	Digital asset brokerage and exchange platform in Europe	On 2 June 2021, SC Ventures, the innovation and ventures unit of Standard Chartered, entered into a partnership with BCG to jointly establish a digital asset brokerage and exchange platform for Institutional and corporate clients in UK and Europe.	StanChart's European digital brokerage launch is in line with the geographical expansion and growth strategy of BCG. OSL can tap into the large pool of FI in the European market with a leading partner.	Jun 21
Meitu	Digital asset Investments	Purchased US\$100mn in bitcoin and ether	Meitu corporate treasury investment into digital assets indicated its expectations for ample room for the industry's growth.	Mar and Apr 21
ZA International	Digital asset trading partner	On July 5, ZA International designated OSL as the exclusive digital asset trading partner to support its first digital asset transactions.	The partnership shows that ZA International values OSL compliance capabilities and best-in-class offering. The partnership will enable OSL to leverage ZA's advanced technology to improve user experience.	Jul 21

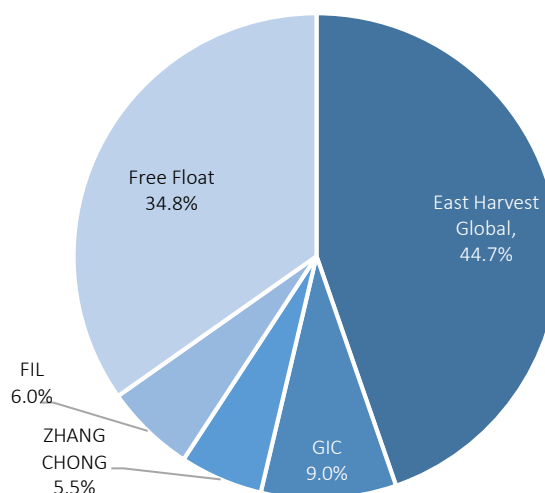
Source: Company data, media, China Tonghai Securities

Figure 29.BCG – Revenue by segments, 2020



Source: Company data, China Tonghai Securities

Figure 30. BCG – Shareholding structure

Source: Bloomberg, China Tonghai Securities
Note: As of 5 Aug 2021

Management team

Fig 31. BC Technology Group – Management team

Name	Age	Position/Title	Experience/Responsibility
Lo Ken Bon	44	- Executive Director of the Company - Deputy chairman of the Board - Chairman of the Nomination Committee and the Risk Management Committee	Over 20 years of experience in management consulting and strategy execution
Ko Chun Shun	69	Executive Director of the Company	Extensive experience in direct investment, M&A, TMT and financial services
Madden Hugh Douglas	44	- Executive Director of the company - Chief Executive Officer of the Company	20 years of experience in blockchain, financial markets and security
Chapman David James	40	Executive Director of the Company	Oversees business operations for digital asset trading platform OSL
Steve Zhang	37	Chief Financial Officer of the Company	Over 15 years of experience in financial planning and reporting, capital markets, fundraising, and investor relations
Wayne Trench	38	Chief Executive Officer of OSL	Oversees all of the activities in digital asset trading platform OSL
Phillip Pon	45	Group Chief Operating Officer of the Company	Over 20 years of experience in private equity and venture capital
Usman Ahmad	42	Group Chief Information Officer of the Company	Previously held senior positions in technology at leading financial services companies

Source: Company data, China Tonghai Securities

APPENDIX 1

Segment driver and forecast

We outline our predictions for the performance of each of BCG's key segments below.

Digital Asset Services Business (Self-operated) – Key growth driver

Outlook

Earlier investment in the digital asset economy will drive robust growth

We expect significant y/y increases in operating metrics across the board (active clients, trading volumes, revenues and assets on platform) as its earlier investment and development efforts bear fruit and the digital asset economy expands rapidly.

Forecast

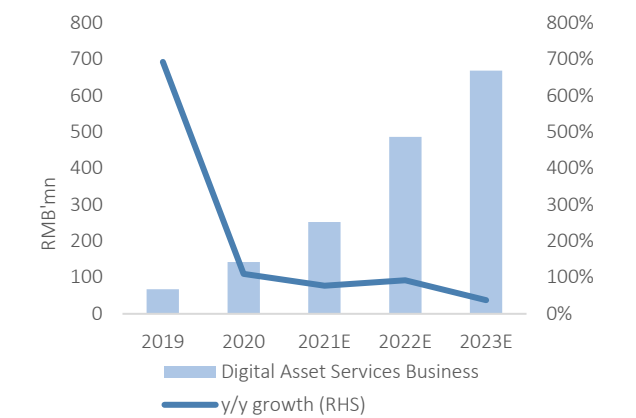
Digital Asset Services Business (or OTC business): We forecast segment revenue CAGR of 71.8% in 2020-23E and account for 66.5% of total revenue in 2023E (vs 65.7% in 2020), mainly driven by solid growth in the trading volumes and the addition of institutional clients on its platform.

- **Trading volume:** We forecast the overall digital asset platform trading volumes to grow at a CAGR of 49.7%, from RMB149.4bn in 2020 to RMB501.0bn in 2023E, driving by the increased global interest and investment into digital assets.
- **Take rate:** We forecast the overall take rate on the digital asset platform trading volumes to improve to 0.14% in 2023E (vs 0.10% in 2020). We expect the OSL platform has higher bargaining power relative to FIs, with its position as one of the world's preeminent providers of institutional-grade digital asset investment solutions and services to professional investors.

Description

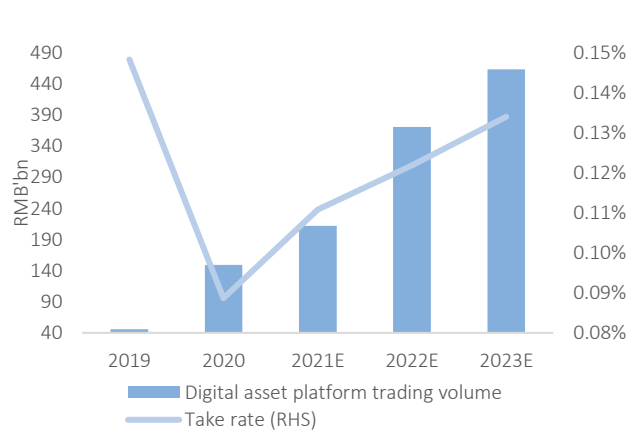
OSL's digital asset trading business provides institutional-focused prime brokerage and trading solutions that accounted for the most revenue (78.0% in 2022E). The OSL digital asset trading business generates income through trade commissions, fees or trading spreads from clients who buy/ sell digital assets through the platform. OSL's target clients include institutional and professional investors.

Figure 32. BC Group – Digital Asset Services revenue, 2019-2023E



Source: Company Data, China Tonghai estimates

Figure 33. BC Group – Trading volume and take rate, 2019-2023E



Source: Company Data, China Tonghai estimates

Technology Infrastructure Business – White label SaaS solution to enhance scalability

Outlook

Scalability of SaaS solution will dramatically increase TAM

We believe OSL's B2B2C SaaS model will add another dimension of scale, with the potential to expand access to many markets and customer segments in both digital assets and traditional finance. Our bullish view of OSL's SaaS solution is based on its robust client pipeline and regulated status, which will serve as tailwinds.

Since its launch in 2Q19, OSL's SaaS solution has onboarded: DBS Bank as a technology client (4Q20), JV with Standard Chartered (2Q21), ZA International (3Q21). Its robust pipeline of potential clients includes large financial institutions globally.

Forecasts

Technology Infrastructure Business (or SaaS business): We forecast segment revenue CAGR of 229.4% in 2020-23E and account for 29.0% of the total revenue in 2023E (from 4.1% in 2020), mainly driven by strong institutional demand for digital asset investments for plug-and-play solutions.

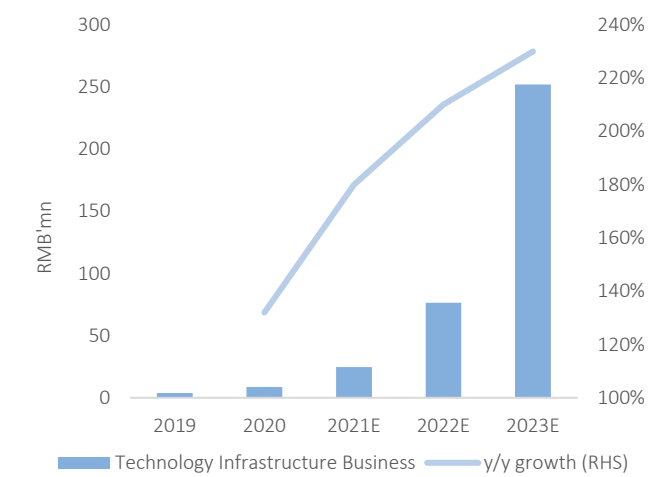
- **Revenue:** We forecast the technology infrastructure business to be a significant growth driver for the company. The segment revenue will jump to RMB315mn in 2023E (vs RMB9mn in 2020), contributing 29.0% of 2023E total revenue (vs 4.1% in 2020)
- **Gross margin:** We expect the segment gross margin to be stable at 99.0% in 2021E-23E (vs. 99.3% in 2020).

Description

OSL's Technology Infrastructure Business licenses its digital assets SaaS solution to third party white label customers. Under a B2B2C SaaS arrangement, white-label customers license OSL's technology to operate their exchange platform to facilitate trades among the platform's end users. In return, OSL charges fees including initial implementation fees (determined by project size), recurring license, service fees (determined based on the transaction volume) and revenue share.

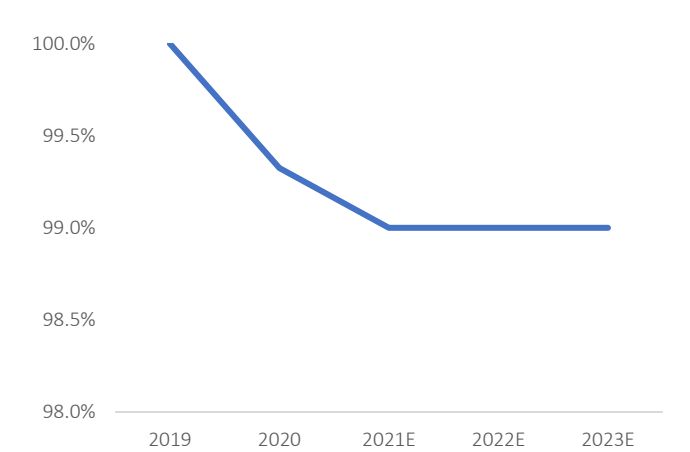
SaaS and related service offerings include operation and maintenance of systems provided, management of digital wallet infrastructure trading and custody services.

Figure 34. Technology Infrastructure Business revenue, 2019-2023E



Source: Company Data, China Tonghai Securities estimates

Fig x. Gross margin of Digital assets and blockchain platform business, 2019-2023E



Source: Company Data, China Tonghai Securities estimates

Advertising and Business Park Area Management Services Business – Stable under long term lease

Outlook

We expect contribution from this segment to come down to 4.5% in 2023E (from 30.2% in 2020) as it is eclipsed by the rapidly growing digital assets-related segments, which will become more dominant. We expect rental income to be stable.

Forecast

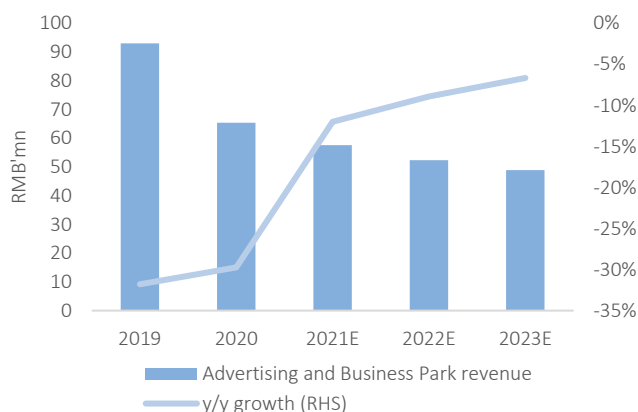
We forecast stable growth for Business Park Area Management Services and Advertising (segment revenue CAGR of -9.2% in 2020-23E) and account for 4.5% of revenue in 2023E (from 30.2% in 2020).

- **Advertising business segment:** We expect its Advertising business segment to gradually scale-down, and forecast the segment revenue to decrease to RMB14mn in 2023E (Edwin) from RMB27mn in 2020.
- **Business park area management service business segment:** We expect this segment to be relatively stable and forecast the segment revenue to be RMB37mn/ 36mn/ 35mn in 2021-23E, compared to RMB39mn in 2020.

Description

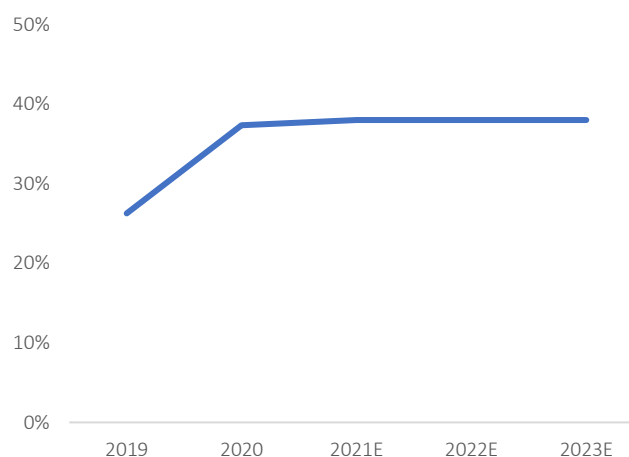
BC Group's business park area management services business provides operations and management services for commercial property in the Jingwei Park business park in Shanghai. The Group's advertising business includes providing professional and customized one-stop integrated marketing communication services to customers through diversified communication platforms comprising traditional advertising, digital advertising and roadshows. Traditional advertising includes outdoor, TV and print advertising, while digital advertising mainly covers blogging and bulletin board sites. The Group's primary customers are from the automotive industry.

Figure 35. Advertising and Business Park revenue, 2019-2023E



Source: Company Data, China Tonghai Securities estimates

Figure 36. Gross margin of Advertising and Business Park, 2019-2023E



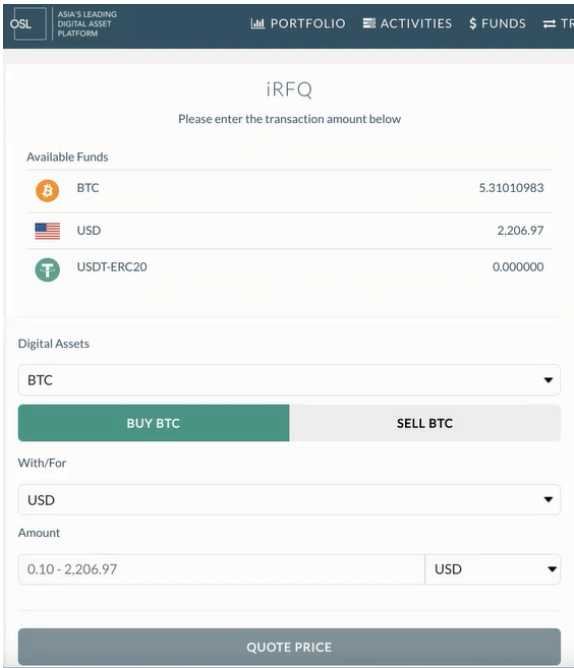
Source: Company Data, China Tonghai Securities estimates

APPENDIX 2

User interface of OSL platform

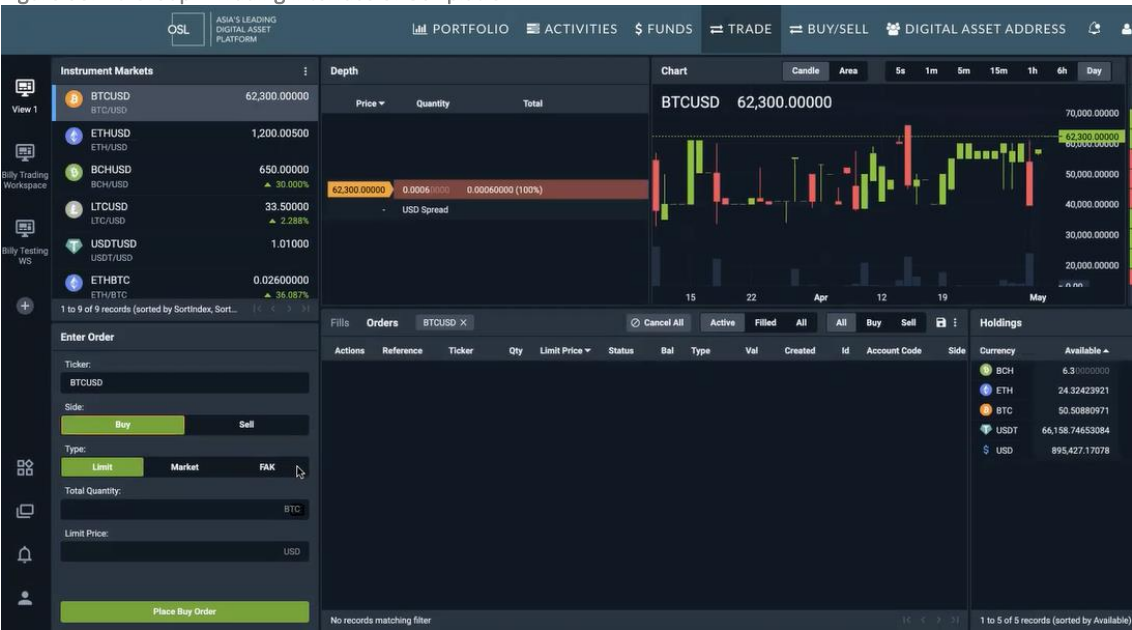
We provide screenshots of the user interface of OSL platform below.

Figure 37. BCG – OSL platform



Source: Company data

Figure 38. BC Group – Trading interface of OSL platform



Source: Company Data

BC Technology Group (863 HK)						Stock Rating: BUY					
Income statement (RMB'mn)	2019	2020	2021E	2022E	2023E	Per Share Items (RMB)	2019	2020	2021E	2022E	2023E
Revenue	165	217	316	624	1,085	Adjusted diluted EPS	-0.92	-0.80	-0.62	0.01	0.65
DA & blockchain	72	151	259	571	1,036	DPS	0.00	0.00	0.00	0.00	0.00
Advertising & Mgt	93	65	58	52	49	BVPS	-0.25	0.43	1.13	1.44	2.50
Cost of goods sold	(69)	(42)	(38)	(38)	(41)	Ratio Analysis	2019	2020	2021E	2022E	2023E
Gross profit	96	175	278	585	1,045		Growth (YoY%)				
Operating expenses	(293)	(401)	(521)	(585)	(715)	Revenue	13.6%	31.5%	46.1%	97.2%	74.1%
Other income, net	(9)	2	8	8	8	Gross profit	81.7%	81.6%	59.3%	110.6%	78.5%
EBIT	(207)	(224)	(235)	9	338	Attributable profit	50.8%	2.5%	4.1%	T/A	7581.5%
Finance costs, net	(40)	(35)	(19)	(4)	2	Diluted EPS	43.3%	(13.5%)	(22.0%)	T/A	7581.5%
Share of net profit of associates and JV	0	0	0	0	0	Margins					
Pre-tax profit	(247)	(259)	(255)	4	340		Gross margin	58.3%	80.6%	87.9%	93.9%
Tax	2	(2)	(5)	(1)	(68)	Operating margin	(125.4%)	(103.7%)	(74.4%)	1.4%	31.1%
Minority Interest	(2)	(11)	0	0	0	Net profit margin	(147.9%)	(115.3%)	(82.2%)	0.6%	25.0%
Attributable profits	(244)	(250)	(260)	4	272	Other ratios					
Adjusted EBITDA	(89)	5	(47)	161	511		Return on assets	N/A	N/A	N/A	0.1%
Balance sheet (RMB'mn)	2,019	2,020	2021E	2022E	2023E	Return on equity	N/A	N/A	N/A	0.7%	44.8%
						ROIC	N/A	N/A	N/A	0.4%	28.4%
PPE	205	158	130	109	99	Dividend payout ratio	0.0%	0.0%	0.0%	0.0%	0.0%
Intangible assets	51	44	42	44	56	Net debt to equity	N/A	95.3%	(16.5%)	(10.3%)	(24.9%)
Other non-current assets	143	21	25	35	66	Interest coverage (X)	(2.3)	(1.1)	(2.6)	5.2	19.6
Inventories	447	2,622	3,795	5,324	7,430	Valuation ratios					
Trade receivables	34	17	24	35	68		P/E (X)	N/A	N/A	N/A	1,339.7
Cash and equivalents	192	349	428	412	612	P/B (x)	N/A	26.2	10.0	7.8	4.5
Other current assets	73	198	232	322	599	FCF yield (%)	(6.2%)	(1.0%)	(3.9%)	(0.2%)	3.5%
Total assets	1,145	3,409	4,677	6,282	8,929	Dividend yield (%)	0.0%	0.0%	0.0%	0.0%	0.0%
Long-term Borrowings	263	67	50	50	50	Key Operating Metrics	2019	2020	2021E	2022E	2023E
Other non-current liabilities	218	150	150	150	150		Revenue mix (%)				
Accounts payable	41	43	26	24	24	DA & blockchain	43.5%	69.8%	81.8%	91.6%	95.5%
Short-term borrowings	75	411	300	300	300	Advertising & Mgt	56.5%	30.2%	18.2%	8.4%	4.5%
Other current liabilities	613	2,603	3,677	5,152	7,355	Segment growth (%)					
Total liabilities	1,211	3,273	4,203	5,676	7,879		DA & blockchain	736.9%	122.7%	81.7%	137.8%
Total shareholders' Equity	(69)	143	481	613	1,057	Advertising & Mgt	(31.8%)	(29.8%)	(12.0%)	(8.9%)	(6.7%)
Minority interests	3	(7)	(7)	(7)	(7)	Gross margin (%)					
Total equity	(66)	135	474	606	1,050		DA & blockchain	100.0%	99.3%	99.0%	99.0%
Cash flow statement (RMB'mn)	2,019	2,020	2021E	2022E	2023E	Advertising & Mgt	26.3%	37.3%	38.0%	38.0%	38.0%
						Other operating metric					
EBITDA	(150)	(171)	(195)	43	369	Trading vol. (RMB'bn)	45.5	149.4	201.7	371.1	501.0
Other gains, net	61	171	148	118	142	Take rate	0.15%	0.10%	0.12%	0.13%	0.14%
Change in working capital	(107)	(34)	(157)	(156)	(214)						
Tax Paid	(1)	(1)	(5)	(1)	(68)						
Operating cash flow	(196)	(36)	(209)	4	229						
Capex	(26)	(8)	(11)	(16)	(31)						
Others	0	0	14	20	26						
Investing cash flow	(25)	(7)	3	5	(5)						
Change in borrowings	177	12	(128)	0	0						
Interest paid	(35)	(33)	(33)	(25)	(25)						
Others	(19)	232	446	0	0						
Financing cash flow	123	212	285	(25)	(25)						
Net change in cash	(99)	169	79	(16)	199						
Free cash flow	(222)	(43)	(220)	(12)	198						

Source: Company data, China Tonghai estimates. Note: FY End Dec

Rating Definitions	Disclaimer and Risk Statement
BUY We expect the stock to have a total return of > 10% over the next 12 months	This document is published by China Tonghai Securities Limited ("Tonghai Securities"), a licensed corporation (central entity number AAC577) regulated by the Securities and Futures Commission in Hong Kong. This document is for distribution in Hong Kong only to persons who are "Professional Investors" as defined in Part 1 of Schedule 1 of Securities and Futures Ordinance (Cap 571) of Hong Kong and any rules made thereunder. This document is not intended for distribution to or use by, any person or entity who is a citizen or resident of any jurisdiction where such distribution or use would be contrary to applicable law or regulation within such jurisdiction. This document does not constitute an offer or a solicitation of an offer to buy or sell any securities. This document is circulated to addressees solely and may not be reproduced or redistributed to any other person or published, in whole or in part, for any purpose. Tonghai Securities has no investment banking relationship with the issuer within the preceding 12 months from the date of publication of this document. The research is based on information obtained from sources believed to be reliable, but Tonghai Securities does not make any representation or warranty as to its accuracy, completeness or correctness. Opinions expressed are subject to change without prior notice. Any recommendation does not have regard to specific investment objectives, financial situation and particular needs of any specific addressee. Tonghai Securities accepts no liability whatsoever for any direct or consequential loss arising from any use of this document. Tonghai Securities and its affiliates as well as persons associated with any of them from time to time may or may not have interests in the securities mentioned in this document. The prices of securities may move up or down, and past performance is not an indication of future performance. Investors shall consider seeking separate legal or financial advice before making investment decisions.
HOLD We expect the stock to have a total return of < 10% and >-10% over the next 12 months	
SELL We expect the stock to have a total return of < -10% over the next 12 months	
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