A NEW CHAIN OF THOUGHT

EXPLORING THE BUILDING BLOCKS OF THE NEXT DIGITAL ERA

JULY 2024

PRIMAL

QUINLAN &ASSOCIATES

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FOREWORD

The promise of decentralisation and user empowerment has ignited a wave of global enthusiasm for Web3.

Visionaries and early adopters were drawn to blockchain's potential to disrupt traditional economic models and create a new era of value exchange. However, as with any nascent technology, rapid influxes of capital and widespread speculative behaviour led to an inevitable series of market corrections, shaking out over-leveraged projects and speculative ventures. And with each crypto winter, critics were quick to declare the demise of Web3, pointing to its volatility and perceived lack of tangible value.

While these busts may have overshadowed more foundational market and technology developments taking place in the background, enthusiasts and developers have continued to build robust infrastructure aimed at improving blockchain's scalability, security, and usability. Corporate giants and governments have also begun to recognise the transformative potential of Web3, fuelling a wave of strategic investments, the exploration of real-world use cases, and supporting regulatory initiatives. Projects that survived through multiple downturns have shifted away from crypto "pump-and-dump" tactics, focusing instead on building sustainable business models with real-world impact.

We believe that further embracing Web3 technologies will be critical for companies to maintain their relevance in a rapidly evolving digital landscape. For example, deploying Web3 solutions in regions with limited traditional financial infrastructure presents a unique opportunity for businesses to penetrate emerging markets and advance their social responsibility agendas (e.g., supporting financial inclusion). More importantly, over the long term, the values, attitudes, and preferences of younger tech-savvy generations are likely to support ongoing investment and innovation in the Web3 space. The fact is, the transition towards a digital-native economy is already well underway.

To us, Web3 is not merely a technological upgrade: it serves as *'The Building Blocks of the Next Digital Era'*. For executives, understanding and integrating Web3 technologies is essential to leveraging its potential for innovation, efficiency, and growth in what is fast becoming a digital-native age. And as the digital-native economy continues to grow, those who adapt to these changes will be well positioned to capitalise on the next era of the internet's evolution.

QUINLAN &ASSOCIATES

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EXECUTIVE SUMMARY

The internet has undergone a marked evolution over the past few decades, transitioning from a simple, one-way information-sharing model in the late 1980s to highly interactive platforms in the early 2000s. The introduction of Web2 facilitated considerable user-driven content creation and interaction, yet these platforms remained under centralised control. The late 2000s marked the advent of Web3, powered by blockchain (i.e. distributed ledger technology), which sought to empower users with governance roles on digital platforms. Blockchain, in particular, brought with it new concepts like decentralisation and tokenisation, allowing more efficient peer-to-peer and programmable transactions.

The development of Web3 can be viewed in the context of the purpose and function of digital and physical spaces. While the digital space under Web2 evolved to be a key social and economic enabler via introducing a platform-based economy (e.g. social media, e-commerce platform, etc.), the financial transactions and exchange of goods tied back to the physical world. Web3 is gradually integrating social and economic activities in digital and physical spaces, paving the way to supporting a new paradigm of a digital-native economy.

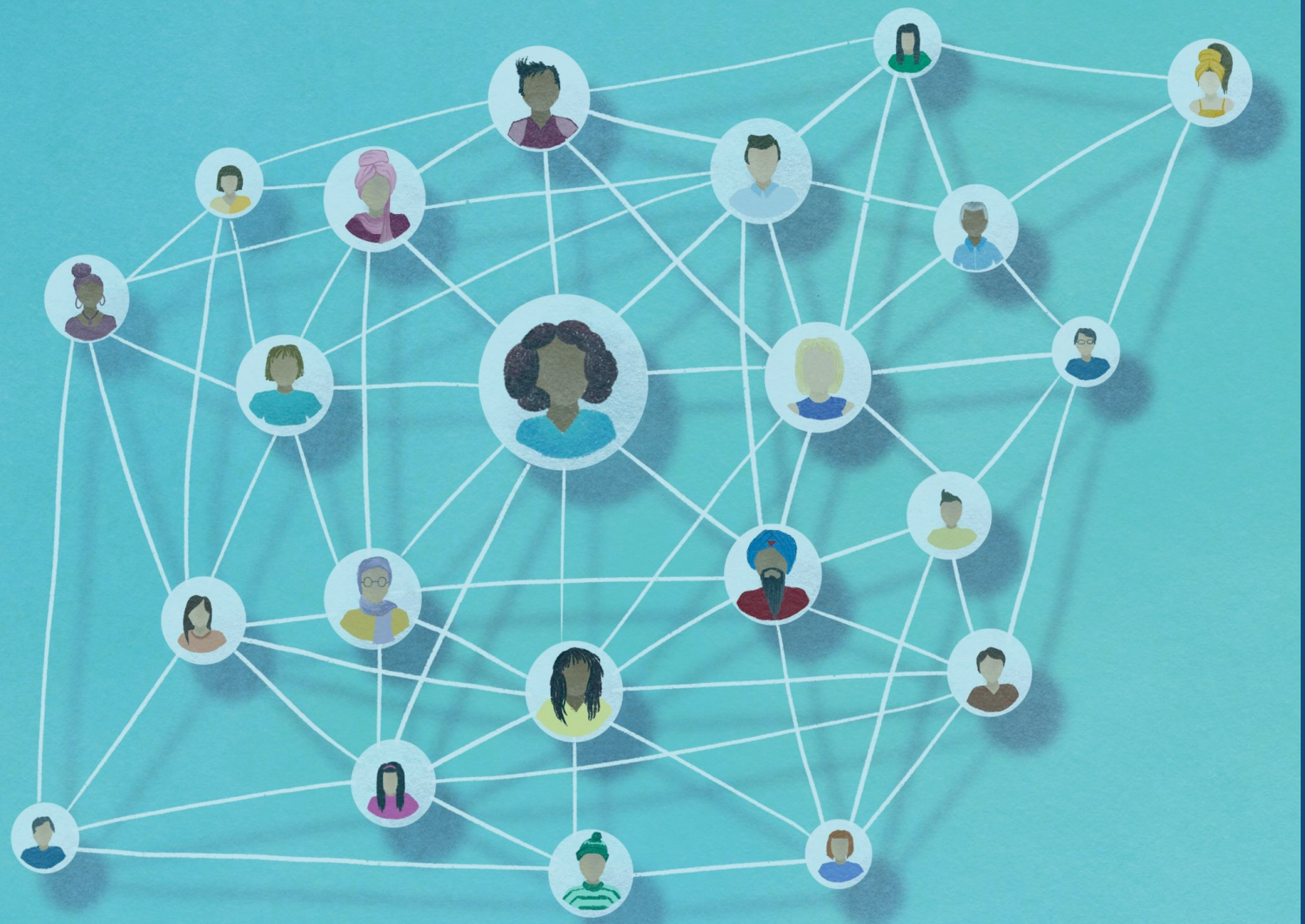
This integration is set to be propelled by demographic shifts, with Gen Z demonstrating a high degree of digital literacy and a strong preference for digital channels. And supported by a vast generational wealth shift in the coming years, Gen Z's will remain key drivers for Web3's ongoing growth. This is particularly true for emerging markets with sizeable young, unbanked populations, many of whom see Web3 as a way to drive financial inclusion among their digitally literate residents.

The public and private sectors are already preparing for this shift. Governments worldwide are enacting legislation to facilitate Web3-friendly environments, and major brands are integrating Web3 technologies into their business models. The private sector's aggressive investment in blockchain-related patents indicates a further commitment to prepare their operations for this incoming change.

Due to its importance, the Web3 market has experienced several cyclical growth patterns driven by speculative behaviour and investor hype. Developments such as initial coin offerings ("ICOs"), decentralised finance ("DeFi"), non-fungible tokens ("NFTs"), and cryptocurrency exchange-traded funds ("ETFs") have each unlocked significant wealth creation opportunities. However, each of these booms has been followed by "crypto winters" of subdued market activity.

Cycles aside, the Web3 landscape remains resilient, with successful startups and unicorns continuing to emerge. This persistence underscores the long-term viability of Web3 solutions, with continuous development in Web3 applications and infrastructure. Other structural growth drivers include decentralised infrastructure, developer tooling, game finance ("GameFi"), and security solutions. Many of these applications are also highly synergistic with the financial and non-financial services industry.

We see considerable potential for organisations looking to explore how to capitalise on the opportunities presented by Web3. However, a carefully considered evaluation, development, and implementation strategy is required, as is an understanding of Web3-specific design considerations. A new chain of thought is needed.



SECTION 1

THE EVOLUTION FROM WEB1 TO WEB3

THE EVOLUTION FROM WEB1 TO WEB3

Key Takeaways

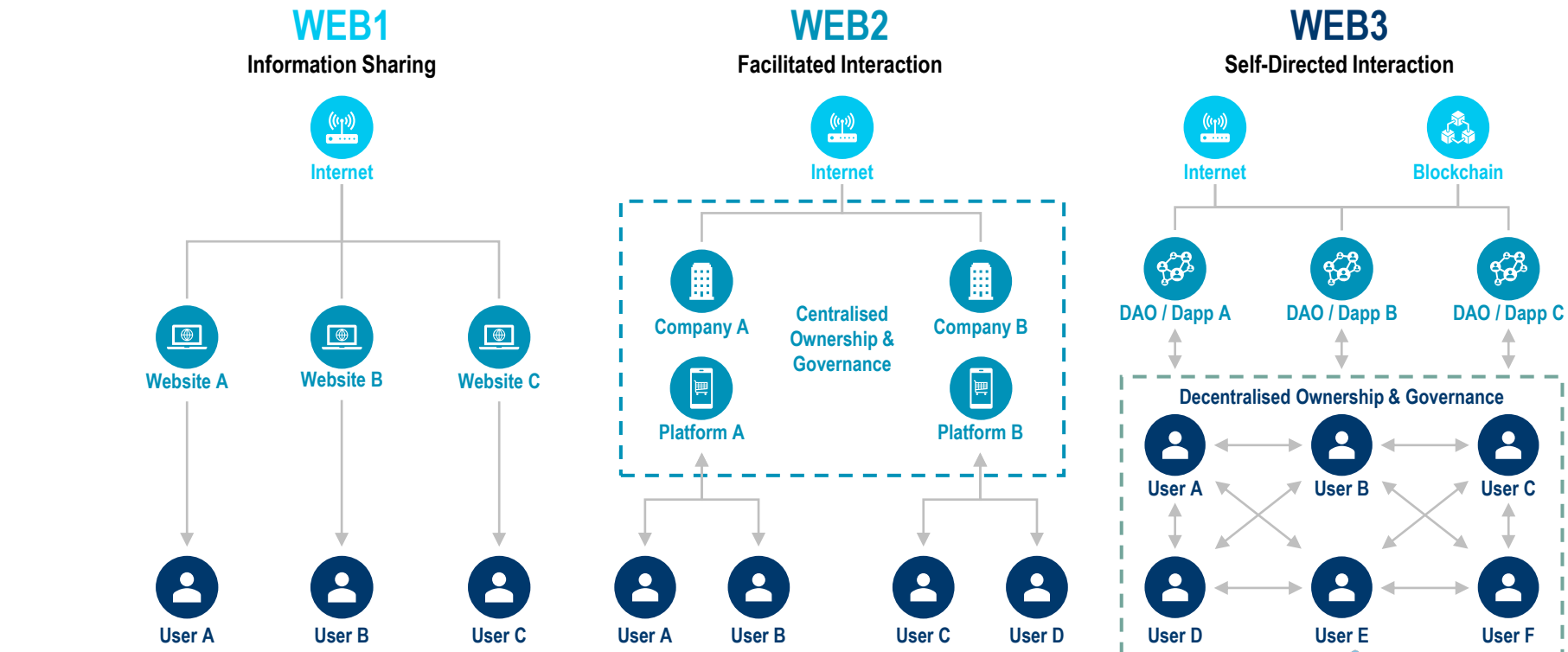
The internet has undergone a considerable evolution over the past few decades.

In the late 1980s, the first generation of the web was introduced, supporting simple, one-way information sharing. Content was created by website owners (read-write) for end users' consumption (read-only).

The second generation of the web, characterised by significant interactions and/or content creation driven by users with read-write capabilities, was introduced in the early 1990s and took off in the early 2000s with the advent of social media platforms. However, the ownership and governance of these Web2 platforms remained centralised and controlled by the platform owners.

In the late 2000s, the third generation of the web was introduced, aiming to maintain self-directed interaction among users while empowering them to have an active role in the governance process of digital platforms.

Web3 enables self-directed interaction amongst internet users without the need for centralised facilitation



Inception Year	1989	1991	1993	1991	1994	2003	2008	2014	2015	2017
Cases	World Wide Web	Webpage	Search Engine	MMO RPG	E-Commerce	Social Media	Crypto	NFT	DAO	Dapp & Metaverse
Notable Examples			Google		amazon			CryptoPunks		

Source: Quinlan & Associates analysis

BLOCKCHAIN DRIVING USER EMPOWERMENT

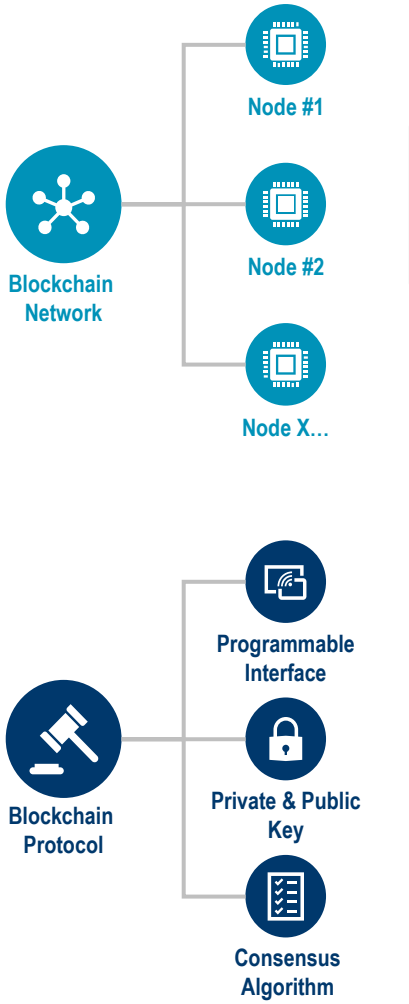
Blockchain technology empowers Web3 users and offers seamless information exchange without the use of intermediaries

Key Takeaways

Blockchain – or distributed ledger technology – acts as the backbone of Web3, enabling seamless information exchange without the need for intermediaries via decentralisation and tokenisation.

Blockchain Network (Decentralisation)
The network consists of a group of computers (commonly referred to as nodes) that maintain an immutable, trustworthy, and traceable record of information, leveraging cryptography and a peer-to-peer surveillance mechanism.

Blockchain Protocol (Tokenisation)
The protocol, on the other hand, is a governing principle that helps maintain the blockchain. It includes a cryptographic hash function, private and public keys, a programmable interface, digital signatures, and consensus algorithms (e.g. Proof-of-Work, Proof-of-Stake, etc.). The protocol allows assets to be tokenised and hence programmed, enabling more efficient and transparent exchanges among network participants.



DECENTRALISATION

1 Data Integrity
…through cryptography and a Peer-to-Peer surveillance system

2 Data Ownership & Transparency
…through fully traceable digital records on a decentralised ledger

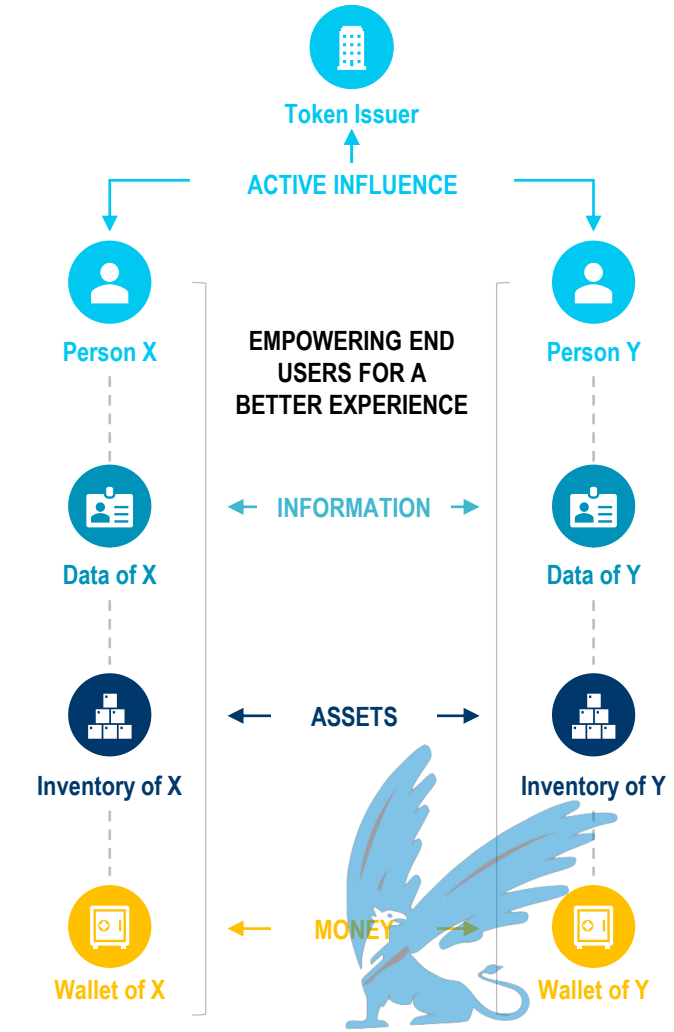
"Golden Source Of Truth"

TOKENISATION

3 Removal of Intermediaries
…through automating transactions with embedded conditional logic

4 Transparent Governance / Rights
…through configuring certain rights directly on the digital asset

"Programmable Asset"



Source: Quinlan & Associates analysis

SECTION 2

MACRO GROWTH DRIVERS

TRANSITION TOWARDS A DIGITAL ECONOMY

Key Takeaways

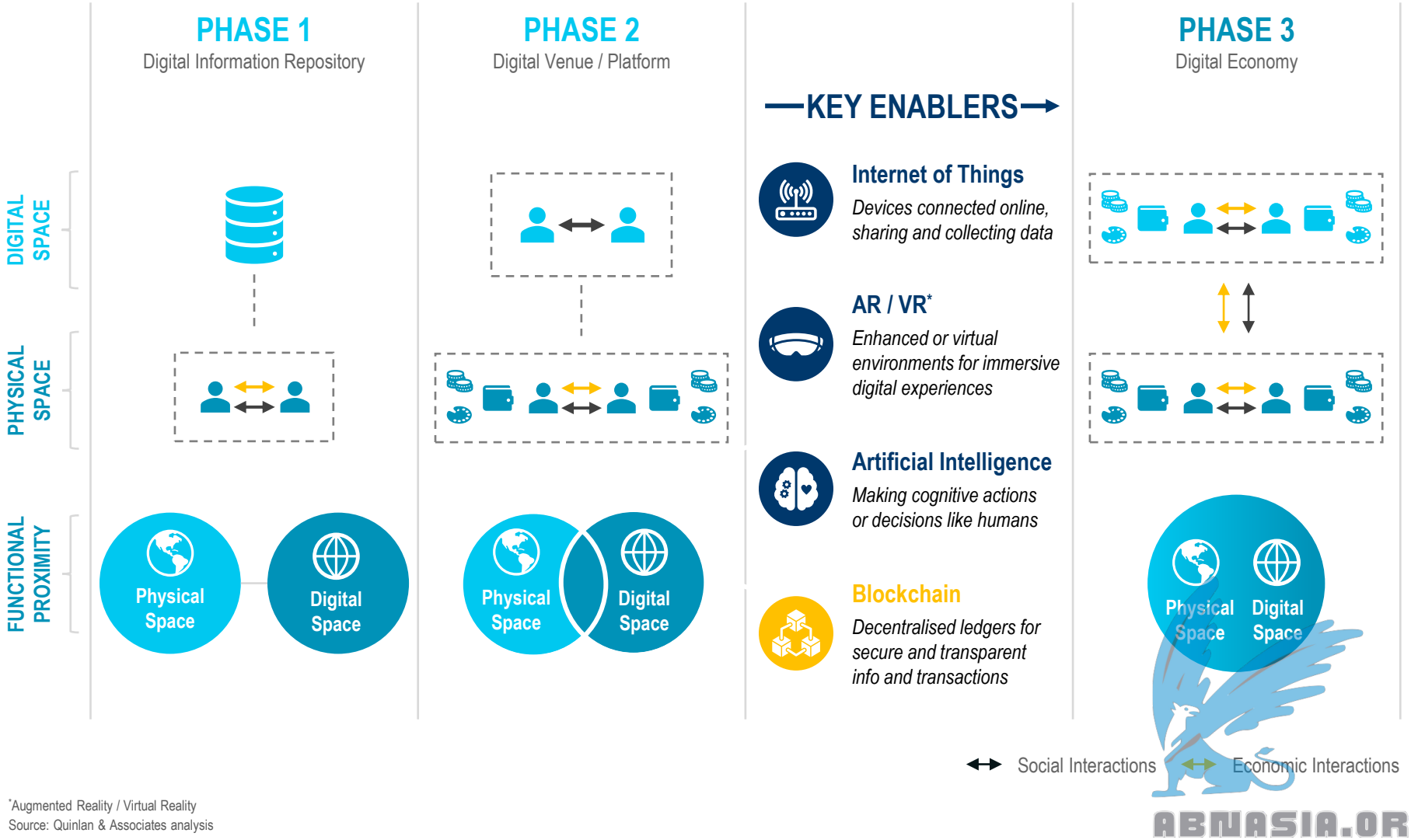
It is important to understand the evolution of web in the context of digital space, an extension of physical space that serves specific purposes.

The digital space initially served, primarily, as an information repository, providing a distinct separation from the physical space.

Over time, digital and physical spaces began to overlap, with the digital realm becoming a venue for social interactions, while economic interactions remained largely physical.

With the enablement of blockchain technology (i.e. Web3), the digital space is advancing to support a pure form of the digital economy. Social and economic interactions are becoming increasingly interoperable across digital and physical spaces, blurring the boundaries between the two. This is an essential concept to understand to fully grasp the structural importance of Web3 in the coming years.

We are seeing the world increasingly move towards a "digital-native economy," powered by blockchain technology



*Augmented Reality / Virtual Reality

Source: Quinlan & Associates analysis

MACRO GROWTH (1/3): INTERNET ACCESS

Rapidly rising internet access, particularly in emerging markets with sizeable unbanked populations, will support the Web3 (especially DeFi) financial inclusion agenda

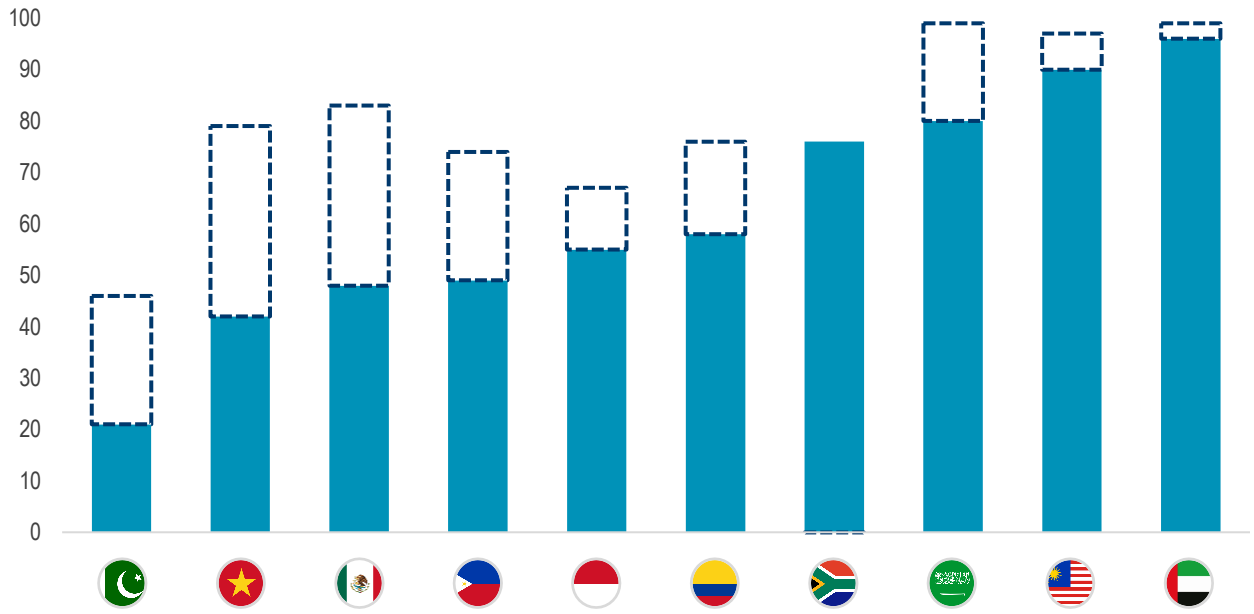
Key Takeaways

The growth of the Web3 ecosystem is being aided by rapidly expanding internet access, especially in emerging markets.

Many of these economies are home to sizeable populations of young, unbanked and underbanked individuals who lack access to conventional financial services. However, most markets are home to relatively high internet penetration levels. Given this backdrop, Web3 infrastructure, especially DeFi, is likely to play an increasingly important role for emerging markets as their citizens seek access to financial products and services that are otherwise unavailable.

As internet connectivity continues to improve, we see the enormous potential for Web3 to bring financial empowerment to the world's unbanked masses, supercharging the financial inclusion agenda in emerging and frontier markets.

Digital Population
Emerging Markets vs. Global, 2023



7
…out of 10 top countries with the largest digital populations are emerging markets

	PAK	VNM	MEX	PHL	IDN	COL	ZAF	SAU	MYS	ARE	Emerging Avg.	Global Avg.
Internet Accessibility (Proportion of Total Pop.*)	46%	79%	83%	74%	67%	76%	75%	99%	97%	99%	79.5%	66%
Banked Population[1] (Proportion of Total Pop.)	21%	42%	48%	49%	55%	58%	76%	80%	90%	96%	61.5%	76%
Potential Gap (Internet Accessibility – Banked Pop.)	25%	37%	35%	23%	12%	18%	N/A	19%	7%	3%	18.0%	N/A
Average Age (Years)	20 *(-10)*	32 *(+2)*	29 *(-1)*	25 *(-5)*	29 *(-1)*	31 *(+1)*	27 *(-3)*	30	30	33 *(+3)*	28.6	30

[1]People with a checking / savings account at a financial institution (e.g. traditional banks, virtual banks, etc.), *Population
Source: PPRO, DataReportal, World Economics, Quinlan & Associates analysis

MACRO GROWTH (2/3): DIGITAL-NATIVE USERS

Key Takeaways

Demographic shifts are also underpinning greater Web3 adoption.

Younger populations, particularly Gen Z, are showing growing interest and awareness in Web3 technologies, with over 70% of Web3 users being millennials and younger.

Gen Z, the generation born in the late 1990s to early 2010s, is a group with a high degree of digital literacy and preference, with over 70% preferring online channels over physical communication.

The values of this demographic also align well with key principles Web3 principles, with 61% advocating for equal access and 57% adopting a creator mindset. Gen Z shows a greater level of Web3 awareness, interest, and adoption compared to other demographics.

The adoption of Web3 is likely to accelerate as this tech-savvy population matures.

The younger, digital-native population (i.e., Gen Z's and Millennials) embrace a creator and shared ownership mindset, aligning with many of the key principles of Web3

Key Traits & Interest
2023, Younger Demographics

DIGITAL NATIVENESS

75% — **PRIMARY ACTIVITY: ONLINE**
…of Gen Zs spend their free time online, averaging 7 hours per day

79% — **SMARTPHONE RELIANCE**
…of Gen Zs could not live without their smartphones

70% — **DIGITAL INTERACTIVITY**
…of Gen Zs and Millennials prefer online communications

VALUE OF ACCESSIBILITY & DEMOCRATISATION

61% — **INCLUSIVITY BELIEF**
…of Gen Zs actively advocate for equal access (more so than other generations)

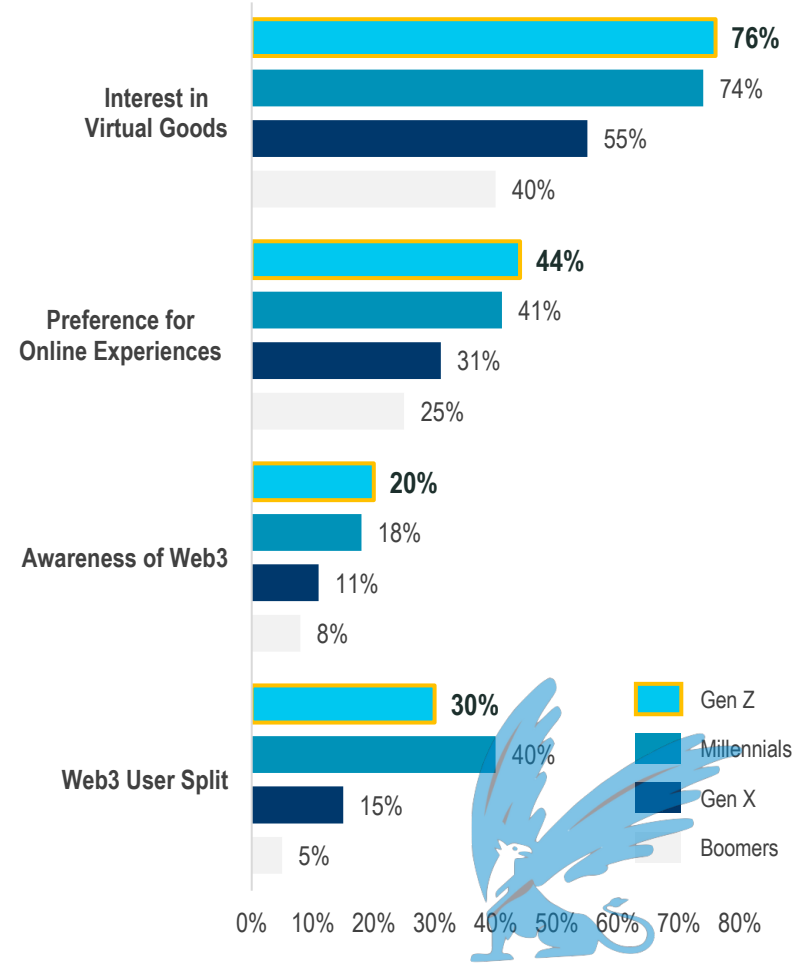
57% — **CREATOR MINDSET**
…of Gen Zs would like to be a social media influencer, leveling the playing field

SENSE OF OWNERSHIP

93% — **ENTREPENEURIAL SPIRIT**
…of Gen Zs have taken a step towards exploring business ownership

64% — **MONETISATION PLANS**
…of Gen Zs plan to monetise a project online in the near future

Web3 Interest Across Different Generations
2023



Source: Ypulse, The Star, LivePerson survey, Instagram Trend Report, Rzlt.io, Toluna, Survey Monkey survey, Quinlan & Associates analysis

MACRO GROWTH (3/3): WEALTH TRANSFER

Key Takeaways

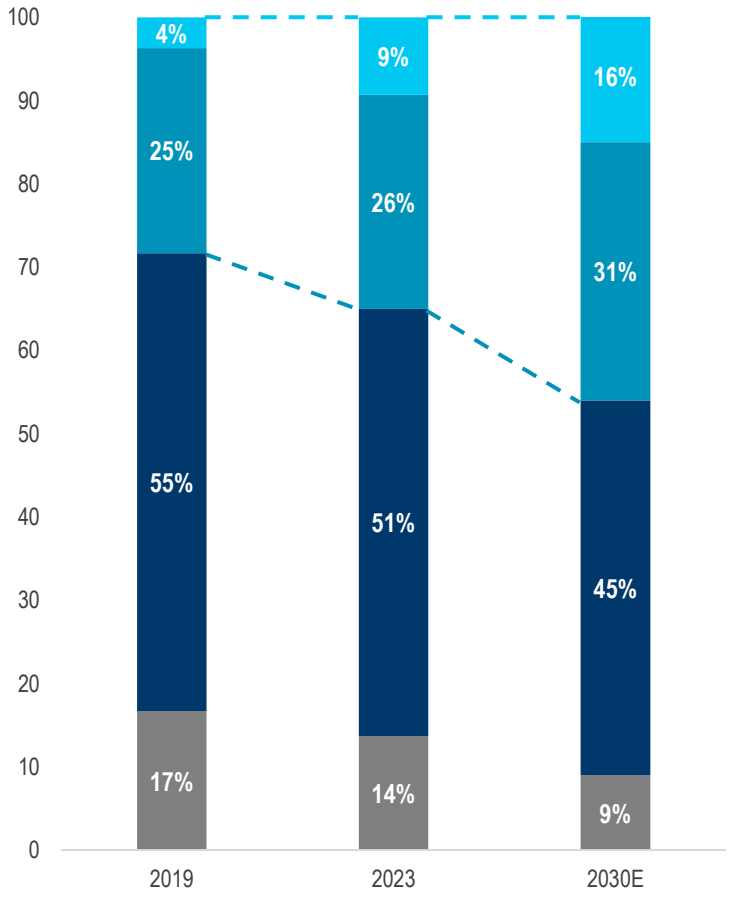
A vast generational wealth shift is set to take place in the coming years. By 2030, younger generations are expected to surpass baby boomers in terms of global wealth share, with 50% of total wealth being shared by Gen X and younger.

Given their affinity for digitally-native solutions and self-directed, online investing (e.g., the "Robinhood" generation), this generational wealth shift is set to be a key driver of ongoing investments into the Web3 ecosystem in the coming years.

Supported by a vast generational wealth shift, younger generations are projected to surpass Boomers in terms of global wealth share by 2030, fueling more Web3 investments

Wealth Transfer

Proportion of Wealth[1], % by Generation



~50%

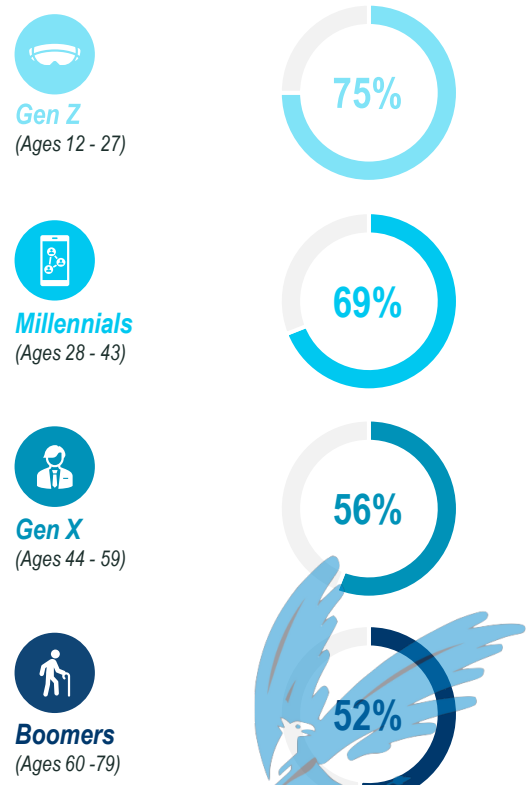
…of total wealth is expected to be shared by Gen X and younger in 2030

USD 5.2tn

…is estimated to be transferred by billionaire Boomers to their heirs

Wealth Expectations

Across Demographics



[1]Taking US wealth distribution as a proxy

Source: Knight Frank, Deloitte Center of Financial Services, US Federal Reserve, Beresford Research, Quinlan & Associates analysis

SUPPORT FROM THE PUBLIC SECTOR

Key Takeaways

Governments around the world are taking steps to create Web3-friendly environments to foster continued growth of the sector.

Many jurisdictions are developing consultation papers, launching new projects, and drafting legislation to guide and regulate participants in the Web3 space.

By providing a more stable and predictable operating environment, these government-led initiatives are creating an important foundation for the ongoing adoption of Web3 technologies, especially for institutional players, including large corporates and institutional investors.

Governments around the world are establishing Web3-friendly environments to foster continued growth

Jurisdiction	Select Developments	Example Consultation Papers & Projects
	• **HONG KONG** established its "Task Force on Promoting Web3 Development" to attract offshore and onshore Web3 firms. It has also set up legal frameworks for crypto exchanges and virtual asset spot ETFs through its main financial regulator, the Securities and Futures Commission (SFC)	• Task Force on Promoting Web3 (2023) • Joint Circular on Intermediaries' Virtual Asset-Related Activities (2023)
	• In 2023, **SINGAPORE** finalised its regulatory framework for stablecoins, announced requirements for Web3 firms to safeguard customer assets, and set guidelines to prevent margin trading for non-professional investors	• Consultation Paper on Proposed Regulatory Approach for Digital Payment Token Services / Stablecoin-Related Activities (2023)
	• **JAPAN** passed its new regulatory framework for stable-coins, which came into effect on June 1, 2023, and in the same year, the Liberal Democratic Party of Japan set up "Web3PT," a Web3 Project team, to support and explore Web3 applications	• Amended Payment Service Act (Passed: 2022, Effective: 2023) • Web3PT Whitepaper (2023)
	• The **U.S.** court ruling in SEC v. Ripple Labs set a non-binding precedent that digital asset (e.g. XRP in the case of Ripple) purchases / sales on secondary trading platforms are not "securities" transactions, ruling against this allegation of the SEC	• SEC v. Ripple (2023)
	• In 2023, the **U.K.** set plans for a digital securities sandbox (DSS) overseen by the Bank of England and the Financial Conduct Authority after the government published its plans to regulate crypto assets, covering issuance, exchange, lending, etc.	• Future Regulatory Regime for Cryptoassets (2023) • The Financial Services and Markets Act 2023 (Digital Securities Sandbox) Regulations (2023)
	• The **EUROPEAN UNION** has clearly stated its support for the development of Web3, as outlined in MiCA, which was ratified in 2023, as the regulation removes the need for individual national Web3 permit regimes replacing it with one system for all EU countries	• Markets in Crypto-assets ("MiCA") Regulations (2023)
	• In 2022, the **UAE** took a significant step by establishing the Virtual Assets Regulatory Authority ("VARA") to regulate and supervise VASPs[1], with the DIFC and ADGM also introducing their own virtual-asset-related regulations	• VARA Rulebooks (2023) • Guidance on Regulation of Virtual Assets in ADGM (2023)

[1]Virtual Asset Service Providers

Source: HKSAR Government, Monetary Authority of Singapore, Liberal Democratic Party of Japan, Reuters, the U.K. Government, European Securities and Markets Authority, Cointelegraph, Quinlan & Associates analysis

SUPPORT FROM THE PRIVATE SECTOR (1/2)

Key Takeaways

Major brands across several industries have started exploring the integration of Web3 technologies into their business models and customer offerings.

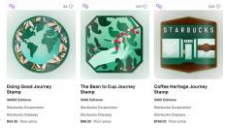
From launching loyalty programs powered by NFTS to facilitating peer-to-peer transactions using Web3 payment rails, a growing number of companies are looking at how best to leverage the unique capabilities of blockchain-based applications and systems.

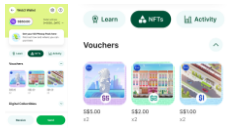
The private sector's embrace of Web3 signals a recognition of the technology's potential to deliver innovative and engaging customer experiences. As more mainstream brands experiment with Web3 use cases, it further validates the growing importance being placed on finding real-life use cases for decentralised technologies in the commercial world.

Blockchain adoption is seeing considerable traction across a variety of different industries, offering users novel, immersive experiences

Consumer Blockchain Use-Cases

Notable Examples

	reddit	MAC	GIVENCHY	STARBUCKS
				
	NFT LAUNCH (2021)	**NFT LAUNCH** (2022)	**METAVERSE EXPERIENCE** (2022)	**LOYALTY SCHEME** (2022)
Description	Dropped first NFT collection (CryptoSnoo) in 2021 (with its 4th collection in 2023), allowing comments to feature an avatar	Launched an NFT collection with iconic American artist, Keith Haring, creating a sensory experience of its lipstick collection	Hosted makeup stations with their makeup products on Roblox, enabling users to engage in avatar makeovers	Extended its loyalty scheme into Starbucks Odyssey, allowing users to earn NFTs and exclusive benefits by completing activities
Key Milestones	**780 ETH in Transaction Volume***	**>USD 500m Raised** *(June 2023)*	**>10.7m Visitors** *(end 2023)*	**>58,000 Active Users** *(2024)*

	NIKE	Grab		indosat ooredoo
				
	MARKETPLACE PLATFORM (2022)	**WALLET** (2023)	**WALLET** (2023)	**GAMING EXPERIENCE** (2024)
Description	Developed a platform for users and customers to co-create virtual Nikes wearable and earn royalties	Embedded a user-friendly Web3 wallet on its app for its 180 million user base, allowing them to earn and redeem NFT vouchers	Enabled direct, seamless P2P settlements via Telegram chats, where users simply select the recipients' Telegram nickname	Provided Web3 play-to-earn games accessible to 100 million users in Indonesia, providing a more rewarding experience
Key Milestones	**>USD 1m in First NFT Sales**	**180m Grab Users** (2023)	**900m Telegram Users** *(2024)*	**14x MAU Growth** *(Since Launch)*

*For Reddit's best-selling collection, which is Foustlings x Reddit Collectible Avatars

Source: M.A.C Cosmetics, Givenchy Paris, Techcrunch, Circle, Dailycoin, Nike, CryptoNews, CoinGape, Quinlan & Associates analysis

SUPPORT FROM THE PRIVATE SECTOR (2/2)

Key Takeaways

Blue-chip companies have also aggressively invested in blockchain-related patents.

In 2023 alone, the number of blockchain patents granted surpassed 2,400, with the lion's share of being granted in North America and Asia Pacific.

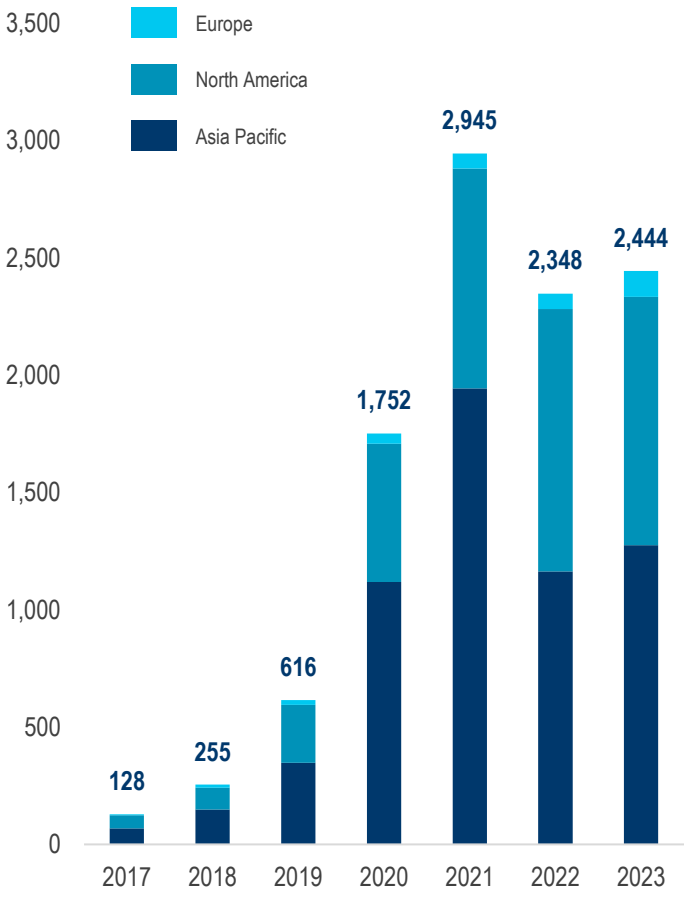
Top technology and financial firms, including Ant Group, IBM, and Tencent, have acquired blockchain-related patents in an effort to add Web3 capabilities to their service offerings. This includes features like faster cross-border remittance and blockchain-based enterprise solutions.

The private sector's continued investment in blockchain technologies underscores the continued shift of Web3 into the mainstream.

Beyond exploring commercial uses cases, blue-chip technology and financial services companies across the globe are aggressively investing in Blockchain-related patents

Granted Blockchain-related Patents by Region

Number of Patents, 2017-23



Top Blockchain[1] Patent Recipients

2017E-24E, Global

	Company	Ctry*	# Granted	Focus Area[2]	Purpose[3]
1	Ant Group / Alibaba Group	CN	1,010	• Transactions • Data storage	*Enable faster cross-border remittance services with DLT-based architecture*
2	IBM	US	660	• Database • Transactions	*Build out full stack blockchain-as-a-service offering for enterprise usage*
3	Tencent 腾讯	CN	582	• Data storage • Data processing	*Add blockchain capabilities to Tencent cloud services*
4	PURESTORAGE	US	214	• Data storage	*Enhance data storage services with patented blockchain technologies*
5	PING AN Expertise Creates Value	CN	148	• Data storage • Data mgmt/	*Improve subsidiary companies' operations through smart contracts*
6	BANK OF AMERICA	US	143	• Data mgmt. and sharing	*Build on needed infrastructure for speedy DLT-based payments*
7	中国联通 China unicom	CN	136	• Devices • Access control	*Utilise blockchain patents to bolster communication services*
8	Microsoft	US	100	• Identification • Data mgmt.	*Expand Azure's blockchain service capabilities for enterprise usage*
9	TOYOTA	US	96	• Transport	*Become a leading innovator by exploring applications in the auto industry*
10	intel.	US	89	• Security • Data mgmt.	*Devise innovative hardware products by leveraging blockchain*

[1]Numbers of patents granted regarding "blockchain" and "distributed ledger technology" based on the Google Patent search engine, [2]Based on Key Words, [3]Not exhaustive, *Country

Source: Google Patents, company websites and press releases, Quinlan & Associates analysis

WEB3 ADOPTION OUTLOOK

Key Takeaways

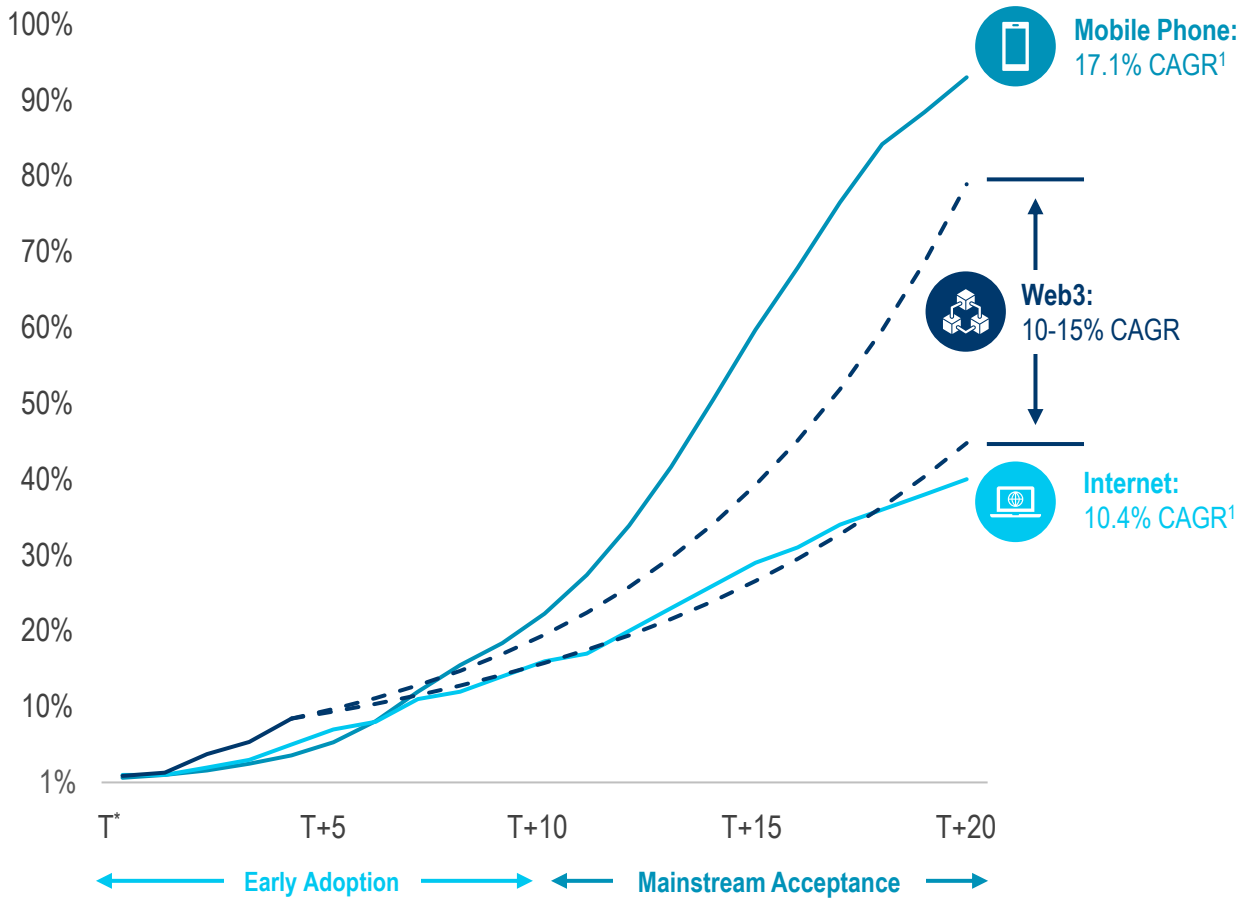
Web3 adoption rates have grown aggressively in recent years, surging from 1% to 8% global adoption in less than 5 years.

We forecast the growth trajectory of Web3 adoption to ultimately mirror technologies like the mobile phone and internet, reaching mainstream global adoption (i.e., 66% adoption rate) in the next 10-15 years.

By comparison, the internet took 23 years to reach its current adoption rate of 66% from 8%, while mobile phones took 15 years to reach their current level of adoption of 96%.

We anticipate the growth rate in Web3 adoption will ultimately mimic technologies like the mobile phone and internet

Technology Adoption Trends
Adoption Rate After Reaching 1% of Global Population



[1]CAGR after reaching an 8% adoption rate, *T is the number of years it took to reach 1% global adoption rate, which varies by each technology
Source: International Telecommunications Union, The World Bank, Quinlan & Associates analysis

It took…

23 years
…for the internet to reach the current adoption rate of 66% from 8% (i.e., current Web3 adoption rate)

15 years
…for mobile phones to reach a 96% adoption rate from 8% (i.e., current Web3 adoption rate)

It is expected to take…

10-15 years
…for Web3 to reach mainstream global adoption (i.e., above 66% of the population)

SECTION 3

CYCLICAL GROWTH DRIVERS

CYCLICAL GROWTH (1/5): MARKET CAP

Over the past 7 years, the global Web3 market has grown from relative obscurity into a multi-trillion-dollar industry, underpinned by several key industry developments

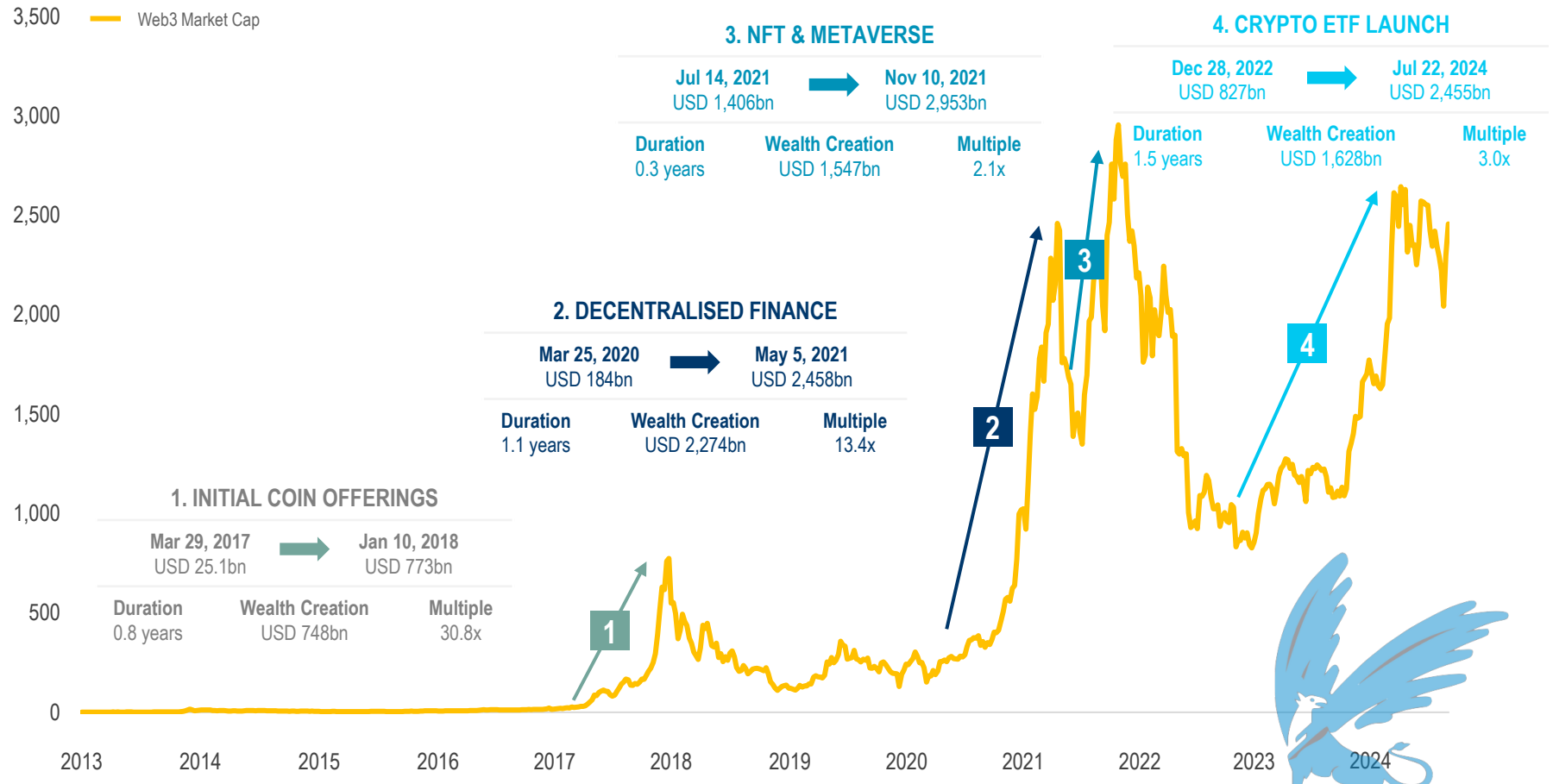
Key Takeaways

The global Web3 market saw considerable growth over the past decade, evolving into a multi-trillion-dollar industry.

This expansion has been driven by several key developments within the industry, including initial coin offerings ("ICOs"), decentralised finance ("DeFi"), non-fungible tokens ("NFTs"), the metaverse, and cryptocurrency exchange-traded fund ("crypto ETF") launches.

Each of these developments unlocked multi-billion/trillion-dollar waves of wealth creation (and innovation) within short periods and have collectively propelled the global Web3 market to its current state.

Web3 Market Cap
USD billion, Jan 2013 – Jul 2024



Source: Coinmarketcap, Quinlan & Associates analysis

CYCLICAL GROWTH (2/5): ICOs ("WAVE 1")

Approximately USD 15 billion has been raised through initial token offerings ("ICOs") since 2016 across a wide variety of applications

Key Takeaways

The Web3 market made its debut breakthrough in 2016/17 with the rise of initial coin offerings ("ICOs").

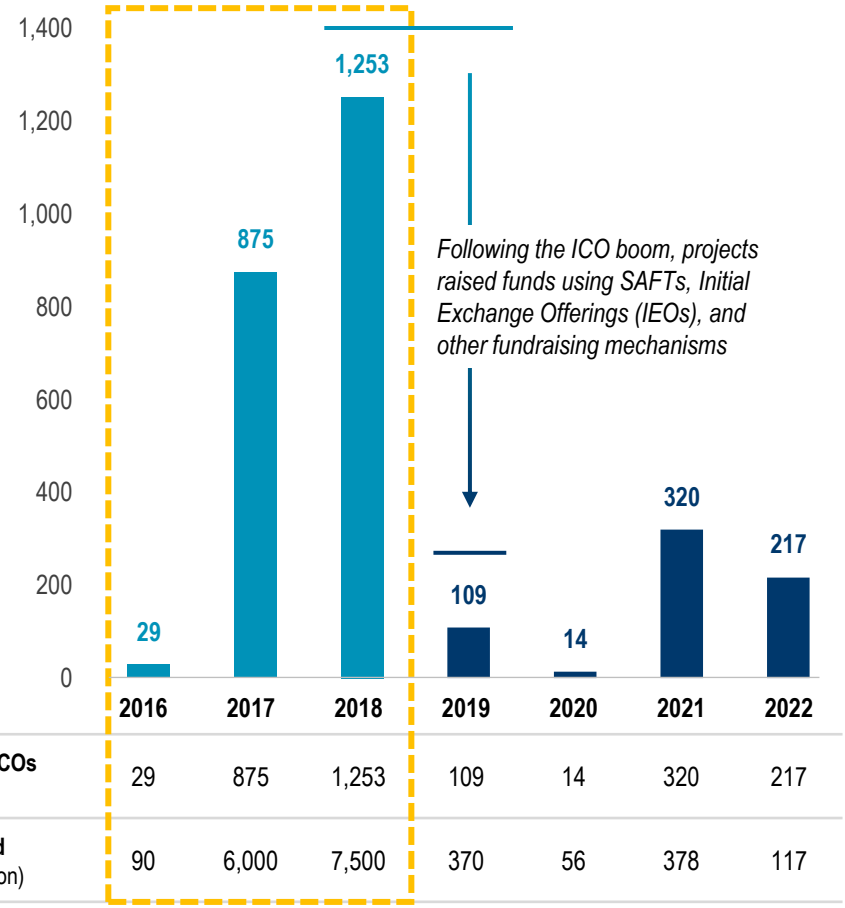
These fundraising mechanisms allowed Web3 startups to raise capital by issuing their own cryptocurrencies (most commonly in form of utility tokens), driving the market capitalisation of Web3 assets to ~USD 800 billion in 2018.

ICOs were particularly prevalent in finance and financial services-related Web3 applications, with ICO projects raising a cumulative ~USD 15 billion since 2016.

However, with the ICO bubble bursting in 2019, Web3 projects began utilising alternative fundraising methods, such as simple agreements for future tokens ("SAFTs") and initial exchange offerings ("IEOs").

ICO Market

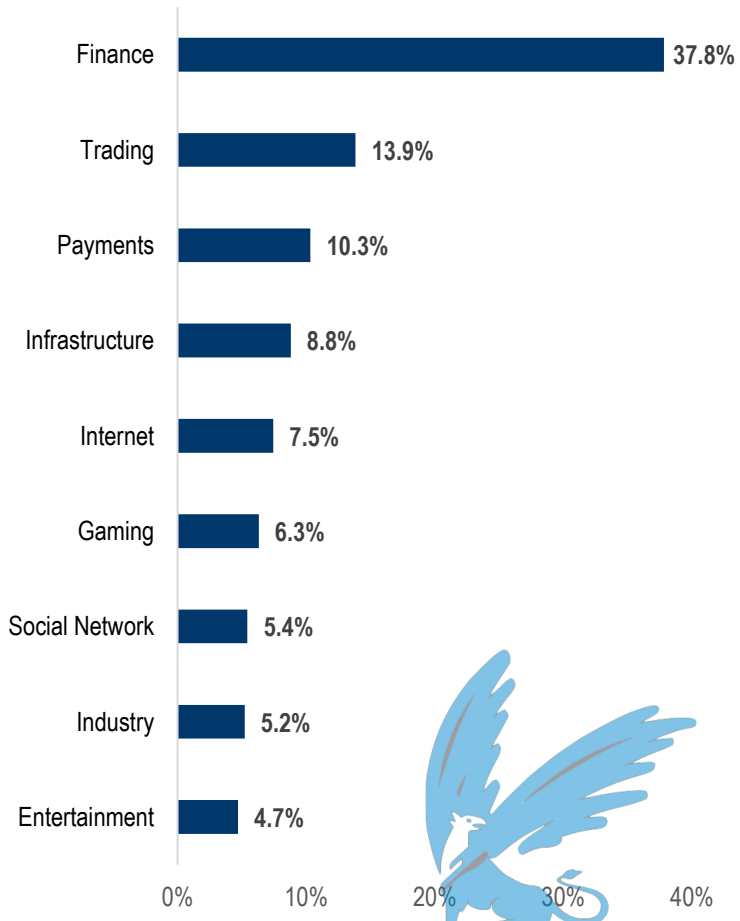
Number of ICOs, 2016-22



	2016	2017	2018	2019	2020	2021	2022
Number of ICOs (#)	29	875	1,253	109	14	320	217
Fund Raised (in USD million)	90	6,000	7,500	370	56	378	117

ICO Project Nature

%, Cumulative, Jan 2016- Jul 2024



Source: ICOBench, Foundico, Quinlan & Associates analysis

CYCLICAL GROWTH (3/5): DEFI ("WAVE 2")

Key Takeaways

DeFi underpinned the second wave of growth in the Web3 market.

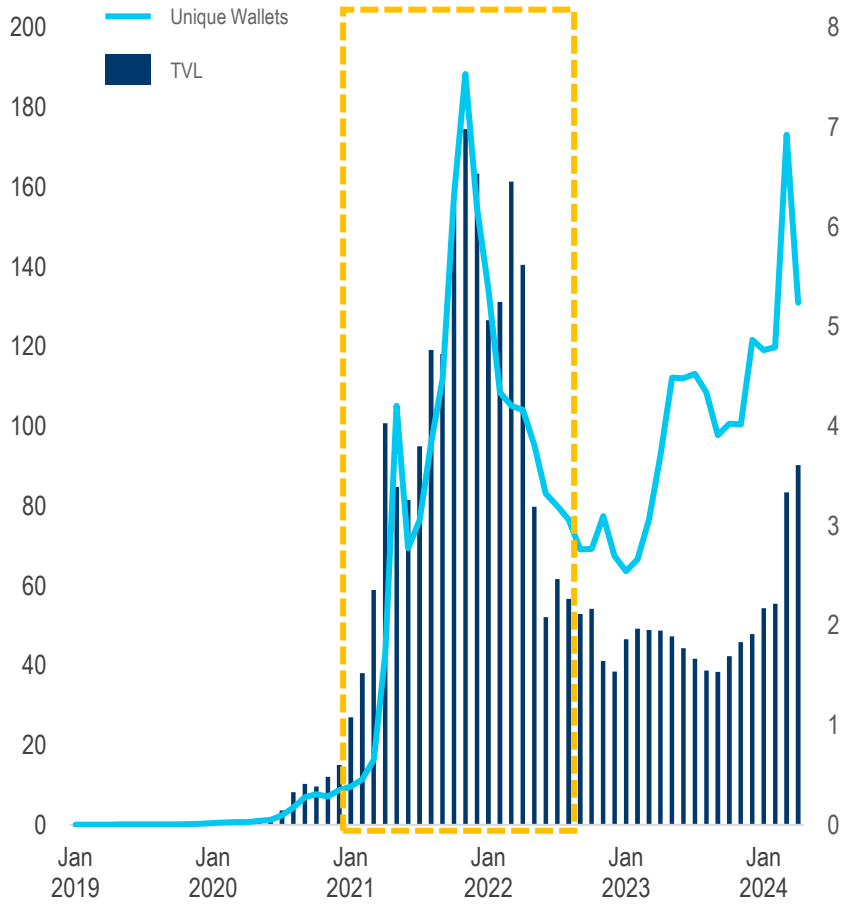
DeFi protocols, built on blockchain technology, enabled alternative financial services outside the traditional banking system.

At its peak in 2021, the DeFi market boasted over 7 million users who had locked in USD 175 billion worth of assets. Explosive growth in wallet usage (and trading volumes) on DeFi platforms drove substantial asset and wealth creation.

Over 7 million users have locked in USD 175 billion worth of assets to decentralised finance platforms and applications since 2019

DeFi TVL & Unique Wallet Address

Left: USD billion; Right: # million, Jan 2019 – Apr 2024



DeFi Trading Volume and TVL

USD, Jul 2024

Decentralised Exchanges	24-hours Volume (millions)	Dex TVL (millions)	Cumulative Volume (billion)
Uniswap	1,082	33.7	1,530
Raydium	1,064	14.1	54
Orca	392	15.2	-
PancakeSwap	349	15.2	790
Phoenix	123	-	-
Lifinity	75	0.068	2.9
Thorchain	61	107.6	50
Balancer	40	1.7	30
Trader Joe	33	2.6	13
Quickswap	28	0.4	75

Source: Defi Llama, Statista, Quinlan & Associates analysis

CYCLICAL GROWTH (4/5): NFTs ("WAVE 3")

Key Takeaways

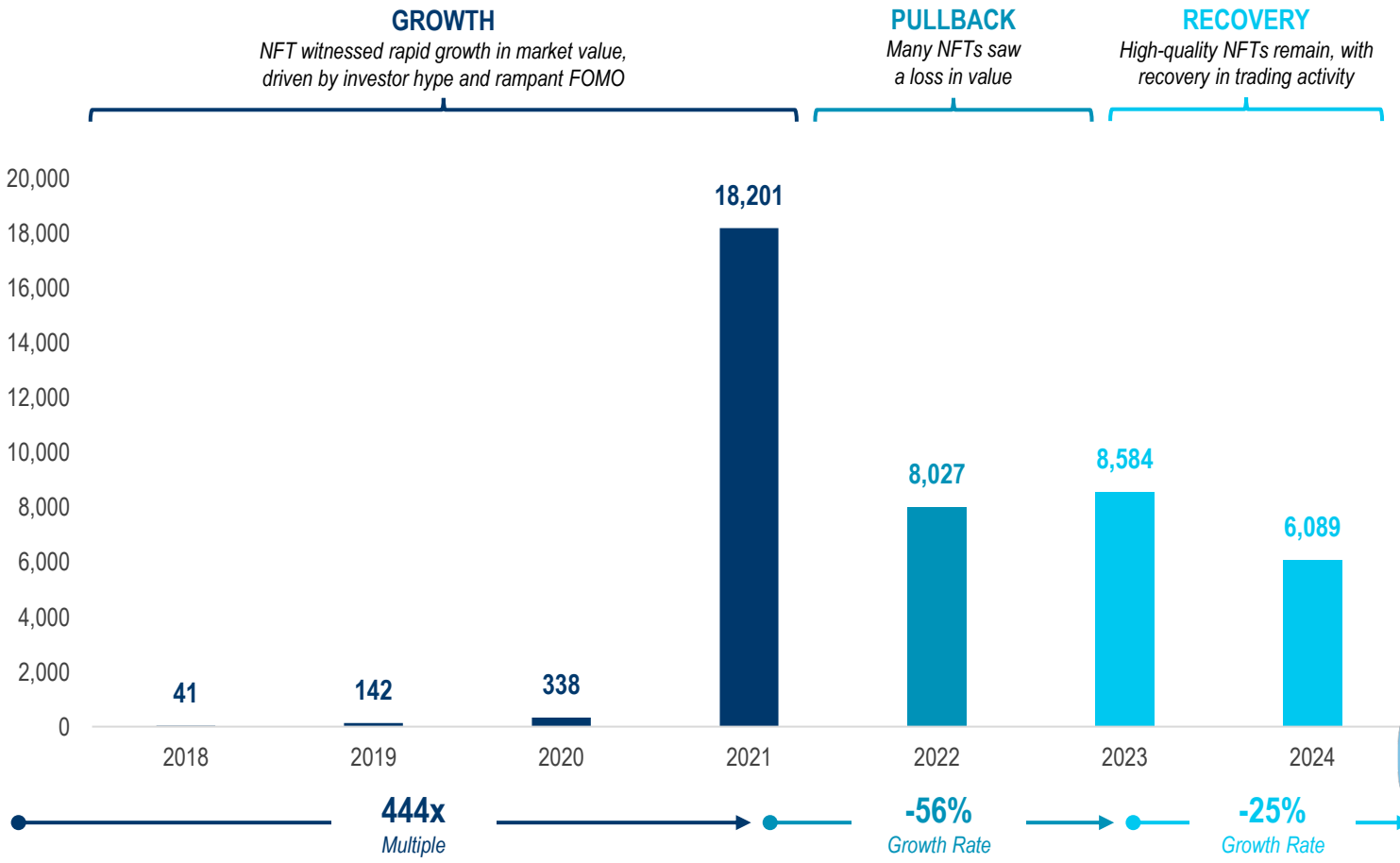
NFTs drove the third wave of growth in the Web3 market, with Investor hype and a fear-of-missing-out ("FOMO") fuelling a rapid surge in NFT issuance and trading activity.

Although the value of many NFTs were wiped out once the hype was gone. high-quality NFT projects continue to support trading activity and market presence.

Of note, the top 10 NFT collections account for a sizeable 38% of the total NFT market capitalisation, worth a combined ~USD 2.3 billion as of July 2024.

Like previous new markets, NFTs experienced a peak, decline, and have now stabilised as a multi-billion-dollar industry

NFT Market Capitalisation
USD million, 2018-24 (as of 8 Jul)



38%
…of the NFT market cap is supported by the top 10 NFT collections, worth a combined USD 2.3 billion

Source: Defi Llama, NFTGO, Quinlan & Associates analysis

CYCLICAL GROWTH (5/5): CRYPTO ETFs ("WAVE 4")

Crypto ETFs are attracting new institutional capital inflows, opening the floodgates for mainstream investment into Web3

Key Takeaways

The latest wave of Web3 wealth creation has been driven by an influx of institutional capital, much of which has been supported by favourable regulatory developments.

Major regulators across the globe, including the U.S. Securities and Exchange Commission ("SEC"), have approved fund managers to launch crypto ETFs, opening the door for institutional investment in Web3.

The institutional holdings of large-cap cryptocurrencies (e.g., Bitcoin and Ethereum) to create such ETFs is providing significant capital flows, fuelling a new wave of growth in the industry.

Bitcoin Rally
Press Coverage, 12 March 2024

Bitcoin Tops $72,000 for the First Time as Rally Builds Steam

- LSE to start taking applications for Bitcoin, Ether ETNs
- Technical signals show rising institutional, retail interest

By Sidhartha Shukla
March 11, 2024 at 3:42 PM GMT+8
Updated on March 12, 2024 at 4:13 AM GMT+8

Save

Bitcoin topped $72,000 for the first time, advancing for a sixth straight day and taking gains this year to almost 70% on the back of massive inflows into US exchange-traded funds.

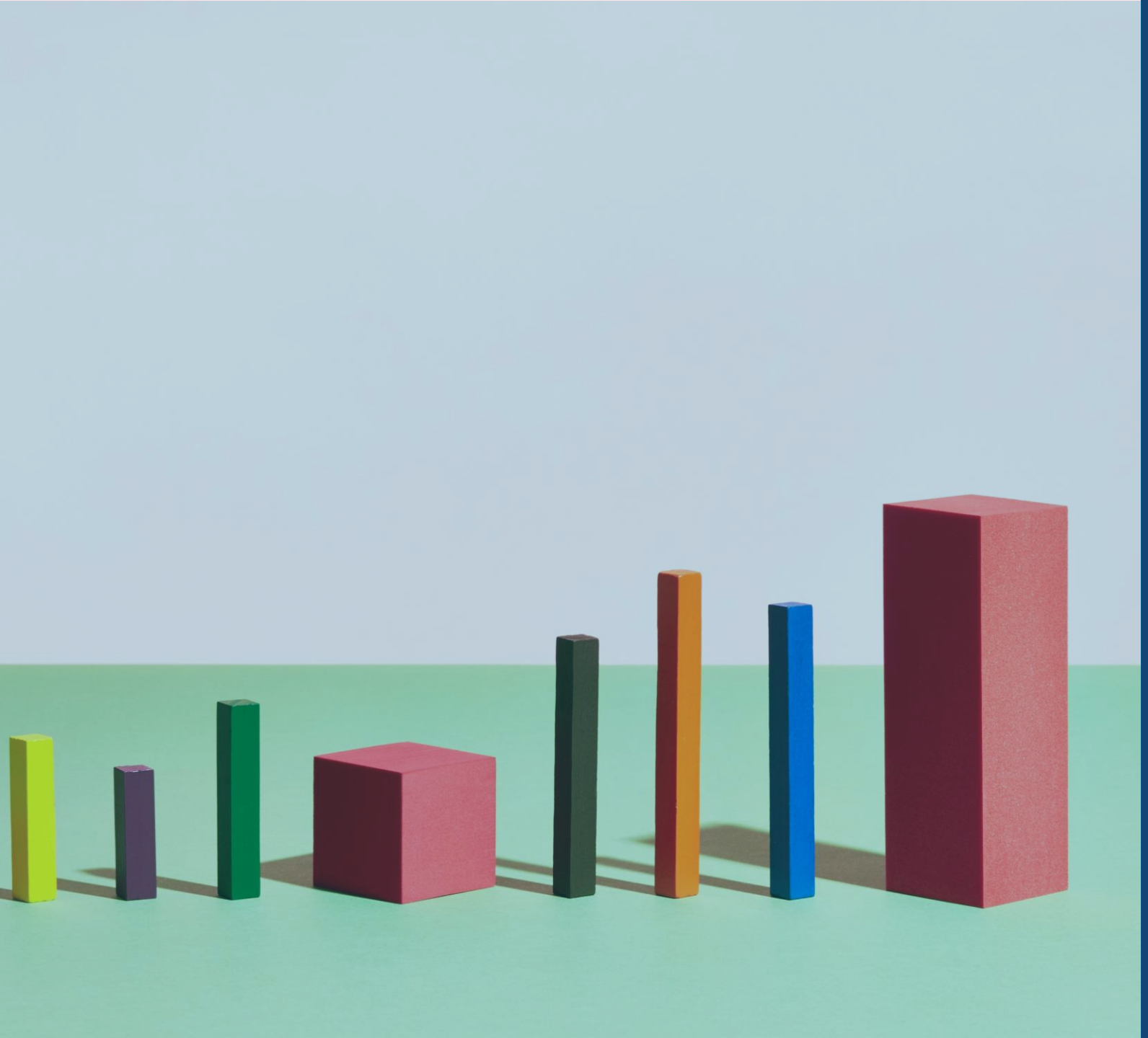
The original cryptocurrency rose as much as 5% to $72,880 on Monday, before paring the increase. Smaller tokens like Ether, Solana and Avalanche also advanced. The crypto gains came even as equities were mixed ahead of a key report on US inflation.

With the launch of cryptocurrency ETFs by major financial institutions, Bitcoin reached the USD 70,000 threshold for the first time, supported by a sizeable inflow of new capital to the cryptocurrency market

Bitcoin Spot ETFs
As of 8 July 2024

Company		ETF Name	Exchange	AUM (USD)
GRAYSCALE	**Grayscale**	Grayscale Bitcoin Trust	NYSE	**24.3bn**
BLACKROCK	**BlackRock**	iShares Bitcoin Trust	Nasdaq	**17.2bn**
Fidelity INTERNATIONAL	**Fidelity**	Wise Origin Bitcoin Trust	Cboe BZX	**9.9bn**
ARK | 21shares	**ARK/21 Shares**	ARK/21 Shares Bitcoin Trust	Cboe BZX	**2.9bn**
bitwise	**Bitwise**	Bitwise Bitcoin ETP	NYSE	**2.2bn**
VanEck	**VanEck**	VanEck Bitcoin Trust	Cboe BZX	**0.53bn**
VALKYRIE	**Valkyrie**	Valkyrie Bitcoin Fund	Nasdaq	**0.50bn**
Invesco | galaxy	**Invesco & Galaxy**	Invesco Galaxy Bitcoin ETF	Cboe BZX	**0.38bn**
FRANKLIN TEMPLETON	**Franklin Templeton**	Franklin Bitcoin ETF	Cboe BZX	**0.31bn**
WISDOMTREE	**WisdomTree**	WisdomTree Bitcoin Trust	Cboe BZX	**0.08bn**

Source: Bloomberg, SEC, Blockworks, Quinlan & Associates analysis



SECTION 4

STRUCTURAL GROWTH PILLARS

EMERGENCE OF UNICORNS

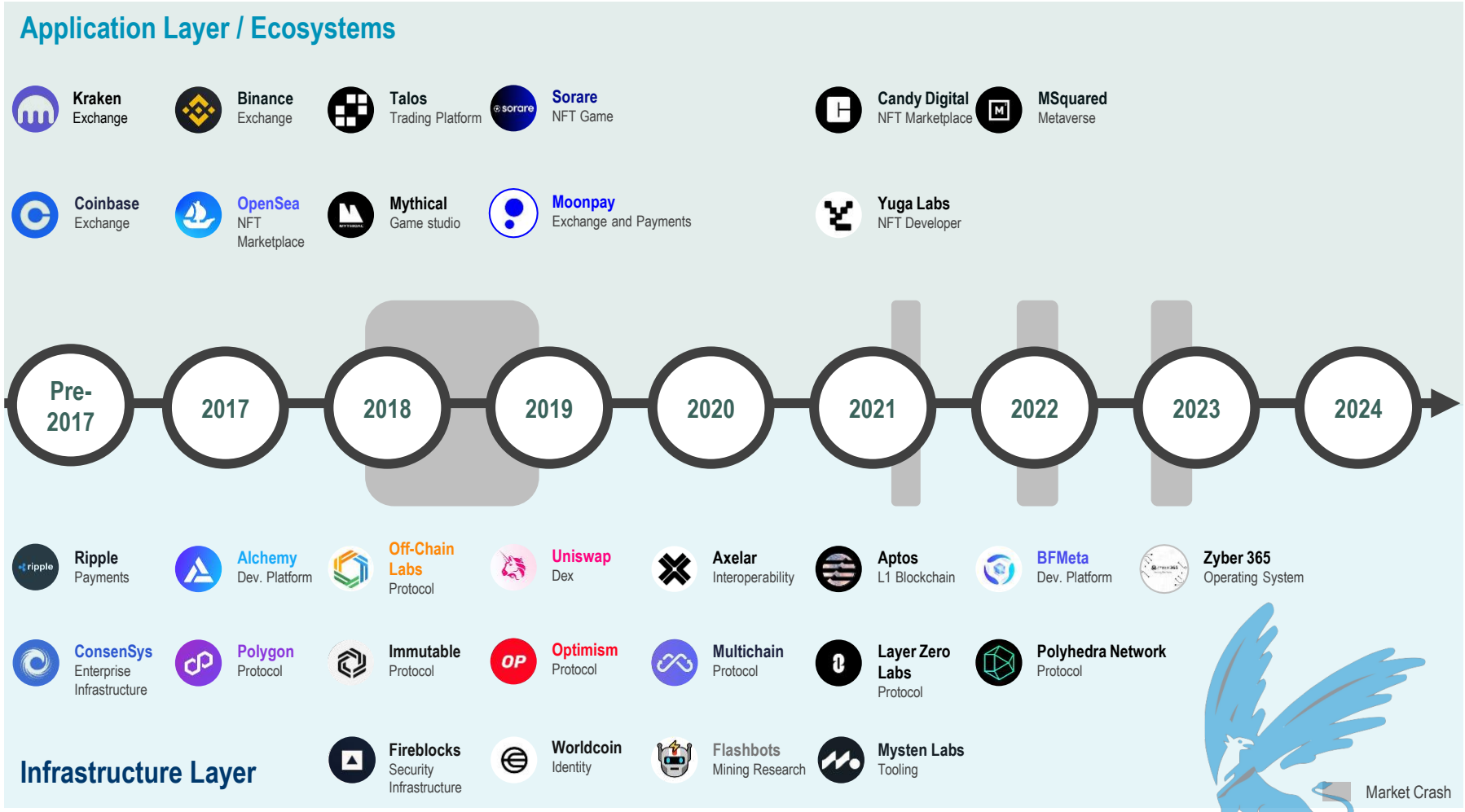
Key Takeaways

Despite the cyclical nature of the Web3 market, in which periods of investor hype and FOMO are followed by "crypto winters,", crypto unicorns continue to emerge in the Web3 space.

The Web3 landscape has proven capable of nurturing and sustaining the development of highly successful enterprises.

This resilience and the ability to foster innovative startups in the face of market volatility indicate Web3's underlying potential and the long-term viability of decentralised technologies and applications.

Throughout Web3's various boom and bust cycles (including "crypto winters"), a plethora of Web3 unicorns have emerged and continue to thrive to this day



Source: Crunchbase, Quinlan & Associates analysis

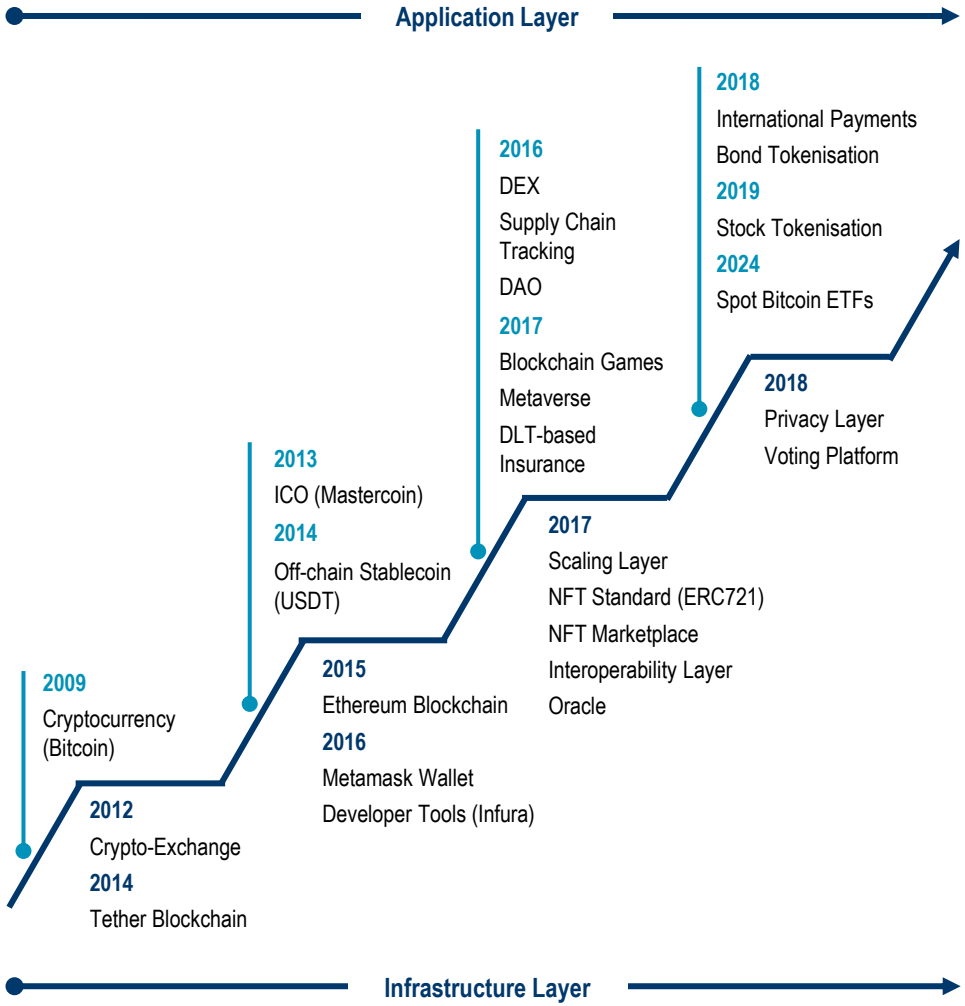
INFRASTRUCTURE, APPS, AND USERS

Key Takeaways

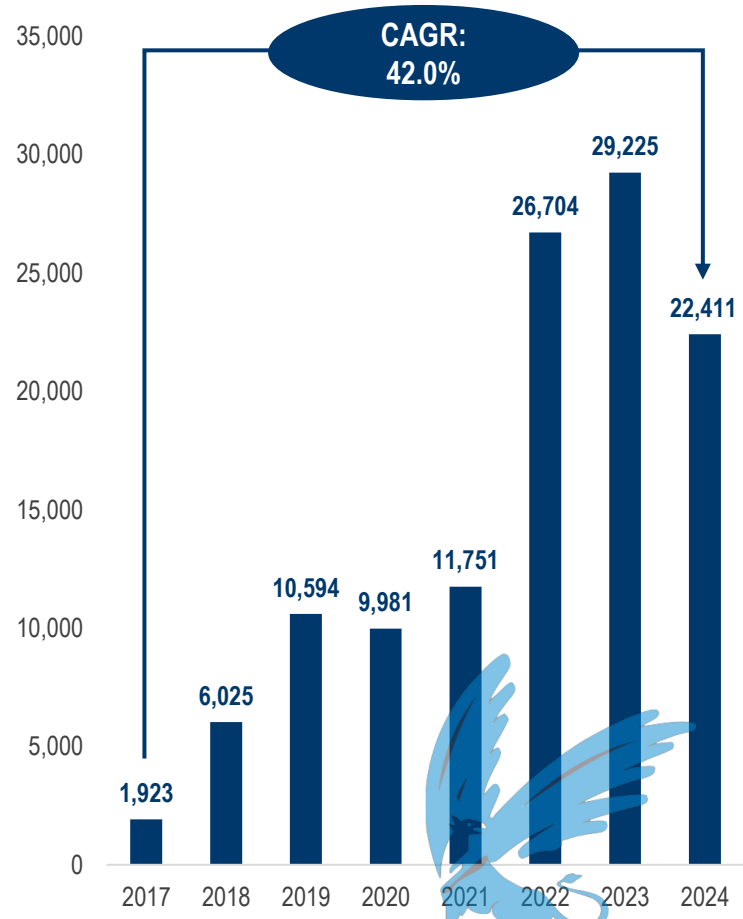
Macroeconomic fundamentals and cycles aside, Web3 applications and infrastructure continue to develop at pace, with a large base of active developers contributing to building both the front- and back-end of this ecosystem.

New applications and offerings cater to a wider base of users, while a robust collection of infrastructure supports the viability and sustainability of this growth, paving the way for new waves of adoption.

Cycles aside, ongoing developments in Web3 applications and infrastructure continue to support rising user adoption



Total Monthly Active Web3 Developers[1]
Jan 2017- Jul 2024



[1]Only counting original code developers
Source: IMF, Reuters, Medium, Coindesk, Nasdaq, World Bank, Electric Capital, Quinlan & Associates analysis

DECENTRALISED INFRASTRUCTURE

Key Takeaways

Web3 has seen significant growth in decentralised infrastructure developments. This includes the emergence of decentralised physical infrastructure networks ("DePINs") that enable the sharing of key resources such as storage, computing power, and wireless networks.

DePINs provide a decentralised alternative to traditional centralised infrastructure, allowing users to own and monetise their infrastructure through Web3. Decentralised storage solutions are poised to drive major growth within Web3. From 2022 to 2024 alone, the amount of available storage grew by a factor of 63x.

DePINs promise better security and reliability when compared to traditional storage solutions, making them an attractive option for data-intensive applications and projects.

Decentralised infrastructure, such as decentralised storage, is poised to drive major advancements in the Web3 space

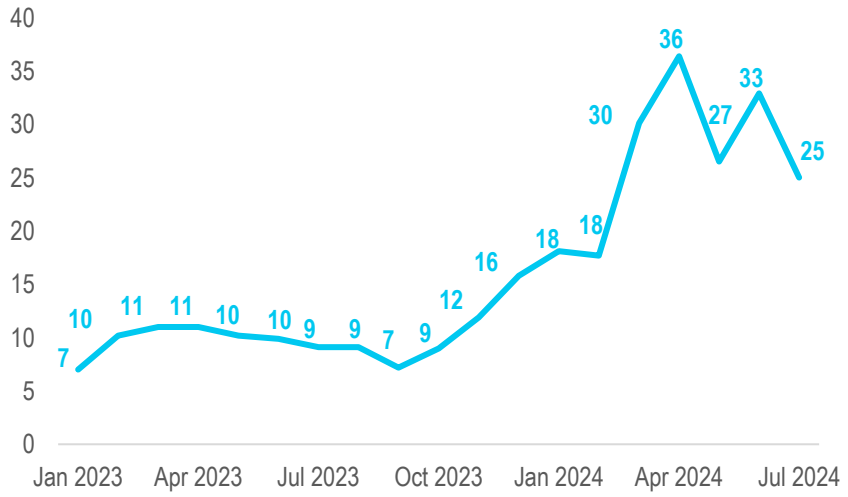
Decentralised Physical Infrastructure Network (DePIN)

Market Capitalisation, USD Billion, Jan 2023 – Jul 2024

DePIN A decentralised IoT that allows users to own and monetise infrastructure by leveraging cryptocurrencies and DLT, enabling the sharing of storage networks, computing power, wireless networks, and other resources

KEY BENEFITS

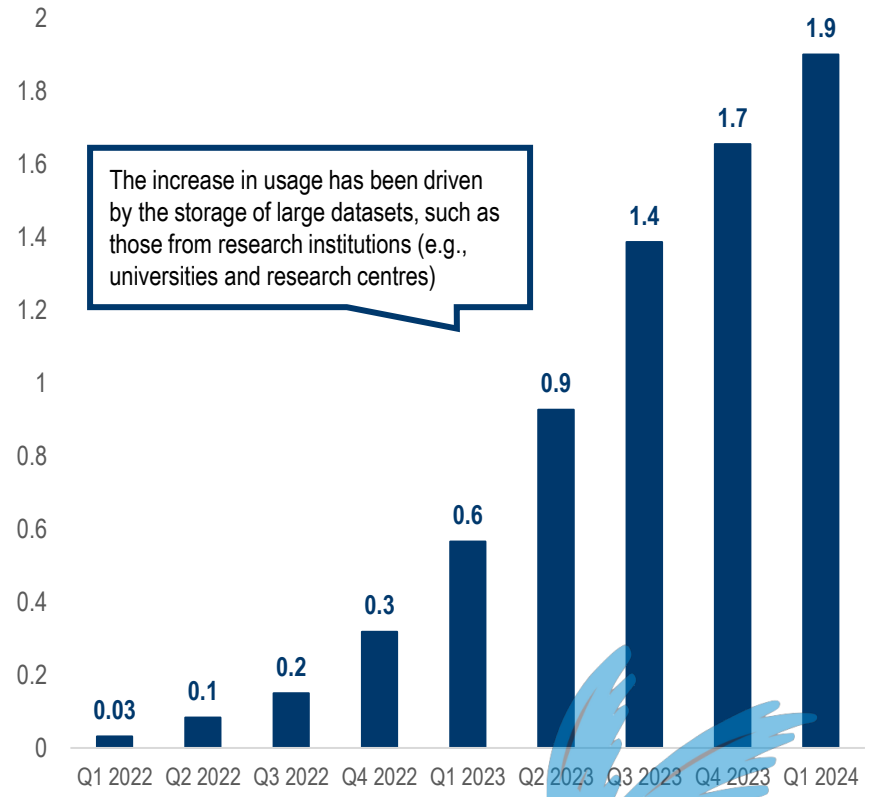
- Lower costs of accessing network of resources for developers
- Enables greater competition and innovation with token incentives



USD 7bn *As of Jan 2023* — **3.6x** → **USD 25bn** *As of Jul 2024*

Used Capacity of Decentralised Storage

Exbibyte (EiB)[1], Q1 2022 – Q1 2024



0.03 EiB used *As of Q1 2022* — **63x** → **1.9 EiB used** *As of Q1 2024*

[1] 1 EiB = 1.15 billion GB

Source: EV3, Statista, Messari, Quinlan & Associates analysis

DECENTRALISED ARTIFICAL INTELLIGENCE

Key Takeaways

Decentralised A.I. represents a key driver of Web3 growth, promising a more innovative approach to training A.I. models.

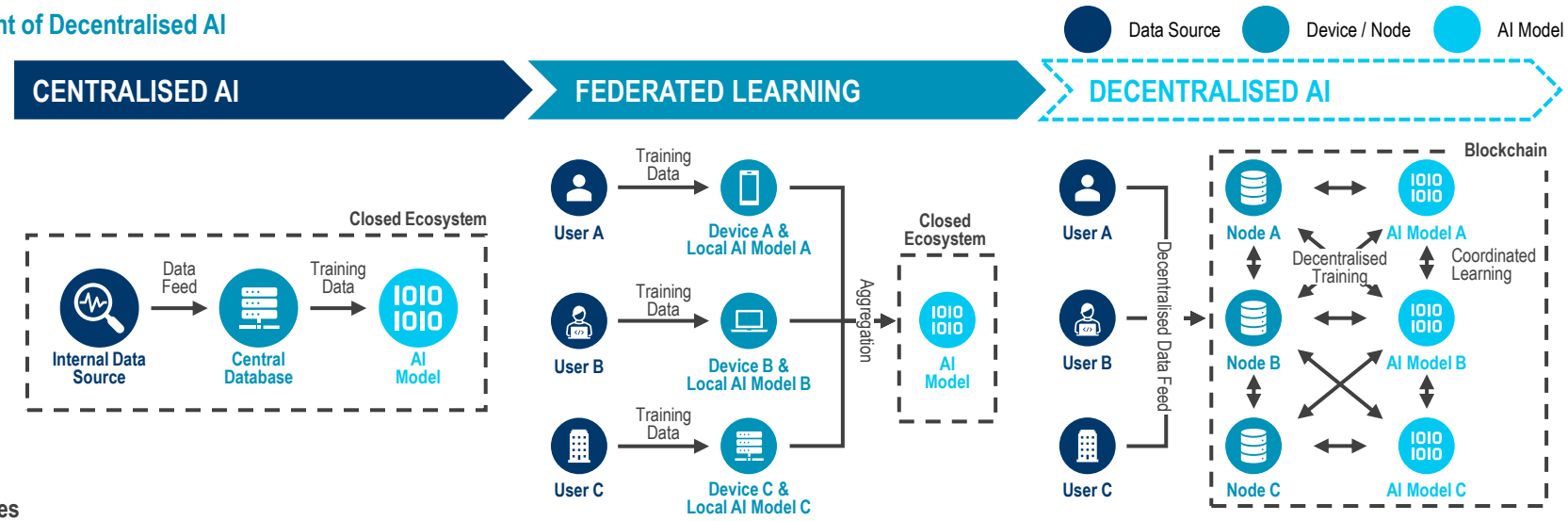
Leveraging underlying decentralised infrastructure, decentralised A.I. enables greater data availability, a wider variety of computing resources, and enhanced data security and privacy.

This method of training A.I. models also incentivises communities of innovators through tokenisation and smart contracts, with governance updates driven by consensus mechanisms.

While the progress of centralised A.I. is controlled by a single entity, decentralised A.I. allows for more updates and innovation to be driven by contributors.

Decentralised A.I. is coming to the forefront of Web3 as a more connected and innovative method of training A.I. models

Development of Decentralised AI
Global



Key Features

Level of Autonomy	✗	• Central authority oversees the entire AI system, including data storage and model training	✗	• Operates under a centralised authority / server that coordinates the learning process	✓	• No central authority / server, with decisions and updates made through consensus mechanisms
Data Sources Availability	✗	• Gathers data from its central repository, where it has consent to use data for training models	✓	• Individuals and organisations collaboratively train models through data sharing	✓	• Accesses a wide range of data sources across its network
Computing Resource	✗	• Leverages powerful, dedicated servers for processing, which can be extremely costly	✓	• Leverages computing resources of multiple devices / nodes in a distributed network	✓	• Relies on the distributed computing power of participants
Data Security / Privacy	✗	• Concentration of data in a single location can be a key target for data breaches	✓	• Secure from training on individual devices/nodes; only model updates aggregated and shared	✓	• Offers strong data security without central points of vulnerability; use of smart contracts
Innovation & Incentives	✗	• Limited opportunities for innovation as the model is controlled by a single entity	✗	• Limited distribution of benefits/rewards among contributors, slowing innovation	✓	• Attracts a large community of innovators through tokenisation and smart contracts

✓ High ✗ Low

Source: LeewayHertz, Quinlan & Associates analysis

DEVELOPER TOOLS

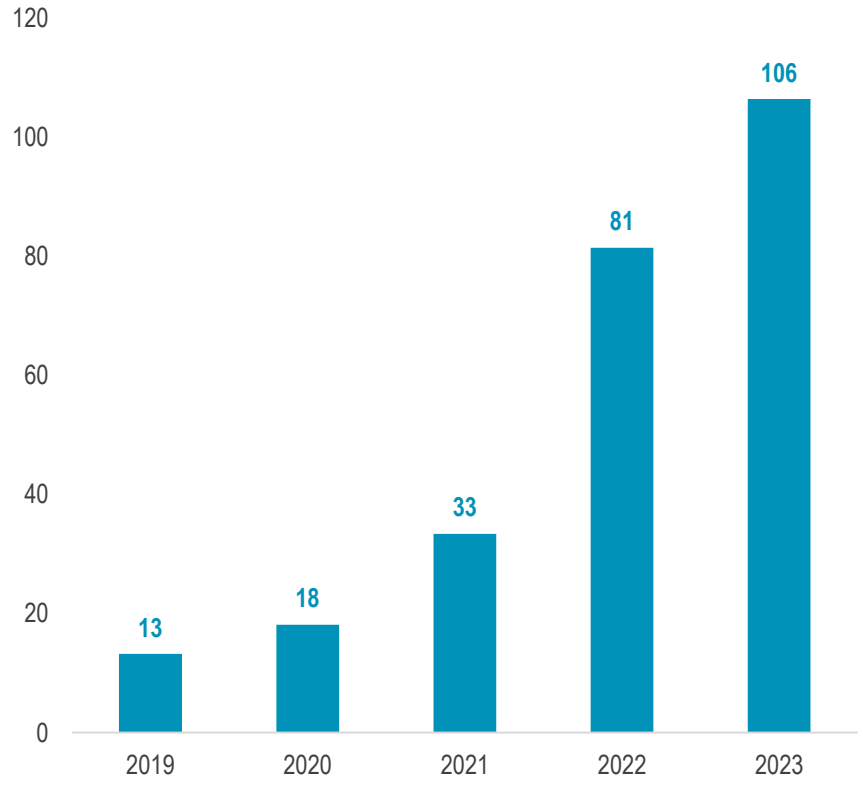
Key Takeaways

The Web3 market has seen robust growth in the use of software development kits ("SDKs"), with annual Ethereum SDK installs growing by 8.2x from 13 million in 2019 to 106 million in 2023.

Rapid growth in SDK installations coincided with a surge in smart contract deployment, which grew over 25x from 2018 to 2024 across Layer 1 and Layer 2 blockchain networks.

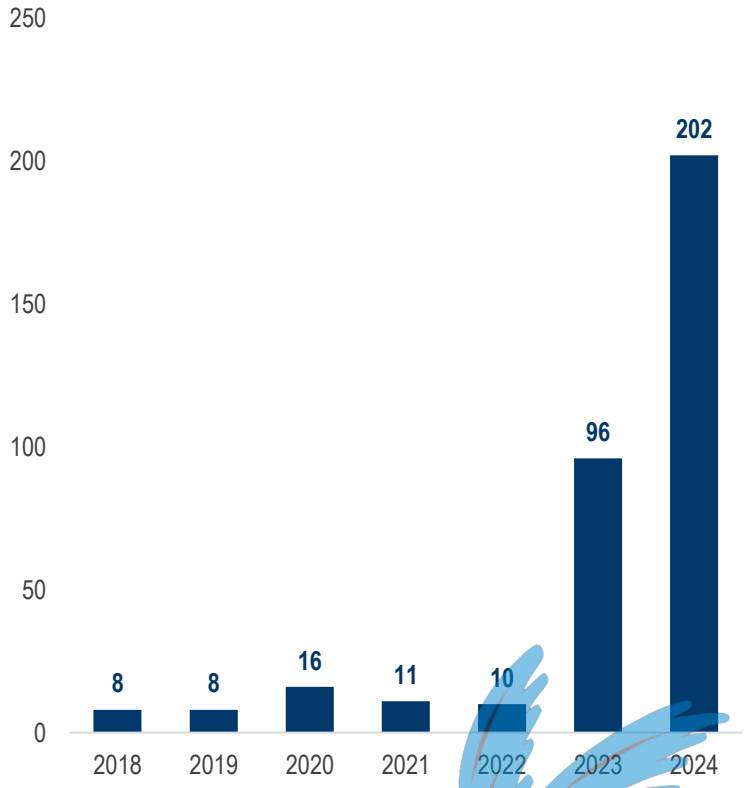
Robust utilisation of SDKs and increased deployments on L1 & L2 chains indicate rapidly growing demand for developer tools

Annual Ethereum SDK[1] Installs
Millions of Installs, 2019 – 2023



13m installs *As of 2019* — **8.2x** → **106m installs** *As of 2023*

Smart Contracts Deployed on Ethereum + L2 Chains[2]
Millions of Deployments, 2018 – 2024[3]



8m contracts *As of 2018* — **25x** → **202m contracts** *As of Jul 2024*

[1]Software Development Kit, [2]Includes Optimism, Arbitrum, [3]Data from July 2024
Source: Alchemy, Dune Analytics, Quinlan & Associates analysis

DECENTRALISED GAMING (1/2)

Key Takeaways

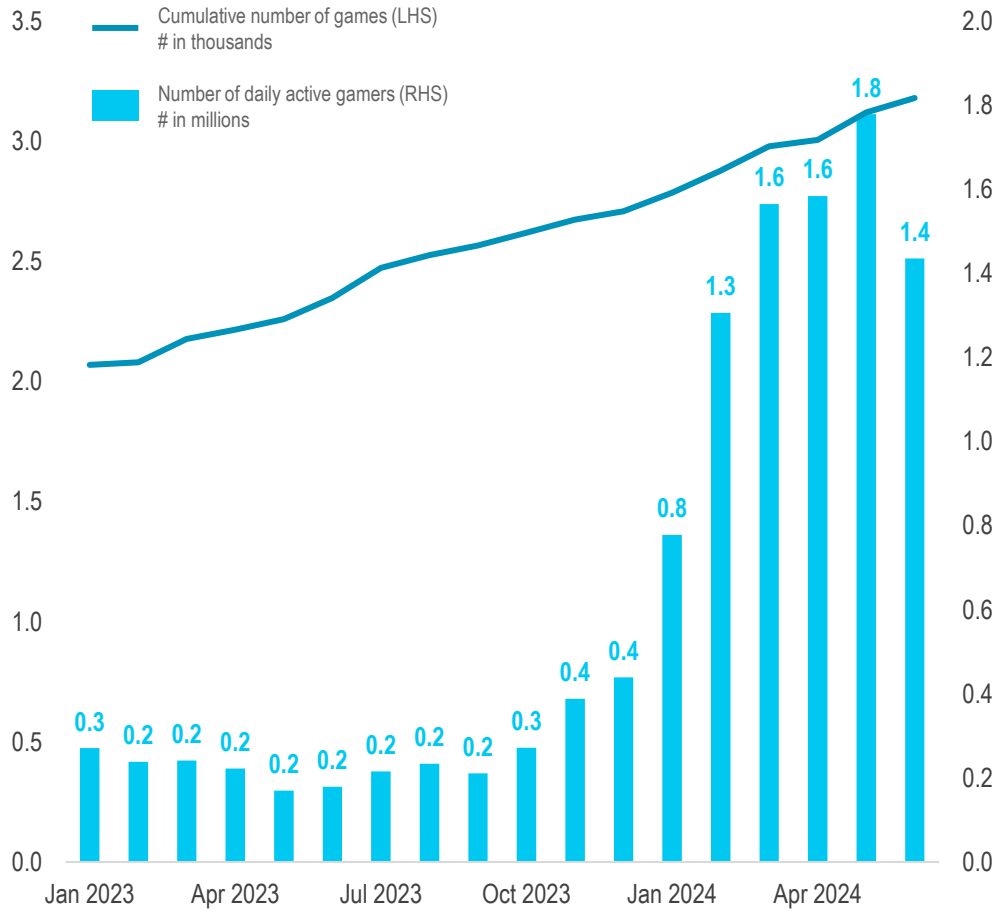
Combining gameplay and monetisation mechanisms through Web3 capabilities, the concept of game finance (GameFi) was introduced in 2017.

The GameFi market recorded nearly USD 2.1 billion in transactions in the first half of 2024 alone. As of July 2024, the GameFi market is a USD 16.4 billion industry covering nearly 3,200 games.

The number of daily active blockchain gamers also grew nearly five-fold from January 2023 to June 2024.

On-chain gaming's rapidly rising popularity coincides with a booming market for monetised content and gameplay

Blockchain Games
No. of Games and Active Gamers, Jan 2023 – Jun 2024



Source: Footprint Analytics, EV3, Quinlan & Associates analysis

Blockchain Games
No. of Games and Active Gamers, Jan 2023 – Jul 2024

4.6x
Number of daily active gamers from 2023-24

3,297
Total Web3 games in the market

USD 2.1bn
Transactions in 1H 2024

USD 16.4bn
Total GameFI token market cap in Jul 2024

DECENTRALISED GAMING (2/2)

Key Takeaways

The growth in GameFi (i.e., Web3 gaming) is also being fueled by rapid developments in augmented reality ("AR") and virtual reality ("VR") technology.

Gaming remains one of the largest applications and revenue-generating segments within the AR/VR ecosystem, with 33.1% interactive video games in 2023 using headsets or mounted displays.

With the AR/VR market reaching USD 17.3 billion in 2024, GameFi is expected to provide one of the avenues for over 3 billion global users to 'play-to-earn'.

The obvious synergies between Web3 gaming and the broader AR/VR landscape underscores the potential for Web3 to drive further innovation and value creation in the immersive technology space.

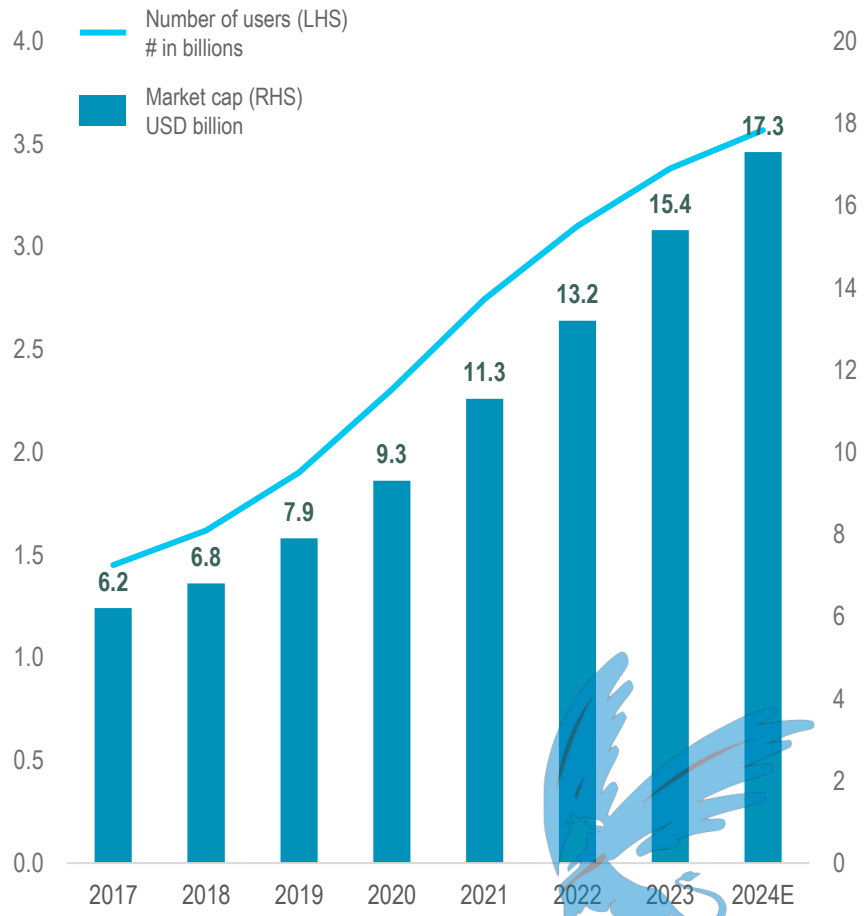
Web3 gaming is also riding on the waves of the rapidly expanding AR / VR industry, being a subsection of its largest use-case

AR / VR
Top Revenue Generating Segments, 2023

Market Share	Segments	Recent Developments
33.1%	**Gaming** Interactive video games that typically use headsets or mounted displays	• Sony invests USD 2bn into XR research (2023) • Disney unveils omnidirectional tiling for VR (2024)
11.7%	**Live Events** Dynamic live events that blend real and digital elements for audiences	• Twenty-One Pilots holds a VR concert experience (2021) • Gucci launches VR virtual stores (2022)
9.7%	**Video Entertainment** Videos that incorporate immersive elements for entertainment	• Apple releases the Apple Vision Pro (2024) • Unity starts supporting the Apple Vision Pro (2024)

Largest Segment

AR / VR
Market Capitalisation and Number of Users, 2017-24E



Source: Company websites, Statista Market Insights, Quinlan & Associates analysis

WEB3 SECURITY

Key Takeaways

Web3 security solutions will play a vital role in supporting the industry's growth in the coming years, especially with the spread of online threats and thefts (which reached a peak monthly value of USD 23.9 million in stolen NFTs in 2022).

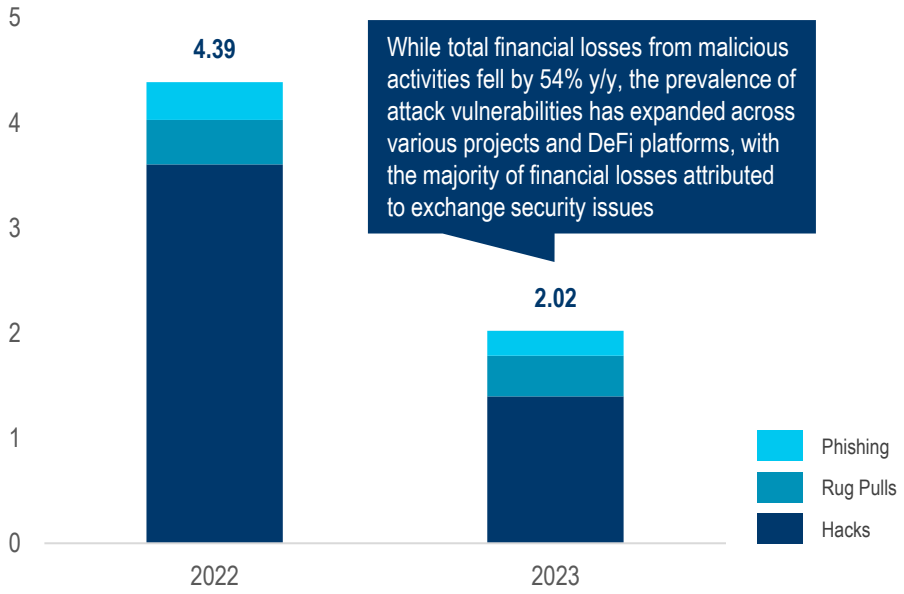
Although overall financial losses in the Web3 space fell 54% year-over-year from 2022 to 2023, continued investment is needed to combat fraud, phishing scams, hacks, and other malicious activities. The fact is, over USD 2 billion of assets were still lost in 2023 as a result of vulnerabilities, with financial services accounting for over 56% of these losses.

Robust Web3 security measures will be crucial in fostering trust and enabling the sustained growth of the Web3 ecosystem in the face of evolving digital threats.

Amidst a proliferation of online threats – and thefts – in the digital world, Web3 security solutions will play a vital role in supporting the industry's growth in the coming years

Total Financial Losses from Malicious Activities (Global Web3 Market)

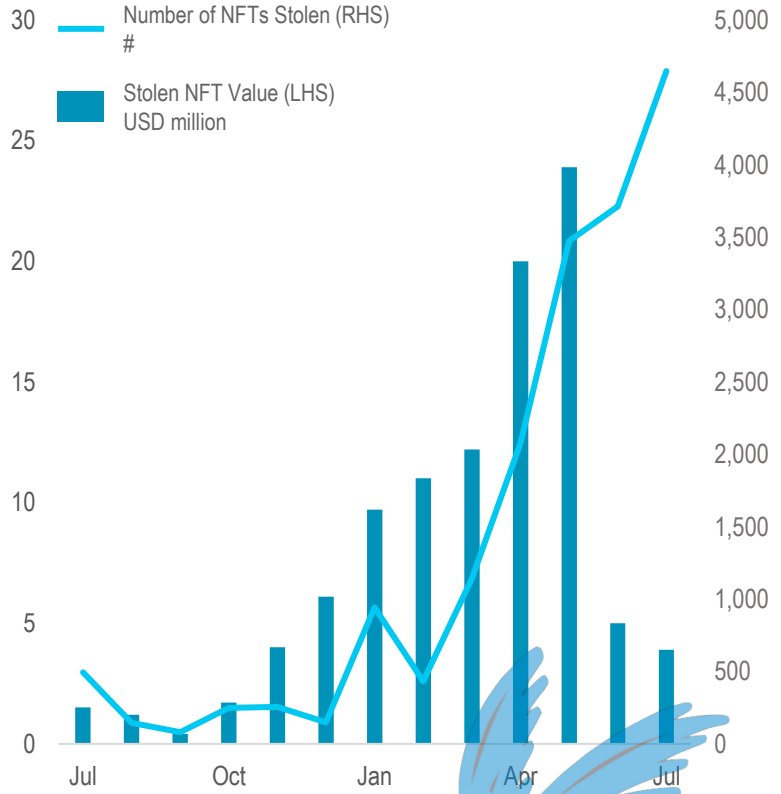
USD Billion, 2022-23



Top Project Types		% of Global Financial Loss Amount
1	DeFi	29%
2	CEX	20%
3	Public Blockchain	15%
4	Cross-chain Bridge	7%
5	Payment Platforms	7%

NFT Fraud

Stolen NFTs, Jul 2021 – Jul 22



Top Scam Types:

- Phishing by scam emails / messages
- Social media compromises
- Impersonation scams

Source: Beosin, H-X Technology, Quinlan & Associates analysis

SECTION 5

HOW WE CAN HELP

WEB3 APPLICATIONS AND SYNERGIES

Key Takeaways

We see a wide variety of angles for players in different industries to identify high-growth and synergistic applications that can allow them to best capitalise on the structural growth story of Web3.

This includes both financial and non-financial services sectors, with applications spanning DeFi, NFTs, infrastructure, tooling, gaming, and security.

By aligning their strategies with the evolving Web3 landscape, organisations across diverse industries can position themselves to leverage the myriad opportunities presented by this highly transformative era.

We see ample scope for different industries to identify areas of high-growth and synergistic applications to capitalise on the structural Web3 growth story

POTENTIAL AREAS OF ADOPTION

		DeFi	NFTs	Infrastructure	Tooling	Gaming	Security
FIANNCIAL SERVICES	**Banks** *(e.g. retail banks)*	Cross-border payments for 24/7 banking	Digital asset custody and loan collateralisation	Secure borrower and loan detail storage on-chain	Smart contract platforms for automating tasks	In-game digital money and asset custody management	DLT-based credit scoring to minimise fraudulent activities
	Insurance *(e.g. insurers)*		Proof-of-policy-holding through NFT minting	Secure policy-holder and policy detail storage on-chain	Automated policy and claim processing via smart contracts	In-game NFT-based item insurance coverage	Shared DLT-ledger for fraud detection in medical claims
	Securities *(e.g. sell-side)*	Automated market-making for new class of digital assets	Tiered membership proof for security brokerages	Syndicated loan information storage on-chain	DLT-based compliance and reporting software	In-game digital asset trading services	Digital identity verification for trading counterparties
	Payment Networks		DLT[4]-based KYC / AML[5] based on digital identity	Cross-border payment data recording on-chain	DLT-based interoperability solutions	In-game payment facilitation	Secure cross-border P2P[6] or B2B[7] payments
NON-FINANCIAL SERVICES	**Goods-Oriented** *(e.g. FMCG[1])*		Authenticity verification for retail goods	Supply chain and logistics data management	Decentralised marketplaces for P2P transactions	In-game branded NFT items and digital collectibles	Supply chain security and product authentication
	Service-Aligned *(e.g. Healthcare)*		Utility NFTs for memberships and access control	DLT-based service and reputation-based networks	Automated progress tracking and payment features	Virtual service delivery via DLT environments	DLT-based access control for users and administrators
	Tech and Info[2] *(e.g. Telco[3])*		Digital rights management for content monetisation	Decentralised cloud storage for A.I. training	DLT-based software development and data analysis	Game and content development with GameFI firms	Data and user verification through DLT-based accounts

Not applicable

[1]Fast moving consumer goods, [2]Technology and Information (e.g. media and entertainment), [3]Telecommunications, [4]Distributed Ledger Technology, [5]Know-Your-Customer / Anti-Money Laundering, [6]Peer-to-peer, [7]Business-to-business

Source: Quinlan & Associates analysis

HOW WE CAN HELP (1/3): QUINLAN & ASSOCIATES

Key Takeaways

Quinlan & Associates can assist you in developing a robust Web3 strategy that aligns with your specific needs and resource constraints, spanning:

- Evaluating of the existing innovation strategy to identify opportunities for Web3 deployment;
- Developing a firm-wide strategy that incorporates Web3 and other distributed ledger technology-based solutions; and
- Implementing strategic priorities across your organisation to deploy Web3 capabilities.

Leveraging our extensive experience in the Web3 space, Quinlan & Associates can help your organisation realise its Web3 ambitions

	EVALUATE	DEVELOP	IMPLEMENT
Description	***Evaluate an organisation's innovation strategy and processes to identify gaps and opportunities for Web3 deployment***	***Develop an appropriate firm-wide innovation strategy that incorporates Web3 and other DLT[1]-based technologies***	**Implement strategic priorities across the organisation to deploy Web3 capabilities, including via targeted partnerships**
Action Items	• Market analysis to identify the latest Web3 trends in your industry and potential implications for your future business model • Competitor benchmarking to identify capability gaps against relevant peers, industry best practices, and relevant sectors • Market sizing on key digital transformation opportunities to adopt DLT-based solutions (including potential revenue upside and cost savings on offer) • Determine adequacy of internal capabilities to effect change, including available budgets, legacy systems, IT expertise / talent, etc.	• Define an end-to-end innovation and Web3 strategy and target operating model at the group and business-unit level, in line with the org.'s[2] broader vision • Develop solutions to address key roadblocks, including defining appropriate strategies around people (e.g. innovation culture), resources (e.g. brand strategy), processes (e.g. compliance protocols), and systems (e.g. IT and data strategy) • Identify the most relevant digital delivery model at each stage of the value chain, and outline all necessary enablers to drive implementation	• Establish and oversee a Project Management Office ("PMO") team to support the org.'s innovation and Web3 programme • Develop an overall execution plan (e.g. outlining key workstreams, defining rollout prioritisation and deliverables, etc.) • Connect your organisation to our network of Web3 start-ups/large corporates to better understand key use cases and proof-of-concepts • Assisting with potential partnerships for general implementation efforts

[1]Distributed Ledger Technology, [2]Organisation's
Source: Quinlan & Associates analysis

HOW WE CAN HELP (2/3): QUINLAN & ASSOCIATES

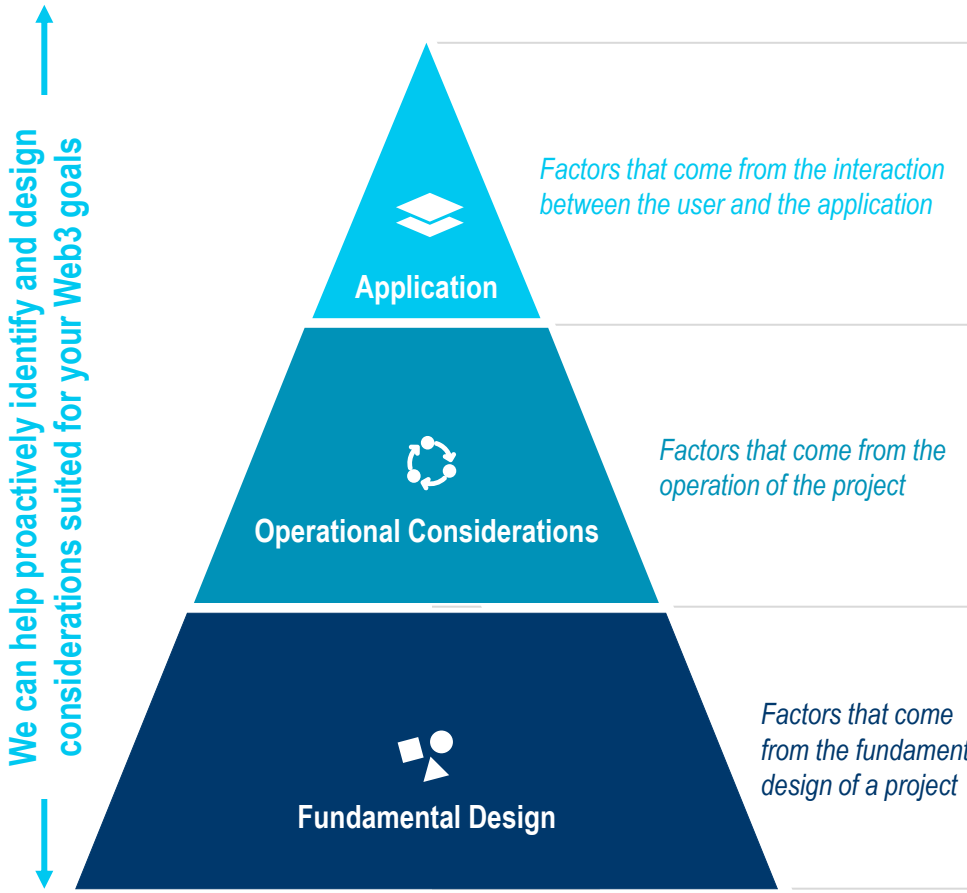
Key Takeaways

Quinlan & Associates can also help you in navigating key design considerations for your organisation's Web3 initiatives, ranging from:

- **Fundamental design** factors, such as project governance and security;
- **Operational consideration** factors, including data privacy, scalability, and interoperability; and
- **Application design** factors, such as user experience and user interfaces.

Business considerations aside, we can also assist your organisation in navigating critical Web3-related design considerations

Design Considerations
Factors



Design Considerations

USER EXPERIENCE
Some users will not understand Web3 concepts, such as private keys, public keys, and wallets, and will demand more intuitive solutions

USER INTERFACE
Users dislike cluttered and scattered interfaces, which may lower overall usage of a Web3 solution if not addressed

DATA / USER PRIVACY
Users may have sensitive data / identities that must be shielded from other parties. Firms may also need to adhere to data retention regulations

SCALABILITY & INTEROPERABILITY
Firms may struggle to scale their solutions and / or integrate their applications to their existing systems and other blockchains

GOVERNANCE
Firms may need to retain a degree of control over their network to remain accountable for their actions, for both regulatory and internal compliance

BLOCKCHAIN TYPE & RISKS IMPLICATIONS
Firms may face concentration risks from nodes, vulnerabilities from smart contracts, and a lack of flexibility from the blockchain of their choice

Source: Quinlan & Associates analysis

HOW WE CAN SUPPORT YOU (3/3)

Key Takeaways

Primal Capital has a suite of fund products offering investors targeted exposure to early-stage Web3 companies with a concentration in infrastructure, developer tools, finance, gaming, security, and A.I.

Primal Capital offers a range of value creation services to ensure that portfolio companies are well-positioned to grow, including:

- Capital and advisory support;
- Operational and scaling support;
- Market access and treasury support; and
- Technical and product support.

Primal Capital offers full fledged support to Web3 companies, from capital introduction to operational scaling, leveraging its extensive experience and network

Main Areas of Concentration

Fund Products' Exposure to Early-Stage Web3 Companies

Focus Areas	Positioning of PRIMAL
INFRASTRUCTURE *(e.g. DePIN)*	Focus on companies that provide utility / value-add to users, ranging from yield generation to computational power, capitalising on Web2 and Web3 demand
DEVELOPER TOOLS	Concentrate on value-added Web3 developer tools, resources, and platforms dedicated to key sectors like gaming to seize opportunities across different verticals
FINANCE *(e.g. DeFi)*	Focus on the growing Web3-enabled finance space, especially products on core chains with large, growing user bases to capture demand from emerging markets
GAMING *(e.g. AR / VR)*	Support projects that provide services and tooling to the rapidly growing Web3 gaming user base, with a focus on games at the intersection of AR/VR
SECURITY *(e.g. Identity)*	Prioritise projects dedicated to safeguarding users' digital assets and data, as well as ensuring the integrity of transactions
ARTIFICIAL INTELLIGENCE	Target areas of synergistic growth between A.I.[1] and Web3 (e.g. decentralised compute platforms, crypto x A.I. projects) to capitalise on the continued adoption of A.I.

[1]Artificial Intelligence, [2]Machine Learning, [3]Amazon Web Services
Source: Primal Capital, Quinlan & Associates analysis

Support Capabilities

Range of Value Creation Services Beyond Investing

We go beyond simply investing and offer a range of value creation services

Areas of Support

CAPITAL AND ADVISORY SUPPORT
- Direct investment
- Capital introductions (e.g. with other VCs)
- Ecosystem connections (e.g. with accelerators)
- Board advisory on key strategic decisions

OPERATIONAL & SCALING SUPPORT
- Connection facilitation (e.g. with enterprise clients)
- Industry mentorship
- Corporate training (e.g. A.I. / ML[2])
- AWS[3] services (e.g. free AWS credits)

MARKET ACCESS & TREASURY SUPPORT
- Market-making services
- Token listing assistance
- Market trading advice
- Digital asset custody solutions

TECHNICAL & PRODUCT SUPPORT
- CRM Solutions
- Technical due diligence
- Penetration Testing
- Smart Contract Auditing

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