McKinsey & Company

McKinsey Technology Trends Outlook 2022

Web3

August 2022

What is the tech trend about?

Web3 includes platforms and applications that enable shifts toward a future, decentralized internet with open standards and protocols while protecting digital ownership rights, providing users greater data ownership and control over how their data is monetized, and catalyzing new business models

Web2 (Current)

"Internet users (mostly) exchange their data for services based on TOS[1]"

Web3

"Internet users own their data and shape the terms of its use"

	Web2 (Current)	Web3
Highlights	Centralization where large platforms govern access and own the user data. Users have the "right to be forgotten" in some jurisdictions	**Disintermediation** with a shift toward individual ownership and control over data monetization, functionality, and value
Business model	Data monetization by tech platforms (eg, personalized ads, revenue sharing) where user audiences are often the "product" sold to advertisers	**Revenues are shared back to users and/or capital contributors** through smart contracts and decentralized autonomous organizations (DAOs)
Technical infrastructure	Centralized and aggregated services (eg, cloud computing services, security models, app stores) Private code, private data, cloud platform-based security models Accessible tools for building on the platform and services	**Decentralized** databases and software programs (eg, smart contracts) **Open-source code**, public immutable data, public-private key cryptography, and composability (ie, ability to fork and integrate on top of existing projects) **Accessible tools** for building on the services but often in new languages and with Web3-specific components

[1]Terms of service.

Source: Expert input; McKinsey analysis

Why should leaders pay attention?

Web3 is based on a more **decentralized, community-governed set of protocols** that could represent a paradigm shift of authority and ownership to individuals with potentially far-reaching implications

Disruption of existing business models

Web3 enables the disintermediation of business models by encoding existing functionality into autonomous smart contracts. Web3 could offer wider economic opportunities (eg, decreased fees), moving the accumulation of value away from middlemen and toward users and suppliers

Rapid innovation through open protocols

Rapid innovation is unlocked by the open-source and modular nature of Web3, which allows for rapid development, testing, and scaling of applications, built by a global developer base. This composability and growing developer base could increase the level of innovation exponentially over time

Increased access and inclusion

Web3 is public and permissionless, meaning that everyone can access, create, and own information and assets, globally, without intermediaries

Opportunity to build new infrastructure

Web3 infrastructure is nascent; new applications require new tools and infrastructure to scale and meet expected service requirements (eg, development platforms needed to build Web3 internet services, middleware software, node infrastructure, etc)

Unified customer experience

Web3 enables a transition from omnichannel to unichannel, seamlessly integrating customers' digital identity across applications by leveraging a common decentralized blockchain data layer, as opposed to a siloed view of customers that is limited to an individual business's customer profile

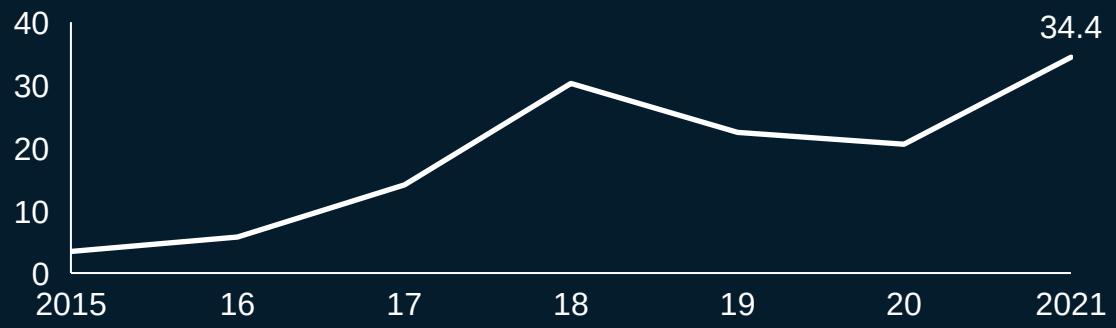
Source: Expert input; McKinsey analysis

Why is there enthusiasm for Web3?

Talent and investment have rapidly increased in the past year, with **continued expectations of long-term growth**

Talent

Number of developers contributing to Web3 projects,[1] 2015–21
thousands

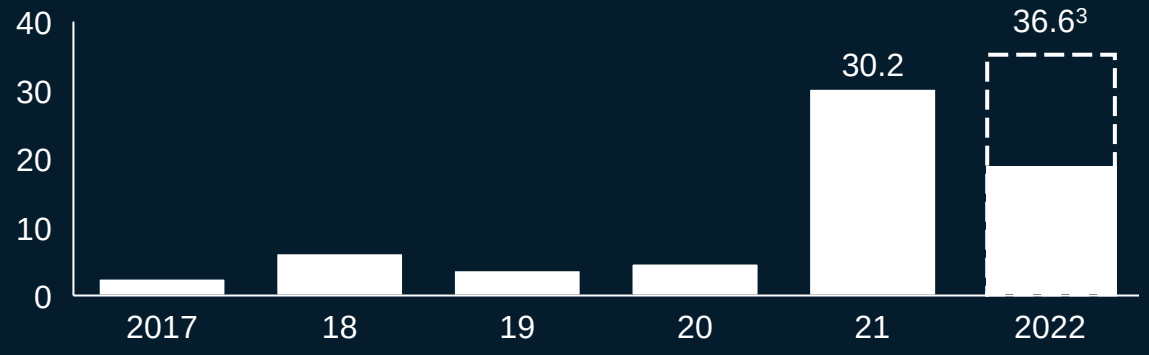


>34,000

Active Web3 developers in 2021

Capital

PE and VC investments[2] in Web3 deals, 2017–21
$ billion



~70% per year

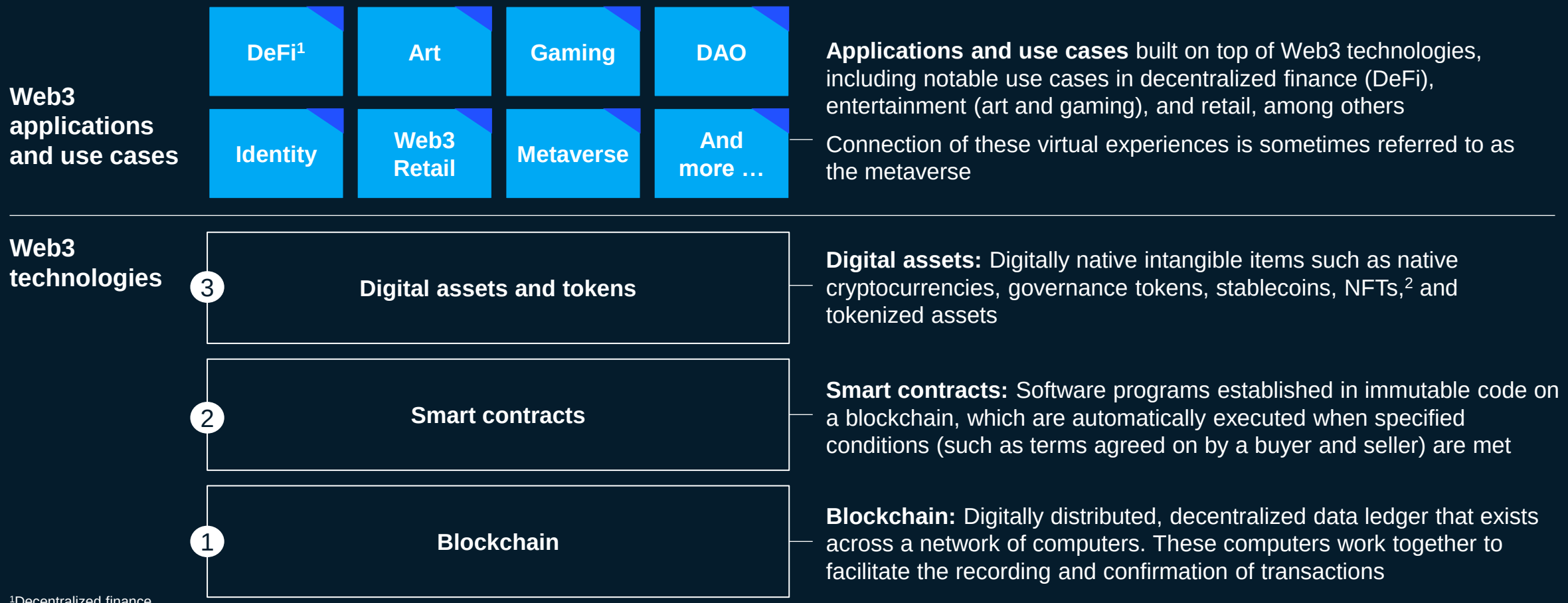
Growth rate of PE and VC investments in Web3, 2017–22

[1]Based on open-source repositories and code commits from GitHub.
[2]Private-equity and venture capital investments.
[3]Extrapolated from 2022-H2 investment figures of $18.3 billion ("What winter? Crypto VCs continue their spending spree," *Fortune*, Jul 2022).

Source: Dovemetrics; Electric Capital; GitHub; PitchBook; The Block Research

What are the most noteworthy technologies and areas of interest?

Web3 can be decomposed by its foundational technologies and applications



[1]Decentralized finance.
[2]Nonfungible tokens.

Source: Expert input; McKinsey analysis

What industries are beginning to adopt and shape Web3?

Many use cases across industries are being identified and built, especially as the tech infrastructure improves

Details on following pages

Media and entertainment: Gaming

Web3 enables interoperability across games, digital assets facilitating new gaming experiences, and play-and-earn business models in which in-game rewards (eg, NFTs) are distributed with different utilities and value

Media and entertainment: Digital art and media

Creation and ownership of digital media (eg, artworks, video content)—sold as NFTs—allow new business models and creative possibilities while providing artists with more control and, in some cases, ongoing perpetual royalties

Retail

Retailers are using Web3 technologies to create new offerings, devise new modes of customer engagement (eg, ecosystem loyalty programs, access to unique experiences), assure the authenticity of goods, tap into new royalty-based revenue streams, accept novel payment methods (such as “stablecoins”), and track and orchestrate logistics across loosely coupled global supply chains

Financial services

DeFi is an ecosystem of applications that could autonomously perform similar services to traditional financial institutions, albeit with very different levels of protection, and where the traditional revenues are handed back to users or liquidity providers of these applications. Many are governed through token-based distributed governance systems. Other areas of financial services exploring Web3 applications include payments, asset management, and some areas of capital markets

IT and electronics

Innovators will use Web3 to create decentralized, peer-to-peer networks, enable social-media users to create and sell their content, enable stronger user control of digital identity, and lay the groundwork for the adoption of metaverse platforms

Industries leading adoption include **financial services, media and entertainment, retail, and information technology and electronics**

Emerging industries include blockchain-based identity,[1] logistics, carbon markets, and public sector

[1]For more information about digital identity, see “Trust architectures and digital identity,” McKinsey, Aug 2022.

Source: Expert input; McKinsey analysis

What are the examples of business disruption that Web3 could cause?

Web3 represents a new business paradigm in the gaming industry's revenue models: from pay-to-play[1] and free-to-play[2] today to play-and-earn[3]

Media and entertainment: Gaming

Innovations

Incentives for players in a play-and-earn model where players earn in-game digital assets (eg, NFTs, in-game tokens) while playing, and can easily monetize these rewards via peer-to-peer networks or exchanges

Distributed ownership opportunities, where players can realize true ownership of in-game assets, with long-term potential for interoperability across different Web3-enabled games and metaverse

Community-based development where the player community can share feedback with developers and vote to change some in-game dynamics or codevelop game patches and updates

Different business model for gaming companies through digital-asset sales, secondary-market royalties (eg, for NFTs), and value exchange channels (eg, dedicated marketplaces)

Potential risks and uncertainties

High barriers of entry due to up-front investment (eg, in-game NFT and/or token purchases) and knowledge of existing Web3 tools (eg, self-custodial wallets) to start playing games

Low-fidelity gaming experience of present NFT games relative to traditional Web2 gaming, largely attributable to nascency of industry

Incentive-driven player base, such that player retention is at risk if rate of earnings decline**,** absent other incentives (eg, compelling gameplay)

Controversy in the traditional gaming community, where lack of understanding of Web3's value proposition and skepticism toward increasing monetization models is driving backlash

Nascency of infrastructure, in particular related to transaction costs, throughput, and security, to access and play the game reliably

Regulatory uncertainty on asset classification of in-game NFTs and digital assets, and of play-and-earn new business models

[1]With pay-to-play, accessing the game costs money.
[2]With free-to-play ("freemium" model), players do not have to pay for game access but usually pay in-game.
[3]With play-and-earn, playing earns rewards: players become owners of in-game items and earn rewards in cryptocurrency.

Source: Expert input; McKinsey analysis

What are the examples of business disruption that Web3 could cause? (continued)

Retail

In retail, engagement channels and data ownership will shift away from business-centric to consumer-centric

Innovations

New model for consumer data ownership and access, which could enable greater control for users (eg, anonymous identity with permissioned data sharing)

New channels and methods for customer acquisition, engagement, and retention (eg, community-based retention models, Web3 loyalty programs, Web3 marketing through airdrops, etc)

New product categories to express brand identity in digital native form (eg, Web3 native items, digital twins of physical products)

New digital environments for customer engagement, potentially connected across different Web3 channels (eg, metaverse)

New value exchange models for global commerce (eg, stablecoins)

Provable authenticity and record of ownership for digitally native goods

Potential risks and uncertainties

Unclear long-term viability of specific digital assets and communities, coupled with (unwanted) volatility of digital asset markets

Immature user experience and security for digital goods to assure ownership and trusted transfer of assets (eg, self-custodial wallets)

Considerations on how to retain control over brand identity as new platforms and experiences proliferate in public permissionless infrastructure

Evolving regulatory environment for consumer protection and personally identifiable information building from early implementations notably in Europe (GDPR[1]) but expanding to many other jurisdictions

[1]The EU's General Data Protection Regulation.

Source: Expert input; McKinsey analysis

What are the examples of business disruption that Web3 could cause? (continued)

Web3 offers the promise of decentralization and potential disintermediation throughout financial services, offering better price and generating cost efficiencies

Innovations

Greater cost efficiency through employing smart contracts whose programmable logic determines automated decisioning and disbursement (eg, in decentralized lending, swaps)

Interest revenues and trading fees returned to users (eg, depositors, liquidity providers, lenders) instead of flowing back to the central enterprise

Broader investor base and enhanced liquidity for traditionally illiquid or inaccessible investment assets (eg, fractionalized commercial real estate)

Greater transparency of transactions since all ownership and transaction data reside on, and are potentially discoverable on, the blockchain

Low credit risk and delinquency in applications such as DeFi lending that entail overcollateralization requirements and automatic liquidations

Facility for providing always-on financial services (24/7), such as lending, trading, derivatives, mortgage, and insurance

[1]Antimoney laundering/know your customer.

Source: Expert input; McKinsey analysis

Financial services

Risks and uncertainties

Unsettled regulatory picture, including unclear classification of assets and jurisdictional authority

Limited or absent consumer protections (eg, for funds held in custody), including irreversibility of any fraudulent transactions

Immature user experience, often with poor interface design and lacking seamless integration with traditional financial services (eg, onboarding, funds transfer)

Security concerns, including the compromise and collapse of some nascent projects in DeFi, wallet theft, and poor AML/KYC[1] controls

Nascent technology, lacking traditional data privacy when using open, permissionless distributed ledgers and reliant on software (smart contracts) and data (oracles) that are not yet battle-tested at scale

What are some broader uncertainties affecting Web3 adoption?

Nonexhaustive

Evolving regulation as authorities choose approaches to governing issues such as consumer and investor protection, asset classification (eg, security, commodity, currency) and its implications, legality, and enforceability of blockchain-based contracts, accounting and tax standards, capital provisioning, accountability mechanisms, and know-your-customer and antimoney-laundering standards

Consumer protection is increasingly becoming a focal point for regulators, especially during times of failure of several nascent Web3 projects (eg, the FTC's Consumer Protection Data Spotlight of June 2022 found that consumers lost $575 million from January 2021 to March 2022 as a result of bogus cryptocurrency investment opportunities)

User experience and value proposition of Web3 alternatives compared with incumbent systems (which also are continuing to evolve) are often either poor, unclear, or poorly understood

Robustness of new technologies that depend on code (eg, smart contracts) or data (eg, oracles) is improving but has experienced some notable failures. The composability of underlying Web3 code can perpetuate vulnerabilities

Ecosystem infrastructure is nascent and will continue to mature as business models (eg, merchants accepting digital loyalty tokens) and value chains (eg, creation, trading, and secure storage of NFTs) are tested and refined or discarded

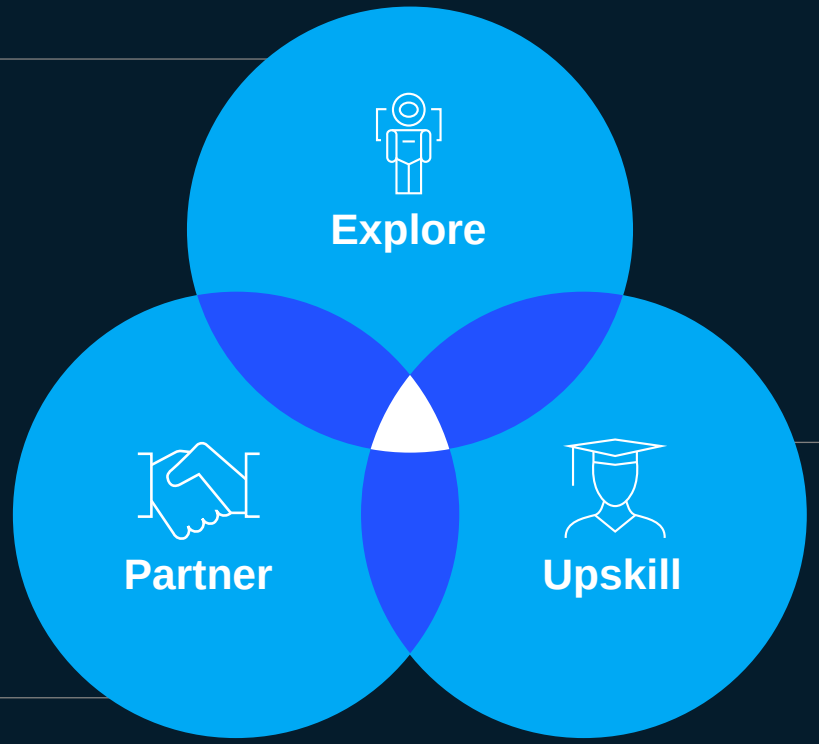
Sustainability differences among Web3 platforms—relative to conventional alternatives—are shifting, given the high-energy consumption of older proof-of-work-based systems and the enhanced efficiency of alternatives such as proof-of-stake-based systems

Source: McKinsey analysis

How can leaders begin engaging with Web3?

Reevaluate your business model, value chain, and industry ecosystem to understand where Web3 disruption may happen. Likewise, keep an eye out for the rise of new competitors and business models in industries leveraging Web3 (eg, stablecoins, cryptocurrency payments) that will challenge the status quo

Partner with Web3 players to facilitate entry into new services and product offerings (eg, branded assets with NFT creator studios, Web3 gaming experiences)



Upskill workforce, from leadership to developers, on Web3 and its applicability to the organization's relevant applications. Start experimenting on small pilots and scale as teams learn by doing

Source: Expert input; McKinsey analysis

Who are industry players leveraging Web3 with impact?

Industry	Example	Description
 **Financial services**	**USDF consortium and Figure**	**USDF:** a consortium of FDIC-insured banks—**aims to promote the adoption and interoperability of a bank-minted stablecoin** in the form of tokenized deposits (as opposed to the fully reserved model) to facilitate the compliant transfer of value on blockchains. This stablecoin will run on the Figure network, a public blockchain
 **Media and entertainment: Gaming**	**Nike acquisition of fashion-gaming company RTFKT to enter Web3 and the metaverse**	**RTFKT**—a creator-led studio that uses the latest in game engines, NFT, blockchain, augmented reality, and other technologies to create one-of-a-kind sneakers and other digital artifacts—is widely regarded as a metaverse-native fashion brand that merges culture and gaming. **Nike** acquired the company in late 2021; earlier that year, RTFKT had a valuation at $33 million
 **Retail**	**Aura Blockchain Consortium for tracking and tracing**	**The Aura Blockchain Consortium** (including, among others, LVMH, Prada, Richemont) **is a not-for-profit, collaborative industry initiative that enables tracking and tracing for luxury goods.** Using a universal private blockchain, it has the goal of enhancing customer service by enabling consumers to access details of a luxury product's entire supply chain, product history, and authenticity. Members pay licensing fees and a fixed fee per product to track and trace any product with an NFT, attached to the product through a QR code or RFID tag

Source: Company websites

What are some controversial topics regarding Web3?

Nonexhaustive

Source: McKinsey analysis

1 Reliability and sustainability

Which Web3 business models and value chains will emerge as technically reliable, scalable, and commercially sustainable?

Business models must show they can produce more value for users than existing systems, achieve uptake beyond an enthusiastic cohort of early adopters, and overcome volatile periods. They must also satisfy evolving regulations for consumer protection, asset classification, and know-your-customer standards

2 Patterns of adoption

Given Web3's nascency and rapid development, what will unlock mainstream adoption? As a cultural phenomenon, how will patterns of Web3 adoption vary among different populations?

In order to become mainstream, Web3 tech needs to improve in terms of scalability, reliability, and security, with accessible developer tooling and improved user experience for consumers. Adoption across geographies will differ depending on a variety of factors, including government regulations, public interest in an open internet, and access to adequate connectivity

3 Enterprise architecture integration

How will Web3 ecosystems coexist and interconnect with enterprise system architectures and with hyperscale Web2 platforms?

Interoperability of platforms will be necessary for users to transfer assets (eg, enabling the transfer of avatars between different virtual worlds). This interoperability is a stark departure from the centralized business models of many web 2.0 businesses

4 Regulating trust

How will regulatory action influence trust in Web3 and affect potential future innovation?

Insufficient clarity around regulatory frameworks on Web3 technologies may contribute to reduced trust among users and developers. At the same time, Web3 may address a growing need for empowerment of the individual across data, functionality, and value, enhancing the trust of users and developers in the Web3 fundamentals

5 New models and the metaverse

How will the Web3 and immersive-reality trends influence existing models for accessing and building systems on the internet and come together to enable new experiences in the metaverse?

As the Web3 trend blends with others, new propositions and platforms will emerge. The metaverse, for example, could leverage tech trends like immersive reality and advanced connectivity to enhance and enable innovative user experiences in Web3 environments. Future use cases of open learning, working, entertaining could take place here

Additional resources

McKinsey Blockchain & Digital Assets

McKinsey Metaverse

Telecom’s future in the Web3 era: José María Álvarez-Pallete López