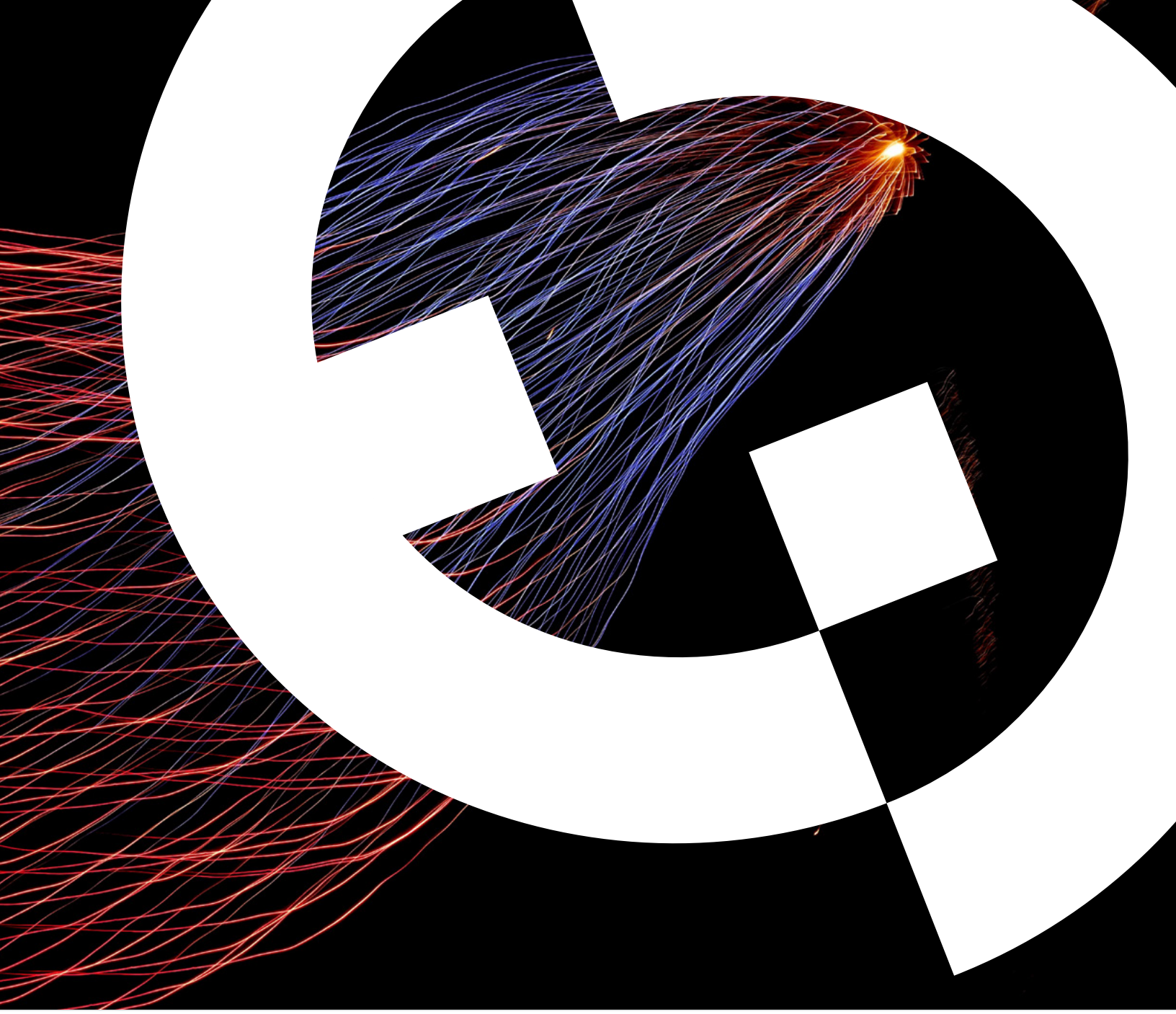


The geopolitics of the metaverse:
No escaping bifurcation

PREPARED BY EURASIA GROUP

DECEMBER 2021

eurasia group politics first

- The idea of the metaverse, which proponents believe to be the next evolution of the internet, is beginning to seep into mainstream thinking, spurring corporate interest and venture capital investment in the concept, with regulatory scrutiny likely to follow.
- While the concept remains somewhat fuzzy, there is a consensus that a combination of technologies including augmented and virtual reality, next-generation data networks, and decentralized financing (DeFi) and payments systems are laying the foundation for a more realistic and immersive digital world where people will be able to interact with each other, have shared experiences, and create, buy, and sell digital assets.
- Regulators will face major challenges keeping up with innovation in this new digital space; meanwhile, the geopolitics of the metaverse is likely to mirror trends in the physical world that are pushing toward bifurcation into Chinese and Western-centric technology stacks and data and financial layers.

CONTACTS

Paul Triolo
Practice Head, Geo-technology
+1 202.903.0006
triolo@eurasiagroup.net

Kevin Allison
Director, Geo-technology
+1 202.552.5399
allison@eurasiagroup.net

Sienna Tompkins
Associate, Geo-technology
tompkins@eurasiagroup.net

This report offers an initial look at the concept of the metaverse—technology industry jargon for what some experts and investors believe will be the next stage of evolution of the World Wide Web. The text below introduces the concept of the metaverse, describes the technologies that are making it possible, and offers an initial look at the regulatory and geopolitical issues raised by the concept.

Across the metaverse

The term "metaverse" was coined in the 1992 Neal Stephenson science fiction novel "Snow Crash," which featured a character who was a pizza delivery driver by day and a powerful hacker in an immersive virtual world by night. Today, the idea of a persistent, real-time, three-dimensional, immersive online environment where people can interact with each other and create, buy, and sell things is no longer just the subject of speculative fiction: The metaverse is generating real-world headlines and attracting capital as technologists, companies, and investors eye opportunities in this emerging—albeit still somewhat vaguely defined—digital space.

While the concept is almost 30 years old, big advances in the ability of people to transmit and store information are starting to bring it to life. Other factors fueling interest in the potential for social and commercial interactions in a virtualized environment include better connectivity, improved network throughput, new financial tools, and a younger population that has grown up online and in virtual worlds that have some hallmarks of the metaverse. The trend toward entirely virtual experiences has been accelerated by the Covid-19 pandemic, which forced millions of people to adopt digital alternatives to the office, school, and socializing.

It is still far from certain when and under what circumstances the metaverse will come together, how it will work, or whether it will amount to much more than an incremental improvement in the digital experience. However, the basic building blocks are now largely in place for a digital environment that, according to some industry observers, will be **social, live, and synchronous, massively scalable, persistent, hardware agnostic, highly interoperable, content-rich, economically vibrant, and can act as a bridge between worlds**. And the race is on to seize the economic and commercial opportunities that will be created by a virtualized online environment—or multiple environments—where people can interact with each other, create things, exchange goods, and share experiences.

Defining the metaverse

In a few words	"A computer-generated universe that his computer is drawing onto his goggles and pumping into his earphones." –author Neal Stephenson in his 1992 novel "Snow Crash" "A shared virtual 3D world, or worlds, that are interactive, immersive, and collaborative." –NVIDIA "A virtual environment where you can be present with people in digital spaces … An embodied internet that you're inside of rather than just looking at." –Facebook CEO Mark Zuckerberg "A persistent bridge between the physical and digital worlds with unprecedented scale, interactivity, and interoperability." –Moritz Baier Lentz, BITKRAFT Ventures
As a constellation of existing and emerging technologies and applications	Interest in the metaverse as the next evolution of the Web has been driven by advances in the following technologies and applications, which can be combined to create new types of digital environments: • Cloud computing • Social networks • Graphics processing units • 3D graphics software engines • Massively multiplayer online gaming • In-game currencies/economies • Cross-platform gaming • High-speed, low-latency networks • Augmented/virtual reality (AR/VR) • Blockchain/digital assets • Non-fungible tokens (NFTs) • Online payments

First movers: Hardware/software companies, digital assets, and supporting infrastructure

A period of experimentation is now underway in which various players will compete to devise new platforms and business models for this emerging digital space, including the digital and financial infrastructure that powers it. Key technology players in the metaverse include:

Large social media companies: So far, Facebook, which rebranded in late 2021 as Meta, has made the most significant public-facing bet on the emerging metaverse. The company is developing a range of technologies and services relevant to both consumer and enterprise level metaverse applications. It is also putting in place a financial layer via the Diem—formerly Libra—stablecoin project. Meta launched the Novi wallet in November 2021, with support so far only for the Paxos stablecoin, but this will likely change in early 2022.

Digital infrastructure companies: Metaverse applications and services will run primarily in hyperscale datacenters. Many of the leading players in this space—from REITs to data center operators, server hardware suppliers, semiconductor firms, and suppliers of operating system and virtualization software—will have potential to benefit from growing interest in the metaverse concept.

AR/VR hardware and software providers: For both consumer and enterprise metaverse applications, vendors such as Facebook's Oculus, Apple, Microsoft, Zappar, Niantic, Augment Reality Labs, Lucyd, and Magic Leap will be key. These companies will work with cloud services providers and telecommunications carriers to deliver 5G low-latency high-bandwidth services for AR/VR headsets at home or in the factory, for the home entertainment/education metaverse, and for the business operations metaverse. Development has already started with expansion of applications such as

Facebook Horizons Workrooms, which will use dedicated AR/VR hardware to allow people to gather in office-like settings, but it will move quickly into other areas such as smart glasses leveraging high-speed 5G connections.

Telecommunications carriers: These companies also recognize the potential for metaverses and AR/VR applications to generate substantial revenue as they attempt to defray the costs of building out next-generation 5G networks. Low-latency and high-data throughput will be critical to the functioning of mobile AR/VR headsets and other devices, making 5G a key enabling technology for the metaverse. Major carriers, including Verizon, SK Telecom in South Korea, and China Mobile, hope to make money as 3D avatars of smartphone users begin working, interacting, and relaxing in digital offices, factories, and leisure venues.

The blockchain ecosystem: First movers here include companies involved in blockchain services, oracles (services that connect smart contracts that run on blockchain systems such as Ethereum with real-world information), DeFi, and supporting services. Many of these firms are still largely oriented toward enterprise solutions for blockchain, to facilitate cross-border commercial payments systems, for example. These include ConSensys and Ripple Labs, as well as consortia such as Hyperledger Fabric and the R3 Consortium (R3 Corda). Some important platforms do not lend themselves to traditional types of investment because they are governed via decentralized developers or miners—in the case of Ethereum—or groups such as the Linux Foundation (HyperLedger Fabric).

Ethereum is likely to have a key role in the future of the metaverse concept, owing to the role of the Ethereum blockchain and its native currency Ether (ETH) in DeFi and cryptocurrency derivatives products. Backers of Ethereum are pitching it as the programmable money of the future that comes with many other applications relevant to the metaverse. In late 2022, upgrades to the ETH ecosystem designed to improve transaction rates and reduce network fees will be a major driver of new metaverse-related applications. Other newer projects designed to overcome limitations on transaction rates on the current Ethereum blockchain include Solana (SOL) and Avalanche (AVAX).

In addition to **major cloud providers offering blockchain services**, such as Microsoft, Amazon, IBM, Salesforce, Oracle, Alibaba, and Huawei, several emerging firms in the digital asset space that are essentially **software as a service (SaaS) blockchain-based companies** have some potential to play a significant part. These include unFederalReserve, Luniverse, ChainAnalysis, and Kaleido. Others attempting to navigate the regulatory environment and offering services linking real world assets to digital assets via tokenization or cryptocurrency custodial services are Paxos, Gemini, Coinbase, Circle, and ConSensys, among others. DeFi industry participants that are already operating decentralized exchanges or other decentralized apps (dapps) include Uniswap, Solana (Solana Labs), Polkadot, and Raydium.

One or many interoperable metaverses?

A main draw of the metaverse for ordinary users is likely to be the ability to create and consume content, share experiences, and invest, own and lease property, and engage in other virtual transactions. These would be analogous to activities they pursue in the "real" world. People may also be attracted to opportunities to have new types of virtual experiences, including new forms of immersive entertainment, that are not possible in the physical world.

The consumer-centric metaverse will also likely intersect with a more enterprise-level, industrial metaverse, where companies and workers will be able to create and interact with virtual analogues of physical equipment, known as digital twins, and leverage artificial intelligence, AR/VR, and other technologies for business and industrial applications. These virtual spaces will develop and emerge at different paces. However, there are lingering questions about how this will work—including who will own or operate the metaverse, and how it will be governed.

There are several prior examples of metaverse-like digital environments created with varying degrees of functionality that eventually proved to be fads and faded away. A host of once promising startups have shut down, such as High Fidelity and Sinespace, or remain quite niche. These types of virtual

worlds are typically created by a single company that is then responsible for scaling hardware and software systems to support the operation of virtual environment and ensure that it complies with local laws in different jurisdictions.

One interesting antecedent is Second Life, a vast 3D metaverse launched by Linden Labs that became massively popular with both people and major brands following its launch in the early 2000s before fading from mainstream consciousness. While Second Life had been written off as dead as recently as a few years ago, as of 2021, the site still claims to have about 1 million active users. At its height around 2006, hundreds of thousands of dollars were changing hands daily as users—who were represented in the space as customizable virtual "avatars"—created and sold a wide variety of virtual goods, including buildings, vehicles, animations, clothing, skin, hair, jewelry, flora and fauna, and works of art.

Second Life was notable for having a profitable business model based on selling and renting of virtual real estate, with big corporations including technology companies, consumer brands, and media outlets all investing resources in establishing a virtual presence within Second Life during the site's heyday.

More recently, Facebook/Meta has been touting its interest in the metaverse as a successor to the mobile internet. In 2014, the company purchased Oculus, a virtual and augmented reality company, for USD 2.3 billion, signaling its growing interest in gaming and new forms of online experiences. In an interview in June, CEO Mark Zuckerberg said Facebook was transforming itself into a metaverse company. In August, it launched Horizon Workrooms, a virtual environment for workplace interactions, as part of its push into the metaverse domain. The company's evolution into a metaverse company culminated in the rebranding into Meta in November 2021.

A key question is whether users, and potentially regulators, would accept Facebook/Meta or another leading online platform incumbent as the developer or sponsor of a wider virtual world or metaverse. More broadly, the question is whether "walled gardens" or more open systems will prevail. Other new gaming platforms are also flexing their muscles in the metaverse. These include Roblox, Fortnite, and Animal Crossing: New Horizons, all games that feature metaverse-like components and have attracted large international audiences.

Zuckerberg himself has said no single company will own or operate the metaverse. Rather, he envisions a decentralized space, with different companies providing components that are interoperable. In this scenario, users will have the ability to move avatars and digital goods between more than one metaverse environment. A more decentralized infrastructure would require reliable mechanisms for tracking who owns what. For this reason, many proponents see blockchain as a key enabling technology of the metaverse.

The metaverse economy: Enter blockchain …

Increasing interest in the metaverse has coincided with an explosion in the development and use of new digital methods of making payments and exchanging virtual assets. This includes blockchain and related technologies and applications that allow people to assign ownership and exchange digital objects that have no real-world presence or physical analogues.

The idea of buying virtual goods has become second nature to gamers who spend virtual "V-bucks" to purchase costumes or dance moves for their avatars in Fortnite, for example. But many proponents of the metaverse envision an even broader virtual economy. Rather than micropayments using in-game scrip, imagine people and companies creating, buying, selling, and transferring a far wider array of goods, services, and assets among many different online environments using a common means of exchange.

This has fueled interest in the potential for new digital tools such as stablecoins—a form of cryptocurrency backed by real-world assets that is designed to be platform agnostic and hold a relatively stable value—to serve as the financial backbone of the metaverse. Among some boosters, the vision of a fully functioning metaverse economy has become deeply intertwined with the concept of trusted blockchains and applications running on top of them.

Other blockchain-based technologies touted as potentially helping to run the metaverse economy include non-fungible tokens (NFTs)—digital assets that serve as a sort of virtualized ownership layer that can confirm the provenance of items that are natively digital, such as digital art, game assets, famous tweets, or domain space. Some proponents think NFTs have potential to provide a link between the blockchain and digital asset world and gaming and virtual reality. DeFi and other decentralized apps running on established blockchains such as Ethereum could also provide a foundation for trusted exchange between participants in the metaverse.

Creating and browsing the blockchain metaverse

The fusion of virtual 3D worlds with cryptoeconomic structures such as Ethereum and associated blockchains is already underway, in sectors such as gaming and virtual reality, creating what are essentially blockchain metaverse projects. In addition, there are special browsers being included with DeFi wallets that allow users to browse portions of these online environments. They can access large collections of NFTs via brokers such as OpenSea, including artwork and music, and facilitate payment with cryptocurrencies held in unhosted wallets.

These crypto/NFT-based metaverses include Dencentraland, Cryptovoxels, and Somnium Space. Decentraland is a virtual world launched in February 2020 with a limited supply of virtual land that users can buy using ETH. In June, auction house Sotheby's created a digital replica of its New Bond Street headquarters as a virtual gallery in Decentraland to show digital art. Also in June, New York-based digital real estate investment vehicle Republic Realm paid the equivalent of USD 913,228 for 259 parcels of Decentraland and plans to turn them into a virtual shopping district named Metajuku, styled after Tokyo shopping district Harajuku.

Cryptovoxels, inspired by Minecraft, is another virtual world/metaverse powered by the Ethereum blockchain, allowing players to buy land and build stores and art galleries. Somnium Space is a VR-based virtual world on the Ethereum blockchain focused on monetizing VR assets. Users can buy "land," called Somnium Space Cubes (CUBE), which are traded on some cryptocurrency exchanges, as well as create, import, and trade NFTs via OpenSea. Wallet/browser apps such as MetaMask allow users to browse these metaverses and NFT-specific markets such as OpenSea; they create, buy, and sell NFTs via the Ethereum and Polygon blockchains. Other gaming platforms, such as Axie Infinity, are NFT-based video games that use Ethereum-based cryptocurrencies. These platforms allow users to collect, breed, fight, and trade creatures known as "axis," and maintain massive collections of NFTs.

Growing interest in the next phase of the metaverse concept has coincided with the erosion of trust in traditional institutions, including governments and the financial sector, as well as the ongoing "techlash" against technology platform companies. This could likewise fuel interest in more decentralized cryptoeconomic systems as an alternative to traditional financial players or big technology firms when it comes to performing digital transactions or safeguarding digital assets (please see Eurasia Group graphic: Geo-technology/Fintech: Digital Assets, 12 August 2021). Over time, participants in the metaverse economy will likely prefer platforms that they perceive as offering the best combination of security, privacy, or other features that users see as most important.

Uncertainties abound

Beyond the characteristics that can be envisioned, there are some key uncertainties about how the metaverse—or multiple interoperable metaverses—will be structured and organized. These include:

- Will mainstream users prefer a more open, decentralized metaverse or will they gravitate toward a closed or walled garden type structure run by platforms such as Facebook or Apple?
- Is it possible to be so decentralized that such a space is essentially operated by a global conglomeration of users?

- How will identities be handled? For example, will people prefer to access the metaverse via a single, unified identification layer, possibly tied to biometric details, or will they use multiple logins based on different criteria?
- Does the current internet architecture have the capacity to support a fully functioning metaverse or is something new needed for all or portions of it?
- How can existing organizational structures translate into a metaverse and how much anonymity will be allowed/tolerated?

The advent of blockchain technologies based on algorithmic trust can solve some of these problems and limit some malicious activity, but this may not be sufficient for handling all contingencies. There will likely be a period of innovation, evolution, and adjustment as companies, investors, and individual users evaluate their willingness to spend time and invest capital in competing approaches and ecosystems. Regulators will also likely have a role in determining how the metaverse emerges and takes shape.

Who will regulate the metaverse?

The issue of how to jumpstart a vibrant metaverse economy is particularly complex, and as companies and programmers experiment with new approaches, they are likely to draw regulatory scrutiny. Already, Facebook's attempts to establish a global stablecoin payments system, first called Libra and now Diem, have run into hurdles in the US, the EU, and China. This experience suggests that one sizable impediment to the development of a global-scale metaverse will be gaining regulatory acceptance for its financial infrastructure.

Regulators have been willing to tolerate relatively closed and small-scale systems such as Second Life, which had an estimated GDP at its height of its popularity of around USD 500 million. Regulators have also been relatively tolerant of game-based purchases via digitized fiat currencies in virtual worlds such as the social media game Farmville.

China has moved rapidly over the past two years to gain the upper hand in overseeing all aspects of cryptocurrencies and derivative digital assets, but authorities in other major financial markets have been much slower to determine a clear framework for regulation.

However, global regulators are likely to be much more skeptical of allowing unregulated activity using digital assets in a global-scale virtual environment via tools such as stablecoins and other digital assets, including NFTs increasingly being used in online games. Concerns that a stablecoin such as Diem could be rapidly adopted by Facebook's 3-billion-person user base—with potentially negative impacts on financial stability—were a key reason why global financial regulators poured cold water on the concept.

How regulators will deal with DeFi also remains unclear. This is partly because it is not certain whom regulators could target for regulation in this environment. Current financial rules are designed to primarily regulate traditional intermediaries, which do not really exist with DeFi. In addition, so far there is little regulatory collaboration across major markets on DeFi, which will make future efforts challenging as the sector develops rapidly.

Regulators, particularly those in developed markets with mature financial regimes, have become more sophisticated in bringing portions of the online universe into compliance with regulations that are still operative only within national borders. But there is no regulatory body for the metaverse yet, and virtual worlds such as Second Life have already run into legal challenges when laws in one country conflict with those of another for individuals operating in the virtual world and still subject to their local jurisdiction.

This will increase pressure on companies that are developing vital pieces of the metaverse economic ecosystem to be transparent and work with regulators to ensure that there is visibility into what they are trying to do. This will go both ways, as financial regulators develop a more sophisticated

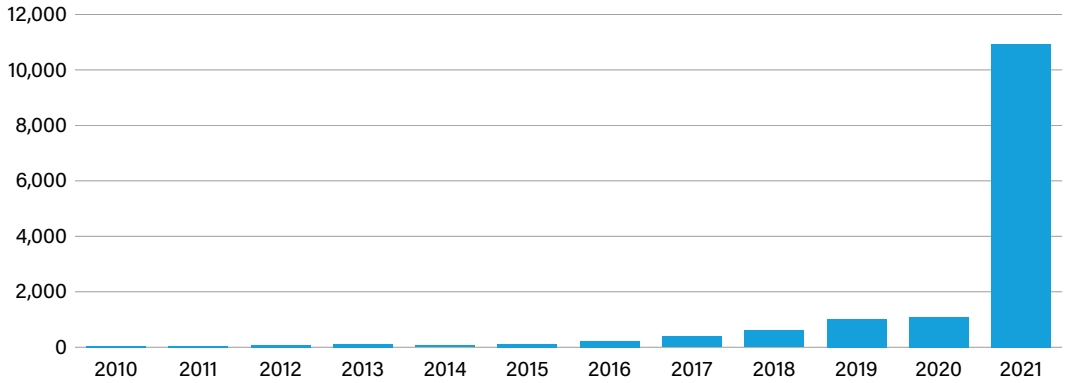
understanding of emerging financial instruments and services within the digital asset domain. Firms devising the tools that will underpin metaverse economics will also work to ensure regulators do not end up stifling innovation. A key point of friction will be the tendency on the part of national regulators to try to fit new metaverse-related services into existing national regulatory frameworks. Over time, challenges presented by many sometimes contradictory national rules will likely prompt governments and industry to embrace multilateral approaches to regulation of digital assets.

Companies that develop immersive online metaverse environments will also face intense scrutiny from governments and civil society over online safety. Current concepts of the metaverse envision a highly immersive and interactive environment in which users will interact with other people—likely including new forms of entertainment. Some metaverses may also evolve to enable virtual characters that may use AI systems to mimic human behavior in interactions with real users.

This has potential to inflame debates about how digital platforms manage issues related to hate speech and other illegal or harmful content, adult content, age restrictions, disinformation, and data privacy—topics that have already led to regulatory backlash against large tech platforms in many countries. The financial and economic dimensions of the metaverse—where proponents envision people owning and trading assets and even potentially building all-virtual businesses and industries—will also fuel government concerns about cybersecurity, anti-money laundering measures, and other financial safeguards.

Companies working to build out the metaverse concept are aware of the problem. A senior Facebook executive leading the company's metaverse push has reportedly said the company wants to establish "almost Disney levels of safety" in its online environments, while also acknowledging the huge challenge of moderating such environments at global scale.

Number of registered trademarks in China related to the metaverse
(2021 figures as 29 November)



Source: Quartz

The geopolitics of the emerging metaverse(s)

Incipient metaverses are already breaking down along geopolitical lines. The nascent Chinese metaverse represented by super apps such as WeChat, for example, is unlikely to be compatible or portable to other jurisdictions. Other incipient entertainment metaverses such as streaming video app TikTok have shown the ability to operate across cultures and are wildly popular outside China. But already these types of mini metaverses have run into cultural concerns across borders and regulator issues regarding access to personal data. This is likely to remain a knotty problem for the proliferation of metaverses across borders and regions. In addition, great power competition is almost certainly likely to spill into the metaverse, and already has to some degree.

Beijing, for example, is dead set against allowing blockchain-based decentralized economies to develop within the country that would remain outside of central control. To counter this, China

is pursuing a two-pronged strategy: aggressively rolling out its own central bank digital currency and backing the launch of the Blockchain Services Network (BSN), which is intended to be a low-cost platform for establishing blockchain apps and helping Chinese companies become leaders in this space. BSN allows the use of public blockchains such as Ethereum and many others, but the operators require developers to adhere to the regulations prevalent in whatever jurisdiction they are working. Chinese developers, therefore, will not be allowed to develop DeFi apps targeting the China market. Beijing likely intends to use the digital CNY and the BSN as tools to prevent the creation of a transaction layer focused decentralized metaverse in China. This will not stop the development of a metaverse "with Chinese characteristics" however.

This year saw the establishment of the Chinese Metaverse Industry Committee, which includes telecoms juggernauts China Mobile, China Unicom and China Telecom. These infrastructure firms have partnered with several tech companies to form the committee, China's first industry group dedicated to the concept. At its founding ceremony, the three telecom giants discussed plans to leverage their advantages in 5G network infrastructure, cloud gaming, and virtual reality technologies to shape the metaverse.

But in an indication of what the complex evolution of the metaverse will be within China, state media in December warned about the need for regulation to precede innovation in the metaverse, noting that virtual property sales were a type of "financialization" of digital assets and carried risks such as volatility, fraud, and money laundering. Media reports have noted that Chinese regulators have not tackled the issue of how to regulate aspects of the metaverse, such as the legal status of NFTs, and that some types of transactions involving digital assets may not be supported by existing laws. Nevertheless, Chinese companies continue to pursue the development of metaverse applications—typically without the transaction layer. Baidu will hold its AI Developer Conference in late December, for example, entirely in a metaverse format using its Hirang app, the first time that a conference in China will be held entirely in virtual space. Baidu claims the app can support 100,000 users interacting online simultaneously.

But for the metaverse, the widening divide in terms of "values" between the US and China and other authoritarian countries has already significantly bled over into cyberspace. The decoupling of data flows, applications, and deeper layers of the technology stack has already been happening for some time, and is likely to continue, catching metaverses in its wake. This could lead to a Western democratic-centric decentralized metaverse(s) wholly or partially interoperable with more centralized, authoritarian, censored metaverse(s) running on largely Chinese hardware and embedded with the political preferences and social controls coming from Beijing or Moscow.

The response of governments and central banks to concerns about monitoring and regulation of financial risks in the metaverse, and their ability to craft new regulatory frameworks to deal with these challenges, will likewise be important to the evolution of the concept, as the Libra/Diem episode has shown. While Facebook presented a fairly easy target for regulators, the rapid expansion of decentralized platforms and the difficultly regulators will experience as they try to stay ahead of the technology curve, except in select and more advanced jurisdictions, will be one of the key factors determining how rapidly the metaverse/Web3.0 takes hold globally.

At the same time, data protection and privacy concerns will come into play, as well as cybersecurity concerns about the protection of personal and financial data. China's recent attempt to limit the time children spend playing online games is likely a harbinger of broader societal debates that will erupt if the metaverse becomes a place where people spend significant time and invest heavy amounts of financial capital.

More broadly, as the metaverse and metaverse-like environments gain commercial traction, attracting users and money, they will import many of the policy debates that companies, regulators, and civil society are wrestling with in other domains, including rules for influential internet platforms, data protection, cybersecurity issues, content, and consumer protections. The complexity

of managing these issues across a virtualized environment with potentially billions of users will probably require new multilateral mechanisms for regulatory collaboration, while also enabling interoperability, across both national borders and the metaverse.

List of leading Chinese metaverse companies and what they do

Gaming

Social network

Digital payments

Tencent
The gaming giant outlined its initial vision for metaverse products in a November earnings call highlighting its gaming and social platform technology as "pathways" to metaverse opportunities. In addition, the company recently invested in Wave, a US virtual concert organizer, and registered over 20 metaverse-related trademarks for its apps. Tencent also owns a 40% stake in Epic Games and has a joint venture with Roblox Corp, both of which are working on their own metaverses.

E-commerce

Cloud computing

Alibaba
The e-commerce and cloud computing conglomerate recently launched a "Metaverse Art Exhibition" for Singles' Day featuring NFTs by consumer brands and has applied for a range of metaverse-related trademarks, including "Dingtalk metaverse," "Taobao metaverse," and "Ali metaverse."

Search

Social network

Baidu
China's leading web search company launched a new virtual world social platform named Xirang, in a move seen by many as its most tangible foray so far into the metaverse.

Digital content

Gaming

Bilibili
Live video streaming and gaming platform Bilibili also discussed metaverse development in its Q3 earnings call, emphasizing that Bilibili was already developing associated products.

Digital content

VR hardware

ByteDance
The developer of video-sharing and social networking apps TikTok and Douyin has acquired virtual reality hardware startup Pico Interactive for USD 772 million and invested around USD 15.6 million into Mycodeview, the company behind Reworld, an up-and-coming competitor to metaverse incumbent Roblox.

Gaming

NetEase
NetEase is China's second-largest video gaming company and also operates advertising services, email, and e-commerce platforms. The company has been recruiting talent such as engineers of virtual scenario construction and virtual characters. NetEase Cloud and NetEase Fuxi Lab also launched the first "virtual character + RTC (Real-Time Communication)" software development toolkit, generating real-time interaction for virtual characters.

Gaming

Shenzhen ZQGAME
The multi-player gaming company's share price surged in September following announcements that it would launch a metaverse-related product (a baijiu-making game in cooperation with a real distillery so that players actually get to taste the liquor they make in the virtual world and record their unique brews as NFTs).

Digital content display

Shanghai Fengyuzhu Culture and Technology Co.
Shanghai Fengyuzhu is a content production and digital display company using special effects such as holographic imaging and 5G cloud XR.

Gaming

Jinke Culture Industry
In September, the gaming company responsible for viral gaming app "Talking Tom Cat" announced it was developing metaverse games, sending its share price up 20%. The announcement drew the attention of the Shenzhen Stock Exchange, which asked for further information about the development of metaverse products.

Digital content

VR hardware

AVIT Ltd
AVIT is a digital software and hardware producer as well as a virtual reality content producer that has previously launched virtual reality cable channels watched using VR headsets. Its shares have experienced a rise alongside other metaverse concept stocks as the term gains mainstream recognition.

Gaming

Perfect World Entertainment
Perfect World Entertainment has two main subsidiaries: a video game publisher and film production company. The company's flagship multi-player online role-playing game will reportedly be set to further integrate immersive technologies and metaverse-related elements. The company has a strategic partnership with Huawei on the tech giant's new open-source operating system, HarmonyOS, that will power Internet of Things devices as well as smartphones.

GIS

SuperMap Software
SuperMap is a Geographic Information System (GIS) software products and services provider and IT enterprise in Asia. The company has recently hosted metaverse experts to visit the company and deliver speeches outlining the importance of mapping software as building blocks for the metaverse, particularly augmented reality elements that integrate physical and digital spaces.

VR/AR hardware

Nreal
Nreal is an augmented reality technology company which sells a flagship pair of AR glasses called Nreal Light, along with a host of applications that can run on smartphones. It recently completed a series C funding round of over USD 100 million co-led by Jack Ma's Yunfeng Fund, Hontai Fund, and NIO Capital, the investment arm of electric vehicle company NIO. A NIO representative highlighted AR/VR as the next nexus of smart living and the potential use of VR/AR glasses for in-car entertainment. The company is now valued at around USD 700 million.

Gaming

Box.Game
Box.Game, a China-based coding platform for youth, has closed a USD 5 million angel round to help build a 3D virtual world where young users can create, play, and socialize. The company claims it is the first youth-focused metaverse project in China to attract new funds this year.

Source: Eurasia Group, company websites

Photo credit: Reuters
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