

CHAPTER 1

Metaverse: Convergence of Tech and Business Models

- Metaverse, Omniverse, and Human Co-Experience
- Big Tech vs. Web3
- Seven Layers of Technology Stack
- Business Models Converging in Metaverse
- Building a Better Internet for the Creator Economy

Metaverse, Omniverse, and Human Co-Experience

In October 2021, Facebook, the company of the world’s largest (and beleaguered) social network announced that it would rebrand its corporate identity to “Meta” in order to double down on its commitment on the promise of a “Metaverse.” The Metaverse, as Meta describes it, “is a new phase of interconnected virtual experiences using technologies like virtual and augmented reality.” Subsequently, the founder Mark Zuckerberg announced, in his new capacity as the Meta CEO, that Instagram will soon enable users to display – and “hopefully” mint – NFTs, the nonfungible tokens on blockchains.

The social network will no longer define the future of Facebook (Meta). The Metaverse will. But what is the *Metaverse*, exactly?

The Metaverse is the convergence of two ideas that have been around for many years: virtual reality and a digital second life. To hear Tech CEOs like Zuckerberg talk about it, the Metaverse is the future of the internet. Or it's about virtual and augmented reality. Or it's a video game. Or maybe it's a deeply immersive version of Zoom (not sure if that would be more uncomfortable)? A virtual world that mirrors our own physical world?

The truth is that the Metaverse may encompass all the above, and it's best understood as the broad term to cover whatever is coming next for the internet. In addition to Facebook, a new generation of major tech, internet, and gaming companies have joined the bandwagon, and they have their own vision for the Metaverse (see **Figure 1.1**). For example:

- **Nvidia**, the Californian chipmaker, instead calls the Metaverse the Omniverse. Its platform is connecting 3D worlds into a shared virtual universe. Omniverse can be used for projects such as creating real-life simulations of buildings and factories. It could be the building blocks of the Metaverse. “We waste a whole bunch of things

Different Tech Leaders' Take on What is the Metaverse

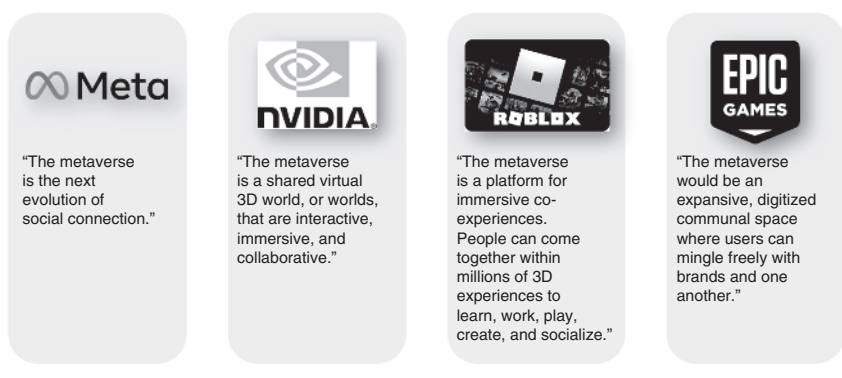


Figure 1.1 Big Techs' (Different) Visions for the Metaverse

Source: Official websites of Meta, Nvidia, Roblox. Decrypt.co. *Washington Post*

to overcompensate for the fact that we don't simulate. We want to simulate all factories in Metaverses, in this omniverse," Nvidia CEO Jensen Huang said in an interview with CNBC.

- **Roblox Corporation** is a videogame platform that only went public in the year 2021. But in November the same year, it announced plans for a Metaverse that is built around its players. The company says it wants to create a virtual space where people can “come together within millions of 3D experiences to learn, work, play, create, and socialize.” Roblox refers to that as a “human co-experience,” a term indicating that the Metaverse is bigger than gaming.
- **Epic Games** has long been in the Metaverse. The company behind the video game Fortnite has become more than just a shooting game. The Epic/Fortnite platform allows gamers to participate in dance parties and virtual concerts, such as one it held for pop star Ariana Grande. “We don't see ‘Fortnite’ as *the* Metaverse,” says an executive of Epic Games, “but as a beautiful corner of the Metaverse.”

Meanwhile, the traditional Big Tech companies are also exploring the world of Metaverse, hoping to create new growth opportunities from their existing internet platforms, for example:

- Google made a Metaverse statement with its latest tool Google Lens, which enables users to use a device's camera to capture an object. The technology then uses image recognition and Google's search system to describe what the object is and provide information about it. Such a system could one day be used with headsets in a metaverse.
- Microsoft has started developing a series of “metaverse apps” to help business users of its Azure cloud computing

service combine virtual and physical elements. “Metaverse is essentially about creating games,” said its CEO Satya Nadella, “It is about being able to put people, places, things [in] a physics engine and then having all the people, places, things in the physics engine relate to each other.”

- Tencent, the social media and gaming giant in China, is reportedly entering the Metaverse, and experts say the virtual world could shape up to be a battle between Meta and Tencent. Tencent has strategic partnerships such as with Epic Games and Roblox’s gaming platform. Additionally, Tencent’s empire spans virtual offices and mobile payments, so it would have a massive audience across multiple industries.
- Huawei, the 5G and smart hardware leader in China, reached a strategic cooperation with Perfect World, a Chinese cultural and entertainment group, in November 2021. This partnership will integrate metaverse elements into the gaming industry. Perfect World’s self-developed ERA engine will work with Huawei’s Hongmeng OS (Operating System) to apply distributed computing and shading technology to break the hardware limitation of a single device, potentially providing better game experience.

As we speak, Big Tech companies such as Facebook, Google, Microsoft of the US, and Tencent, Alibaba, and Xiaomi of China are leveraging the convergence of emerging digital technologies, such as the super-fast cellular 5G networks, internet of things (IoT), artificial intelligence (AI), blockchain, cloud computing, and Big Data analytics, AR/VR, game tech, decentralized storage (like IPFS), decentralized and mesh network, and even quantum computing, to create metaverses powered by massive data from both physical and virtual worlds. But an important question arises: Are we keen to migrate into the Metaverse built by Big Tech?

Big Tech vs. Web3

Big Tech gave us the internet as we know it, but that also brought heavy baggage. Just a handful of enormous companies control the web, whether that's Google, Amazon, Microsoft, Apple, or Facebook (and other major “platform companies”), and they're happy to keep it that way. Although the current internet has expanded social connectivity and more user participation (e.g., user-generated content), we have witnessed large-scale walled platforms that require users to operate within the respective app and device. The users are confined to operate within the individual ecosystem of these large platforms.

Equally important, the current internet is dominated by companies that provide services in exchange for your personal data. Because data has become a critical resource in AI and data-driven technologies, the internet giants more often *proactively* collect user data. Because average users are using these popular internet platforms for everything in their daily lives, the internet giants are collecting every aspect of user data, whether identity data, network data, and behavioral data (see **Figure 1.2**). Take precision marketing, for example. Users' data can be analyzed and based on that they are given different characteristic labels (e.g., “keen to travel”; “makeup lover”).

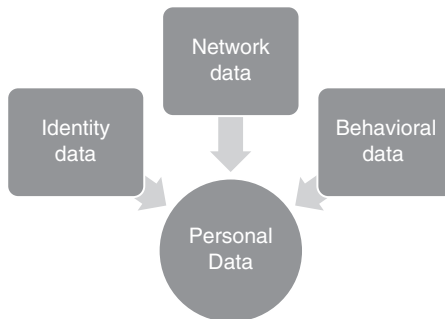


Figure 1.2 Personal Data – Key Resource for the Digital Economy

Then, companies show specific advertising messages to potential customers based on the matching of labels.

- **Identity data.** This includes basic information of a person, such as a name, gender, mobile phone number, and identity card number, which are mainly applied to authenticate users' identities.
- **Network data.** This contains location data, log data, and device information. For example, mobile payment services may encourage users to share location data as well as personal information and purchasing habits with others.
- **Behavior data.** When users browse websites or Apps, those behaviors are recorded to extract user behavioral habits. For example, from the patterns of Facebook "likes," data analysts could predict the users' sexual orientation, religion, alcohol and drug use, relationship status, age, gender, race, political views, and more.

What does this mean for Big Tech companies racing into the Metaverse? The Metaverse can be the next state of the internet's consolidation, a marketing spin on Big Tech's increasing reach and power. Big Tech could re-pitch their extensive lineup of products under a new name, and there would be more data collection from users, since the Metaverse is meant to be a more "immersive" internet. If that's the case, the Metaverse is still a story of Big Tech – just as problem-riddled as now – but bigger.

And even the "new" platforms will not solve the problems of the "incumbent" platforms. For example, Epic Games CEO Tim Sweeney has been outspoken about the threat of a Metaverse run like an Apple ecosystem, governed by "one central company" and "more powerful than any government," he once commented at a VentureBeat report. (Epic Games started a lawsuit against Apple for antitrust violations in 2021, challenging Apple's policy of collecting a 30 percent fee on every in-game transaction in titles like Fortnite. We will cover the case in more detail later in Chapter 10.)

His vision for the Metaverse, shared with *The Washington Post*, entails a cyberspace made interoperable through Fortnite as a game platform and Epic Games' Unreal Engine. Not too surprisingly, the judge on the *Epic v. Apple* case wrote that "Epic Games seeks a systematic change which would result in tremendous monetary gain and wealth . . . [The lawsuit] is a mechanism to challenge the policies and practices of Apple and Google which are an impediment to Mr. Sweeney's vision of the oncoming Metaverse." Ouch.

Similarly, John Riccitiello, CEO of competing game engine company Unity, agrees that Big Tech's vision for the Metaverse is Orwellian. His solution? Everyone should use Unity. "It pulls down the height of the wall of the walled garden," he says. In the history of the internet, things rhyme. From Microsoft in the 1980s to Apple, Google, Facebook and Amazon in the 2010s, all tech giants have started out offering unique services that consumers loved, and they fought for more open competition against incumbents. Over time, after they won leadership positions in the new internet, their missionary zeal waned. They became the "new monopoly."

Therefore, the actual promises of Metaverse, in our view, will not (and should not) be solely realized by Big Tech companies. Who wants a Metaverse built the way Web 2.0 was? (The current mobile internet on smartphones is often referred to as Web 2.0, and the beginning of internet on PC computers is Web 1.0.) Big Tech companies may build up a Web 2.0 Metaverse, as they're not going to give up their server-based models or data collection. And we may even see a much quicker scale of the Web 2.0 Metaverse, building on the existing major platforms.

But new open-source metaverse projects are now seeking to combat the inevitability of this next total service – environment internet by Big Tech platforms. The next web, as the true Metaverse enthusiasts believe, should be architected on open protocols and standards, including blockchain technology. The true spirits of fairness, openness, and community building with the Metaverse ecosystem will come from the

decentralized communities on the blockchain. The rapid innovation from open source developers will make their mark on the Web3 Metaverse economy.

Figure 1.3 shows that from an internet user’s perspective, Web1.0 is “read only,” Web2.0 platform economy is “read and write,” and Web3 or the Metaverse will be “read, write, execute, and own.” The key is that the ownership of the internet itself should shift from Big Tech companies to individual users. The ultimate vision of Web3 is that there will be no dominant “mega corporation.” Instead, the Metaverse will be built by millions of creators, programmers, and designers, each earning a bigger share of the rewards than the tech giants currently allow.

(In this book, Web3 and Metaverse are used interchangeably, and they create a clean break with the present-day internet. Using the Metaverse term as a distinctive descriptor allows us to understand the enormity of that change and, in turn, the opportunity for disruption. And the Web3 term is a direct expression that we need to build a better internet.)

History of the Web

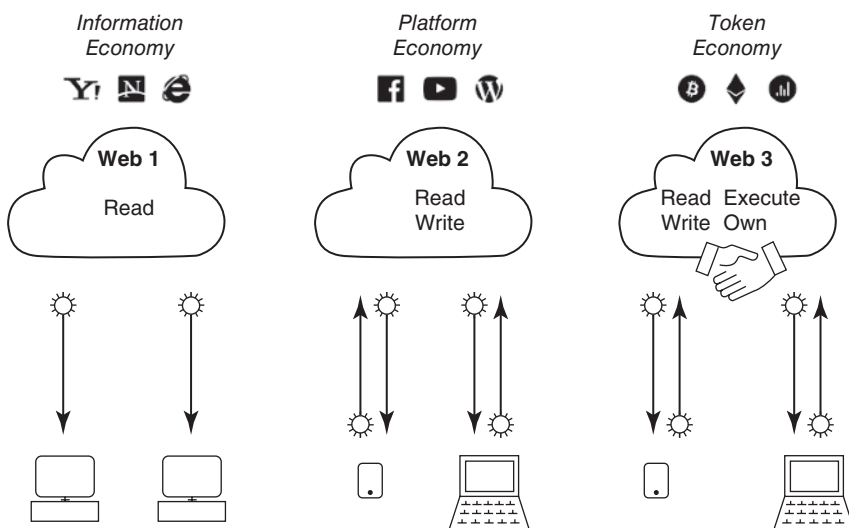


Figure 1.3 From Basic Internet to Web3 (Token Economy)

We argue that the future of Metaverse is built with seven layers of protocol like ISO internet standards, with blockchain technology at the heart of each layer to serve many functions, including governance protocol, incentive mechanism, global payment rail, trustless participation, and global immutable ledger for crucial activities in the Metaverse. In the following sections we will define those layers and describe blockchain’s central role in all layers.

Seven Layers of the Technology Stack

Similar to ISO internet standards, the Metaverse internet is composed of seven layers, from the physical and network layer at the bottom (the first layer) to the digital economy of the Metaverse at the seventh layer (see **Figure 1.4**). This section will dive down into each layer of the Metaverse. (For readers who are more interested in the Metaverse business applications, you may skip this section and come back to the technology stack discussion later.)

Layer 1: The Physical and Network Layer

The physical layer includes IoT devices and AR/VR devices. The network layer includes the 5G/6G network and

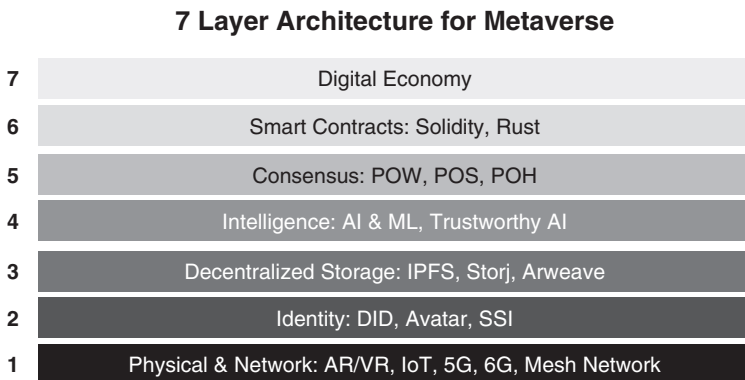


Figure 1.4 The Seven-Layer Architecture for Metaverse

“mesh network.” Because of the speed and pervasiveness of the 5G network, the blockchain transactions can be propagated much more efficiently and network bottlenecks can be reduced and thus improve the performance and scalability of blockchain. The data collected from IoT devices and from AR/VR devices can be propagated to the upper layers with data privacy and sovereignty protected using decentralized identity and then empower the Metaverse economy.

A mesh network allows network nodes to connect directly, dynamically, and nonhierarchically to as many other nodes as possible and cooperate with one another to efficiently route data from/to clients. This lack of dependency on one node allows for every node to participate in the relay of information. Mesh networks dynamically self-organize and self-configure, which can reduce installation overhead.

The ability to self-configure enables dynamic distribution of workloads, particularly in the event a few nodes should fail. This, in turn, contributes to fault-tolerance and reduced maintenance costs. Smart contract can be deployed on top of the mesh networks to incentivize workload execution, bandwidth sharing, and data sharing, which eventually serve as basic building blocks in the Metaverse internet. Blockchain technology can be used to enhance 5G security and enable mesh network connectivity and bandwidth via its immutability property, incentive mechanism, and global payment rail.

Layer 2: The Decentralized Digital Identity Layer

Decentralized identity (DID) or self-sovereign identity solutions, such as Metaverse DNA digital identity Avatar, Serto, Sovrin, and many other DID implementations, are the initial attempt of allowing individuals to manage and control their own identity. The background is that traditional internet designs such as ISO’s seven-layer protocol, and four-layer TCP/IP stack do not take into account digital identity. This is one of the main reasons why traditional internet security problems

are frequent. That's why digital identities are now being suggested as the new firewall.

We still have time to structure Web3 with digital identity as the underlying core technology and ecological modules. The benefits of introducing DID in the second layer in the Web3 protocol include:

1. **Increasing security** because of decentralized storage of identity data. There is no centralized database for identity, and each user holds and controls its own identity data. Hackers usually have more incentive to hack centralized identity data stores because of the sheer amount of identity data that can be acquired. For DID, the hacker will have less incentive because they have to hack each DID one by one.
2. **Moving authentication** and access control from centralized policy store to end user's wallet application. This increases access control and promotes user awareness of security and privacy.
3. **Enabling KYC/AML** (know your customer/anti-money laundering) with customer consent for metaverse applications. The majority of real-world metaverse applications will need KYC/AML in most countries to meet regulatory requirements. DID can be used to associate verifiable credentials granted from KYC/AML workflow to meet the regulatory requirements. Also, it's a mechanism to enable KYC once and then use everywhere, cutting the cost of regulatory compliance for metaverse applications.
4. **Providing a foundational block** for data ownership authentication, which is critical for the data-sharing economy. In order for metaverse applications to reach their potential, the data must have the right ownership. In Web2.0, data sharing means "copy and paste," and data owners usually lose the ownership of data. In metaverse applications, the data can be shared with an expiration time and the data owner does not lose ownership of the data.

- 5. Authenticating off-chain data.** For off-chain data feeder or oracle, if the feeder and oracle are based on **decentralized** identity, the reputation of the oracle or data feeder can be established, and this enables on-chain smart contracts to get accurate data input for business applications.

Layer 3: The Distributed Data Layer

The data will be stored in a distributed and decentralized fashion, using technologies such as IPFS, FileCoin, and BigChainDB. The decentralized peer-to-peer storage system has the following benefits:

- 1. Lower costs.** The decentralized data storage system leverages and incentivizes utilization of idle storage, using the token economics model, to reduce the waste of storage and thus reduce overall cost of storage. As decentralized storage markets mature, the overall cost of storage will be much lower compared to the centralized cloud storage system such as AWS S3 or other types of cloud storages. We see decentralized storage gradually taking over the centralized cloud storage market share in the next decade.
- 2. Higher reliability.** The data gets distributed and stored on multiple hosts in the decentralized network. The system saves copies of the original data (creating a deliberate data redundancy). In case of any loss or hardware failure, the system will present the backup copy. Additionally, chunks of all shared data can be separately encrypted using a unique hash. This extra security layer protects data from intruders. (The blockchain concept of “hash” will be explained in detail in later chapters.)
- 3. Increased speed.** Unlike a centralized storage system, decentralized storage systems use peer-to-peer technology. Data transmissions do not happen through the central

server, which becomes slow at peak traffic times. With advanced routing and load balancing and caching algorithms, in the future, the speed can be improved further. In addition, since several copies of data get stored at multiple locations, downloads can become quicker.

4. **Good price discovery and fair market pricing.** With millions of nodes present, the market for decentralized storage systems becomes a perfect competition. No single node can charge a premium price. This ensures good price discovery and fair pricing across the entire market. Such a market also guarantees that only good-quality nodes can compete and survive.
5. **Increased security and privacy.** Most important of all, decentralized data storage systems provide a high level of security. They partition the data into smaller chunks, make copies of the original data, and then encrypt each portion separately using hashes or public-private keys. The whole process secures the data from bad actors.

Layer 4: The Distributed Intelligence Layer

Artificial intelligence (AI) and machine learning (ML) are currently the core component inside a dynamic Web2.0 tech stack. But the main problem with current AI/ML is their siloed data and proprietary algorithms. The data sharing and algorithm sharing among different organizations introduce privacy nightmare as well as standardization obstacles. In the Web3 and Metaverse era, we see that AI/ML leveraging blockchain technologies become more distributed and decentralized.

By leveraging smart contract and token economy, an incentive mechanism can be provided to AI/ML with high-quality data and algorithms. The AI/ML algorithms' hash can be published on blockchain, such that before each call to AI/ML inside a metaverse application, you can calculate and compare to see if the hash has changed, which can help in determining whether the algorithm has been changed by hackers. You can

define a workflow process to vet and publish good-quality data and AI/ML algorithms, using blockchain technologies to sign and execute the workflow tasks.

By implementing role-based access control based on smart contracts, the privacy of data sharing can be managed to allow only authorized users to access the data, so that the privacy concerns can be minimized to allow data sharing among different organizations. The standard application programming interface (API) technology can be used (such as Rest API and GraphQL) to allow standard access to the quality data and algorithms, including incentivized participation from different data providers. (For example, “The Graph” project provides decentralized on-chain data for blockchain projects.)

Layer 5: The Consensus Layer

The consensus layer is composed of one or several hybrid consensus algorithms to make sure that all participants agree on the state of the Metaverse network. From the blockchain technical perspective, a consensus algorithm is a mechanism through which all the peers of the blockchain network can reach a common agreement about the present state of the distributed ledger. In this way, consensus algorithms achieve reliability in the blockchain network and establish trust between unknown peers in a distributed computing environment.

In addition to technical consensus used in the blockchain algorithm, we also see the importance of the so-called “social consensus.” In the Metaverse, the “social consensus” means the governance and active participation of individuals or organizations within the Metaverse ecosystem. The social consensus in Metaverse needs to meet the following requirements:

- **Coming to an agreement.** Everyone in the ecosystem strives to reach an agreement, which would benefit the whole Metaverse ecosystem.
- **Collaboration.** Everyone in the ecosystem aims for a better agreement that results in the whole ecosystem’s interests.

- **Cooperation.** Everyone in the ecosystem will work as a team and put their own interests aside.
- **Equal rights.** Everyone in the ecosystem has the same right in voting based solely on its stake in the system. The centralization of stake or so-called “whales” in the ecosystem must be dealt with, using technologies such as quadratic voting or other mechanisms.
- **Incentivized participation.** Incentive mechanism needs to be in place to encourage active participation.
- **Borderless.** The social consensus needs to be global and without borders.

Layer 6: The Smart Contract Layer

The smart contract layer can be viewed as an orchestration layer for the Metaverse economy. The complex business logic and workflow process related to critical transactions are executed via smart contracts.

A smart contract, like any contract, establishes the terms of an agreement. But unlike a traditional contract, a smart contract’s terms are executed by the codes running on a blockchain like Ethereum, Polkadot, Solana, and HyperLeger Fabric. Smart contracts allow developers to build decentralized apps that take advantage of blockchain security, immutability, integrity, and on-chain verifiability while offering sophisticated peer-to-peer functionality – everything from value exchange, insurance, and loans, to trade finance and gaming. Just like any contract, smart contracts lay out the terms of an agreement or deal. What makes smart contracts “smart,” however, is that the terms are established and executed as code running on a blockchain, rather than on paper sitting on a lawyer’s desk.

Smart contracts are written in a variety of programming languages (e.g., Solidity, Rust, Java, C++, and Web Assembly). On the public chain ecosystem, each smart contract’s code is stored on the blockchain, allowing any interested party to inspect the contract’s code and current state to verify its functionality.

Each computer on the network (or “node”) stores a copy of all existing smart contracts and their current state alongside the blockchain and transaction data.

Smart contract-powered apps are often referred to as “decentralized applications” or “DApps” – and they include decentralized finance (or DeFi) tech that aims to transform the banking industry. DeFi apps allow cryptocurrency holders from anywhere in the world to engage in complex financial transactions – saving, loans, insurance – that without a bank or other financial institution taking a cut.

In addition to DeFi applications, smart contract will play a crucial role for various decentralized applications in Metaverse, including gaming, education, healthcare, tourism, supply chain management, trade finance, and legal applications, and many more industry sectors. The business flow and associated logic of these industry sectors can be implemented using smart contracts. It’s important to note that for real-world metaverse applications, the smart contracts need to get reliable input from both layer 3 (data layer) and layer 4 (intelligence layer) and then leverage layer 5 (consensus layer) and layer 6 (smart contract) to execute the related business logic. The result is vast value creation for the society, thanks to the huge productivity gains.

Layer 7: The Metaverse Economy Layer

The layer 7 is the Metaverse economy layer. The layered architecture allows open platform design and component reusability. The higher layer of protocol can be built on top of the lower layer of protocol. Different products and systems built using the layered architecture can communicate with each other via APIs. (The security issue, however, will be the core of each layer and needs to be applied to each layer with “security first” design principle.)

The Metaverse economy has four core elements: digital creation, digital assets, digital markets, and digital currencies. The

first is digital creation, which is the beginning of the Metaverse economy, without which there is no commodity to trade. In the physical world, people "create" all kinds of things or services. We describe it as a *product*; when it enters the market for circulation, it is referred to as a *commodity*. In the Metaverse, people are doing *digital creation* and creating *digital products*. Digital creation is digital and essentially is a collection of data. As the following chapters will illustrate, new digital technologies are now enabling ordinary internet users to become creators of digital contents.

The second is digital assets, which are represented by data and have property rights and can be used in transactions in the Metaverse. The third is the digital market, which represents the digital world marketplaces and the trading rules that everyone must follow. Finally, the fourth is digital currency, which shall enable global digital asset transactions with real-time settlement and clearing at minimum fees. Therefore, the Metaverse economy is essentially the "creator economy."

Business Models Converging in Metaverse

While the Web3 technology stack is still evolving, many companies have joined the bandwagon and announced warm and fuzzy business ideas around metaverse magic. In addition to the Big Tech companies mentioned earlier, major brands like Adidas, Coca-Cola, Dolce & Gabbana, Gucci, NBA, and Nike – just to name a few – also view the Metaverse creating a world of infinite possibilities for them to create new experiences and engage with their customers in entirely new relationship-building ways.

Meanwhile, numerous Web3 startups are emerging in this space to create the Metaverse in the decentralized context. For Big Techs and startups, the common belief is that the Metaverse is the future social network, and more. It will connect everyone and maybe even everything. Thus, the Metaverse provides a platform and ecosystem where business models converge. The case studies in this section will illustrate the convergence of

business models at metaverse plays, both from Big Tech and early startups' perspectives.

Case 1: Meta – AI, AR/VR, Big Data, Social Network, and UGC Converging

Facebook has been planning its foray into the Metaverse for some time now – possibly even several years. But renaming the parent company to Meta was perhaps the biggest, boldest statement of intent the firm could make. "The next platform and medium will be an even more immersive and embodied internet where you're in the experience, not just looking at it, and we call this the Metaverse," said CEO Mark Zuckerberg at the announcement of the name change.

Zuckerberg believes that the Metaverse provides an organic development of the company within the existing concept, but there are more reasons why Metaverse makes sense for Facebook (see **Figure 1.5**):

- **Increased engagement.** Virtual reality is supposed to increase the time users spend online and consequently spur content consumption.
- **New content market.** Metaverse offers huge opportunities for creating and selling virtual 3D content, far greater than those of Instagram or TikTok.
- **A new level of communication.** Metaverse will allow people thousands of kilometers away from each other to communicate as if they were sitting in the same room.
- **A new branch of economy.** According to Zuckerberg, the Metaverse must have its own comprehensive economic system.

Meta platforms owns not only four of the top six social media platforms, but also Oculus, which manufactures VR hardware. Virtual reality has been about to go mainstream for a decade now but is far from ubiquitous, leaving the company perpetually trying to capitalize on this \$2 billion acquisition. What could sell VR headsets more effectively than the notion

**Meta: the Convergence between AI, AR/VR,
Social Network, UGC, Big Data**

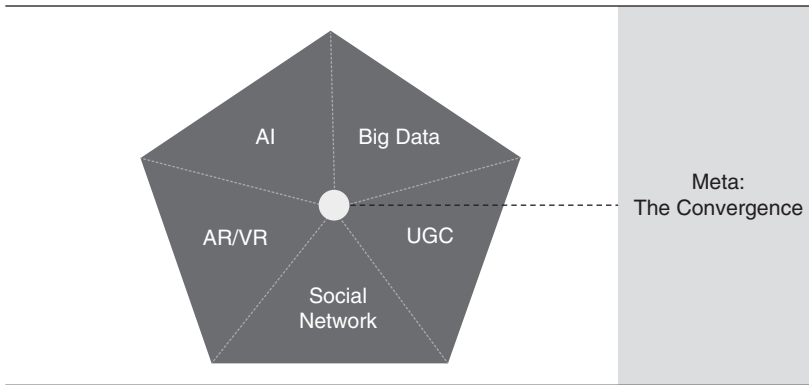


Figure 1.5 Meta – AI, AR/VR, Big Data, Social Network, and UGC Converging

that everybody will need one to access the internet of the future – especially if that same internet is Meta’s own?

***Case 2: Roblox – 3D Communication, Social Network, AR/VR,
and NFT Converging***

Human co-experience is a term used by Roblox CEO David Baszucki. In a recent speech, Baszucki said, “It’s been called the Metaverse today. We’ve called it human co-experience.” Baszucki defines the Metaverse as a place where technology combines high-fidelity communication with a new way to tell stories, borrowing from mobile gaming and the entertainment industry. According to Baszucki, this new category of the Metaverse or co-experience is predicated on eight fundamentals: identity, social, immersive, low friction, variety, anywhere, economy, and civility.

Essentially, the “human co-experience” can combine business models from 3D communication, social network, and potentially AR/VR and NFT into the Metaverse (see **Figure 1.6**). The users of Roblox can seamlessly shift between modes of communication, from text, to voice, to video, to 3D immersive. In

Human Co-Experience: the Convergence between 3D Communication, Social Network, AR/VR, NFTs

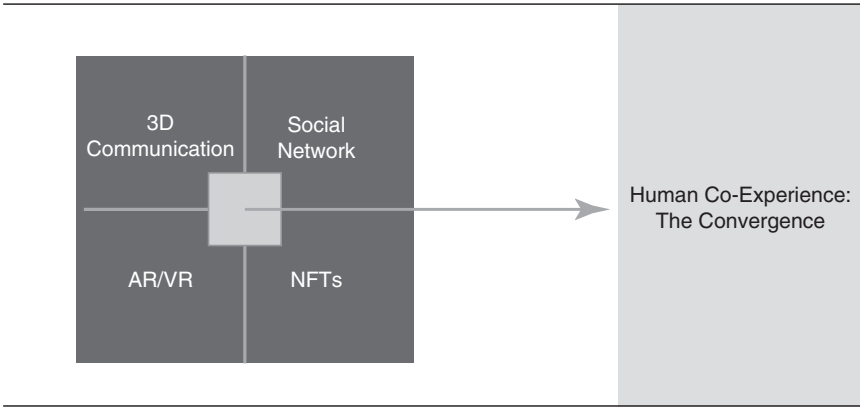


Figure 1.6 Roblox – 3D Communication, Social Network, AR/VR, and NFT Converging

fact, different participants in the conversation may choose the most convenient mode of communication depending on the context. The result is individualized, immersive co-experiences, where people can come together within millions of 3D experiences to learn, work, play, create, and socialize.

Case 3: Soul – Social Network, AI, and Digital Coin Converging

China Tencent-backed Soul App branded itself a “Soul”cial (an extension of “social”) Metaverse for the young generation. Soul app went online in November 2016, and it has of late come to overseas markets including North America, Japan, and South Korea.

According to Zhang Lu, CEO of the company, the problem the app took on was that “young people usually have certain emotions and viewpoints that they tend not to share with people around them or on WeChat.” The approach was to build an anonymous space that links netizens by their hobbies and values. Soul has tagged itself as a “social networking metaverse,” probably to differentiate itself from dating apps such as MOMO and Tantan – both seen as local imitators of Tinder.

The product logic behind Soul is nowhere near as complex: connection and content hold the key to sparking the desire to socialize. For example, Facebook attracts individuals from preexisting social circles, before increasing their engagement using content created by their friends and families. Meanwhile, content-based platforms, like Twitter and Instagram, lure and retain newcomers with their original and captivating content. But Soul has been able to address the challenges of whether to give priority to content over preexisting social circles, or vice versa by applying its distinctive recommendation algorithms at both levels, based on AI and Big Data (see **Figure 1.7**).

Even though Soul boasts a futuristic design and user interface, the product is still far from a metaverse. It is a networking platform built on the online socialization model – not an open world with users “creating content and experiences.” Though this app has an avatar customization system, it lacks interaction enabled by human-machine interfaces (HMI) or other AR/VR tools. The platform’s monetization mainly relies on VIP subscriptions and e-commerce.

In addition, the token economic system is not fully functioning. The elements that resemble a metaverse are its AI-powered

Soul: the Convergence between Social Network, AI, Digital Coin, UGC, Big Data

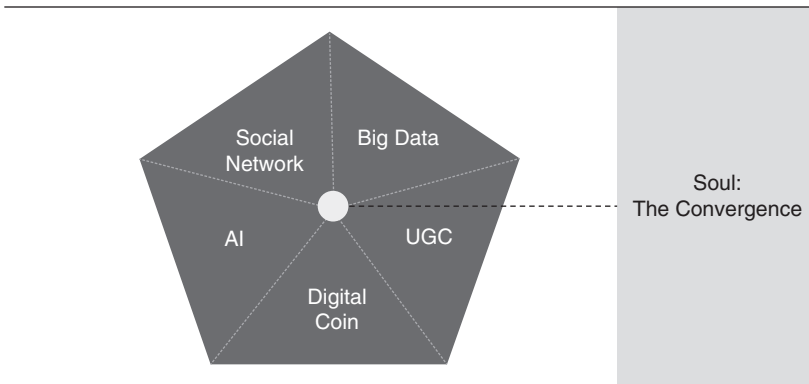


Figure 1.7 Soul – Social Network, AI, and Digital Coin Converging

matching algorithms and a currency called “Soul coin,” which is used to purchase avatar decorations and send virtual gifts. Yet, these gifts are not tradable and cannot be exchanged back to “Soul coins.” Not to mention that this in-app currency is not decentralized. (The next section will discuss the true Web3 ecosystem properties.)

Like Facebook’s Meta, Soul did not make itself a metaverse company by claiming to be one. As for the top-notch game developers backing the project, they simply want to acquire its traffic and data on users’ behavioral patterns. True metaverse platforms will be built by decentralized communities, will flourish in the new era of Web3, and will meet the ecosystem properties we define below.

Case 4: Loot – NFT, Creative Ideas, Art, Derivatives, and Games Converging

In late August 2021, Loot, an NFT (nonfungible token) experiment hacked together by Vine co-founder Dom Hofmann, was launched to the public. In the span of a week, the project went viral. Twitter was overflowing with commentary surrounding the project – skeptics, staunch advocates, and everyone in between. Many thought leaders, from Vitalik Buterin to Chris Dixon, framed Loot as a paradigm shift in the conception of the Metaverse, NFTs, and gaming itself. John Palmer went as far as to say, “We’re in a different era now; there was “Before Loot and now there’s After Loot.” Others, however, viewed it as nothing more than a speculative pump in an asset with little intrinsic value.” (**Chapter 5** will cover an in-depth discussion of NFTs.)

The concept of Loot was stunningly simple (see **Figure 1.8**). There are 8,000 total “Loot bags,” which are text files containing eight phrases. Each of the “items” resembles objects you’d discover in a game like Dungeons & Dragons – that’s why Hoffman calls it “adventurer gear.” These Loot bags are NFTs on Ethereum that are provably rare, transactable, and composable

Loot: the Convergence between NFTs, Creative Ideas, Art, Derivatives, and Games

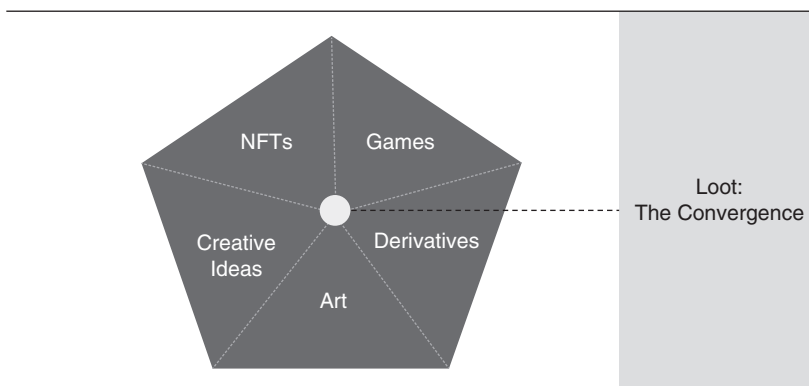


Figure 1.8 Loot – NFTs, Creative Ideas, Art, Derivatives, and Games Converging

with other open protocols. Loot combines the business models of creator economy plus art, derivatives, games, and decentralized autonomous organizations (DAOs) into its own metaverse version and uses the term *Lootverse*.

But what can you actually do with a Loot bag? The answer is very simple and maybe even unsatisfying. According to the project description: “Loot is randomized adventurer gear generated and stored on chain. Stats, images, and other functionality are intentionally omitted for others to interpret. Feel free to use Loot in any way you want.”

In other words, there is no game for Loot to be used in, at least in the beginning. The “game,” then, is the building process itself; people finding different ways to remix, integrate with, and build on the Loot ecosystem. Loot, then, is a set of open-source objects. Their value comes from the way that they can be used in the future.

Put differently, Loot is a first-of-its-kind bottom-up game. Nobody owns or controls Loot; the original keys to the contract were burnt after a governance vote. Rather, the community of users, builders, and owners determines what Loot means to

them and how they want to use their items. In the weeks immediately after Loot's release, there was an early burst of momentum from artists, developers, and other creators inspired by the project.

As of late 2021, Loot's Developer momentum has slowed, the community remains small, and outside interest has faded away. What Loot has achieved already, however, shouldn't be diminished. The Lootverse is likely to become popular again in the right time with the right catalyst.

Case 5: SocialFi – Social Network, Game, Finance, Payment, and NFTs Converging

SocialFi is the convergence of social network, game, finance, payment, and NFT into one platform. The current business model of social networks is inherently extractive. The platforms take their customers' data and sell it, while serving them increasingly intrusive advertising. As the saying goes: Users are not paying for social media; they are the product. Now, SocialFi puts the economics of creation back into the hands of users.

SocialFi aims to deliver benefits and rewards to users through the financialization and tokenization of social influence (see **Figure 1.9**). One such early adopter in SocialFi space is Monaco Planet. By introducing the concept of write-to-earn, content creation itself serves as a form of mining. ("Mining" refers to "earning" crypto tokens on a blockchain ecosystem, which will be explained in detail in **Chapter 3**.) Active content creators and discussion participants on Monaco Planet continuously reap the benefits in the form of native tokens. Most native tokens will be distributed to users who generate content, creating a form of "mining" that is sustainable, inclusive, and productive.

A true SocialFi platform belongs to its users instead of an internet behemoth. And as the vast majority of Monaco Planet's native tokens will be distributed to users as rewards for content creation, Monaco Planet functions as a true decentralized

SocialFi – the Intersection between Social Network, Gaming, Finance, Payments, and NFTs

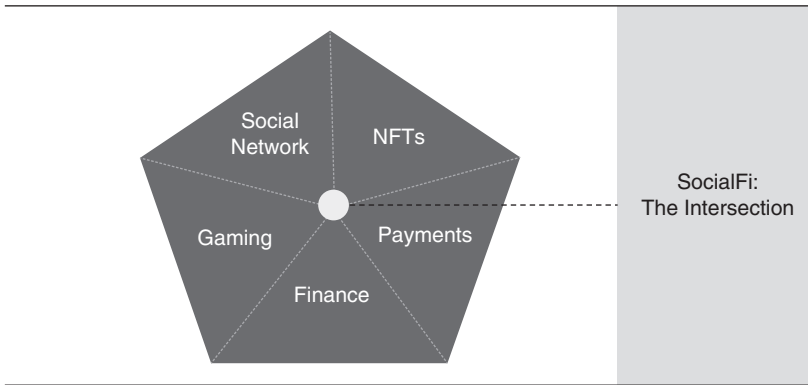


Figure 1.9 SocialFi – Social Network, Game, Finance, Payments, and NFTs Converging

autonomous organization (DAO), governed by native token holders who can send in proposals and vote. As a SocialFi platform, the ownership and governance of Monaco Planet are determined by the users themselves. Moreover, holders of native tokens will enjoy the currency appreciation brought by the platform’s growing economic activity.

Building a Better Internet for the Creator Economy

In summary, the years 2021–2022 are the grand opening of Metaverse. The social network giant Facebook rebranded itself as Meta to develop virtual reality digital worlds, the graphics-chip maker Nvidia turned its focus to digital twins – virtual versions of real-world objects or spaces – that people can manipulate and study in computer-generated worlds, and NFT (nonfungible token) rose from obscurity to front-page news, generating digital assets to represent every possible real-world object, from art and music to tacos and toilet paper.

The Metaverse – a persistent, 3D, interactive sequel to today’s two-dimensional internet, in which users work, play, buy, and sell inside immersive virtual worlds – has become

the internet's Next Big Thing (Web3). As the successor to the mobile internet that has defined the last decade, Web3 represents a paradigm shift for the internet, an embodied internet as a unification of physical and digital worlds that you're inside of rather than looking at.

The case studies above – especially the Monaco Planet and SocialFi cases – provide a glance into what the initial Metaverse business models are and how they could empower ordinary people to enjoy immersive, rewarding, and profitable experiences by developing or interacting in diverse metaverses. New technologies, especially blockchain and other distributed technologies, will unlock opportunity for the billions on the margins of the internet revolution and enable them to become players in the upcoming *creator economy* (see **Figure 1.10**).

By contrast, in the case of Facebook, the Meta rollout has been criticized for user data concerns. Given the track record of Facebook, there are valid reasons to have serious privacy concerns about the company's new focus on virtual reality. Zuckerberg has tried to get out ahead of these concerns, promising multiple layers of privacy protection as the company pivots with its Meta rebrand. The announcement of the Facebook metaverse has thus far been met with at least as much suspicion and hesitancy as it has enthusiasm, as the public wonders what (if anything) the social media giant plans to do differently this time. (Meta stock dropped significantly in the months following the change of corporate name and strategy. But that could be attributable to broad market factors, too.)

Therefore, it's time to build a better internet, where the users, not the Big Tech platforms, control their data value, data privacy, and data security (see **Figure 1.11**). We believe that the next wave of computing innovation—along with entirely new sectors of the economy – will be built on decentralized technology. This is Web3 – a group of technologies that encompasses digital assets, decentralized finance (DeFi), blockchains, smart contracts, tokens, decentralized autonomous organizations (DAOs), and more to come.

Players of the Metaverse “Creator Economy”

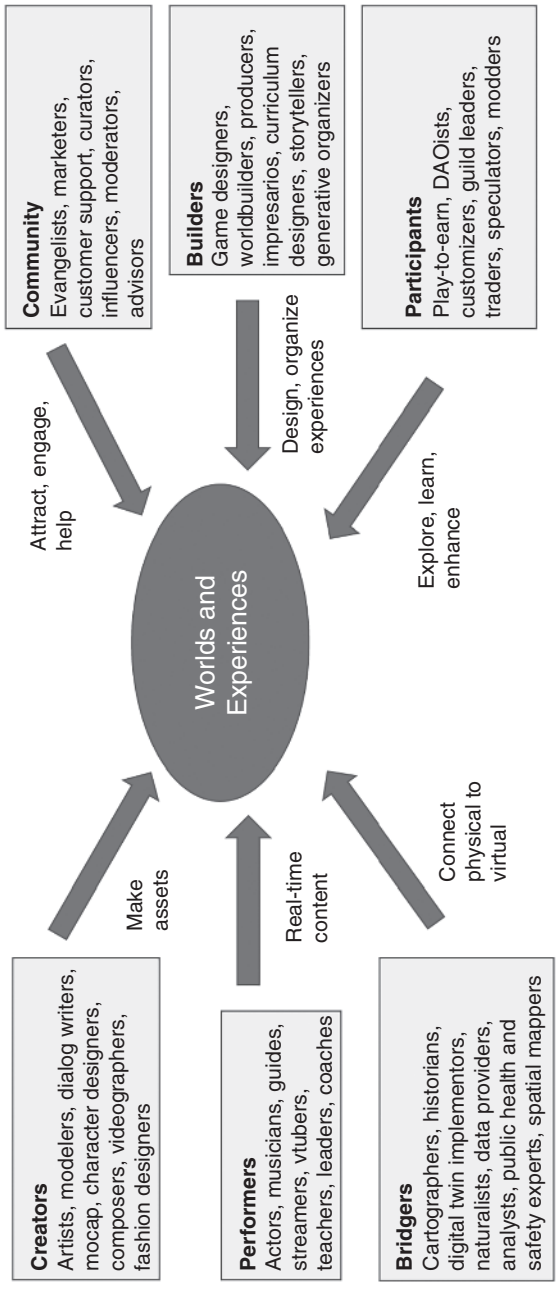


Figure 1.10 The Metaverse “Creator Economy”
Source: Jon Radoff, *Building the Metaverse*

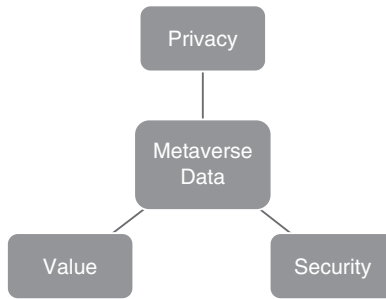


Figure 1.11 Users Controlling Data Privacy, Security, and Value in Metaverse

In our view, the true Metaverse should be built by a decentralized community instead of a centralized IT behemoth. The data generated by users inside a metaverse platform should belong to the users, and users can decide to share the data with other platforms and receive monetized value as the owner of the data. Meanwhile, user data privacy can be preserved since there is no centralized collection, and users' data can be stored on metaverse platforms powered by distributed ledger technology (DLT) like blockchain. (Currently, users' data are "trapped" at Big Tech platforms, and the metaverses created by them may remain walled gardens and potentially create a dystopian society.)

Following is a list of ecosystem properties that the Metaverse business model should meet; the business model cases in the earlier section have demonstrated a few of these properties:

Fairness. The ecosystem shall be fair to every participant, there is no insider deal making or secret transactions which exploit other participants in the ecosystem. The SocialFi platform Monaco Planet emphasizes the fairness for everyone participating inside the platform.

Peer to peer. There will be no intermediaries; all interactions and transactions and various activities happen peer to peer. There will be ecosystem solution providers who are also consumers or clients of other solutions inside

the ecosystem. Almost all blockchain-based projects developed by decentralized communities have tried to make peer-to-peer interaction/communication/transaction as the central component of the platform, completely opposite to tech conglomerates (like Facebook) and their metaverse plays (like Tencent's Soul).

Global payment rail. Must have global real-time instantaneous settlement and clearing for payment enabled by cryptocurrency.

Decentralized autonomous organization (DAO). DAO will manage and govern the business relationship, transactions, and activities.

Sustainable token economy. Combining physical and digital worlds with a sustainable business model and actual value creation, Metaverse will be able to flourish and benefit all participants. The token economics must encourage and incentivize participation and contribution from ecosystem players, rewarding positive contribution and punishing malicious actions. Ponzi scheme-like systems that use later arrival participants' funds to pay for early participants can only survive a short duration of time and will not be sustainable.

Security. Security shall be the most important aspect of the Metaverse platform. A defensive, in-depth approach must be implemented to protect every technological layer and build blocks in the Metaverse ecosystem. In addition to cyber and technical security, the ecosystem must consider token economy security and regulatory compliance.

Self-sovereign identity (SSI). SSI means that individuals should own and control their identity without the intervening third party and centralized authorities. Personal data is stored and managed in a decentralized manner, thus increasing its protection. Owners have access to the information associated with their identity and must provide consent before it can be shared. SSI is the

foundational building block for the creator economy, as users will all become creators of digital assets.

Immersive experience. An “immersive experience” allows a person to enjoy a more engaging, rich, and rewarding experience than from today’s two-dimensional screen. Immersive technologies create distinct experiences by merging the physical world with a digital or simulated reality. Augmented reality (AR) and virtual reality (VR) are two principal types of immersive technologies.

Multiple-dimension experience. The internet experience can be enhanced by multiple spatial and time dimensions, which allow users to teleport to different 2D or 3D spaces in milliseconds and time travel to the past or to the future.

In the near future, blockchain-based Web3 will surround us, with our lives, labor, and leisure all taking place inside it. The *blockchain internet* is poised to revolutionize every industry and function, from finance and healthcare to media entertainment and real estate, creating trillions in new value – and the radical reshaping of society. In the next chapters, we will discuss the convergence of digital technologies that will enable metaverse applications, and we will also introduce different applications and security and privacy aspects of the Web3 Metaverse.

The Metaverse may be the next major platform in computing after the world wide web (Web1.0) and mobile internet (Web2.0). It will represent a profound shift in the way individuals and communities use technology. Value creation and distribution of data is being taken away from centralized actors and put into the hands of decentralized groups of individuals. In addition to Big Tech companies, sovereign nations are aggressively investing into Metaverse research and next-generation digital infrastructure, including state-backed blockchain networks. The race to build the new, decentralized, blockchain-powered internet – otherwise known as Web3 – is on.