

Is the metaverse the next digital frontier?



Wealth Management
Dominion Securities

You have likely heard about this nebulous concept and how it could be the future of the internet, or how we could all be living in it someday. But what is it exactly? This primer is intended to help you gain a better understanding of what the metaverse is while providing thoughts on the implications of this burgeoning investment theme.

As the global pandemic has forced societies to engage far more digitally than ever before, it is perhaps not controversial to say that we have been living in some version of the metaverse already. This dramatic shift in our daily interactions has sparked a complete re-imagining of what a digitized life might eventually come to look like. That said, it is impossible to predict with any degree of precision how the metaverse will develop from here. Just as many were proven incorrect with regards to how, and the timeline in which, the internet would evolve, it is just as likely that most prognostications on the future of the metaverse could suffer a similar fate.

The inherent difficulty in attempting to predict the future, particularly when it comes to technologies like the metaverse, is attributable to two dynamics. First, humans tend to struggle with exponential growth functions. For illustrative purposes, consider this theoretical example: if a single drop of water is added to a football stadium at 1 p.m., and then one minute later it doubles and two more drops are added, and one minute after that it doubles again to four drops and so on, what time will it be when the stadium is completely filled with water? Most people immediately start thinking in terms of weeks or months, but the (startling) answer is 1:49 p.m. Even more interestingly, the stadium goes from 93 percent empty at 1:45 p.m. to being half full at 1:48 p.m. to being completely full at 1:49 p.m. Because most of us are hard-wired to think in linear terms, we end up underestimating the growth of industries and technologies that obey exponential power laws.

The second dynamic is associated with the behavioural side of human psychology—in particular, our limitations in fully appreciating how our decision-making within complex economic systems can lead to non-linear outcomes, a concept best represented by a quote made

famous by Bill Gates when he expressed that “most people overestimate what they can do in one year and underestimate what they can do in ten years.”

Nonetheless, early indications suggest a metaverse opportunity that could be significant in the longer term. However, the sequence of events matters as much as the destination, so it is important to be able to adjust our thinking because if there is one certainty, it will be the uncertainty of how the metaverse unfolds. That said, we expect this evolution, like substantial technological developments before it, to follow “Amara’s Law,” in that the actual development of the metaverse will likely underwhelm over the short run, while exceeding expectations over the longer run.

Our goal here is not to reach any firm conclusions, but rather to offer a basic primer on the metaverse while avoiding the over-intellectualization of what is a highly esoteric subject matter.

A brief history lesson of the metaverse

Though the metaverse has only recently entered our collective lexicon, coinciding with Mark Zuckerberg’s strategic decision to rename his company from Facebook, Inc. to Meta Platforms, Inc. in 2021, its origin actually stretches back to 1989 when British computer scientist Sir Tim Berners-Lee invented the World Wide Web while working at CERN, the European Organization for Nuclear Research. Berners-Lee was attempting to solve for the inefficiencies associated with information-sharing between scientists at universities and institutions around the world. He would later submit a proposal centered on HTTP (Hypertext Transfer Protocol), not realizing that his “pet protocol” would act as the technological cornerstone for what would eventually become the internet.

In 1992, inspired by Berners-Lee's invention, science fiction writer Neal Stephenson published the novel "Snow Crash" where he coined the term "metaverse," using the word to describe a 3D virtual space which, in hindsight, prophetically illustrated a digital environment where individuals would congregate and share meaningful interactions with one another. In 2003, Philip Rosedale and his team at Linden Lab unveiled Second Life, the first-of-its-kind online virtual world, and then in 2006, Roblox was introduced—an online platform that allowed users to create and share games with each other. Almost a decade later in 2015, Decentraland was born, a successor digital state to Second Life built on the Ethereum blockchain where users could not only interact with other users in a digital world but also own the digital assets themselves made possible by the smart contract functionality built into the Ethereum network's programming (which we elaborate on in the following section).

There are two important insights to glean from this abridged history lesson. First, the greatest developments are often anticipated decades in advance but are frequently discounted as being too hyperbolic. Second, by connecting the dots backwards, we soon realize that the metaverse was merely the product of technological evolution driven by constant innovation over the past several decades.

The evolution from Web 1.0 to Web 3.0

As mentioned earlier, the first implementation of the web (i.e., Web 1.0) began in 1989 coinciding with Berners-Lee's HTTP invention. Broadly speaking, Web 1.0 refers to the first stage of the internet where information was disseminated through public websites/portals but without any user participation—think AOL and its home page. An important distinction here is that the number of people consuming content far exceeded the number of people creating it.

In 2004–2005, Web 2.0 came into existence. Colloquially referred to as the "social web," Web 2.0 is an evolved version of Web 1.0 dominated by user-generated content on social platforms. However, these activities exist within a centralized system with power concentrated around massive walled garden networks such as Facebook, LinkedIn, and Twitter.

Looking ahead, as a progression from Web 2.0, Web 3.0 will likely be a decentralized network that (1) has no central authority, (2) has greater transparency, and (3) relies on blockchain technologies (i.e., Ethereum) for transactions and asset ownership. In its purest form, the philosophy behind Web 3.0 is that no person or group of people should be able to control all the information and processing power within the network. Rather, users should be able to create their own platforms and content with all the benefits accruing to the creator without having value being siphoned through various intermediaries.

Of course, as we move to a Web 3.0 society, this inevitably begs the question of the willingness of current incumbents to relinquish their dominance in favour of a more equitable digital ecosystem. Furthermore, this leaves the discussion wide open in terms of how regulation and governing structures may need to evolve in response to these new Web 3.0 dynamics. Though these are important questions, they are beyond the scope of this article.

What is the metaverse?

The notion of the metaverse comes part in parcel with the evolution of the internet from Web 1.0 to Web 3.0 in that they share some core principles. Specifically, both incorporate the concept of a decentralized future and embrace the idea of deepening social engagement. However, the main difference between Web 3.0 and the metaverse is that the former is focused on how the internet will be structured in the future, particularly as it relates to the economics/ownership of the internet, while the latter is attempting to solve for how users will be able to experience, on a visceral level, that same internet of the future.

Simplistically, we can think of the metaverse as a collection of hundreds, if not thousands, of tangential interconnected virtual reality environments where we use devices to digitally replicate various sights, sounds, and other sensations that make an individual feel like they have been transported to an entirely different environment despite never having left their own local physical world. We accomplish this through the use of virtual reality headsets, audio interfaces, and haptics (i.e., devices that allow users to experience the sensation of touch in virtual environments).

Video games provide an example. For instance, rather than using a game controller to direct the movement of a character that you see on the television screen while sitting on your couch in the living room, imagine "teleporting" into the actual digital environment using the devices noted above and literally becoming your gaming character. In time, the metaverse will, in theory, allow us to engage with each other from the comfort of our own homes regardless of our physical location and in a manner that will be indistinguishable from our current interactions in the real world.

This is perhaps an opportune time to briefly introduce the concept of an individual's digital persona or "avatar" and explain how cryptocurrencies, blockchains, and tokens/NFTs (non-fungible tokens) tie into the metaverse construct. An avatar is a digital representation of an individual in the virtual world similar to the way we would have a character that represents us digitally in a video game. When operating an avatar with the intention of making a transaction, traditional paper currencies have no utility and this is where digital infrastructure becomes crucial.

The most popular metaverse environments are currently being built on the Ethereum network, which utilizes blockchain technology while also offering smart contract functionality. The Ethereum blockchain is a decentralized, distributed public database where all digital transactions are verified and recorded—the Ethereum blockchain also maintains a master ledger that tracks the transfer of ownership of digital assets executed through Ethereum’s smart contract system. A smart contract is simply a program stored on a blockchain that self-executes when predetermined conditions are met. For example, when user A sends a certain amount of tokens to user B, the smart contract will self-execute and automatically transfer ownership of a specific digital asset on behalf of user B to user A that is consistent with the agreed upon smart contract.

Simplistically, tokens on the Ethereum network are used to facilitate digital transactions, while NFTs are used to prove ownership of digital assets. By definition, a token is fungible—in other words it is divisible, non-unique, and interchangeable, making it an ideal payment vehicle. Conversely, NFTs are unique and irreplaceable and by virtue of these characteristics, NFTs are optimal for storing data that include items such as digital pictures. Critically, the uniqueness of NFTs can potentially create scarcity value.

Metaverse technology available today

When Zuckerberg rebranded Facebook as Meta Platforms in 2021, he acknowledged the disparity between mainstream adoption of the metaverse and a fully immersive metaverse experience, admitting the latter could only be achieved with further major technological advances. Nonetheless, the technology today has given us a glimpse into the possibilities of what a more actualized metaverse could become.

Virtual reality and augmented reality

There are currently two broad categories when it comes to digitized environments: virtual reality (VR) and augmented reality (AR). The main difference between the two is that VR’s objective is to completely replace a user’s view of the world with a digital one via a VR headset (top image). Meanwhile, AR’s intent is to present information that is superimposed on the real world using a smartphone device that allows the user to interact with the real world and virtual world simultaneously while still being able to clearly distinguish between the two (bottom image).

Given the cumbersome nature of current VR headset configurations, the introduction of alternative technologies will likely be required for a more seamless metaverse experience to drive greater adoption.

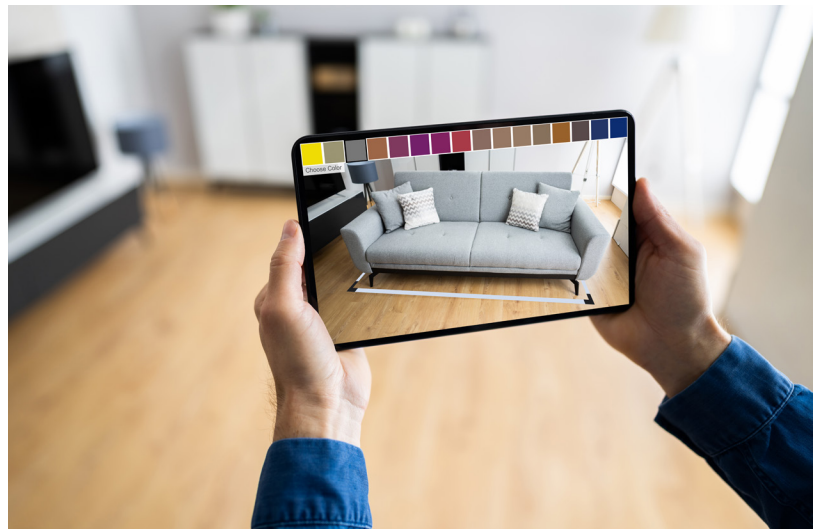
Spatial audio and haptics

As touched on earlier, in addition to visualizing the metaverse, a user must also be able to engage other senses, namely hearing and touch—this is accomplished through utilizing technology such as spatial 3D audio and haptics, respectively (e.g., haptic gloves and body suits). Similar to today’s VR/AR technology, both audio and haptic devices will also need improvements to drive deeper metaverse immersion.

Virtual reality



Augmented reality



Five broad metaverse categories

Companies establishing a metaverse footprint

| Online game makers | Design software vendors | Social networking | Gaming, AR/VR, & hardware | Live entertainment |
|---------------------|-------------------------|-------------------|---------------------------|--------------------|
| Roblox | Unity | Meta Platforms | Meta Platforms | Live Nation |
| Epic Games | Adobe | Tencent | Hewlett-Packard | Disney |
| Microsoft | Autodesk | | Logitech | Brooklyn Nets |
| Activision Blizzard | | | Valve | |

Source - Bloomberg, RBC Wealth Management

Metaverse landscape

As it stands today, corporations are jockeying for position in five broad categories shown in the table. This is certainly not a static list—in fact, futurist Cathy Hackl, considered to be the “Godmother of the Metaverse” given her expertise as a digital strategist, expects every company will eventually require a metaverse strategy. We anticipate seeing more announcements similar to the one made by Disney this year when it created the position of “Senior Vice President for Next Generation Storytelling and Consumer Experiences” to oversee the company’s strategic efforts in the metaverse. Interestingly, former Disney CEO Bob Iger recently announced that he would be investing in and joining the board of metaverse startup Genies, and be tasked with playing a key role in helping the company “navigate its mission to empower humans to create their own avatar ecosystems.”

Meanwhile, there are other compelling pieces of evidence that suggest the metaverse might not simply be a digital fad, including: Meta Platforms’ \$10 billion metaverse investment; Amazon’s recent job posting seeking a

product manager who will be tasked with “the delivery of cloud-based metaverse services”; and Apple CEO Tim Cook’s comments during the company’s latest quarterly conference call where he stated that he “sees a lot of potential in the space and is investing accordingly.”

Metaverse opportunity is sizeable

According to Bloomberg, the global metaverse revenue opportunity could approach \$800 billion annually in 2024 (which includes the aforementioned verticals), up from approximately \$500 billion in 2020. When we consider this estimated opportunity set and marry that with the expectation that more companies will eventually announce their metaverse intentions, it appears there is a growing wall of capital, both financial and human, that will continue to drive metaverse development over time, suggesting that the metaverse market opportunity could be sizeable in the longer term, possibly greater than current market expectations.

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