


Chapter 8

Building Blocks, Opportunities, and Challenges of Metaverse in Web 3.0

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ABSTRACT

The Metaverse is an immersive virtual world facilitated by virtual reality (VR) and augmented reality (AR). It is a backbone technology for Web 3 in which users interact using avatars in a digital content environment. Metaverse as a platform enriches Web 3 with its decentralized, interactive, and immersive experiences, allowing newer forms of collaboration, innovation, and entrepreneurship. A quick historical background and its evolution are discussed. Being a content-rich environment, upgraded high-speed connectivity is necessary. Internet 3.0, decentralization, and VR/AR technologies will help build the foundation. Metaverse requires special hardware, software, content, networking, and governance. The Metaverse promises economic models in which cryptocurrencies and Metaverse Coins are traded. Metaverse is still evolving as research is increasing and associations are focusing on standards. Robust governance and regulations are still nascent. Certain negative aspects include privacy and security, addiction, cyberbullying, and disinformation, about which users must be cautious.

INTRODUCTION

The Metaverse is a virtual digital environment in which people appear as digital avatars and interact with software and each other using objects in both virtual and real worlds. It is an online environment and a parallel digital universe where people play games, work, learn, meet, and socialize. It is an infinitely and constantly expanding virtual world with new features, dimensions, and technologies.

Metaverse allows people to buy and sell digital assets. Digital assets are those that do not have a physical form but are only used or experienced online, such as software, subscription, or membership

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to online services such as music. Cryptocurrencies are often the preferred currency for transacting these digital assets.

Metaverse has no space and location limits. This turns out to be a for-it advantage. In contrast, there is the possibility of missing content because of an unstable internet connection which is a disadvantage.

HISTORICAL BACKGROUND

There are several definitions for the term “Metaverse” (Ritterbusch & Teichmann, 2023). Being evolving and because of the lack of sufficient standards on the topic, there is no single authoritative definition. “Metaverse” is a crossword that comprises two words – “Meta” from Greek to mean “with,” “after,” “beyond,” or “transcendence.” “Verse” means “universe.” So, Metaverse roughly means a “new universe” or a “third space.” Another version is a philosophical view that defines the Metaverse as a “metaphysical,” meaning “to stimulate different people’s understanding, imagination, and innovation” of the Metaverse.

Metaverse is not a straightforward technological development but an evolution with progress happening in bits and pieces. It is the culmination of various technologies that saw small feature enrichments developed over time. Ivan Sutherland’s paper, *A Framework for Virtual Reality* (1965), was the first to discuss an “ultimate display” – a head-mounted device that can help traverse a virtual world (simulation environment) created by computer software. It can provide sensory experiences in a way that is indistinguishable from reality. This idea laid the foundation for virtual reality (VR) and has influenced the development of VR technology over the years. The same year, Morton Hellig built a VR prototype called Sensorama Simulator that provided a multi-sensory experience. William Gibson’s novel *Neuromancer* (1984) mentions about cyberspace. The first formal use of the term “Metaverse” is in Neal Stephenson’s science fiction novel *Snow Crash* (1992). Several movies showed traits of the Metaverse, including *Johnny Mnemonic* (1995), *The Matrix* (1999), and *Ready Player One* (2018).

The development of the internet has brought Metaverse to a more reality. *Second Life* (2003) by Linden Lab is the first virtual world. Though the intention was not to create a game, it largely appears to be a massively multiplayer online role-playing game. The first augmented reality (AR) game, *Pokémon Go*, was released in 2006. The first virtual reality (VR) headset, Oculus Rift, was released in 2012. Facebook acquired Oculus Rift in 2014 for \$2 billion. In 2018, Fortnite, a popular video game, introduced a “Party Royale” mode that allowed players to socialize in a virtual world.

The term *Metaverse* gained popularity after Mark Zuckerberg, on October 28, 2021, announced the name change of the popular social media platform Facebook to Meta Platforms. The name change reflects potential changes and extensions in social media with virtual and augmented reality (FB, 2021). It expressed commitment and a changing focus towards building a futuristic platform. Meta went on to build its Metaverse world called *Horizon Worlds*.

Microsoft soon followed with the Activision Blizzard acquisition in 2022 for \$68.7 billion. The move was seen as a major investment in the Metaverse, and the company hoped the move would accelerate its adaptation and readiness to the new technology. Microsoft Mesh, released in March 2023, is a mixed-reality collaboration platform featuring customizable avatars, objects, and environments and integrates well with other Microsoft products, such as HoloLens and AltspaceVR.

The Metaverse became a hot topic at the World Economic Forum (WEF) Annual Meeting 2022 in Davos, Switzerland. Several workshops and sessions dedicated to it are featured at the event. It became the first major venue, reflecting the importance of the platform. It became a stage for global collabo-

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