Chapter 11
Building Blocks for the Metaverse:
Virtual Worlds, Marketplaces, and Tools

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ABSTRACT

The term 'metaverse,' was first coined in Neal Stephenson's 1992 novel "Snow Crash," and has since been used to describe various types of virtual and augmented reality experiences. . The metaverse holds varying interpretations for different individuals. From its origins in science fiction literature to its recent rise to prominence in popular culture and the technology industry, the metaverse has captured the imagination of many. For some, it represents a virtual arena for socializing with friends, while others perceive it as a potential commercial arena for businesses and their clients. This chapter explores the concept of metaverse and its core building blocks. The chapter has three major sections: the first deals with an understanding of the emergence and concept of metaverse with a focus on virtual worlds, the second presents insight into the economy and commercial value generation by this new meta-era, and the third delves into the techniques and tools that enable the metaverse.

INTRODUCTION

The term "Metaverse", was first coined in Neal Stephenson's 1992 novel "Snow Crash" and has since been used to describe various types of virtual and augmented reality experiences. Over the course of the next two decades, the term was sparingly used, and mostly by sci-fi evangelists. But the concept once again rose to discussion in 2011 when Ernest Cline published his futuristic and best-seller novel - *Ready*

Player One, where the protagonist goes on a search for an easter egg in a worldwide virtual reality game. The best-seller novel later led to a box-office hit movie and a popular game title.

This set the pace for the next decade where many video game companies explored what the metaverse really is. Roblox offered immersive user-generated games, and Decentraland tried creating new virtual experiences, but the term "Metaverse" gained widespread recognition when Facebook renamed itself to Meta in October 2021 and unveiled its intentions to allocate a minimum of $10 billion towards the development of this concept.

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VIRTUAL WORLDS

Understanding the Potential of the Metaverse

The emergence of virtual worlds as a central component of the metaverse provides a glimpse of the transformative potential of immersive digital environments. Virtual worlds, which are defined as explorable and interactive online simulations, have become increasingly influential in shaping the future of the internet (Ball, 2020). Virtual worlds serve as dynamic platforms that transcend physical boundaries in the metaverse, allowing users to engage with digital realms in a highly immersive manner (Stephenson, 2020). These virtual environments allow users to construct, investigate, and interact within a variety of fabricated environments, and are frequently accessible via a variety of devices including computers, mobile phones, and virtual reality headgear. The ability to establish a virtual identity and interact with other users bolsters the significance of virtual environments in the metaverse (Dionisio et al, 2013).

The transformative power of virtual environments in the metaverse resides in their capacity to break down barriers and provide unparalleled immersion. By leveraging technologies like virtual reality (VR), augmented reality (AR), and mixed reality (MR), users can transcend physical limitations and immerse themselves in digital worlds that obscure the line between the real and the virtual (Gartner, 2023). Users can engage in previously inconceivable experiences by transcending the limitations of physical space afforded by virtual environments' immersion. The impact of virtual worlds is not limited to individual users; it extends to multiple industries, such as education, healthcare, and entertainment, revolutionising how we learn, rehabilitate, and interact with media (Dionisio et al, 2013). Particularly, virtual reality offers users a completely immersive and interactive experience, transporting them to simulated environments that can imitate real-world settings or offer wholly fantastical landscapes (Schuemie et al., 2001). Utilising specialised headsets, controllers, and haptic feedback devices, which enhance the sense of presence and immersion, users can interact with virtual environments. Augmented reality, on the other hand, augments users' perception and interaction with their physical surroundings by superimposing digital information onto the actual world (Milgram et al., 1995). Augmented reality allows users to

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