Part A

Introduction to Metaverse

Chapter 1

Introduction of Metaverse in Business

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Abstract

It has become obvious to companies that the metaverse may help maximize profits. The purpose of this chapter is to describe the uses and possibilities of metaverse-based virtual and augmented reality technologies in the future. Brands can now engage with customers at a completely new level of interaction through Metaverse, which cannot be achieved within current marketing channels. Immersive XR environments may require decision makers to reexamine customer journeys, demographic characteristics, and customer personas. The main purpose of this chapter is to present an overview of metaverse applications. Further this section reveals the ways in which the business and education industry can benefit through metaverse applications. Additionally, this section reveals the real-world applications of technology in metaverse for avatar, gaming, and prospects. Finally, this chapter sheds light on the academics and practitioners by showing how metaverse elements can contribute for business processes.

Keywords: Metaverse; luxury; business; advertising; education; avatar; gaming elements

1. Introduction

The first section of this chapter presents the overview of metaverse applications. The second section of this book chapter reveals the ways in which the business and education industry can benefit through metaverse applications. The third section reveals the real-world applications of technology in metaverse for avatar, gaming, and prospects. Finally, this chapter sheds light on the academics and

practitioners by showing the summary findings of the recent research studies on how metaverse elements can contribute for business following the conclusion of the chapter. "Metaverse" refers to a collaborative, decentralized digital, three-dimensional (3D) environment that offers more immersive experiences. Put it, it can be considered a cosmos existing outside the real world (Carrión, 2024). The acronym "Metaverse" combines Meta, meaning beyond, with the universe, meaning a theoretical environment connected to the physical world, and is considered the next technological big bang after the internet (Turjya et al., 2024). Soon, the metaverse will become an integral part of people's daily lives, surpassing the limitations of existing communication networks (Besson & Gauttier, 2024). Metaverse is unique because users interact virtually through a digitalized, cognitive being called an avatar. It represents the user's digital self and is interconnected as they would in the real world, but with fewer physical limitations (Park & Kim, 2024). Today, we can catch many giant business houses using Metaverse, and a few: Baidu launched the Metaverse app "XiRang" (Dwivedi et al., 2022), while Gucci Beauty introduced Drest's beauty mode (Gao et al., 2024).

The metaverse is an emerging area in virtual reality (VR) where people can engage in a shared virtual environment, such as VR, augmented reality (AR), and the Internet (Carrión, 2024). According to Dwivedi et al. (2022), the concept of metaverse can be classified into two distinct categories: metaverse as a functional tool, which encompasses applications in office work, social interactions, education, and healthcare; and metaverse as a target, which finds utility in domains such as gaming, business, role-playing, and real estate and the integration of metaverse into various aspects of our lives continues to grow, increasing businesses are adopting metaverse offices to facilitate telework and remote work (Dwivedi et al., 2022).

In this chapter, we examine the potential for Metaverse in business and other fields, examine its potential advantages, and examine contemporary trends and future prospects. The metaverse will revolutionize business by providing customers and companies with the ability to interact with digital avatars and extend their real-life experiences. It is important to note, however, that despite the possible drawbacks, the advantages of the Metaverse are substantial and warrant further investigation.

2. Metaverse: Uses and Possibilities for Future

This section will demonstrate the uses and possibilities for future using metaverse-based VR and AR technologies.

2.1. Metaverse and Business

The scholarly discourse about the advancement of metaverses primarily centers on fundamental ideas, which is fascinating. For example, it is worth noting that the gaming industry has made significant financial commitments toward developing and implementing the metaverse (Behl, Jayawardena, Pereira, et al., 2023a; Behl, Jayawardena, Bhardwaj, et al., 2024a). However, it is essential to highlight that

users cannot transition seamlessly and swiftly between different virtual worlds within the metaverse (Jacobson, 2011). With each instance of movement, users begin their experience afresh, establishing a distinct realm with its unique currency (Guan et al., 2024). In addition to the potential for metaverse governance, businesses also analyze the prospect of improving their existing business models.

Several multinational corporations, such as Sony, Nissan, Amazon, Toyota, Adidas, American Apparel, Disney, and IBM, were attracted to Metaverse due to its increasing popularity (Soni et al., 2022). Nissan created its Metaverse dealership to provide residents complimentary copies of the Sentra (Jacobson, 2011). In addition, American Apparel, Disney, and Amazon established virtual stores within the Metaverse platform (Chung, 2022). Reuters established a virtual news bureau in Metaverse almost two decades ago, intending to report and write financial and cultural stories. This initiative was part of the London-based company's effort to engage new audiences via cutting-edge digital technology. Given that this tendency has already manifested, it is not surprising that corporations such as Gucci, Warner Music, JP Morgan, Atari, and Ubisoft are involved. The idea of the metaverse has become very popular in many parts of the retail industry due to the rapid development of technology. There is much potential that the metaverse, with a significantly higher market value by 2024, would drastically alter the retail scene (Yoo et al., 2023). Engagement between consumers and vendors and among consumers can be achieved within the metaverse. It enables virtual product presentations, facilitates collaborative shopping experiences, and allows for the generation of user-generated content, among other creative features (Soni et al., 2022; Yoo et al., 2023).

2.2. Metaverse and Education Sector

It is necessary to note that, metaverse is one of the most implying areas in the field of internet technology which has the potential to revolutinize the education sector (Allam et al., 2022). For example, the most important technological advancements provided and used through Metaverse are adequate to change the future of education sector (Behl, Jayawardena, Bhardwaj, et al., 2024; Behl, Jayawardena, Pereira, et al., 2023). In universities and in secondary schools even, teaching materials can be improved by adding interactive information using VR diagrams, charts and AR based in-classroom tours (Zhang, 2023). This also provides a solution to the previously described problem in education sector as metaverse can enhance the levels of student engagement. In order to expand the scope of physical education, virtual and augmented technologies may be used to seamlessly integrate physical education with virtual learning (Behl, Jayawardena, Bhardwaj, et al., 2024; Behl, Jayawardena, Pereira, et al., 2023). The adoption of the metaverse in education raises important issues regarding privacy, security, digital citizenship, and the ethical use of the metaverse. To be able to navigate the metaverse responsibly and ethically, educators and policymakers need to equip learners with digital literacy skills and the ability to think critically in order to do so (Cui et al., 2023). There are many opportunities for experiential learning within the metaverse, where students can apply theoretical knowledge to practical

scenarios and solve problems with the help of immersive simulations and virtual experiences. Through the use of avatars and virtual classrooms, educational institutions will be able to create virtual classrooms within the metaverse, where students and instructors will be able to interact in real time (Jayawardena et al., 2023; Luik & Taimalu, 2021). Virtual classrooms can be set up to mimic a physical classroom environment, with whiteboards, presentation screens, and seating arrangements that are similar to those of a physical classroom. As an example, students are able to simulate chemical reactions, physics experiments, and biological processes in virtual labs, for example (Jayawardena et al., 2023).

3. The Real-World Applications of Technology in Metaverse for Avatar, Gaming, and Prospects

This section demonstrates real world applications of technology in metaverse for avatar, gaming, and prospects.

3.1. Metaverse and Avatar

When considering the metaverse avatars, it demonstrates users based on their physical appearance and have symbolic meanings with regard to the business aspects. Avatars are most of the times the digital representations of users, allowing users to represent themselves in artistic, optimistic, or particularly focused ways (Onu et al., 2023). One such example is "Second Life" which is a virtual environment created by Linden Lab in 2003 is widely regarded as an accurate representation of the Metaverse, allowing users to create avatars, build luxurious homes, and attend conferences. In Second Life (SL), users can create an alternative persona that can be a faithful representation of their real-life self, an improved version, or an entirely new identity. SL users had no limitations when creating their self-representation, unlike other virtual worlds (Richter & Richter, 2023). People perceive and interact with each other in virtual worlds through avatars, which are essential for facilitating the virtual experience (Kim et al., 2023; Turjya et al., 2024). Avatars are depictable digital representations of people or objects that facilitate communication and interaction in the metaverse environment. If VR and the metaverse progress as predicted by the developers, our digital identities will be avatars. For example, it is necessary to understand that, through well-designed avatars, users can express their identities, preferences, and sometimes their life goals, which facilitates self-representation (Behl, Jayawardena, Shankar, et al., 2024; Behl, Pereira, Jayawardena, et al., 2023). When considering virtual events, where forming social bonds and interacting with others are crucial, the high level of user interaction makes metaverse based applications a unique feature.

3.2. Metaverse and Gaming

A metaverse is also known as a shared online community where customers from all over the world gather to socialize and interact with one another (Behl, Jayawardena, Shankar, et al., 2024). It is anticipated that companies who wish to

invest in the Metaverse for gaming will be able to develop cutting-edge Metaverse gaming applications, such as those utilizing blockchain technology, 3D reconstruction, AR, the Internet of Things, and artificial intelligence (Behl, Pereira, Jayawardena, et al., 2023). Metaverse games differ from traditional video games by providing extensive player interaction inside an ever-evolving universe, where the distinction between the real and virtual worlds becomes indistinct (Carrión, 2024). The Metaverse game market is projected to experience a compound annual growth rate (CAGR) of 42.33% between 2023 and 2030. The market is projected to reach approximately US$168.4 billion by 2030. The significant expansion of these platforms indicates a shift in how individuals engage with digital entertainment and establish connections with one another. Studying user engagement, particularly continuation intention, becomes highly significant (Jo et al., 2024). Games like the Sandbox, Axie Infinity, Horizon World, SL, Decentraland, and My Neighbour Alice incorporate elements of Metaverse gaming (Bau & Power, 2024).

Metaverse is also known as a shared online community where customers worldwide congregate to interact and socialize (Barta et al., 2024). Companies looking to invest in the Metaverse for gaming can create cutting-edge Metaverse gaming applications, such as those utilizing blockchain, 3D reconstruction, AR, the Internet of Things, and artificial intelligence (Bau & Power, 2024). Individuals can be charmed by the Metaverse because it gives them the impression that they are actually in the world they have visited. They can interact intricately with their surroundings in a 3D environment or setting. Furthermore, the Metaverse offers a lively and extraordinary environment where users can learn, interact socially, work, make money, and increasingly virtually attend meetings and events (Barta et al., 2024).

3.3. Metaverse and Prospect

The Metaverse will ultimately construct a realm encompassing physical and digital domains with a fully operational economy. The Metaverse can accommodate digital assets, virtual content, intellectual property (IP), and digital currencies (Barta et al., 2024). Additionally, it can be completely self-sustaining and capable of continuous improvement. The rapid evolution of technology, including advancements like 5G, AR, VR, MR, and other technologies and devices, has the potential to transform the concept of the internet. This transformation, known as the Metaverse, could create a new form of internet that offers multi-interface capabilities and fully immersive human-computer interaction. The Metaverse can potentially exceed people's expectations and become a reality (Barta et al., 2024).

Various industries, such as healthcare, medicine, education, agriculture, electronics, and other engineering and scientific fields, necessitate innovative automation to handle substantial volumes of data while upholding sustainability. The metaverse is a futuristic technology that surpasses the boundaries of our current environment (Kim, 2021). Leading IT businesses have already acted to capitalize on the Metaverse trend, and consumer brands are also creating plans for Metaverse platforms. Recently, Nvidia CEO Jensen Huang suggested that the Metaverse will be far more significant than the physical world (Kim, 2021). A

community-based experience will be created in the Metaverse through platforms that allow users to connect with live virtual events, concerts, and even real-life avatars. Soon, the Metaverse may employ AR, allowing us to view "holograms" of the Metaverse and see the real world's background through AR glasses. The Metaverse will eventually be connected, allowing four avatars to move from one platform to another. Companies may pay developers to create "physical" outlets within the Metaverse, and in some high-traffic regions, "real estate" deals will be costly. The Metaverse is a distinct virtual realm that operates independently from the physical world. However, actions within this virtual domain can have tangible consequences in reality (Behl, Pereira, Jayawardena, et al., 2023b). Additionally, the Metaverse has its self-sustaining economic system that upholds the regulations of the virtual world. Nevertheless, several important questions arise regarding the governance of the Metaverse, including the establishment of rules and the design of its underlying code (Behl, Pereira, Jayawardena, et al., 2023b).

Expanding the Metaverse will result in a substantial increase in investment across various sectors. First and foremost, it will result in an additional surge in the virtual goods market. The present magnitude of virtual goods stands at approximately US$50 billion and is projected to expand to US$190 billion by 2025. Furthermore, it can accelerate the advancement of AR/VR. The worldwide AR/VR market is projected to reach a spending of US$12 billion in 2020 and is anticipated to grow at a CAGR of 54% from 2020 to 2024. In 2020, the total number of AR/VR devices shipped was 5.12 million, and it is expected to reach 43.2 million units by 2025 (De Felice et al., 2023). Additionally, the realization of the Metaverse will necessitate a significant increase in data storage and computing requirements, thereby fostering the accelerated growth of cloud computing. Furthermore, the content or platform builders can construct a captivating virtual environment that seamlessly combines social, entertainment, advertising, e-commerce, and other features. As the user value chain expands, their business value experiences exponential growth.

The year 2021 is recognized as the inaugural year of the Metaverse. Currently, in the emerging era of expansive navigation, humans are endeavoring to enter the realm of digital technology (Jayawardena et al., 2023). The Metaverse is a complex amalgamation of various technologies, currently in its embryonic stage (Jayawardena et al., 2023). However, it is still far from being fully accessible to humans. The realization of the Metaverse necessitates utilizing multiple techniques, including 5G, VR/AR, and cloud computing. Notably, the core technologies of AR/VR have yet to establish a definitive business model (Huang et al., 2023). These technologies have recently gained access to the doorway and pathway of the Metaverse, but the true Metaverse necessitates additional elements (Jayawardena et al., 2023). If the Internet allows for online office work, shopping, and teaching, the advancement into the Metaverse era should involve complete permeation and integration. This entails achieving full interconnection of all aspects of the Internet, technological compatibility, and even the realization of a genuine 3D world (Jayawardena et al., 2023). The immersion experience aims to establish a connection between the physical and virtual worlds, both linked to the Internet. China's top mobile development service provider has recently emerged.

Aurora Mobile effectively integrated the push feature into the self-created game demo on the Roblox platform (Huang et al., 2023). This feature enables the virtual information in the game to transcend the boundaries between the virtual and real worlds, allowing for dialogue and interaction between the two. It also facilitates the development of the "Metaverse" concept (Behl, Jayawardena, Pereira, et al., 2023a, Behl, Jayawardena, Shankar, et al., 2024b).

Within the Metaverse, individuals possess the capacity to partake in activities that extend beyond mere online conversations. Additionally, individuals have the opportunity to engage in immersive encounters within the virtual realm by utilizing technologies such as VR, AR, mixed reality (MR), and other similar advancements. The forthcoming Metaverse will possess cross-platform compatibility and entirely rely on user-generated content (Oh et al., 2023). Users can accomplish tasks and encounter and comprehend the results in the actual physical environment (De Felice et al., 2023). The Metaverse will offer a comprehensive and deeply engaging experience for individuals. Individuals can effortlessly create unlimited virtual representations without any limitations based on location (Behl, Jayawardena, Bhardwaj, et al., 2024; Behl, Jayawardena, Pereira, et al., 2023). Blockchain technology's intelligent contract can be utilized to create an economic system that seamlessly combines the virtual and real worlds in terms of economic, social, and identity systems, ensuring the accuracy and truthfulness of the content. The Internet of Things facilitates incorporating digital technology into our daily routines. In the future, every person will participate in the virtual world called the Metaverse, using a digital identity to generate various sources of income from virtual possessions (Wang & Wang, 2023). They can create, own, and exchange various virtual items. Advanced technology will be smoothly integrated into the human body, manifesting human consciousness in the Metaverse. The Metaverse holds an alluring vision and a promising future (Periyasami & Periyasamy, 2022), but its implementation in commercial applications requires the progress of hardware and technology.

4. Conclusion

VR platforms have not demonstrated a significant number of active users (Wang & Wang, 2023). Despite the expectations of numerous analysts, even more sizable corporations, the gaming industry is anticipated to be at the forefront of progress, with newer games potentially focusing less on gameplay and more on creating social environments (Wang & Wang, 2023). Organizations have a significant opportunity to adapt their business models and operational capacity to function within the Metaverse (Jayawardena et al., 2023). This can potentially bring transformative impacts on marketing, tourism, leisure, and hospitality (Jayawardena et al., 2023). In addition, new VR platforms will emerge from the business world to facilitate instruction in educational institutions and corporations. This is analogous to an actor who embodies disparate roles while upholding a uniform interpretation and employing the same emotions. The Metaverse will only materialize on a significant magnitude (Behl, Pereira, Jayawardena, et al., 2023b).

From a broader perspective, the Metaverse is currently in its nascent phase of advancement due to insufficient technological capabilities, incomplete industry expertise, and the high cost of equipment. The physical and virtual domains will progressively merge through the advancement of communication, cloud computing, AI, blockchain, and other technologies (Behl, Pereira, Jayawardena, et al., 2023). This integration will encompass various aspects of daily life, including entertainment, education, work, and trading, within the Metaverse system. Ultimately, this will give rise to a vast and diverse digital world (Behl, Jayawardena, Shankar, et al., 2024; De Felice et al., 2023). In VR, legal frameworks should operate with the same level of effectiveness as they do in the physical world. Because we are discussing undiscovered virtual realms, it is suggested that a competent supervisory board be established to investigate and evaluate technology's influence on human psychology (De Felice et al., 2023). Given that the Metaverse is relatively new, we can expect specific impacts. However, it is necessary to consistently and possibly in real-time examine the influence of the negative on human behavior (De Felice et al., 2023). This chapter's discussion on fostering opportunities and mitigating risks should have been interpreted as a prediction.

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