

## METaverse: TECHNOLOGY OF THE FUTURE

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### Abstract

Since the birth of the internet, its fast development and the introduction of a new technological era with Metaverse recently, transferred many things done by the individuals, to digital world from the real one. All necessities of humans, in this digital world, as shopping to education are done in a 3D virtual setting where payments are done with crypto money instead of real money. Even the artwork is now available to buyers in the digital environment. With Metaverse, new professions have emerged and various money-making means shifted the economy to different dimensions. Metaverse brings conveniences to human lives but there are also some difficulties appearing on the way presented as disadvantages and uncertainties. As a new thing for human life, its positive sides catch more attention. Through the augmented reality and virtual reality technologies, real-life objects can be carried into virtual environments where its users experience a real life feeling. In this study, the historical development of the internet and its current version are discussed. The history of the Internet, which started with Web 1.0 with a non-interactive and static structure, continued with Web 2.0 with an interactive and dynamic structure, has developed to the present day as Web 3.0 which can be interpreted by computers and machines. Moreover, in this study, the positive and negative effects of Metaverse that may have on human lives and games in the future is discussed and specified. In addition, financially important Blockchain technology that is widely used nowadays is also analyzed.

## 1. Introduction

The technological developments in recent years and the importance of these developments in human lives are indisputable. Nowadays, most routine work can be completed on the internet by saving considerable time. While the internet is so important in human lives, it is also important to study its history of it by analyzing the processes throughout history. The history of the internet started with WEB 1.0 and advanced as WEB 3.0 to the present day. In addition, blockchain technology has emerged as an economically and financially important factor.

Cryptocurrencies as a part of the blockchain, have started to be valued as much as real money. The content of Metaverse, which has become a fancy word recently, aims to transfer our real world to the digital world and it is seen as a technology in an extraordinary and rapid revolution. The Facebook Company also changed its name to Meta; thus, the importance of Metaverse is

revealed. Even present-day technology affects human lives in positive and negative ways; the effect of the Metaverse has become a concerning issue for the whole world.

This study focuses on the development process of the Internet and discusses the concept of Metaverse, which has been frequently mentioned recently, its areas of use and its impact on users. It has been demonstrated which paths it has taken from the past to the present and from today to the future.

As Büyükbaykal & Sönmezer (2022) mentioned in their study, Metaverse allows users to act as they wish in the virtual environment, and thanks to the avatars they create, they can make friends with other users in the same environment and watch a match or concert with people they have never met. The popularity of the Metaverse can only grow with investment in this virtual environment. Many famous brands have entered this environment and users can dress their avatars with these brands.

It is a difficult and time-consuming process for both individuals and businesses to keep up with rapidly evolving technology and make it a part of our lives. Whichever individuals or businesses can adapt to this process in the fastest way and make it a part of life, will be able to get the best efficiency and have the best advantages. Unfortunately, businesses that cannot keep up with this process cannot benefit from the advantages of technological developments, their market share decreases, and their existence comes to an end (Söyler & Sula Averbek, 2022).

The emergence of NFT technology, one of the economic components of the Metaverse, has been a breakthrough in the history of art. It acts as a virtual signature and identifies the current owner and the real producer of the artworks created with NFT. The first sale of artworks created with NFT was realized in the CryptoKitties game based on the Ethereum network (Yılmaz & Ceranoğlu, 2022).

## 2. Historical Development of the Internet

### 2.1. Web 1.0

Web 1.0, which started in 1989, lasted until 2005 as the first Web application. Web 1.0 was also defined as a network of information links. There was little interaction for users to exchange information and it was impossible to interact with a website. Web 1.0 pages were static and content provider only. Therefore, users could only search and read the information on it. Features:

- They had read-only content.
- Information was shared at any time and publicly.
- HTML (Hypertext Markup Language) language was used and it contained static web pages (Choudhury, 2014).

In the Web 1.0 era, businesses could only share brochures and catalogs related to their products, and users were only allowed to read them and communicate with the businesses (Aghaei, Nematbakhsh & Farsani, 2012).

The most important technical characteristics of this era were Usenet, E-mail, SGML, FTP, IRC, MacOS and File Servers. Brian Merchant compared the first websites to watching black-and-white silent films. Websites of the Web 1.0 era were mostly built using HTML 2.0, HTML 3.0 and HTML 4.0 technologies. Monitors were 15 inches and approximately 700 to 900 pixels in that era (Król, 2020).

Websites may be found, stored, evaluated, or delivered by software programs designed to transform data into useful information and its users could gather information through Web interaction (Bruwer & Rudman, 2015).

Web 1.0 refers to more than lots of new and useful technologies and services. It also had a significant impact on learning and teaching. It is anticipated that Web 3.0 vision provides a combination of virtual and real environments, and users will be able to interact with real-world people and machines without any problem through virtual ways. An effective learning environment may be created with current best practices in online education thanks to these advantages (Rajiv & Lal, 2011).

### 2.2. Web 2.0

Websites such as Orkut, YouTube, Blogs, Google and Wikipedia are examples of Web 2.0. In addition, social media applications that allow members to upload photos are also examples of Web 2.0. Berners-Lee's definition of Web 2.0 is the read-write web (Özden, 2022).

Thanks to Web 2.0, instead of being web readers, users have become web literate and started to produce and share information and benefit from features such as feedback and collaboration. It is seen that the learning of students who learn with Web 2.0 technological tools becomes more fun and permanent learning is realized (Yazıcı, Ocak, & Bozkurt, 2021).

Web 2.0, one of today's technologies, is important in terms of having a say in data management as it enables being active and interactive on the internet (Kırımlı & Demirezen, 2022).

When WEB 1.0 started to fade, it was inevitable to create WEB 2.0. Dynamic websites started to be used instead of static websites thanks to WEB 2.0. Users could produce content share their information and communicate with other users (Ersöz, 2020). Advanced search engines were created so that users may access the necessary information to be reached easier. The development of the Internet has also accelerated with the beginning of the connection of mobile devices to the Internet. Thus, it was easier to produce content (Ersöz, 2020).

IBM was defined by a social network analyst as "an information-oriented environment where human interactions create content published, managed, and used through network applications in a service-oriented architecture" (Deubel, 2008).

The social media brands we use the most today were created during the transition period from WEB 1.0 to WEB 2.0 and they developed and grew rapidly in this period. On the other hand,

internet brands that could not keep up with the change were obliged to disappear. There are many types of Web 2.0 technology and some of the representations are:

- Wikis
- Blogs
- Digital audio file
- Social networks
- Virtual worlds (Harris & Rea, 2009)

### 3. Web 3.0

Shortly after WEB 2.0 had been created, rumors about the WEB 3.0 began to circulate. The founder of "The Web", Tim Berners-Lee also anticipated that WEB 3.0 will be created and it will be called the "semantic web". While Web 2.0 technology allows only people to understand the content, Web 3.0 is now a "system that may be understood and interpreted by machines or computers" (Kapan & Üncel, 2020).

The common feature of WEB 1.0 and WEB 2.0 was the ability to communicate by connecting itself to a central unit. However, WEB 3.0 can enable users to connect directly to each other without connecting to a central platform differently from them. This direct connection suits digital money so it can be transferred directly from user to user without being connected to a central unit.

Thanks to Web 3.0, Internet users' searches on the Web show their preferences and, in this way, preferences can be sorted and customized. In this way, it is possible to improve data management by providing information flow and analyzing data, and thus user satisfaction and collaborations in the social network are developed (Ersöz, 2020).

In 2006, the term Web 3.0 first appeared in an article by Zeldman criticizing Web 2.0. Since 2010, it has been in operation and is an extremely important technological development for network users (Yılmaz, 2021).

### 4. Blockchain Technology

Blockchain technology has great financial importance that entered the world agenda through Bitcoin. The key feature of Bitcoin currency is decentralization. It is not controlled by any institution, state, or person. Thus, the trust issues have been eliminated, transfer fees are reduced, the delivery time is

minimized and efficiency is increased. As the working principle of Bitcoin, an address called "public key" and a password named "private key" is given for each wallet (Kıyak, Coşkun & Budakoğlu, 2019). Password security is high and almost impossible to break. Being the basis of Bitcoin, Blockchain technology has been receiving great interest recently (Zheng, Xie, Dai, Chen & Wang, 2017). Blockchain technology is a technology that will have a significant impact on businesses in the coming years. It may provide transformation of the economy and change the way of perception on business processes (Kitsantas, Vazakidis & Chytis, 2019).

Blockchain systems may be grouped into 2 main categories: access to the blockchain system (permissionless and permitted blockchains) and access to blockchain data (public and private blockchains).

**Permissionless blockchains:** All participants may be involved in the transaction verification process. No prior authorization or restrictions are required for users to create blocks.

**Permitted blockchains:** Only a range of pre-selected and known users may verify/create transaction blocks.

**Public blockchains:** In these blockchains, everyone may join the network, read data and send transactions (Baiod, Light & Mahanti, 2021).

Providing a platform for many potential applications that can also be used in healthcare, Blockchain technology has proposed solutions that have the potential to increase the operating efficiency and transparency of healthcare data (Angraal, Krumholz & Schulz, 2017).

**Blockchain development may be described in three phases:**

**Blockchain 1.0:** refers to cryptocurrencies with applications such as digital payment and money transfer. Electronic shopping and money transfer may be made with a small transaction fee compared to traditional methods, thanks to Bitcoin, the first cryptocurrency. Using pseudonyms in Bitcoin accounts provides better security compared to credit cards. While traditional currencies, printing money and financial regulations are controlled by a central bank, Bitcoin and other digital currencies use cryptography (Tanrıverdi, Uysal & Üstündağ, 2019).

**Blockchain 2.0:** including various financial and economic applications, the Blockchain 2.0 phase is also called the digital economy. It is included in the applications such as mortgages, loans, contracts and bonds. Smart contracts that have become

widespread recently have certain rules and they are used for complex transactions (Tanrıverdi, Uysal & Üstündağ, 2019).

**Blockchain 3.0:** including the fields of education, health, art, science, audit and management, Blockchain 3.0 is also referred to as the digital society. Including concepts such as smart transportation, smart life, smart economy and Smart cities is an important and future application of blockchain technology. Blockchain 3.0 also includes blockchain technologies such as cybersecurity, banking and digital identity (Tanrıverdi, Uysal & Üstündağ, 2019).

#### 4.1. NFT

The rare and unique beings on earth are high-value beings. For example, the work of a well-known artist is valuable both materially and spiritually as it is sole and unique. “Non-Fungible Token” with an abbreviation of NFT means token or a value in Turkish that means an original; in other words, a unique token encoded (encrypted) on the Blockchain internet network. From this point of view, the uniqueness of NFTs makes them valuable. The feature of non-duplication of NFT and unchangeable data is gradually becoming important; artwork copying or transferring to NFT is also prevented. The artworks are offered to buyers in the digital market (Özrili, 2021).

Its popularity increased significantly during 2021; the NFT market had daily sales of 183.121 USD in 2020, while it increased by approximately an average of 38 million USD in 2021. Examples of NFTs include the sale of the first Tweet by Twitter CEO Jack Dorsey for \$2.9 million, or the sale of Beppe's digital work of art for \$69 million. CryptoPunks and Decentraland are two other examples of NFTs. CryptoPunks was created by Larva Labs in 2017 and its entire collection exceeded US\$1 billion in 2021. MANA, the local token of Decentraland has a Metaverse platform where users can buy and sell virtual (Pinto-Gutiérrez, Gaitán, Jaramillo & Velasquez, 2022).

### 5. Metaverse Technology and Ecosystem

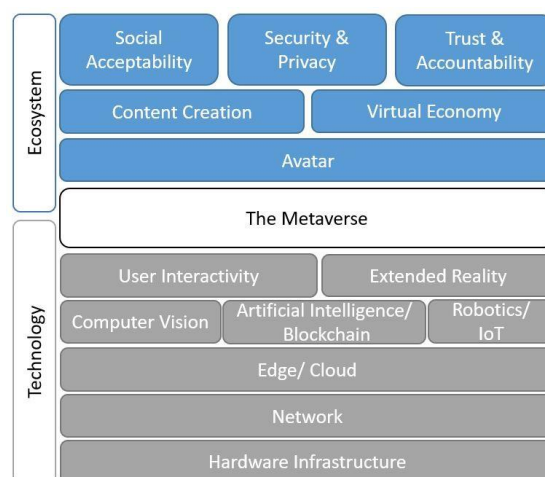
The content of Metaverse which is thought to affect human lives to a great extent has become one of the most topics discussed recently. The word Metaverse consists of the roots of meta 'beyond' and universe in Ancient Greek (Kuş, 2021). Indeed, the word Metaverse was first used in the Snow Crash science fiction novel that was published in 1992. Afterward, it has been the subject of many movies and books (Demirbağ, 2020).

While teleportation was once a fantasy used only in movies, perhaps it does not seem impossible in the new digital world. If Metaverse is put into use as planned; it will inevitably bring important changes to human lives. Metaverse includes the idea of

transportation of commerce, entertainment and other activities in real-life to the three-dimensional virtual world. We will be able to interact and meet with the avatar of a friend we want at any time and place by thanking the avatars we have created in the virtual world of Metaverse (Kuş, 2021).

On Metaverse, users can buy, produce, and sell by also allowing new professions to be created by them. New job profiles such as NFT designers, stylists, investment consultants, Metaverse advertising and marketing consultants and meta journalists appear on the way (Türk & Darı, 2022). The increase in popularity of Metaverse started to increase nowadays (Kuş, 2021).

Metaverse is facing many challenges related to augmented and virtual reality technologies. Both virtual and augmented reality technology can affect the emotions, thoughts and behaviors of the users. The high costs of technological equipment constitute an obstacle to mass adoption. Risks such as health and safety, physical well-being, morality, psychology, and data privacy are risks related to augmented reality technology (Doğan, Erol & Mendi, 2021).



**Figure 1.** Metaverse Technology and Ecosystem

Source: (Lee, Braud, Zhou, Wang, Xu, Lin, Kumar, Bermejo & Hui, 2021)

### 6. The Importance of the Avatar in the Metaverse

In Indian culture, the word avatar is used to denote the temporary characters that gods take on as they roam the earth (Kahraman, 2022).

Socializing in the virtual world of Metaverse happens through avatars. Activities such as chatting, living it up and learning are carried out through avatars (Aytaç, 2022).

In the field of fashion and textiles, thanks to various programs, clothing patterns are prepared digitally and are tried on avatars. Thanks to these programs, various styles can be created by adding the desired pattern, detail, logo, and color to the clothes.

In addition, world-famous brands Adidas, Gucci, Balenciaga and Nike have taken their place in the most played video games, virtual platforms and applications around the world by following the ever-developing digital technology innovations (Yılmaz & Ceranoğlu, 2022).

Avatars, as an important part of the Metaverse, are imaginary entities that represent us in the virtual world. Avatars in the virtual world express their social positions thanks to the costumes they wear by attracting luxury clothing companies attract to make high sales. The younger generation believes that the virtual world is as important as the real world and that their identities in the virtual world and the real world are the same (Park & Kim, 2022).

When creating avatars, avatar creators use visual stereotypes to create a story so that others can understand it. The suit and briefcase put on the avatar is an indication that the avatar is the "manager". Virtual world users who customize their avatars also use the same principles (Pena & Merola, 2010).

## 7. Metaverse Applications

Online video conference: The Covid-19 pandemic forced company meetings as face-to-face meetings to be held online. However, face-to-face communication is more important since most people can express themselves better by using their body language. Apart from this, online communication may cause inefficient cooperation, delay in interaction and receiving false feedback. The situation is different in the Metaverse. People can use their body language and facial expressions in face-to-face meetings with their avatars (Gadekallu, Yenduri & Benevides da Costa, 2022).

Digital Real Estate: it will be possible to build, live, rent, buy and sell properties consisting of land and buildings in the Metaverse - the digital world. The properties offered to the users on it can be sold through auctions by paying with digital currencies. Digital arts: such developments are also seen in the art world with the rapid development of technology and the transfer of many things from real life into digital ones. Although artists still use traditional methods while creating their art, some of them prefer to use digital tools, too. Artists can use their creativity and imagination by creating new pieces through computer-aided digital support (Sağlamtimur, 2010).

Artists use modeling tools such as Maya and ZBrush while creating digital artworks, and can create 3D works, too. This digital art catches the attraction of people. These artworks are presented in the virtual gallery placed in the digital world of Metaverse to art lovers (Gadekallu, Yenduri & Benevides da Costa, 2022).

## 8. Metaverse and Facebook

Facebook has maintained its existence in our lives since 2004 and become one of the most important brands in the world by constantly improving itself every year. Applications such as Whatsapp, Messenger and Instagram are added to it. The reason why the name had been changed was explained and announced that the name would be Meta in the Connect conference video published on 28 October 2021. It was stated that the name of the Facebook application will remain the same, but the name of the company including other applications will remain Meta. Zuckerberg informed in his statement that his priorities would now be Metaverse, not Facebook (Kocabay-Şener, 2021).

## 9. Augmented, Virtual and Mixed Reality

Augmented reality is the processing of computer-aided data with senses such as olfactory, tactile, auditory and visual, and the experience of reality with perceptions by amplification. Today, augmented reality can be used more intensively in commerce, visual arts, architecture, industrial design, education, and video games. Although the concept of augmented reality is thought of as computer technology, in reality, it is medicine, prostheses, applications and many similar technologies that make up the entire augmented reality universe (Ipek, 2020).

Virtual reality is a technology that gives people the feeling of being in the real environment in their minds and enables them to interact with the objects in the environment and creates them with 3D pictures and animations in the digital setting. It is known as a system where users can emotionally perceive and control the virtual world thanks to special devices worn on the body (Kayabaşı, 2005).

Three basic elements make up virtual reality: control, reality and naturalness. The element of control indicates that the control of the virtual system belongs to the user. The reality element, on the other hand, shows its compliance with the known chemistry and laws and rules of physics. The element of naturalness, on the other hand, shows the proportions of the objects with each other and how convincing everything is (Kurbanoglu, 1996).

Mixed reality, which emerged after virtual and augmented reality, is an enhanced version of augmented reality. The difference from

augmented reality is that virtual objects are positioned like real objects in the real environment (Doğan, Erol & Mendi, 2021).

From the first virtual reality device called "Sensorama Simulator", invented by Morton Heilig in 1962, it has developed considerably to date and the most equipped example today is the HTC Vive Pro Eye (Bayrak & Yengin, 2020).

## 10. Metaverse the Med Novels and Games

The Metaverse is not new to human beings. It has been discussed in many books, sciences and TV shows for many years. Many popular game worlds contain the Metaverse today. These games have built a virtual world within themselves and even created their virtual economy. The online game market is expected to turn into a great economic value in a short time. Apart from offering online games, some game worlds also offer online concerts.

**Snow Crash:** The concept of Metaverse was suggested in the snow crash novel written by Neal Stephenson in 1992 and it achieved to reach the masses with the success of the novel. The Metaverse in the novel includes a 65536 km long street that goes around a black planet. The urbanized environment around this road is imagined as the Metaverse (Özcan, 2021).

**Roblox:** Roblox game is a game platform where players can communicate, create friendships, make a team and have fun with each other in a 3D game universe. It is an online game considered a 3D blank painting canvas where players have to complete this painting (Toker, 2019).

**Minecraft:** Although Minecraft is a game design, it also offers the opportunity for its players to create creations beyond their imagination. The Minecraft game provides its users with the opportunity to build 3-dimensional structures that are almost impossible to do in real life (Minecraft dünyası, 2014).

## 11. Conclusions

The birth of the internet and its great change and development until the present day have revolutionized human lives. It made human lives function easier; formerly inconvenient jobs are now at the tips of fingers since many activities such as business, social life and education have started to be performed online. Previously, all of them were performed in 2D formats on the internet, nowadays, thanks to the Metaverse, they can be performed in 3D virtual settings. Even the Metaverses is still a new thing, more can be done on it as planned and then the new era for humans will start. The transfer of real life to digital will make human lives physically easier, but it will still be a topic of debate that may create some psychological issues by forcing its users to anti-social behavior as it suspends people from reality.

With the Metaverse, users will be able to have an identity in the virtual world as well as their real-world identities through the avatars created by themselves. Users will be able to achieve social statuses in the virtual world that they could not imagine in the real world and will wear different clothes they dream of wearing.

This technological revolution has led to some changes in the world economy. With technological developments, new professions are arising from the needs of it that will play an important role in the economy.

With the Covid-19 pandemic around the world, a few restrictions, as a precautionary measure, were imposed on people that stopped their face-to-face communication with each other. During this period, people moved their social life, work, and education to the internet, and as a result, the concept of Metaverse started to be expressed more. After a while, with the decrease in the virus worldwide, work, education and social life returned to normal and face-to-face meetings continue to be organized. However, during this process, it was easier and more comfortable for some people to work online; therefore, their interest in Metaverse has increased considerably. It is a matter of curiosity whether people will accustom themselves to such a virtual environment that offers positive and negative results.

In addition to psychological issues followed by the Metaverse, it is also discussed that some physical problems may occur on the way. According to Kuş (2021), users may use some virtual reality head-suits to move in the Metaverse virtual world, resulting in some actions that can harm themselves in the physical world. This raises the possibility that Metaverse could be a physical disadvantage, too.

Until a few years ago, the advertising industry differed from the current one. Brands used to promote their products through television and radio, now they can promote them on the internet and reach their users easily and at lower costs. Since people spend most of their time online, it makes more sense to advertise and promote products online. As Bilgici and Şisman (2022) mentioned in their study, social media advertising will now shift from social media channels such as Twitter, Instagram, etc. to the Metaverse world with the emergence of the concept of 'metafluence' and brand strategies will now start to be built on 'metafluence' people.

The concept of the Metaverse, both with its positive and negative aspects, is slowly entering human lives and significantly affecting their traditional lifestyle.

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