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Metaverse: Year One. Mark Zuckerberg's video keynote on Meta (October 2021) in the context of previous and prospective studies on metaverses

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Abstract: Metaverse is a term widely used to refer to digital virtual worlds that have coexisted with other terms such as virtual reality, virtual worlds, or some types of cyberspaces. Meta CEO, Mark Zuckerberg, published a video keynote in October 2021 that may have consolidated the term metaverse for this incoming and expanding industry, which affects many spheres of human life, from entertaining to health, advertising, or business. This article aims to review Mark Zuckerberg's announcement, which depicts the main building blocks to create a metaverse, as well as to put it into context with some concepts regarding other aspects of metaverses, such as the origin of the term, the attributes that it should have, some of the attempted definitions of the term, the previous technological evolution necessary to reach its current point and its landmarks, what it is needed to advance in building metaverses, what cannot be considered a metaverse, and companies in different countries that have the potential to launch a metaverse.

Keywords: Mark Zuckerberg; metaverse; technology; audiovisual communication; virtual reality

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Resumen. Metaverso es un término ampliamente utilizado para referirse a mundos virtuales digitales que ha coexistido con otros términos como realidad virtual, mundos virtuales y ciertos tipos de ciberespacio. El presidente de Meta, Mark Zuckerberg, publicó una presentación en video en octubre de 2021 que podría haber fijado el término «metaverso» para referirse a esta industria en expansión que llega, y que afecta a muchas esferas de la vida humana, desde el entretenimiento a la salud, la publicidad o los negocios. El objetivo de este estudio es reseñar la presentación de Zuckerberg, en la que se describen los bloques necesarios para construir un metaverso, así como ponerla en el contexto de otros aspectos de los metaversos, como el origen del término, los atributos que deberían tener, la evolución tecnológica previa que los hace posibles y sus hitos, lo que se necesita para seguir avanzando en la construcción de metaversos, y las empresas que, en diferentes países, tienen el potencial de lanzar un metaverso.

Keywords: Mark Zuckerberg; metaverso; tecnología; comunicación audiovisual; realidad virtual

Sumario. 1. Meta's metaverse. 2. Origin of the term. 3. Evolution of virtual worlds leading to metaverses. 4. The race for the metaverses. 5. Conclusions. 6. References.

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1. Meta's metaverse

On October 28, 2021, Mark Zuckerberg, CEO, and founder of Facebook, announced that the company name would change to Meta, a Greek prefix that means "beyond". Besides referring to building the future, it also refers to the new focus of the platform (parent of Facebook, Instagram, WhatsApp, Messenger, and Quest, among others): the metaverse. "From now on, we're going to be the metaverse first. Not Facebook first" (Meta, 2021, 1:15:38).

Metaverse comes from the combination of "meta" and "verse", apheresis of "universe". Though metaverse and virtual worlds have been studied and implemented to a certain degree in the last decades, Meta's announcement drew huge global attention to the possibilities of the use of virtual worlds in social networks and other environments such as learning.

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In the 1 hour 17-minute-long video called *The Metaverse and How We'll Build It Together-Connect 2021*, published in Meta YouTube channel (Meta, 2021), Zuckerberg explained how the company envisions the implementation of the metaverse, “the successor to the mobile internet” (0:01:49), and a way to surpass screens, that “just can’t convey the full range of human expression and connection” (0:02:52).



Image 1. Building blocks, according to Meta. Source: Meta, 2021).

After emphasizing connecting people as “the most important experience” (0:03:45) that will be felt in the metaverse, he described the eight building blocks of this digital world:

1. The feeling of *presence*: It is “the defining quality of the metaverse” (0:06:12). Users will “really feel” like they are with other people.
2. *Avatars*: 3D images representing the user, that may choose to take different forms: photo-realistic, stylized, or fantasy images.
3. *Home spaces*: the personal space of each user, designed by them, and where they can invite other people.
4. *Teleporting*: Users will teleport to other spaces by clicking a link.
5. *Interoperability*: It refers to the possibility of using the goods or objects that users create in different spaces and platforms, as they are owned by the users.
6. *Privacy and safety*²: To guarantee these rights in the metaverse. For example, to have the choice of blocking people.
7. *Virtual goods*: Things (pictures, videos, books, games, ...) can be brought from the physical world to the metaverse. Other physical objects such as screens will be holograms. And digital objects will be brought to the physical world as holograms and augmented reality.
8. *Natural interfaces*: Instead of keyboards and screens, the interaction will be more natural, using gestures, and having the sense of presence, instead of looking to a screen.

Then, Zuckerberg presented several aspects and products of Meta’s metaverse, such as Horizon (Horizon Home, for home spaces; Horizon Worlds, to create worlds or games; and Horizon Workrooms, for working); games, as *Population: One*, or Nazare glasses (with augmented reality) to experience the virtual worlds.

He also highlighted the importance of creators to build the metaverse, the technological challenges ahead (e.g., realistic virtual hand movements), and how Meta is solving them, as well as the possibilities of the metaverse for gaming, fitness, learning, business, and creating job opportunities.

According to Zuckerberg, it may take decades to achieve what they are planning for the metaverse, which he labels “the next frontier” (1:11:29). But he affirms that many of these technologies are going to be mainstream in the next 5-10 years.

2. Origin of the term

The word metaverse was coined in 1992 by sci-fi writer Neil Stephenson in his novel *Snow Crash* (Dionisio, 2013), one of the 100 best English-language novels since 1923 according to *Time Magazine* (Lacayo, 2010). It tells the story of Hiro, a pizza delivery driver and hacker in real life, and a samurai in the metaverse, which is defined as “a computer-generated universe that his [Hiro’s] computer is drawing onto his goggles and pumping into his earphones” (Stephenson, 1992, p. 26). It is “a grand boulevard” (p. 26) 65,536 kilometers long, where it is always nighttime.

² Significantly, Zuckerberg omitted how Meta will collect data from users, and what it will do with them, something that made Zuckerberg face several trials as Facebook CEO (Patterson, 2020).

According to Stephenson, he wrote the novel influenced by Macintosh “Apple Human Interface Guidelines”, and he created the neologism because “existing words (such as ‘virtual reality’) were simply too awkward to use”. (Stephenson, 1992, p. 458). Previously, *Neuromancer* (Gibson, 1984) had introduced cyberspace sci-fi.

He also used for the first time in a novel the word avatar, which he helped to popularize, that had been used previously in LucasArts’ game *Habitat* (Dionisio, 2013; Stephenson, 1992).

Thus, metaverse started as another way of saying virtual reality (VR), or digital virtual worlds, which have been used in many science-fiction stories, games, or applications. The relevance of October 2021 Meta’s video is that it may have consolidated the term metaverse to refer to these types of virtual worlds and a combination of technologies. Google’s search of the term “metaverse” was over a hundred times more frequent in late October 2021 than in the first months of 2021 (Martins, 2021).

Different authors have attempted to define the metaverse, considering that it “is still a concept that is constantly evolving, and different participants are enriching its meaning in their ways” (Ning et al., 2021, p. 2). Some of these definitions are:

... a computer-generated universe has been defined through vastly diversified concepts, such as lifelogging, collective space in virtuality, embodied internet/ spatial Internet, a mirror world, an omniverse: a venue of simulation and collaboration. (Lee et al., 2021, p. 1)

... a new type of Internet application and social form that integrates a variety of new technologies. It provides an immersive experience based on augmented reality technology, creates a mirror image of the real world based on digital twin technology, builds an economic system based on blockchain technology, and tightly integrates the virtual world and the real world into the economic system, the social system, and the identity system, allowing each user to produce content and edit the world. (Ning et al., 2021, p. 2)

... a massively scaled and interoperable network of real-time rendered 3D virtual worlds which can be experienced synchronously and persistently by an effectively unlimited number of users with an individual sense of presence, and with continuity of data, such as identity, history, entitlements, objects, communications, and payments. (Ball, 2021)

According to Ning et al. (2021), metaverses have three main basic characteristics, namely: multi-technology, to achieve an immersive experience, and to build an economic system based on blockchain technology; sociability, as it is a new way of social interaction; and hyper spatiotemporality.

According to Ball (2020), the attributes of a metaverse would be:

- 1) Persistence. It “never ‘resets’ or ‘pauses’ or ‘ends’, it just continues indefinitely”.
- 2) Synchronicity and live. It is “a living experience that exists consistently for everyone and in real-time”.
- 3) With no cap to concurrent users. “Everyone can be a part of the Metaverse and participate in a specific event/place/activity together, at the same time and with individual agency”.
- 4) A fully functioning economy. “Individuals and businesses will be able to create, own, invest, sell, and be rewarded.”
- 5) A way to span “both the digital and physical worlds, private and public networks/experiences, and open and closed platforms”.
- 6) With “unprecedented interoperability of data, digital items/assets, content, and so on across each of these experiences”.
- 7) With content and experiences “created and operated by an incredibly wide range of contributors”.

3. Evolution of virtual worlds leading to metaverses

Dionisio (2013) described five phases in the evolution of virtual worlds, which may be regarded as the infancy of metaverses:

- 1) Late 70s. Text-based virtual worlds, like in the role-playing game *Dungeons and Dragons*, based on Tolkien’s *The Lord of the Rings*.
- 2) 1986. *Habitat*, a massively multiplayer online role-playing game (MMORPG) created by LucasArts, based on *Neuromancer* (Gibson, 1984). It was the first time the word avatar was used to represent players in virtual worlds.
- 3) Mid 90s. In 1994, *Web World* incorporated user-created content, 3D graphics, open-ended socialization, and integrated audio, so users could socialize in 3D spaces. In 1995, *Worlds* included open-ended non-game genres to socialize, and *Activeworlds* created a 3D world based on Stephenson’s *Snow Crash*. And in 1996, *Onlive!Traveler* included avatars that could move their lips while talking with spatial voice.
- 4) Commercial virtual worlds were made available in *Second Life* (2003), or *Blue Mars* (2009).
- 5) Overlapping with the fourth phase, virtual worlds could include open-source decentralized contributions.

However, Ball (2021) stresses that the technology for metaverse does not yet exist, though “we can feel it beginning”. And he points out eight aspects that need to be developed to have a properly metaverse: hardware, networking, computing power, virtual platforms, interexchange tools and standards, payments, metaverse content, services, and assets, and consumer and business behaviors.

4. The race for the metaverses

Though Meta’s announcement has gained attention, other companies were already working on their metaverse. Ning et al. (2021), in a paper published in September 2021, show several companies that may implement metaverses in different countries, observing that their laws may affect to what extent they may develop them. They find as potential companies to create metaverses (in parenthesis, already developed or announced metaverse-related products):

- In the US: Amazon, Roblox, Facebook, Epic Games, Disney, Snapchat (Bitmoji), Nvidia (Nvidia Omniverse), Microsoft, and Decentraland.
- In China: Tencent (Kings Metaverse), Alibaba, ByteDance (Restart the World), NetEase, Zqgame, and Wondershare.
- In Japan: Sony, Hassilas (Mechaverse), GREE, and Avex.
- In South Korea: Samsung (Samsung Global Metaverse Fund), SK Telecom (ifland), Urbanbase, Metaverse Alliance.
- In England: Sotheby’s (Sotheby’s Metaverse), Maze Theory;
- In United Arab emirates: MetaDubai, Ripple.
- In France: Stage11.
- In Germany: RIMOVWA.
- In Italy: Gucci.

Notably, they do not mention Apple, which some authors see as another company likely to create a metaverse. Thus, John Radoff (2021) states that Meta (Facebook), Apple, and Microsoft are “the three incumbents with the most staked on the metaverse”, and Hatzis (2021) affirms that “Apple’s App Store is the closest thing we have to a metaverse”. Likewise, the research team of the financial services corporation Morgan Stanley concluded that “Apple should be the real catalyst for the metaverse to take off” (Martins, 2021).

Other authors (Williams, 2021; Lovejoy, 2021) consider Fortnite, by Epic Games, a current metaverse. It started as a game in 2017, but later it became a virtual world that hosts concerts, as the one by singer and actress Ariana Grande, or events as some related to the Marvel Universe. From a different perspective, investor Matthew Ball, in his article *Framework for the Metaverse* (2021), observes that metaverses should be distinguished from: virtual worlds and games, virtual spaces –like Second Life–, virtual reality –“sense of presence in a digital world doesn’t make a Metaverse” –, a “digital and virtual economy”, a game –Fortnite, according to Ball, is not a metaverse as its scope is too narrow–, or just a new User Generated Content Platform (UGC).

5. Conclusions

Metaverse has gained popularity as the next step of the digital world after Mark Zuckerberg’s keynote on October 28, 2021, when he announced the changing his company name from Facebook to Meta and showed the roadmap to make metaverse mainstream in 5-10 years. This resulted in the emergence of an intense debate on what the metaverse will look like, as well as on the companies that could be key in the metaverse industry. In this sense, 2021 has become Metaverse: Year One, even if it is still being developed.

Regarded as “the next frontier”, the definition of the term is not yet fixed, as it is not clear what it will imply. Nevertheless, the authors agree on several characteristics such as immersive spaces, the importance of social interaction, and a wide range of applications.

Conceived in dystopian fiction, and despite several ethical, privacy, and safety risks, the metaverse, or metaverses, may help to improve human life in many of its aspects, such as education, or health, as well as transform entertainment, advertising, and many other industries.

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