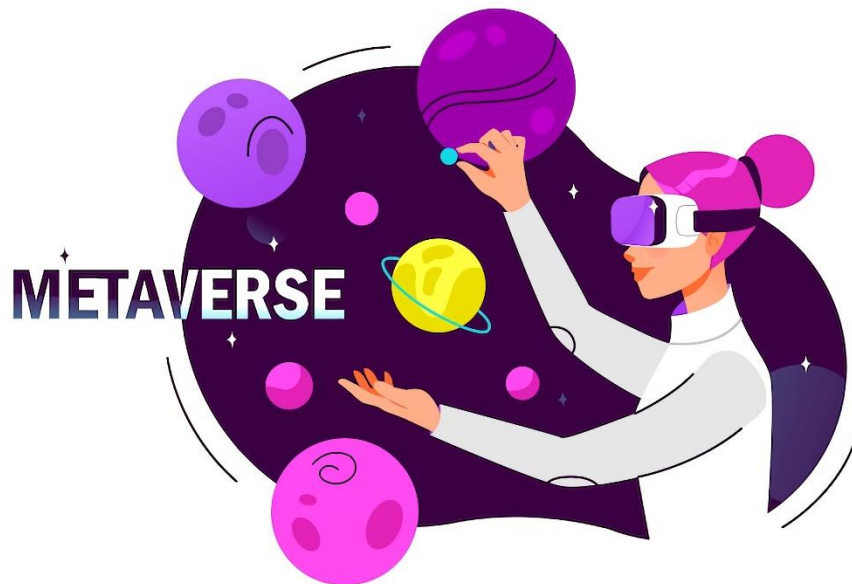


**UNIVERSITAT
JAUME·I**

**DIGITAL MARKETING IN THE METAVERSE AND
ITS EFFECT ON E-COMMERCE**



Author: Stefany Dayana Rojas Rodriguez

Tutor: Carla María Martínez Martínez

DEGREE IN BUSINESS ADMINISTRATION

AE1049 - FINAL GRADE WORK

COURSE 2022-23

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1. ABSTRACT

The concept of the metaverse has its origins in futuristic literature, with the development of the internet allowing the video game industry to create virtual worlds for entertainment, which later with the entry of mass online gamers influenced the creation of proto-metaverses and the first metaverses operating today. Today, it is the technology companies that are investing large sums of money to drive the full development of the metaverse. However, there is still no concrete definition of what this virtual world will be, but it is clear that it will require the development of a set of technologies to make its ecosystem decentralised and immersive.

On the other hand, the development of marketing in the metaverse depends on the emergence of a community of consumers. Protagonists who need virtual worlds for their development. Awakening their interest in interacting in these virtual worlds through their avatars, which allow them to perform various activities. Creating in them the need to obtain greater virtual experiences such as the acquisition of assets in the metaverse, a sector that captures the attention of companies to invest and explore new virtual markets. Marketing is the connection that allows brands to know and satisfy their needs, create new consumer experiences, and understand that the metaverse is a new digital marketing channel.

In this context, brands are experimenting with new marketing practices that influence the creation of new business and e-commerce opportunities in virtual worlds, but in order to make commerce happen, it is necessary to clarify the means of payments that effect the buying and selling of virtual assets. It is clear that the development of e-commerce must be linked to decentralisation and that it plays an important role in the future economy of the metaverse.

For this reason, this research seeks to provide the reader with knowledge of the digital marketing practices that are being carried out in the metaverse. Practices that allow the creation and reinvention of new business models in the third dimension. Giving the opportunity for e-commerce to evolve and adapt to the new demands and needs of consumers, who increasingly demand more real and innovative shopping experiences and personalised attention.

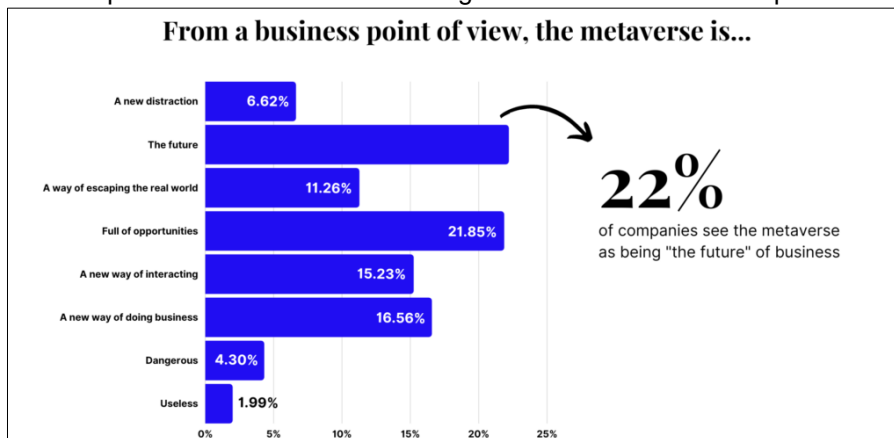
Keywords: metaverse, NFT, extended reality, digital marketing, e-commerce.

2. INTRODUCTION

Imagine that you are in a world parallel to the reality you know now, immersed in a virtual space where you can be at your university or in the office of your workplace from the comfort of your home, but not just watching through a screen as you have experienced in the pandemic, but interacting within this cyberspace as if you were doing it for real in the physical world. Or imagine meeting your friends or loved ones, who are each in different parts of the world, to attend a live concert of your favourite artist, and being there you can enjoy, live the experience and do the same actions and/or activities that you would do if you were in person. Or like any investor or business person, imagine being able to expand your market to a completely digital world where you can acquire plots of land in these virtual realities and then make them profitable by marketing them. These scenarios are the Metaverse drawn by Mark Zuckerberg and other developers, spaces where you can live social, educational, commercial, etc. experiences.

Given this idea or dream of what is to come, some visionaries consider it to be the next internet revolution, a term that has gained notoriety and popularity in the last decade, with a greater scope in 2021 when Facebook announced its commitment to building the Metaverse. According to Sortlist Data Hub's 2022 research of 200 companies that have invested in the metaverse, 55% of these companies believe that the metaverse is the future, making it a risk worth investing in, and 21.85% highlight that this cyberspace is full of opportunities.

Graph 1. The reasons for investing in the metaverse for companies

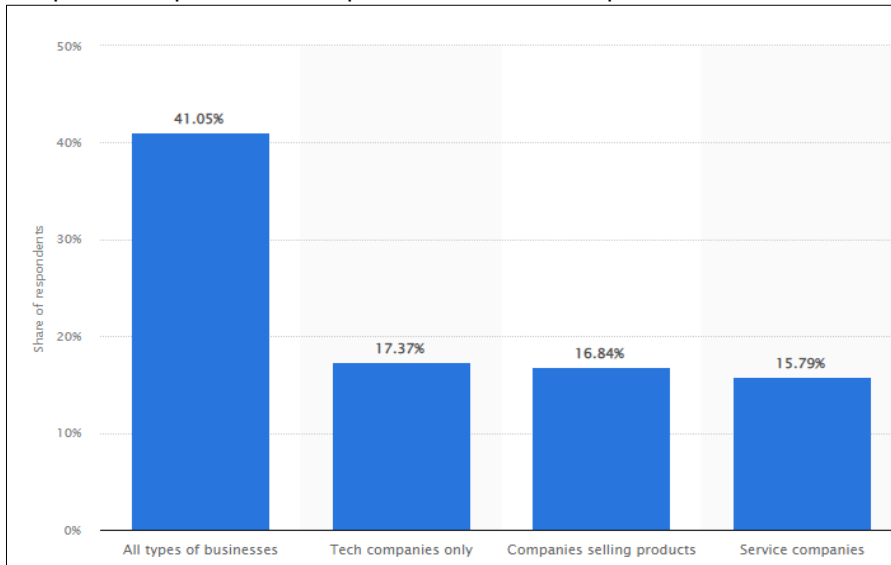


Source: Sortlist Data Hub

Likewise, with the growing popularity of online gaming and the boom in investment in technologies such as the conglomerate featuring extended reality, blockchain, artificial intelligence, and more. They have piqued the interest of individuals and various industries, opening up new possibilities for entertainment, collaboration, investment, and

communication. So, the report published on Statista by J. Clement launches the results of a March 2022 survey of companies investing in the metaverse. To the question "What kind of companies do you think have to be present in the metaverse?", they answered that more than four out of ten companies, companies of all types have to be present in this virtual world, and technology companies 17.4%, and less than 17% should be companies that offer products and 15.79% services.

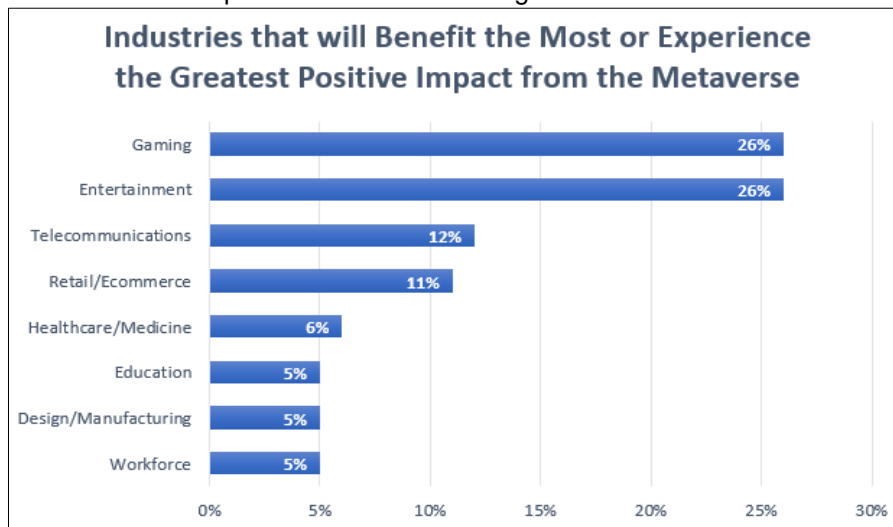
Graph 2. Perspective of companies that should be present in the metaverse



Source: Statista

To understand which type of industry will see the most boom and opportunity in the metaverse. The Agora team interviewed a sample of 300 US developers, publishing the result in April 2022 on their official website. When asked which industry will benefit the most and have the most positive impact on the metaverse, the results showed that the gaming and entertainment sectors will benefit the most, with 26% each. This is notable because it is the gaming companies that have invested the most over the last two decades. Likewise, the telecommunications industry and e-commerce represent 12% and 11% respectively.

Graph 3. Industries benefiting in the metaverse



Source: Agora

In context, there is no doubt that the metaverse will become increasingly present in our lives. As consumers spend more time in these virtual cyberspaces, companies will look for new ways to reach them and adapt to this new environment, so it is important that companies can explore new marketing techniques that encourage e-commerce that is more adapted to the metaverse.

In this sense, this research work will aim to analyse the marketing strategies that are being carried out in current metaverses and their impact on e-commerce, identifying their trends and opportunities for application. This will allow us to answer the following research question: Will digital marketing be able to influence the development of the e-commerce that the metaverse needs?

Therefore, the paper will be structured in three parts, the first chapter being the theoretical framework that entails the history, definition, and technologies that the metaverse needs to develop. The second chapter identifies the consumers and their presentations in the new virtual world, the implications of marketing in the metaverse and its most important practices. Finally, the last chapter refers to how commerce is developing, exposing the new models and opportunities that are emerging, the transformation from e-commerce to decentralisation, its virtual economy focused on payment methods and its expectations for the future. It should be noted that each chapter is based on rigorous research that includes reliable sources to support the analysis of this study.

3. THEORETICAL FRAMEWORK

3.1. Origin and evolution

This section will deal with the origin and evolution of the metaverse, so its history will be marked in three stages. Beginning with literature and fiction, where the metaverse was first contextualised. Subsequently with the appearance of proto-metaverses which are video games that will influence the development of the first ecosystems of a metaverse in its inception stage. Finally, current events with regard to the interest and investments being made by large technology companies and video game developers.

3.1.1. Literary narrative

In his account of the history of virtual worlds, Allan Trevor (2022) indicates that the emergence of the term metaverse and its evolution since then is due to the occurrence of three events that drove the development of virtual worlds. The term "metaverse" was first used in 1992 in Neal Stephenson's novel *Snow Crash*, where the concept is not fully defined by the author, but is presented as a virtual world in which approximately 15 million avatars interact. A space in which activities such as work, leisure, art, commerce, among others, could be carried out in such a way that most of the relevant aspects of human existence were affected. According to Matthew Ball (2022), this work was considered visionary, inspirational and dystopian because it anticipated what would be the future evolution of the internet, when it was just emerging at the time the work was published, and based on his writings it was the inspiration for various works such as CGI¹-based films and *Ready player one*, directed by Steven Spielberg, which proposes a metaverse called Oasis; It was also the inspiration for various projects such as cryptocurrencies and the construction of decentralised computer networks, and even for companies such as Blue Origin, at the beginning of the 21st century, dedicated to aerospace transport. It is also a dystopia because this parallel virtual world is dominated by corporations that run all aspects of life, and distort and deteriorate life in the real world.

However, it is worth mentioning that terms such as "virtual reality" was only illustrated in 1932 in Antonin Artaud's essay *Theatre of Cruelty* and in 1935 in Stanley Weinbaum's story "Pygmalion's Glasses", which describes magical glasses that are similar to those used today to immerse oneself in virtual reality. In addition, the term "cyberspace" was coined by William Gibson in his 1984 work *Neuromancer*, which because of the definition

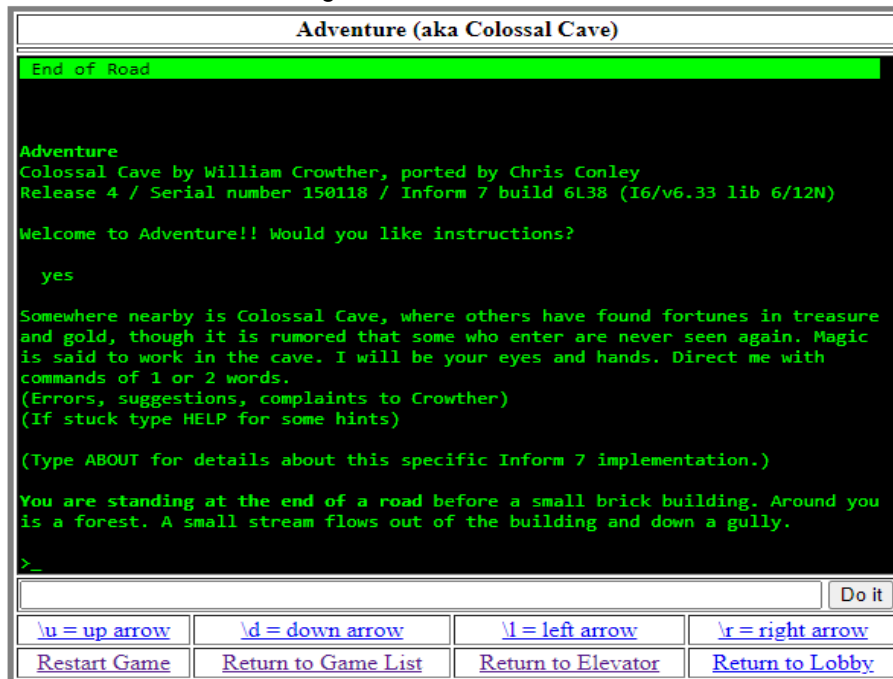
¹ Computer generated imagery, used in cinema to incorporate virtual beings into real scenarios.

he gave to the visual abstraction of cyberspace, naming it *Mátrix*, was later reused by directors Lana and Lilly Wachowski for their film of the same name.

3.1.2. Proto-metaverses

On the other hand, a second important event in the evolution of the metaverse is the development of early metaverse applications and designs. The video game industry is the key actor that anticipates and develops virtual worlds and digital ecosystems. In this sense, Javier Acevedo (2022, p.11) states that "video games anticipate some of the characteristics of current metaverses through connections such as the idea of a multiplayer universe, online interaction or the development of shared playable narratives". This notion is supported by the development of proto-metaverses², over the last seven decades virtual worlds have been evolving, starting with text-based worlds similar to human language, which were known as MUDs³ (MultiUser Dungeons) and would later be called MUD1, British Legends or Essex MUDs, the latter of which would mark the difference in genre with other types of games, due to its focus on exploration and social elements. An example of a MUD game is *Adventure*, which was based on text commands and was the origin of the adventure genre games.

Figure 1. Adventure Game



Source: own elaboration

² Proto-metaverse is the prelude to the metaverse. Virtual worlds that are not connected to a blockchain network.

³ MUD multi-user internet gaming system.

Subsequently, due to the boom and recognition, virtual worlds were created such as MUSH, which stands for MultiUser Shared Hallucinations, and MUX, MultiUser Experiences, which differed from MUD because they do not play in specific contexts and are limited by the creators, but allow players to jointly define and design the context of the game. However, it was not until 1986 when Habitat, published by Lucasfilm, was released, which was an MMO⁴ and one of the first precursors of the MMORPG (massively multiplayer online role-playing game), an online game with 2D graphics and the first to introduce the term avatar, which according to the Real Academia Española describes it as a "Graphic representation of a user's virtual identity in digital environments". It also caused a great stir and division between online and virtual games.

With the emergence of multiplayer games and MMORPGs⁵, a closer idea of what a metaverse would be is contextualised, since an MMORPG for Javier Acevedo (2022, p.11) is a type of "video games based on the creation of content by the user through functionalities such as character design or even maps and also interconnectivity in a virtual world created for other users to interact". However, the metaverse is more complex than an MMORPG because its structure promises to be decentralised and is intended for millions more avatars to interact than in an MMORPG, and both the rules and design of these virtual worlds must be less rigorous. World of Warcraft is a notorious example of an MMORPG, launched by Blizzard in 2004, which reached a large number of subscribers.

In 2003, Linden Labs launched Second Life, an online virtual reality platform game designed in the third dimension, which showed the closest approximation to a metaverse, considered by some to be the first metaverse in history, because it offered the possibility of a parallel life within a virtual space as players had the ability to create their own content, design their avatars, explore and participate in different activities and social events, This virtual world not only involved players, but also opened up to the world of business and corporations, giving way to both for-profit and non-profit companies, and over time, in 2007, they created a stock exchange on the platform to circulate their own currencies which were the Linden dollars (\$L), i.e. they managed to create their own economy, and even managed to offer imports of virtual objects not made within the game.

Just as Second Life created its own 3D virtual world, so did other platforms such as Roblox which has similar functions to Second Life, as well as designing, developing and interacting in their own games. Then there is Minecraft, which allows users to enter the game through avatars, explore worlds and build anything they set their minds to, for example Verizon designed and built an in-game mobile phone that had the ability to make and receive live video calls in our reality.

⁴ Massively multiplayer online, where hundreds of players could log in and interact in video games.

⁵ Massively multiplayer online role-playing game, indicates that the number of players participating is much larger and presents the characters with a variety of options.

Figure 2. Video call in Minecraft with Verizon mobile phone



Source: *VentureBeat*

Finally, Furniture, which was released in 2017 by Epic Games, is considered one of the most successful free-to-play (F2P) games that over time has shifted towards creating virtual spaces focused on social activities such as the Travis Scott concert that was held in 2020. Later that year, Fortnite launched a variant of the game, Fortnite Creative Mode, designed to build worlds like Minecraft and Roblox.

Figure 3. Travis Scott concert in Fortnite



Source: *tweet from Fortnite twitter account*

3.1.3. Investments of the technological giants

Finally, as a third event, the race to build the metaverse among the tech giants is a topical one.

Before Marc Zuckerberg showed interest in the metaverse and announced it at the Connect event in 2021, there were companies such as Sandbox and Decentraland that created their own virtual worlds under a decentralised system, i.e. these virtual worlds were not under the sole control and domination of one company. For example, in Fortnite,

users could only purchase items for their avatars that were offered solely by the developer. However, in virtual worlds where a more complete economy can be generated thanks to cryptocurrencies, blockchain and NFT, and have an open source platform that allows users to have an unrestricted freedom, even more in the control of their assets; users have the possibility to create and market their own products, as well as interact in different social environments such as telecommuting, concerts, universities, among others.

This is a great opportunity to create new user experiences and generate business, revenue and capital, and to expand the audience and target audience for companies. For this reason, some of the leading technology and entertainment companies that stand out for their investment in the metaverse include:

- Meta. Currently one of the largest investors in the metaverse, in 2021 he changed his name from Facebook to Meta, a move that reflected his relevance to the Metaverse. As an investor, that same year, he launched Horizon Worlds, a virtual space for social activities within the metaverse, and through Meta Reality Labs he is developing immersive technologies for the development of the metaverse, including projects such as Oculus, where he builds reality devices, the most popular being the Oculus headset and the Meta Quest Pro and Meta Quest viewers. There is also the Portal project which generates conference meetings with smart camera technologies and computer vision, the Meta Spark project where augmented reality experiences are designed with more immersive features, for example the Meta Smart Studio tool creates augmented reality for any level of knowledge, the Aria Project where augmented reality solutions are provided with smart glasses. In addition, it is addressing research such as realistic haptic interaction, neural control interface, among others.
- Microsoft. Not to be outdone, it acquired Activision Blizzard which is a leading video game developer, makers of popular games such as Call of Duty and Candy Crush, which gives Microsoft 3D virtual spaces that will allow it to develop its platforms in the metaverse, and launched Microsoft Mesh which is a platform for collaboration and communication with mixed reality applications.
- Google. Seeks to connect the physical and digital world through augmented reality, through investments in products such as google glasses which are smart

glasses, in May 2022 announced to generate a new prototype for its augmented reality glasses; Google Project Starline allows conferences using holograms that project a 3D model of the person with whom you are communicating, ie the future of video calls in three dimensions.

- Epic Games. It aims to take Fornite into the metaverse with a diversified ecosystem and support for augmented reality and virtual reality. In 2021, it received a financial outlay of \$2 billion from Lego and Sony to create a virtual environment to ensure the well-being of children. In addition, Epic Game also formed a partnership with Lego for the latter to obtain a virtual community in the metaverse. Another of the most shocking news was announced in 2022, when Epic Game teamed up with NASA to create a Mars metaverse, recreating a virtual environment with the characteristics of the Mars ecosystem, in order for astronauts to get notions and prepare for a trip to Mars.
- Roblox. According to data obtained by Alba Gonzalez (2022), Roblox has different game options with the option of creating one of its own with "Roblox Studio". It seeks to integrate various companies into the world of video games and virtual space, and has therefore entered into strategic alliances with companies such as Nike, which created its online platform under the name Nikeland, an immersive sports space in the metaverse in which sport and gaming are a way of life; in the same category of sport is Vans with the Vans World platform. It also has partnerships with Sony Music where virtual concerts are held. It also entered the education sector through Roblox Education to teach young people how to programme games on the platform.

3.2. Definition

Defining the metaverse is complex; different authors offer a notion based on their personal perspectives, because we are seeking to understand something that is still in a process of development. Even when consulting the Dictionary of the Royal Spanish Academy, no definition can be found. However, the Cambridge dictionary interprets it as "A virtual world where humans, as avatars, interact with each other in a three-dimensional space that mimics reality". Etymologically the metaverse is an acronym composed of two Greek words "Meta" meaning beyond or after and "Verse" which is related to the universe. However, in order to broaden the definition of the metaverse, some notions from different authors are presented here.

According to Hackl's perspective (Hackl, Lueth and Di Bartolo 2022, p.8):

The metaverse is a convergence of our physical and digital selves. Through Web 3.0 technologies such as VR, AR, AI, cloud, blockchain, crypto, 5G networks, and edge computing, the metaverse allows our respective digital identities to catch up so we're consuming content and creating revenue streams in a wholly interactive manner. There's only one metaverse and it's not here yet in its greater form. It's being built and this decade is critical. It includes both the virtual and the physical world.

Alvarado and Supo (2022, p.116), point out that for Matthew Ball:

The Metaverse is an expansive network of persistent, real-time rendered 3D worlds and simulations that support continuity of identity, objects, history, payments, and entitlements, and can be experienced synchronously by an effectively unlimited number of users, each with an individual sense of presence.

Martín-Blas (2022, p.55) defines it as:

Una evolución del internet que conocemos que nos muestra la información de forma plana, en 2D, dentro de un navegador o de una aplicación. Por tanto, el metaverso es un nuevo internet tridimensional (3D) en el que presentimos presencia gracias a los visores virtuales con los que accedemos a él. Dentro de este escenario virtual podemos andar, interactuar, hablar, etc., hasta sentir que somos parte de la acción; pero la gran diferencia con el anterior concepto de internet es que aquí hacemos actividades, pertenecemos a un mundo que se despliega ante nosotros y que es susceptible de ser modificado según nuestras actuaciones [An evolution of the internet as we know it, which shows us information in a flat, 2D form, within a browser or an application. Therefore, the metaverse is a new three-dimensional (3D) internet in which we feel we are present thanks to the virtual viewers with which we access it. Within this virtual scenario we can walk, interact, talk, etc., to the point of feeling that we are part of the action; but the big difference with the previous concept of the internet is that here we do activities, we belong to a world that unfolds before us and that is susceptible to being modified according to our actions].

Mark Zuckerberg, at the Connect 2021 conference, explained that the metaverse is the successor to the internet, linking and interconnecting different digital spaces that will allow different actions to be carried out, including activities that go beyond the physical world. It is characterised by social presence and the feeling of being present anywhere in the world.

Furthermore, in the article Letter from the founder (Zuckerberg, 2021) he explains the activities that can be done within the platform, stating the following: "In the metaverse, you'll be able to do almost anything you can imagine - get together with friends and family, work, learn, play, shop, create - as well as completely new experiences that don't really fit how we think about computers or phones today".

Finally, Dwivedi et al. (2022) classifies the definition of the metaverse into four types: environment, interface, interaction and social life. Referring to the first one that the metaverse generates realistic, unrealistic and merged environments. The interface where there are three-dimensional methods because most of its environments are composed in this dimension, making them more realistic; immersive because they can be entered through a virtual reality viewer; and physical because of tactile and visual elements that can physically reflect them. Interaction is categorised into social networking because of the experience gained from it; collaboration because of the rise of value creation; and dialogue arising from natural conversations between users. Finally, social life which is based on sustainability arising from new user experiences and knowledge; and interdisciplinary study where the metaverse will create a set of values and new concepts and perspectives from different areas that we know from politics, sociology and economics.

3.3. Technological Ecosystem

3.3.1. Blockchain and cryptocurrencies

Fernández (2016) presents a set of definitions from which the blockchain can be conceptualised as an accounting ledger or ledger that is distributed, decentralised and encrypted by a peer-to-peer network, in which transactions can be recorded and assets, both tangible and intangible, can be controlled in a business network. This blockchain system can store any type of information through a network of nodes with a cryptographic system, which does not require permission from any central authority or intermediaries. In this way, the information is valid, protected and unalterable.

Starting from a general idea of what a blockchain is. Its role in the metaverse enables the existence and functioning of an economy, with digital assets being the most important function, as it enables cryptocurrencies to trade with these virtual assets, just as users can transfer them in various virtual worlds. It is also capable of connecting the virtual world with the physical world because non fungible tokens (NFT) make virtual assets materialise in the real world. Moreover, as a public platform with a decentralised open

source code, it allows users to store data in an integrated and secure way, design their own applications and conduct digital commerce, as Huynh-EI (2023) notes.

3.3.2. Non-fungible tokens (NFT)

As Menéndez, P. (2022, p.1) puts it:

Los Non-Fungible Tokens o NFT son un tipo de criptoactivo consistente en un activo digital único, comerciable, transferible a lo largo de mercados digitales de finanzas descentralizadas (DeFi), respaldados a través de contratos inteligentes y se aloja en el ecosistema digital conocido como blockchain [Non-Fungible Tokens or NFTs are a type of cryptoasset consisting of a single, tradable digital asset, transferable across decentralised finance digital markets (DeFi), backed through smart contracts and hosted on the digital ecosystem known as blockchain].

Fonarov, O. (2022) states that these non-fungible tokens are totally unique, that when any type of digital file is issued, whether it is a video, image, gif, song, animation or any other element, a certificate of authenticity, i.e. of ownership, is generated, in which all transactions are recorded, this certificate is issued by means of a cryptographic key. In this way, any intention of usurpation or theft of digital assets can be eliminated.

For that reason, NFTs are necessary for societies in different metaverses to coexist and interact with each other, being a connection to cyberspaces because it creates an environment of identity, community, and social and commercial experience. Also, by acquiring digital assets with NFTs in the metaverse, not only can they be transferred between these online worlds, but they can also materialise in the real world, as for example Adidas offered its Bored Ap-inspired fashion collection via NFTs, in which users also had the option of acquiring it in physical form.

Figure 4. Indigo Superstar Sneaker offered in the metaverse



Source: official Adidas website.

3.3.3. Artificial Intelligence (AI)

Artificial intelligence (AI) is part of a branch of computer science that researches and develops technological systems that have the capacity to substitute human intelligence in certain tasks, using algorithms, learning and processing large amounts of data, and making use of machine learning, according to the explanation of Rodríguez (2018) in an article published for BBVA.

The application of AI to the metaverse will enable the construction of immersive worlds, with a high degree of intelligence and optimised services, creating more interactive and personalised experiences. These services include facial recognition, language processing, advanced interfaces and instant computing. In addition, it will be able to design avatars with similar characteristics to the user, create digital humans, more realistic virtual environments, and be a translation tool and personalised advertising. According to the report prepared by the consultancy Clarke-Modet (2022), if Artificial Intelligence is the fundamental basis of the metaverse, it is estimated that its global expenditure will be more than 300 billion dollars in the near future of three years.

As a demonstration of artificial intelligence in the metaverse, it can be seen that an AI-powered k-pop band called Mave, developed by Kakao Entertainment, has been created in cyberspace. Mave is made up of four artificial members, consisting of Siu, Zena, Tyra and Marty, none of whom are human. However, it offers entertainment services to real users only in the metaverse. The band debuted their first single album called Pandora's Box on 25 January.

Figure 5. Mave Band



Source: *Wired*.

3.3.4. Extended Reality (XR)

It is a terminology that creates computer-generated environments and objects to combine elements of reality with virtuality (García, 2022). It is made up of immersive technologies such as Augmented Reality (AR), Virtual Reality (VR) and Mixed Reality (MR), as well as others such as Artificial Intelligence, explained in the previous section.

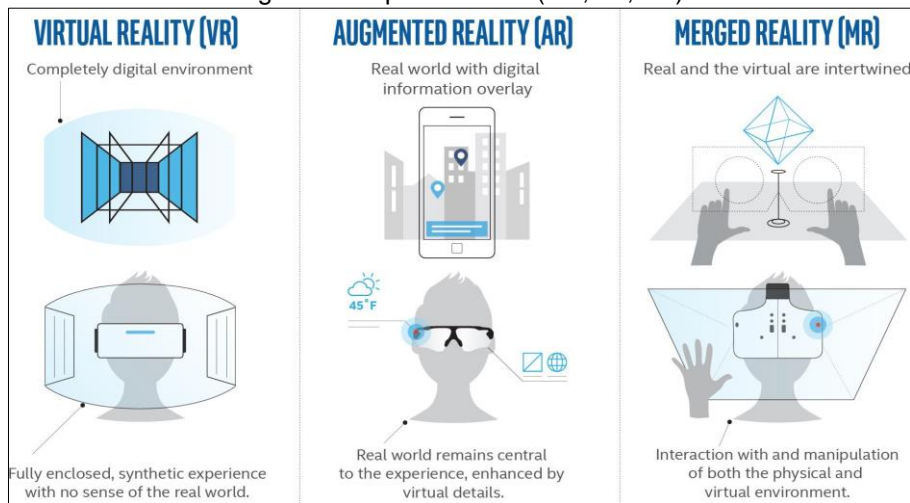
This is followed by a comparative table of the main differences between augmented, virtual and mixed realities, which presents extended reality, and then a graphic illustration (figure 6) of how the three realities are used and visualised.

Table 1. Characteristics of RA, RV and RM

Characteristics	Augmented Reality	Virtual Reality	Mixed Reality
Definition and interaction with the environment	It brings digital value to the physical world, through technological devices. In other words, it allows the user to visualise 3D projections in reality.	Also known as computer-simulated reality. It generates an immersive experience for users by immersing them in a virtual world.	Known as hybrid reality, it is a combination of AR and VR. It brings together virtual elements with reality, where the two coexist and interact.
Degree of immersion	Semi-immersive. Incorporates virtual elements and objects into reality.	Complete (100%) The user enters with a visor and feels inside the virtual world.	Semi-immersive (50%) Combines virtual and real elements.
Hardware type	Medium	High	High
Devices	Smartphones, tablets, and smart glasses.	Special devices such as virtual reality goggles and headsets, and others.	Special devices such as smart glasses, mixed reality headsets and others.
Areas of application	Games, advertising, navigation, interior design, etc.	Games, simulations, training, education, etc.	Navigation, advertising, education, training, product design, etc.

Source: own elaboration

Figure 6. Map of realities (VR,AR,MR)



Source: *DigitalMedia Communication*

Virtual reality is the basis for building digital ecosystems and communities. Through VR devices, users enter and interact in the metaverse and with the support of VR software design the online space within it; both the latter and the VR headset support the generation of metaverse clusters.

On the other hand, with mixed reality, a metaverse is proposed that coexists in parallel with real life, and will offer the possibility of adding virtual elements to our natural environment, such as having a dinosaur at home as a pet and being able to interact with them. Despite being in the early stages, its implementation will be the most massive way to immerse oneself in the metaverse, through special visors that perform three-dimensional scans of the outside world, it is expected that in a decade this technology will replace mobile devices (Martín, 2022).

3.3.5. Web 3.0.

Web 3.0, also known as web3 or 3D internet, is the third evolution of the internet. Web 1.0 was the web of links driven by Netscape, where it represented the static version of the internet and its role was only to provide information with limited interactions that only allowed observation/reading. Web 2.0, the era of likes stimulated by Facebook, users participate, interact and create multimedia content within the platforms, but their data is controlled by technology companies. And the expected Web 3.0, which will be the era of tokens encouraged by Decentraland, where websites and applications will be more autonomous and intelligent, and their data will be decentralised and they will have a token compensation for them. Because of a systematic web and artificial intelligence, as well as other technologies such as blockchain, extended reality and more (Serrano, 2022).

Table 2. Main features of Web 1.0, 2.0 and 3.0

Features/webs	Web 1.0	Web 2.0	Web 3.0
Interact	Read	Read y write	read, write and own
Medium	Static text	Interaction content	Virtual economics
Organization	Companies	Platforms	Networks
Infrastructure	Personal computers	Cloud y mobile	Blockchain cloud
Control	Decentralized	Centralized	Decentralized

Source: Grayscale

Both the metaverse and web 3.0 are considered to be the next evolution of the internet, as they are currently in a process of development. However, the two have different perceptions of how their evolution should unfold: while the metaverse refers to the immersion and experimentation of virtual worlds, web3 seeks to make the infrastructure of the internet decentralised so that people own their own data and can create and manage their digital assets.

However, the web3 and the metaverse complement each other because as the metaverse is the digital ecosystem, it needs web 3.0 for users to interact within it, as the ownership of their data is protected in the same way as their digital content with NFTs, it also makes commercial transactions possible and secure, and provides the necessary technology for users to move between worlds (Santander, 2022).

3.3.6. The internet of things (IoT)

González (2022) indicates that the internet of things is the digital network that unifies the physical world to the internet by means of sensors, software and technological devices, the latter being common or even industrial items that emit and receive information when in contact with the internet; their applications also collect and distribute data acquired from the outside, generating greater accuracy in graphic representations. On the other hand, as various physical devices are projected in the third dimension via the Internet, it allows simulations of these objects to be carried out within virtual ecosystems.

Therefore, the internet of things opens the way for the metaverse to obtain data from the base reality to be transferred to its ecosystem, making both worlds collide and collaborate

with each other. In other words, the metaverse will be able to analyse and interact with physical reality and will also be a 3D interface for IoT devices, providing the user with a more personalised IoT that will be necessary for decision-making.

4. MARKETING DEVELOPMENT IN THE METAVERSE

4.1. Consumers in the metaverse

From the transformation of video games to become virtual platforms that offer to generate experiences to their players; the users of these ecosystems, as well as those who have direct contact with technologies, immersive experiences through extended reality, and virtual worlds, are defined as the current and upcoming consumers of the metaverse.

4.1.1. Consumer demographics

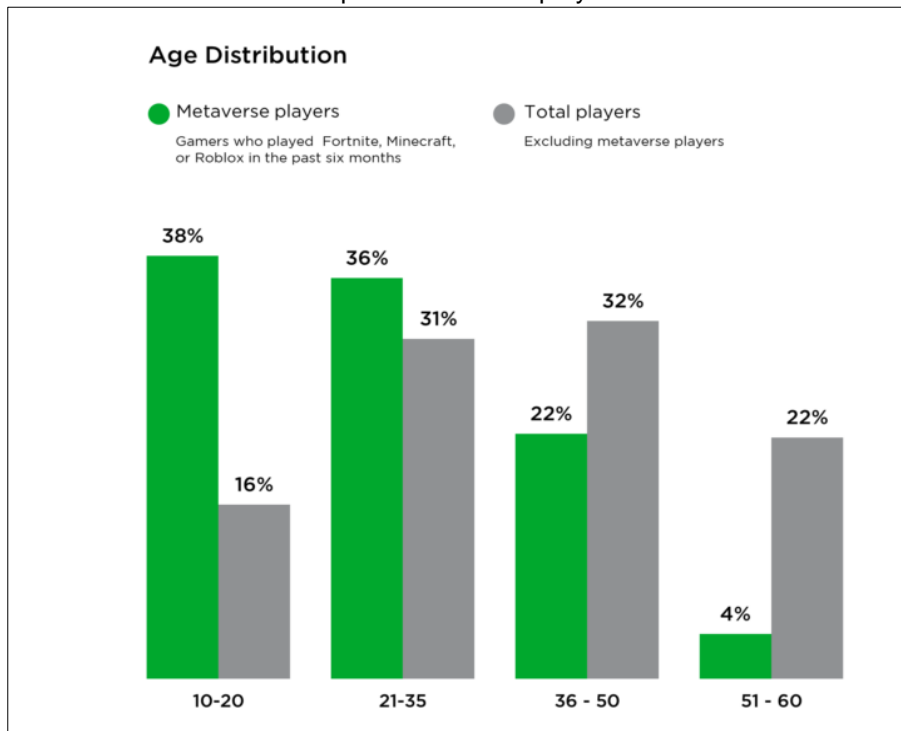
In order to know the current and future consumers of the metaverse, they will be identified according to their demographic characteristics. According to the authors Stanton, Etzel and Walker (2007) determine that consumer demographics as a means to study and analyse the physical and social characteristics of consumers, with certain demographic statistics such as age, gender, income and other aspects that influence consumer purchasing behaviour; in order to understand them and design marketing strategies that are adapted to their needs and preferences. Therefore, to present the consumer demographics of the metaverse, the characteristics described in the definition above will be used.

It is proposed that the metaverse should be designed so that any type of consumer can interact within it. However, there are several studies that specify that there are certain consumers who will have more interest and presence in the metaverse. Although there is not a completely clear definition of what the metaverse is, as explained in the previous chapter, Generation Z (1994 or 97 -2010) and Millennials (1981-1993 or 1996) have a greater understanding of what this digital space consists of, more so than Generation X (1969-1980) and Baby boomers (1949-1968), because they are the ones who have been more exposed to technology and interaction in virtual reality platforms according to Bigcommerce (2022). Furthermore, being the users of metaverses - such as Fortnite, Roblox and Minecraf - considered as the native players of this digital cyberspace who will be in charge of its future architecture, which concentrates young people from Generation Z and Generation Alpha (from 2010); for example, in 2022 it was reported that the daily players of Roblox, representing 54.86%, were users under thirteen years of age, data obtained by Newzoo (Melcher, 2022).

Below, information obtained by Newzoo, is a bar chart that classifies by age the metaverse players and the players in general who do not have any action in the

metaverses. Graph 4 shows that metaverse players between 10 and 20 years of age are the ones who participate the most in these three-dimensional games, representing 38%, which is double the total number of players in that age range, and a percentage difference of 2 points compared to metaverse players between 21 and 35 years of age. On the other hand, it indicates that 27-year-old users are the average age of a metaverse player, younger than players of other game types who are 38 years old.

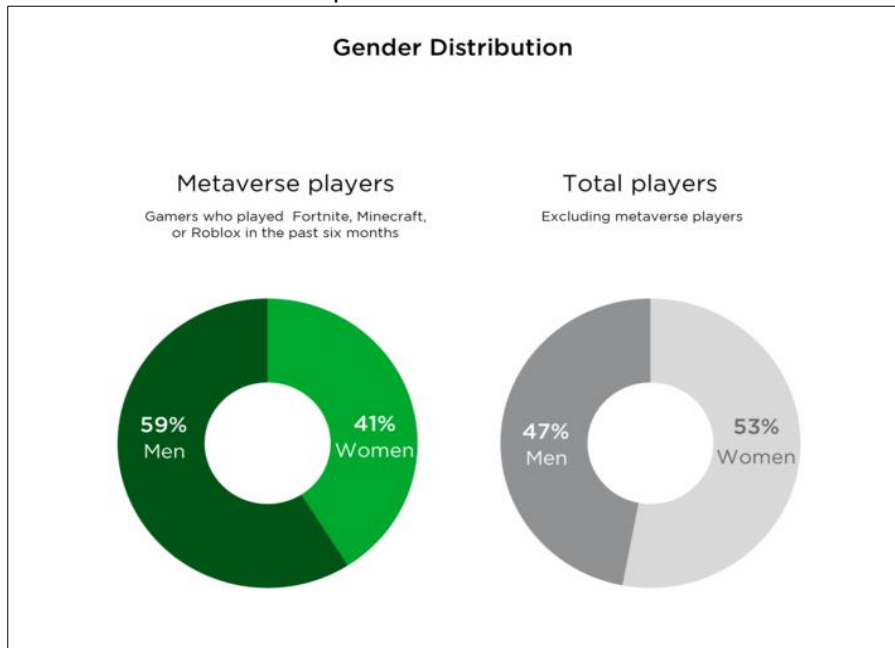
Graph 4. Metaverse players



Source: Newzoo

From the same Newzoo report, it is indicated that the gender of the metaverse player more than half is comprised of men, having 18 percentage points more than the female gender. However, in comparison to the rest of the online players, it is observed that women take the lead with a difference of 6%, as presented in the pie chart below.

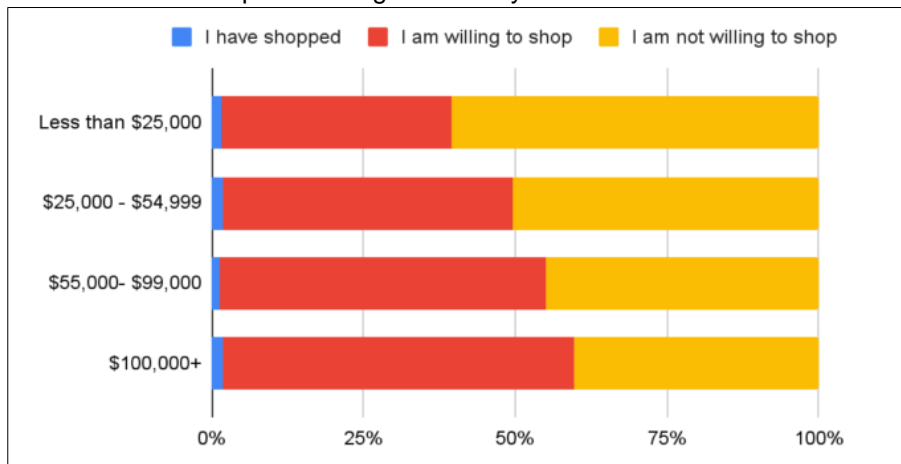
Graph 5. Gender distribution



Source: Newzoo

With regard to income, the study conducted by Bigcommerce indicates the relationship between income and the willingness to invest in the metaverse of the generations mentioned above. Reflecting that Generation Z and Millennials are more willing to make purchases in the metaverse compared to previous generations, and according to the data in graph 6, consumers with higher purchasing power are more willing to invest in the metaverse than consumers with lower incomes.

Graph 6. Willingness to buy in the metaverse

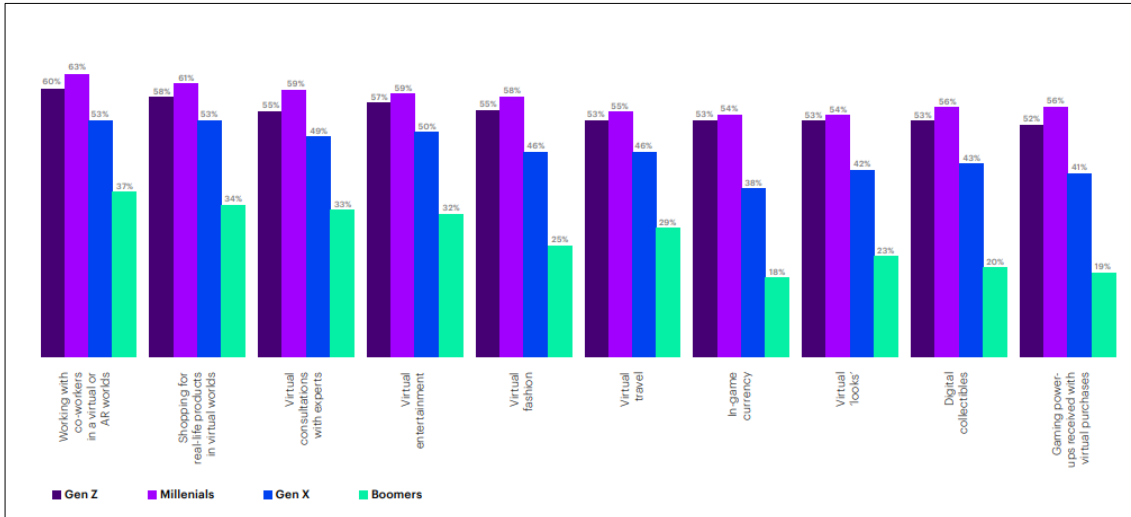


Source: Bigcommerce

Finally, in relation to their interests, the Accenture report indicates that Generation Z and millennials are more willing to acquire digital experiences and invest in digital products and services, so as new user experiences emerge, companies will need to be more

creative and competitive to meet new needs. And as seen in graph 7 it is millennials who will have the greatest ability and opportunity to invest in the virtual world, followed by Gen-z. (Curtis et al., 2023).

Graph 7. People's interest in the metaverse



Source: Accenture

Furthermore, according to Dynata's analysis of the entertainment sectors, young people will be most interested in enjoying experiences in activities such as travel, concerts, gaming and socialising. Beyond entertainment and socialising, however, Capgemini's research indicates that consumers are also interested in both retail and brand interactions, ranking them fourth or fifth in their interests.

4.1.2. Identity within the metaverse

The term avatar originates from Indian mythology, which refers to the incarnation of a divinity, as well as in French and Sanskrit avatāra, which refers to the descent of a divine being from heaven.

In technological terms Schlemmer, Trein, Oliveira (2009, p.28) indicate that:

Avatar is used to refer to the graphical representation of a subject in a virtual world. Depending on the technology, it can range from a simple image, a two dimensional model, all the way to a sophisticated, predefined, personalized 3D model. It may resemble the physical appearance of the human or may instead be a figment of one's imaginations. Creating an avatar allows the user to construct an entirely new identity.

However, avatars do not refer entirely to an online identity, because not all users are able or willing to customise or personalise their avatars to their real image, nor do they truly represent the person's self. However, it gives users the freedom to be whatever they

want to be. The more time users invest and make connections in these virtual spaces, the more important it becomes to embrace a digital identity (Hackl, Lueth, Di Bartolo, 2022).

Moreover, the way in which avatars represent players in virtual reality has an impact on the behaviour of users within these platforms, as well as the possibility of their influence on the way an individual is in real life (proteus effect). For example, an attractive-looking avatar has the facility to establish intimate relationships with other unknown identities, which may provoke positive interactions within the environment, and a taller avatar may make unfair bargaining offers (Yee and Bailenson, 2007).

Users to use their avatars as a mechanism of expression and identity generate business opportunities for companies, so that avatars become components for the construction of an economy in the metaverse. In this scenario, companies have the possibility to explore new markets such as creating virtual assets for avatars, and users can generate a new source of income by offering their services as designers and stylists (Ramírez, 2023).

In figure 7, Mark Zuckerberg presents his avatar in the metaverse ecosystem that his company is developing, this image is taken from the content presentation "The metaverse and how we will build it together - Connect 2021", located on the youtube platform of the Meta account.

Figure 7. Mark Zuckerberg's avatar in the metaverse



Source: *The metaverse and how we will build it together - Connect 2021*

4.2. Marketing Implications

The metaverse is still in the developmental stages, however, different commercial activities are being created in metaverses, leading companies to create and apply new

marketing strategies. Thus, marketers believe that the metaverse offers opportunities for companies to explore new ways to engage consumers, generate new techniques and innovations in their branding towards new scenarios and perform analysis of metaverse strategies in different areas of their organisation (Hazan et al., 2022).

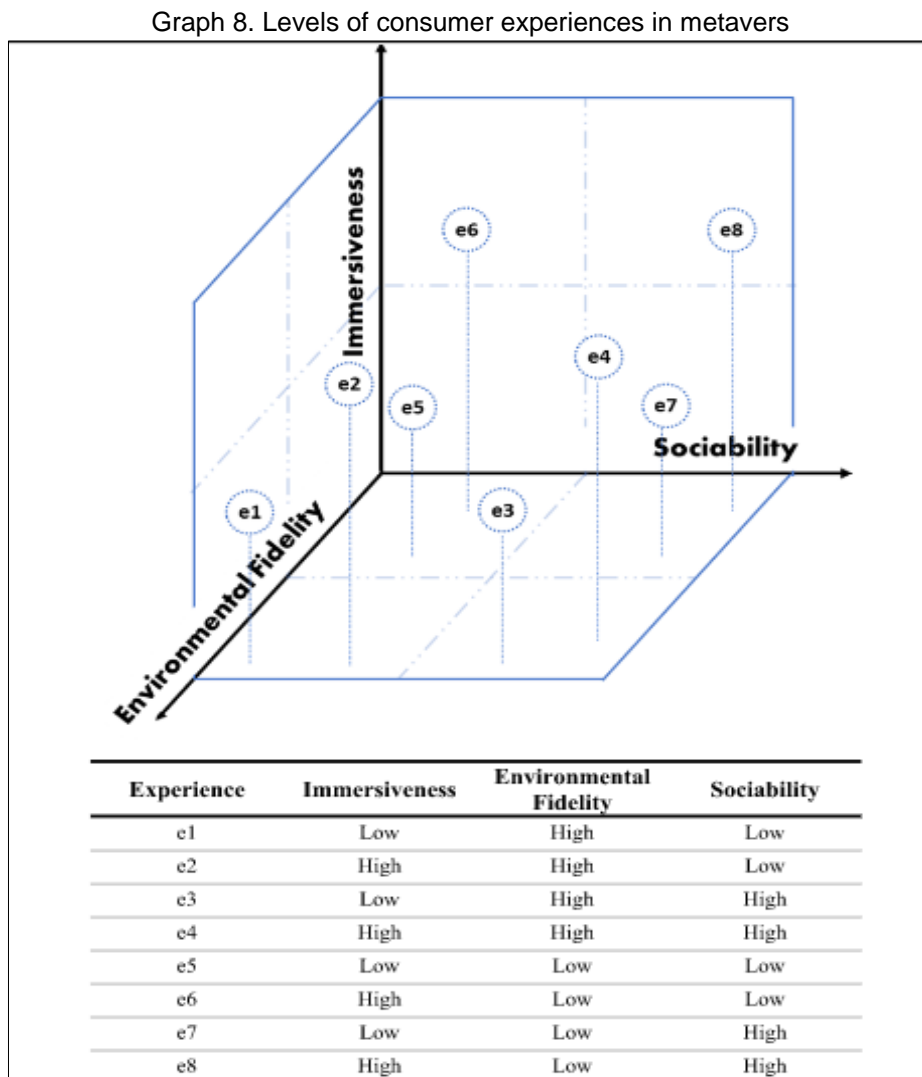
4.2.1. Consumer experience design

To understand how marketing plans and strategies should be developed in the metaverse, it is necessary to analyse and design the possible consumer experiences of users. Giang and Shah (2023) argue that taking into account marketing applications based on the consumer experience can increase the emergence of new businesses and support their users in the commercialisation of new digital goods and services. The design of these new experiences has to take into account immersion, sociability and the fidelity of the user's environment in the metaverse. So, describing these elements:

- **Immersion** is realised by the combination of virtual and physical elements. In which the user explores levels of experience through immersion as a dimension measured by virtuality, where the technological elements and factors of extended reality can influence the degree of telepresence, which is the interaction and feeling of being present in the virtual world, and positively affects the user's perceived value of virtual offerings, and the attitudes and behavioural intentions of consumers in the marketing context.
- **Sociability** is an important factor for companies because it facilitates users to create social spaces to strengthen social presence, which stimulates the benefits and outcomes of consumer actions and interactions; in addition, social presence is effective for brand engagement, experience and promotion. Therefore, understanding sociability is a strategy for companies to create experiences in the metaverse, and adjust the levels of sociability according to their marketing objectives.
- **Environmental fidelity** in metaverse environments influences users' goals and motivations. As they have different motives for entering and shopping in virtual spaces that simulate the real world physically and functionally. These functional, social and experiential motivations affect the activities that users perform. In addition, through avatars, which are their digital representations, and the identity of cybernauts can also influence their goals and behaviours in virtual worlds.

Therefore, marketers consider environmental fidelity as an effective criterion for designing experiences that suit users' goals within the metaverse.

In the following graph 8 below represents the possible experience levels (e1 to e8) of consumers in the metaverse, combining the degree of immersion, sociability and environmental fidelity.



Source: Scientific article by Giang and Shah (2023, p.10)

4.2.2. Metaverse as a new element of digital marketing

Contextualising digital marketing with traditional marketing, it could be said that digital marketing is a complement to traditional marketing, focused on planning marketing strategies through the use of technologies.

Starting from the definition of digital marketing, Núñez and Miranda (2020, p.4) point out that:

Marketing digital como el conjunto de procesos realizados en plataformas tecnológicas por medio la utilización de aplicaciones, softwares y gestión de contenidos y redes sociales a través de canales digitales, que permiten complementar las funciones del marketing tradicional y cuyo alcance se basaría en el entendimiento de las necesidades de los mercados y la satisfacción de las mismas a través de productos y servicios que les generen un alto valor añadido [Digital marketing as the set of processes carried out on technological platforms through the use of applications, software and content management and social networks through digital channels, which complement the functions of traditional marketing and whose scope is based on understanding the needs of markets and satisfying them through products and services that generate high added value].

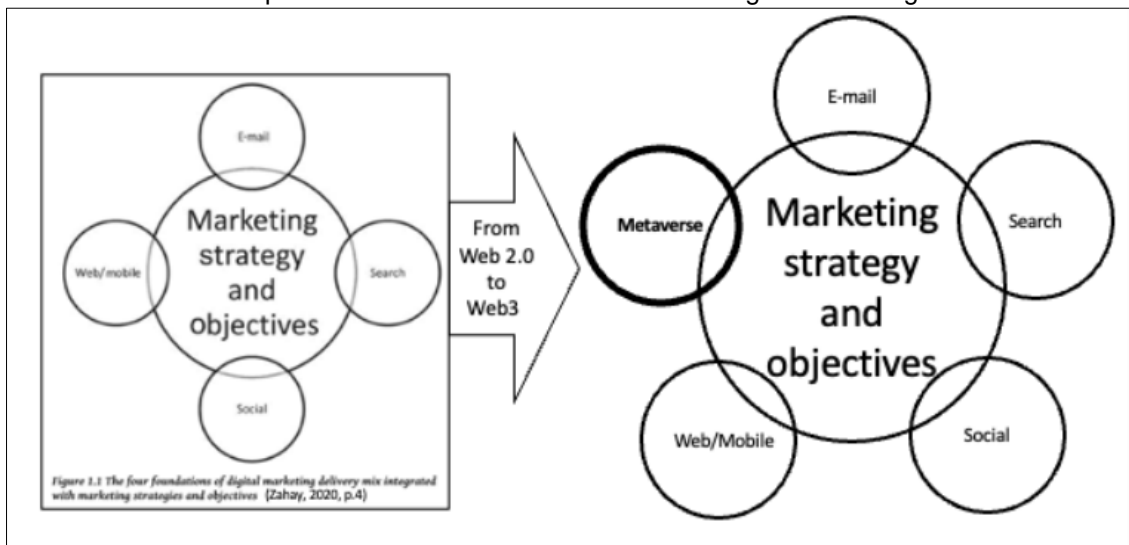
On the other hand, understanding the elements involved in digital marketing, Zahay (2020) mentions that there are four elements of digital marketing mix (DMDM) that are integrated into marketing strategies and objectives, being search, social media, email and web/mobile. On the other hand, Zhang, Chadwick and Liu (2022) propose that within this scheme of elements that contains digital marketing that is based on Web2.0, the metaverse is added as an additional element because it is the channel that will provide immersive experiences to the user within virtual worlds, something that cannot be achieved by the aforementioned elements. Furthermore, the metaverse will be able to connect to the other channels through hyperlinks and other systems that collect and manage experience information, content and data; also the metaverse will contain attributes that are related to and required in the third internet revolution (web3.0), such as blockchain, artificial intelligence, etc.

Graph 9. Digital marketing mix elements



Source: Zahay (2020, p.4)

Graph 10. Metaverse as a new element of digital marketing



Source: Zhang, D.; Chadwick, S.; Liu, L. (2022, p.2)

Therefore, the metaverse being a new dimension of digital marketing, it will be possible to create multifaceted promotional strategies in 3D environments, achieving a better result of brand awareness, recognition and positioning, i.e., brands in the metaverse can achieve higher brand awareness by displaying static and dynamic logos in avatars and virtual spaces, and build their customer-focused brands, due to the availability of consumer data such as preferences and behaviours, the latter being a strategy to segment customers and obtain relevant information for future investments. Moreover, with the data acquired from the metaverse, it will be possible to drive more personalised digital ads and banners, non-fungible tokens (NFTs), and targeted marketing strategies and campaigns towards avatars (Dwivedi et al.,2022).

4.3. Advertising in the metaverse

“The Metaverse maybe a way for companies to extend and create their own advertising strategy” (Abinaya y Shalini, 2023, p.34). Within the metaverse, advertising strategists insert different advertisements or actions promoting products, services and brands. This method of advertising can reach a wider audience than would be achieved with traditional advertising and can be presented in different ways from simple three-dimensional digital advertisements in video games to promoting large virtual events (Merodio, 2023).

Examples of forms of advertising in Decentraland are NFTs, which is typical of what metaverses are doing and consists of selling NFT creations in virtual spaces such as collections, logos or objects. Website or social networks, where items that exist in the real world are imitated and represented in the metaverse so they are promoted in the virtual world, but can be purchased in the real world. Radio and music, in virtual spaces

they often harmonise the atmosphere with music tracks or broadcast commercials in others. Rooms with ambience, there are rooms in the metaverse that are themed to series and films. Posters, posters and brand logos can be seen in the city of decentraland. And events, consisting of virtual concerts, music festivals or brand promotions (González, 2022).

4.4. Marketing and advertising methods and practices

The following is a list of examples of actions that are being developed in marketing and advertising within virtual worlds.

4.4.1. Gamevertising

Within the world of video games, the metaverse can present a type of marketing called Gamevertising, which consists of including advertising in these virtual worlds (Lal, 2023). It is a paradigm shift in digital communication as the user's immersive advertising experience becomes the most important reason (Major, 2021).

Gamevertising presents four formats of advertising associated with online games, such as Ingame advertising, which is advertising that is located within games. Advergaming (advertising+gaming) where the main reason for the game is the product and the brand, creating a video game to advertise them. Webadvertising is the advertising that takes place on the websites of video games. And marketing in virtual worlds that is around avatars and MMORPG2. On the other hand, it presents two types static ads that a fixed advertising that does not change and does not generate any kind of interaction, and dynamic ads inserted in real time running the game so that the collection of information, data and analysis are updated, and is adapted to users (Gil, 2008).

An example is the Fortnite metaverse, where scenarios have been designed to advertise entertainment content from companies such as Marvel, Disney, the Super Bowl, Netflix, among others (Vergara, 2020). Likewise, advertising content is advertised on digital e-Sports platforms. Figure 8 below shows Marvel's marketing and advertising campaign to promote objects, weapons and costumes of Avengers superhero characters in the virtual game Fornite.

Figure 8. Marvel in the metaverse



Source: La Tercera

4.4.2. Interactive virtual experiences

Companies and brands are creating virtual spaces within the metaverses of different developers to create and offer their users and customers' immersive experiences of their services and products, in a way that will help them connect with younger generations and position their brands within these platforms.

An example is the Wendy's brand, an American fast food restaurant, which opened its virtual restaurant, called Wendyverse, within Meta's Horizon Worlds virtual platform, which Meta stated that users will be able to move behind the counter, interact with other users and participate in adventures. In figure 9, the metaverse of the Wendy's fast-food restaurant is presented

Figure 9. Wendyverse



Source: Marketing Ecommerce

4.4.3. Virtual flagship stores

Pereiro (2022), indicates that a Flagship Store is an establishment that represents and connects a brand with the customer, is designed to reinforce the image, transmit corporate values, and generate brand experience for the customer. Its purpose is not to sell products and services, but to generate a differentiating and unique customer experience, and to transmit the essence of the brand.

These Flagship Stores, which are more common in physical shops, are also opening up to the virtual world. There are different brands that are venturing into the metaverse through these shops, especially retailers such as fashion, consumer, sports, and more.

For example, the Spanish brand Silbon, from the Andalusian region, created its shop in the metaverse within the Decentraland ecosystem. Imitating the design of its physical flagship store in Cordoba, as it was its first shop. Its design seeks to reflect the futuristic and gamer aesthetics of the virtual space related to the classic and elegant style of the brand, inside the establishment visitors will be able to identify with the avatars designed by the company, and observe and explore the decoration as if it were an art gallery. By interacting with the images, they will be directed to the brand's e-commerce to purchase the product. This opportunity will help complete the user's experience with the brand, according to Pablo Lopez, CEO of the company (Banda, 2022).

Figure 10. Silbon in the metaverse



Source: Europa press

4.4.4. CGI Influencers and Meta influencers

Luis Rodrigo-Martín, Isabel Rodrigo-Martín, and Muñoz-Sastre (2021, p.69), argue that CGI⁶ influencers, known as virtual influencers, are "avatars created through artificial intelligence and augmented reality techniques that allow them to combine the communicative and advertising possibilities of the traditional influencer with absolute control of their activity and "life" in the networks". Cyber influencers are successful on social networks, providing visibility for the products of major brands such as Gucci, but they are also capable of self-managing their social networks, recognising the trends and preferences of their followers, who often number more than one million.

Also, unlike traditional influencers, they are available, they do not set conditions, nor do they cause problems or scandals. However, as they do not age and are robots, they can generate a certain degree of distrust in the public (Miranda, 2021). However, through the metaverse, virtual influencers will be able to interact with their audiences, creating new experiences with them through their avatars (Guglielmetti et al., 2022).

In addition, González (2022, p.30), mentions that:

Dichos perfiles tienen mucho que ver con el metaverso, ya que gracias a este el poder de los influencers virtuales se está incrementando con creces. Dentro del metaverso ya han realizado sus primeras apariciones como es el caso de Decentraland con la Metaverse Fashion Week [These profiles have a lot to do with the metaverse, since thanks to it the power of virtual influencers is increasing by far. Within the metaverse, they have already made their first appearances, as is the case of Decentraland with the Metaverse Fashion Week].

Therefore, virtual influencers are digital avatars made by means of artificial intelligence and computers that have the purpose of representing brands through communication and advertising on social networks, similar to current influencers such as Kim Kardashian. Likewise, companies are creating their own influencers according to their potential customers. The most recognised influencer is Miquela, who has an Instagram account with the user lilmiquela, currently has more than 2.8 million followers and carries out promotions with important fashion brands such as Calvin Klein; according to marketing experts, these influencers will be able to interact with their followers through the metaverse, by means of avatars, and not only by text messaging or likes that social networks allow, strengthening their presence and relationships with their followers.

⁶ Computer-created virtual people.

The following figure 11, presents the Metaverse Fashion Week (MFW) event held last year and organised by Decentraland. This event was attended by both real and virtual influencers, among the virtual influencers were Miquela, Shadu, Maya, the latter being an influencer designed by the brand Puma.

Figure 11. Metaverse Fashion Week



Source: Conteudo

However, meta-influencers are considered to be individuals who have a presence and a large following on social media, who are currently entering and making a significant presence in the virtual world. These types of influencers build and generate influence throughout their multi-channel network by being connected online (Rosicart, 2023).

Within the metaverse, influencers will be able to create unique content and experiences, reach a new niche of virtual followers, and connect with their followers on higher scales than they could achieve in reality. Moreover, within this three-dimensional space, they will not be subject to the controls and restrictions imposed by digital platforms, but will be able to own their own digital spaces and own their own content and work through NFTs (Makridis, 2022).

4.4.5. Virtual Events

As mentioned in previous sections, virtual events such as the Travis Scott concert and the Metaverse Fashion Week have taken place within various metaverses. Thus, all kinds of events of any theme can be organised, from art fairs, concerts, to business conferences, allowing the intensification of gamification practices, i.e. increasing the participation and interaction of attendees (users), allowing for more dynamic interactions and events with a high degree of creativity, actions that allow companies to present and demonstrate their most attractive features (IM Editorial Office, 2022).

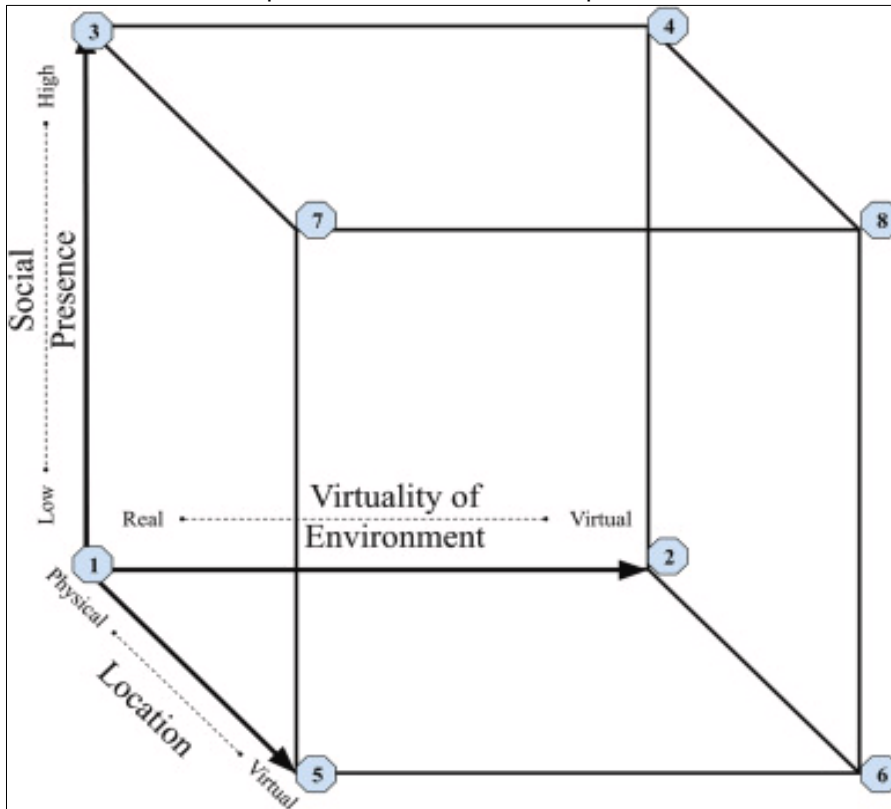
Young et al (2022), proposes to integrate the three dimensions of virtuality which are environment, location and social presence to develop and classify virtual event types by means of a SPEL cube, which gives researchers and designers the ability to create unique event experiences for users. Explaining each dimension:

- **Virtuality of the environment** refers to the level of realities ranging from the physical to complete virtuality, i.e. the ability of technologies to combine different levels of presence between the virtual and the real. With reference to events, it allows to know the dimension of the user's location in order to create a personalised type of virtual event.
- **Location** distinguishes the difference between virtual and physical presence. The terminology around virtual events is classified with respect to the location of users. For example, Zoom conferences went from 10 million to 200 million users, due to the number of users requiring their presence in online video conferences.
- **Social presence** is the subjective feeling of closeness between users that, within the development of virtual reality, allows to understand the enjoyment of the participants and the innate characteristic of human beings as social beings. In the context of virtual events, there is a difference between social presence and telepresence, because individuals have different perceptions of their virtual presence, and the appreciation of distance influences their feelings of closeness. For example, in business events, users' perceived distance influences the performance of virtual teams with respect to decision-making. In addition, their emotions are affected by virtual characters, objects and spaces.

The following graph 11 presents the different dimensions of virtuality in which a virtual event can be designed, for example, in vertex 2 can be developed in trade fair exhibitions or industrial presentations that do not require a social presence. The third vertex is for events designed in a completely face-to-face manner, where there is a greater likelihood of feelings of closeness between users, the opposite difference that occurs in vertex 8, which are completely immersive events and therefore require the availability of appropriate technology for their execution and to achieve a social presence. The fourth vertex is for augmented reality events because it combines the physical world with the virtual environment. Vertex 5 is for videoconference events where the location is completely virtual, but does not require virtual environments and the social presence is low. Vertex 6 is for events that require VR in virtual environments that do not require interactivity between users, such as virtual parades.

The seventh vertex is for virtual events that do not require virtual reality, but do require high social interaction because of the appreciation of art and culture and the need to feel present, such as festivals and sporting events or art exhibitions.

Graph 11. Dimensions of the Spel cube



Source: scientific paper by Young et al. (2022, p.3)

4.4.6. Collectible and membership NFTs

Chapter 2 defined what a Non-Fungible Token (NFT) was, in short, a certificate of ownership of an item or service created within the metaverse. Focusing on NFTs in practical cases for e-commerce activities, applied marketing has been carried out for collections and memberships.

In reference to special collection NFTs, their approach is to generate sales strategies by auction or a fixed price, offering limited and exclusive branded items, for example: in 2021 Coca Cola promoted a collection of NFTs in Ethereum, so, to acquire the collection it was necessary to obtain the cryptocurrency (ETH). This collection consisted of four NFTs, offered in a single auction. The first NFT was a vending machine from the 1950s, inside of which were the other three tokens, including a wearable⁷, an inflatable jacket

⁷ Electronic devices used by people as accessories or wearables, which are able to connect to other technologies and provide data.

that represented the clothing of the deliverymen; a sound visualizer that makes a bottle of the drink when uncorked; and collectible cards from the 1940s. A striking feature was that the tokens offered only for the metaverse, only the fridge was given as a physical prize to the winner of the auction (Plaza and Herrera, 2021).

Figure 12. CocaCola Tokens



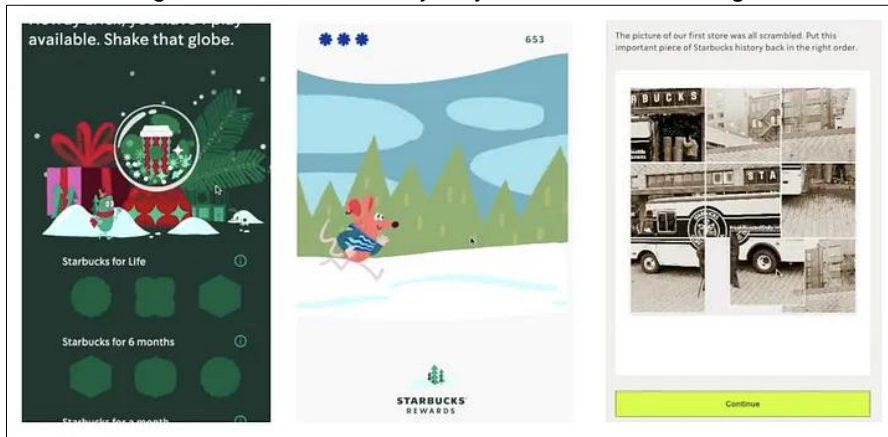
Source: Forbes Colombia

On the other hand, NFT memberships are assets that act as a pass ticket for the customer, offering them the possibility of acquiring tickets to exclusive events and venues, acquiring unique items or any other item that their entry or acquisition requires these tokens. This access is achieved when the cryptocurrency wallet or any means of payment is linked to the brand. This type of marketing builds a close relationship between customers and their brands, because they can acquire all the exclusive benefits offered by the company (Garcia, 2022).

Materialising the definition, in 2022 Starbucks announced its first loyalty programme based on blockchain and the future of the web experience³. Creating a digital community that offers immersive experiences through Starbucks Odyssey, so that users can access exclusive brand services and experiences, and generate a connection between members of its Starbucks Rewards loyalty programme. These collectible tokens, called

travel stamps, can be acquired through bank transfers or as a reward for completing Starbucks Odyssey games or challenges. Accumulating travel tokens will provide points so that users can then access immersive experiences such as virtual espresso martini classes, access to products, collaborations with artists, participation in exclusive events, or trips to coffee farms in Costa Rica, according to the blog post published on the company's website (Starbucks, 2022).

Figure 13. Starbucks Odyssey Games and Challenges



Source: Uxdesign

5. E-COMMERCE IN THE METAVERSE

“Consumer interest in the metaverse focuses on social interaction and commerce” (Monsanto et al., 2022, p. 53). In other words, the interests of metaverse users will not only focus on establishing social relationships through virtual platforms, but through this interaction and experience, companies and users themselves will make room for commercial transactions, a challenge for both the marketing area and for the e-commerce team itself in creating and improving the quality of shopping among cybernauts, shopping experiences that should be similar to the real world, through the incorporation of virtual, augmented or mixed reality technology, and others. A challenge that will transform the e-commerce that is commonly performed, or even some authors consider it the transformation from e-commerce to v-commerce or meta-commerce.

Retail-focused companies are the sector with the strongest presence in virtual worlds, driving innovative methods of e-commerce (Joy et al., 2022). A table indicating the retail companies currently operating in the metaverse can be found on p. 70 of the appendices section.

5.1. Virtual business models

When explained in the section on consumer identity in the metaverse, it was mentioned that within this virtual world there is the possibility of building an economy, in the case of the avatar, a means for companies to offer NFT-authored digital assets to users of virtual worlds, mostly focused on Skins⁸, in a way that allows them to personalise their avatars. This context is what D2A or also considered virtual to virtual V2V is all about, a commercialisation of items, goods and experiences offered in virtual worlds targeted solely at avatars.

In 2019, revenue from skins investments raised \$20.6 billion, in the free-to-play category. In the same year, League of Legends earned \$1.5 billion in revenue, outpacing Fortnite by \$5 billion. And by 2022, Juniper Research estimated that investments in skins and loot boxes⁹ would reach \$50 billion (Parkash, 2022).

This new business model is the evolution from direct to consumer (DTC) to direct to avatar (DTA). This evolution foresees the disappearance of the supply chain process, which can be replaced by design sprints and their previews. In this way, there will be no

⁸ Cosmetics that change the appearance of avatars in video games, according to Juniper Research.

⁹ Random packs of items in the games. <https://www.juniperresearch.com/press/loot-boxes-and-skins-gambling>

logistics management or direct delivery distributors to the final consumer or any similar type of intermediation. In other words, D2A allows brands to have a more direct contact with the end consumer, through their avatars. As a result, companies will be able to focus on creativity, 3D design and prototyping, and direct digital marketing of their products, reducing costs and generating new types of economies with greater scale and speed. According to Ryan Gill, CEO of Crucible (Hackl, 2020).

Different sectors are moving into the direct to avatar marketing experience. The fashion industry is becoming more relevant, with luxury brands such as Balenciaga, Gucci, Ferrari and more.

On the other hand, the D2A experience allows companies to market their products through other models such as Virtual to Physical (V2P) in which users purchase a good or experience in the virtual world to obtain a benefit in the physical world, and sometimes also a benefit in a virtual form. Similarly, the Physical to Virtual (P2V) model involves the purchase of a good or experience in the base dimension to acquire and/or unlock a benefit in the third dimension (Hackl, 2022).

The Virtual to Physical model drives sales of physical products either through augmented or virtual reality. This new form of e-commerce allows customers to visualise brands' products three-dimensionally through a device, giving them a greater sense of the product; and companies can reduce the size of their physical shops and display stock (Gollop, 2020). For example, IKEA Kreativ, which was launched in 2017, allows individuals to take several snapshots of a room in their home and decorate it with products from the IKEA catalogue, giving them a 3D visualisation of the items in their room and the option to save the products they want in their shopping cart for later physical purchase (IKEA, 2023).

The Physical to Virtual model makes transactions simpler for people who do not have a high level of knowledge or experience with NFT or blockchain (Hackl, 2022). In 2021, the company MGA Entertainment, in collaboration with Ionic, launched a collection of digital cards of LOL Surprise dolls, cards that are made with non-fungible tokens and present a QR code so that people who acquire them can exchange them with digital rewards on the Play LOL Surprise portal, these rewards can be tokens, NFT, among others; in this way, users can collect them or carry out commercial transactions with them in virtual worlds. These digital cards were offered in physical packs and marketed in different retail outlets in the US and Europe such as Walmart and Amazon (Hernandez, 2021).

5.2. Decentralised E-commerce

As the Blockchain and other technologies are developed and implemented as technological tools for the construction of the metaverse, this virtual world will be decentralised. Although currently large technology companies seek to control virtual worlds, turning them into centralised environments like today's internet. However, current metaverses such as Decentraland are demonstrating that decentralisation can be consolidated (Grandury, 2022). A decentralised metaverse gives virtual world users control over their own data and virtual assets. To achieve full decentralisation in the metaverse, e-commerce must also be transformed to decentralisation.

E-commerce currently presents various problems related to privacy, autonomy and data protection, security, transparency, the high cost of logistics intermediaries, and the high fees of centralised e-commerce platforms. Against this backdrop, the involvement of the Blockchain in digital commerce encourages its decentralisation. With regard to cost reduction, the Blockchain eliminates intermediaries and the centralisation of digital platforms that are responsible for increasing prices and generating a monopoly sector in digital markets. In relation to transactions, it offers a greater number of payment methods that are more secure and automated, and a better authentication system. It also generates that transfers can be made using cryptocurrencies and payment cards based on this technology, which is important for commercial payment transactions in virtual worlds. Moreover, with its blockchain structure, data transactions and the protection of data information will increase transparency in transactions, protecting the security and privacy of users (Aydođan and Aydemir, 2022). On page 71, a table is presented that encompasses and compares the contribution of blockchain in traditional e-commerce to make it a more decentralised network, influencing factors such as costs, trust and transparency in payments, data security, SCM, and system reputation.

On the other hand, in order to consolidate transactions in virtual commerce, through the blockchain, smart contracts can be entered into, which provide greater guarantees and efficiency in commercial transactions and minimise the risk of fraud or non-compliance. As indicated by Ballabriga (2018), these contracts are designed to be self-executing, without human intervention, so the processes are faster and more accurate, reducing the possibility of human error, fraud or malicious manipulation. In addition, these types of contracts use blockchains such as Ethereum or Solana, are immutable and cannot be

modified after their creation. Currently, these contracts implement NFTs and are the basis of DeFi¹⁰ and DApps¹¹ (Truong, Le and Niyato, 2023).

Therefore, decentralised e-commerce will in the future create new forms of trading practices within the metaverse, due to its very nature promising to be a more secure and transparent system, and being a blockchain-based system it will provide greater autonomy and control to users over their transactions, eliminating third party intervention. Creating a more reliable and efficient trading environment in the metaverse for buying, selling and other commercial transactions on virtual assets.

5.3. Virtual economy: Means of payment

The economy in the metaverse will eventually undergo further consolidation, where not only the entertainment sector will generate significant revenue and profitability figures. The metaverse will transform various industries and markets such as the financial sector, retail, education, health, real estate, among others (Orgaz, 2021). Therefore, within this virtual ecosystem users will create new experiences that can buy, interact, play, learn, exchange virtual assets and even currencies. These sets of activities are realised with specific virtual transactions or tokens that operate in today's metaverses.

According to the Bloomberg Intelligence report (2021), the market opportunities associated with the metaverse could reach 800 billion dollars by 2024. This information indicates the great economic potential that this new form of digital consumption and interaction is generating.

The following sections will discuss the functionality of digital wallets as a means of transferring digital currencies, which in turn in virtual world transactions comprise cryptocurrencies, tokens and virtual currencies.

5.3.1. Digital Wallets

The digital wallet is a software that acts reciprocally with blockchains, which by accessing it you can observe account balances, send and receive funds, and transfer tokens from the metaverse, as well as obtain information necessary to carry out cryptocurrency transactions on the blockchain. It includes an identifier in the blockchain, being of public addresses and private keys, which allows coin transactions to be carried out. There are

¹⁰ Decentralised finance is a set of financial applications based on blockchain technology that operate with digital or virtual assets, and that do not involve financial institutions in the course of transactions.

¹¹ Financial technology that provides financial services without the intervention of intermediaries such as authorities, central banks and other financial institutions.

two types of wallets: hot wallets that are connected to the internet, such as Binance, and cold wallets that are physical and not interconnected to the internet network (Medranda and Arcos, 2023). The best known digital wallet is Meta mask, which is compatible with various types of blockchain such as Ethereum, through which transactions can be made with smart contracts and access decentralised applications, known as DApps. In addition, its presence will be functional for the metaverse, due to the fact that it is a cryptobillet that has access to different cryptocurrencies, non-fungible ERC-20 tokens and gaming assets (Pocayo, 2022).

Therefore, digital wallets have a strong potential to revolutionise virtual transactions due to their ability to provide secure payment systems through robust blockchain encryption methods, making them crucial tools for everyday transactions within any decentralised platform such as the Metaverse.

5.3.2. Digital currencies

Digital currencies are the means of payment and transactions of assets within the metaverse, for practical reasons and based on the research, three types of means of payment or tokens of representations are presented, which are cryptocurrencies, tokens and virtual currencies, in each section their definition, the differences that exist between them and examples of digital currencies that circulate in the current metaverse.

5.3.2.1. Cryptocurrencies

Cryptocurrencies, considered by some authors as crypto-assets, are a type of digital money that interact within online platforms. These digital currencies are based under an encrypted system (peer to peer) on decentralised computers, so their algorithms protect the tokens native to a particular blockchain and are not controlled by a financial institution or government authority. They serve as a payment instrument for transactions on digital and virtual platforms. Their value varies according to market valuations, but they are not fixed to a currency or exchange rate, and are vulnerable to any economic imbalances such as inflations or deflations (Egaña, 2018).

In virtual worlds, digital assets are fungible and therefore, just like a real currency, they can be exchanged with another asset and are indistinguishable from each other. In addition, these metaverse currencies also fulfil the three basic functions of a physical currency, firstly that they are a medium of exchange for trading virtual assets and services, secondly they have a unit of account, i.e. a numbering of value, and finally a

measure of value, which by means of digital wallets metaverse currencies can be saved to preserve their wealth (Hackl, Lueth, Di Bartolo, 2022).

In this sense, in order for economic activities to be carried out in the metaverse, their transactions must be valued by means of cryptocurrencies, among other virtual means. However, these cryptocurrencies do not differ in total with physical ones because they meet certain characteristics that allow their value and exchange in virtual assets and can be used in various scenarios such as events and e-commerce that take place in the metaverse.

Below is a table of the top seven cryptocurrencies most widely circulated in today's metaverses, economic data obtained from Forbes and Crypto.

Table 3. Characteristics of the main cryptocurrencies in the April 2023 metaverse

Cryptocurrency	Blockchain	Market Cap	Company	Description
Internet Computer (ICP)	Internet Computer blockchain	\$2.9 billion	DFINITY Foundation	Replace the centralised Internet with an open source, decentralised and more inclusive one.
ApeCoin (APE)	Ethereum	\$1.51 billion	APE Foundation	Allows holders to participate in the governance of the DAO and access unique ecosystem services
The Sandbox (SAND)	Ethereum	\$1.09 billion	Animoca	It is for investing in real estate or any type of transaction within The Sandbox ecosystem.
Decentraland (MANA)	Ethereum	\$1.04 billion	Bored Ape Yacht Club	Oriented to the real estate market, where you can buy, exchange and sell real estate.
Theta Network (THETA)	Theta	\$1.03 billion	Theta Labs	For decentralised streaming content.
Stacks (STX)	Blockstack	\$995 million	Hiro System PBC	Designed for smart contracts and decentralised Bitcoin applications.

Axie Infinity (AXS)	Ethereum and Binance smart chain	\$933 million	Sky Mavis	Used to breed and trade axis in the Axies universe.
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Source: own elaboration. Retrieved from <https://crypto.com/price/categories/metaverse>

5.3.2.2. Tokens

Tokens can be physical or virtual tokens, which have value in a certain community in order to control its organisation and to enable interaction between its users and its products. In the digital world, a cryptographic token is issued by a blockchain network, which differs from cryptocurrencies because it not only fulfils the role of being a decentralised means of payment, but can be represented in different types of uses, such as being a "right" or "guarantee" to acquire a specific type of service, when tokens become the right over a good or service it is called tokenisation. In addition, another difference it has with cryptocurrencies is that it is built on an existing blockchain, i.e. they do not have their own. It is usually issued by a private entity that decides the design of the token's content and function, and is managed by a smart contract to function within a decentralised application (BBVA, 2023). In some countries these tokens are regulated, such as in the US for tokens sold in DAOs¹², in Switzerland for investment tokens and in Spain for security and utility tokens (Medranda and Arcos, 2023); furthermore, the tokens are not susceptible to malicious attacks or counterfeiting because they are based on a blockchain network. On the other hand, in virtual worlds they are often used as a means of payment or utility representation of a virtual good or service, or even seek to be a financial asset to execute all transactions that could be performed within the virtual platform.

Tokens can be classified into different types: non-fungible tokens, as defined in previous sections, are assets that are not interchangeable and that provide authenticity and digital representation to an object that exists in the metaverse. Service tokens that are mostly issued in an initial coin offering (ICO¹³) for a start-up to raise financial capital in exchange for a stake. Coin tokens in the metaverse, built on blockchain to execute financial activities within this cyberspace. Security tokens, which are linked to financial securities

¹² Decentralised autonomous organisation (DAO). It is an organisation of people who share the same interest, where their rules are set out in smart contracts and their transactions are stored in blockchains.

¹³ ICOs, known as Initial Coin Offerings, are a form of corporate financing, in which tokens, sometimes offered as bargain currencies for future access to services, rather than shares, are obtained by means of digital currencies under a blockchain network.

that function as a digital certificate of electronic shares, in that their registration is recorded in the blockchain network. Governance tokens, which grant the owner political rights to participate and make decisions in a decentralised autonomous organisation, can be acquired as rewards within these same organisations (DAO) or by exchanging cryptocurrencies (Palá, 2022). Examples of tokens as virtual currencies and governance are Decentraland's MANA and The Sandbox's SAND.

5.3.2.3. Virtual currencies

In the report on the analysis of virtual currency presented by the European Central Bank (2012), it mentions that this type of asset is neither regulated nor physical because it has a digital presentation, and is not issued by a central bank or other type of public authority, but is produced by a developer who manages its control and is used on various occasions as a means to carry out commercial transactions such as the purchase and sale of virtual goods and services, to make investments, to generate a savings fund (store them) or other activities that are accepted by the members of a virtual community. Furthermore, the ECB does not consider virtual currencies to be cryptocurrencies, i.e. a Bitcoin is not a virtual currency.

Having described the definition of a virtual currency, non-governmental digital currencies can be considered to meet the characteristics of this digital asset. Therefore, virtual currencies developed by developers of video games or virtual worlds are a type of virtual asset, which can be acquired through fiat currencies or through rewards from winning challenges in games. Among this category of coins are V-Bucks from Fornite and Robux from Roblox. Both coins are issued by their own developers and are used only on their platforms.

5.4. Marketing opportunities in e-commerce

The development of marketing in the metaverse is driving the use of new methods of e-commerce. The following sections will outline the changes that are emerging in the marketing of virtual goods and services, and how e-commerce will develop in the future.

5.4.1. **Personalisation**

Brands create their virtual worlds in different metaverse developers, creating virtual environments-rooms set to the company's own themes and to provide a personalised service to the customer. In this way, organisations connect in a unique way with their consumers, because it improves the experience, participation and identification of users with the brands. To achieve the creation of more personalised virtual environments,

marketing provides information on consumer preferences and behaviours and new consumer trends.

A demonstration of a personalised metaverse is the presentation of virtual showrooms, which is a new revolution in commerce, a new form of shopping journey where you get to know the products or services offered by brands. Through virtual showrooms that can be accessed via digital devices such as virtual reality goggles, brands showcase their goods and provide more personalised advice. This allows users to have a greater interaction with the items, in that they can not only observe them, but even touch and even try them, after the more immersive experience of the product, users proceed to have a greater impulse to buy, therefore, increasing the possibility of making a direct virtual purchase (Bermúdez, 2016).

On the other hand, the provision of more personalised goods and services can capture new audiences, increasing the network of brands' target audiences. Personalisation starts for consumers from the creation of their avatars, where companies can offer items, skins, and virtual clothing based on knowledge of their preferences, and personalisation reaches not only the retail sector but also different industries. This service tailored to meet consumers' expectations decreases the return rate of items, as is too often the case in the physical world, and increases their loyalty and satisfaction, as Ma (2022) puts it. However, with the incorporation of NFT into virtual goods, users can personalise their own products, which is valued by young consumers such as millennials and generation z, who prefer authentic products to mass-produced ones.

In a nutshell, these personalised virtual environments and goods are an innovative marketing tool that drives increased commercial activities in the metaverse e-commerce. There is no doubt that offering personalised goods and services in the metaverse will be a potential strategy to reach and retain virtual customers. With regard to the rooms, these environments simulate physical shops by presenting a variety of elements that represent the brand, such as decoration or customer service. Within these three-dimensional rooms, customers can explore their environment and interact in an immersive way with the goods, articles and services offered by the brands, generating a unique and attractive experience that drives virtual sales. In addition to providing three-dimensional presentation of goods, these virtual spaces should be used to provide more information about the brand, such as corporate values that will increase consumer loyalty and appreciation. This type of presentation is currently represented mostly in the fashion industry, real estate, automotive, among others.

5.4.2. Immersive experience

In relation to the previous section, virtual spaces generate an immersive experience of products for consumers. New extended reality technologies allow users to enter virtual spaces without the need to leave their home, suggesting that the metaverse will provide a more reality-like solution to long-distance shopping.

However, achieving absolute immersion of the consumer experience requires all or most of the sensory senses to be engaged. As Díaz (2022) puts it, driving the embodied experience is a simulation of the presence of our body in the artificial world through the virtual embodiment of an avatar, in which sensory senses such as audio, vision, touch, among other perceptual channels, can be activated. So, in order to achieve this bodily immersion, the technological devices that connect us to virtual worlds must respect natural movements and recreate the cognitive and perceptual experience, although the degree of immersion will depend on the levels of virtuality obtained when entering the devices; the greater the virtuality, the more immersive, continuous and consistent the process of existential experience will be.

In this context, interactive marketing seeks greater customer integration and engagement with shopping experiences. Set in a virtual world, interactive marketing requires advanced technologies to achieve absolute immersion of the consumer experience, becoming immersive marketing (Virket Agency, 2022). This new innovative strategy of gaining the attention, perception and engagement of the consumer's senses in the virtual world provides an added value and opportunity to the development of e-commerce in giving the customer a greater shopping experience in a more real way, compared to a simple second-dimensional shopping experience on the internet.

5.4.3. Live streaming

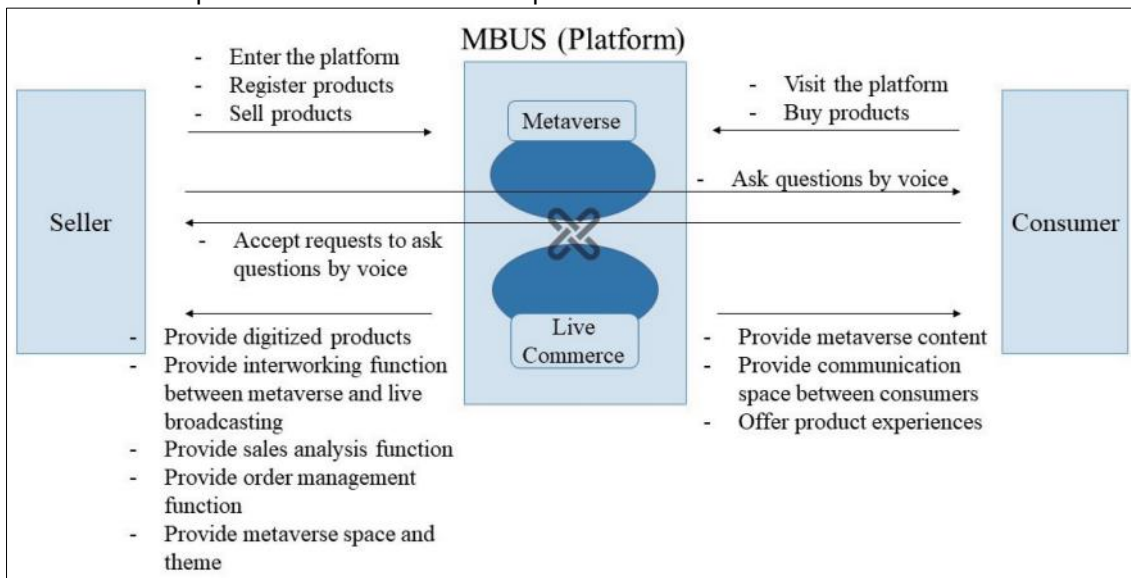
As Del Río (2021, p. 25) puts it,

Es la retransmisión en directo de videos en internet (live streaming). Tanto retener y captar la atención de los clientes, como ofrecer la información correcta sobre cualquier producto o servicio son las principales ventajas de promocionar tu e-commerce a través de un video en directo. Este streaming ayudará a convertir las visitas del directo (las personas viendo el directo o espectadores), en ventas y posibles futuros clientes fieles a la marca [It is the live broadcasting of videos on the internet (live streaming). Both retaining and capturing the attention of customers, as well as offering the right information about any product or service are the main advantages of promoting your e-commerce through a live video. This streaming will help to convert live visits (people

watching the live video or viewers) into sales and possible future loyal customers to the brand].

Live streaming in the metaverse goes beyond live online broadcasting. In this virtual ecosystem, users can immerse themselves within the platform, receiving a greater experience and perception of everything in their environment, based on three-dimensional technologies. According to the proposal of Jeong, Yi and Kim (2022), they propose a new business model in the metaverse in which live trading and digital twins are used, naming the platform MBUS. The authors state that in their finding this business model for sellers provided them with the ability to customise the virtual room environment, manage and obtain order and sales order analysis, perform live streaming and communicate with their customers by voice; however, shoppers have a better immersive experience, can visualise and interact with products, perform live queries by voice, make their purchases, and can communicate with other consumers, not only with sellers. The above described interaction of the live video metaverse platform is shown in the following graph.

Graph 12. Interactions that take place in a live stream in the metaverse



Source: Jeong, Yi and Kim (2022, p.224).

In other words, live streaming developed in the metaverse as an e-commerce strategy generates several benefits such as offering a more personalised service and attention to customers, creating a real and live communication between interlocutors, a more effective buying process and sales control, a better customer experience, and the opportunity for the brand to reach a wider audience, capturing their attention, interest and engagement in a more effective way.

Nowadays, live streaming is used more and more in the metaverse for events, concerts or educational classes. For example, the Fornite platform organised several live concerts in the metaverse by different artists such as Ariana Grande. These events proved that they have the capacity to reach a larger audience than physical concerts.

5.4.4. Search Engine Optimization (SEO)

It is a search engine that by applying strategic techniques and algorithms allows a website to be positioned organically and naturally on the internet, naming it an organic and natural system to differentiate it from other means of charging positioning such as Search Engine Monetization (Hernández, 2020). Therefore, the SEO allows a website to appear in the first pages as the main result of a search engine that has used certain keywords, increasing its traffic, positioning and quality of user visits.

However, the metaverse comprises different levels of immersive and virtual access, where keyword search is not fully adapted to environments that offer visual and sensory experiences, so search systems will evolve differently to adapt to virtual worlds. Currently, it is not clear what role or form the SEO will play, however, there are different versions of voice search such as Siri and Alexa technologies, and image search offered by platforms such as Google Lens and Amazon StyleSnap.

On the other hand, future search interaction on the SEO seems to have a greater presence in visual browsing. This practice, in large part, has relevance for social networks that have generated trends in visual search, influencing e-commerce. For example, platforms such as Instagram that offer virtual storefronts, i.e., the way in which products can be visualised by posting photos in stories and with a click of a button displaying their price or directing the customer to the online shop.

In addition, search platforms such as Google, both in its search and lens versions, incorporate camera technologies, computer vision and augmented reality. According to Hackl (2021), in the field of e-commerce and the retail sector, the Google Lens platform allows users to shop more interactively and easily. This is because the application offers a shopping option in its menu, where the user can take a screenshot or upload a picture of the good or its barcode, and the platform automatically recommends similar objects in its menu that can be purchased in different online shops. Also, the same application offers among its search results the option "view in 3D" to visualise the object in three-dimensional form and provide a better search experience for the user.

Also, by giving a further boost to visual search with AI and augmented reality, the Google maps app offers users the ability to explore the world around them in a more immersive way. For example, when a user searches for a restaurant, they will not only have the option to visualise the route, but will be able to access a live visualisation from within the app, viewing other details about nearby shops and restaurants or important landmarks, and even gain access inside these landmarks. In addition, the user will be able to access the menu, look at other similar options, see how busy it is, get information on recent reviews and view photos of popular dishes (CNET Highlights, 2021).

Undoubtedly, visual search is taking a greater reach on consumers, providing them with a better search experience with more personalised results, the same with the voice SEO, such as: Hello Siri where can I buy some white trainers, and this system will provide the user with a catalogue of websites to purchase the item. Therefore, within the metaverse where interaction is more dynamic SEO will tend to use optimal search mechanisms that relate to a better user experience, which includes dynamic mechanisms with augmented reality, voice and vision, or even later scans of virtual reality environments, mechanisms that only technology will be able to decipher.

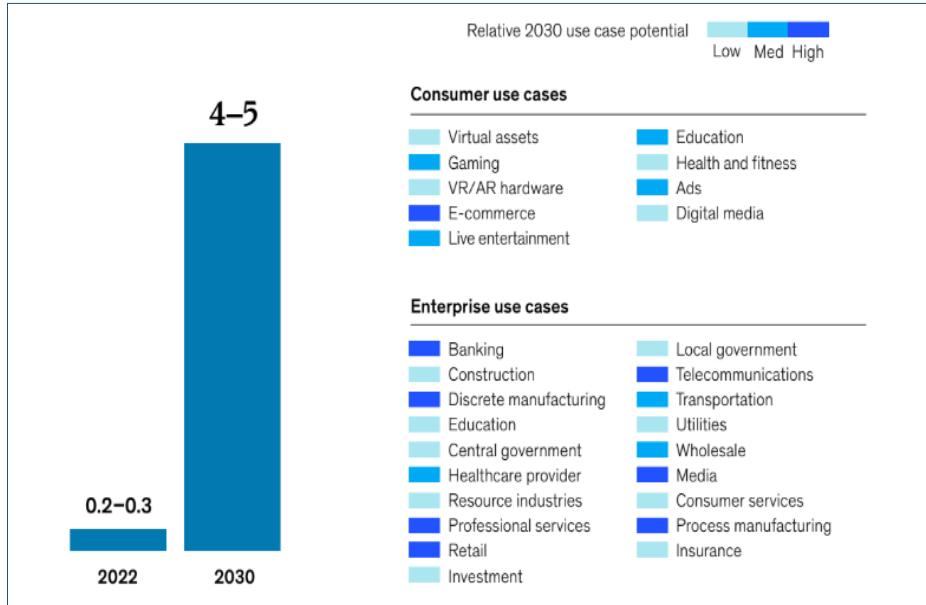
5.5. Expectations

The expectations of e-commerce in the metaverse is an unknown for many authors, but its consolidation is due to different factors. As this research work has developed, the importance of the advances, development and accessibility of technologies such as extended reality was specified, to recreate more real experiences for consumers in the process of exploring and acquiring a virtual good or service. On the other hand, it is important to create a community because they are responsible for the existence and the way the metaverse will function, in that sense, communities, developers and companies all have the possibility to make the metaverse a positive and empowered environment (Hackl, Lueth, Di Bartolo, 2022). Also, the means of payment must be easily accessible, convertible and secure so that consumers in the metaverse can carry out commercial transactions, such as tokens that are based on blockchain, but which are acquired through cryptocurrencies, which in turn are also acquired from fiat currencies. In addition, the creation of legal norms that address aspects such as data protection and cybersecurity, among other elements, should be promoted.

However, there are several studies on the economic impact that the metaverse could have on the economy and e-commerce. According to studies carried out by McKinsey, in the publication of the report Value Creation in the Metaverse, it is estimated that,

entering the third decade of the current century, the metaverse will contribute four to five trillion dollars to the world economy, where e-commerce could represent half of this value, between 2 and 2.6 trillion dollars (Elmasry et al., 2022).

Graph 13. Economic impact of the metaverse on the world economy in 2030



Source: McKinsey

Graph 13 shows that e-commerce is the most important driver of the metaverse economy, driven by sectors such as retail, professional services, banking and telecommunications, among others. These factors suggest that the metaverse could have a strong share in the global economy in the next decade. With respect to retail e-commerce, according to the report by Jain et al. (2022), Deutsche Bank estimates that by 2030 this sector will be worth two trillion dollars, equivalent to twenty per cent of total retail e-commerce across all channels, due to the fact that twenty-five per cent of people will spend at least one hour a day in the metaverse and the advancement of technologies that will enable access to virtual worlds.

Dumán (2022), states that the terminology Metaverse Commerce is the successor to e-commerce, because its structure is composed of e-commerce that presents characteristics of speed and convenience, plus retail that will provide greater personalisation and experience. The metaverse is the link that will bridge the gap between the immersion of physical shopping and the online shopping experience. Thus, the metaverse will enhance e-commerce practices and create unique shopping experiences.

6. CONCLUSIONS

The metaverse will evolve familiar aspects of today's internet and the way people navigate and interact within it. A new world parallel to reality, built in the third dimension that allows its users to explore and perform infinite actions. And which, in turn, within the first metaverses that currently exist, is generating major changes in various sectors and creating new consumer needs.

Marketing has the relevant role of connecting companies with the new virtual consumers, mostly composed of young adults and minors who are familiar with new technologies, therefore, companies must define the new patterns of need and consumption experiences that will depend on the motives of users to enter the metaverse, the ability to achieve their socialisation and the degree of immersion when connecting and interacting within these three-dimensional ecosystems. Likewise, when these virtual consumers enter the metaverse, they have an avatar, which is the presentation of the user's full, partial or imaginary identity, so being their virtual identity creates new needs that brands have the opportunity to satisfy.

Marketing is at an early stage in the metaverse, because this new virtual world is also in its infancy. However, marketing has a great potential to explore and use various mechanisms and strategies to create new unique experiences that it could only provide in virtual worlds, such as the virtual flagship store whose main role is to convey the essence of the brand in three-dimensional scenarios.

Answering the question raised in the introduction about how digital marketing has the ability to influence the development of e-commerce requires the metaverse. Initially, it begins by highlighting that the metaverse is a new extension of digital marketing that, unlike other channels, presents immersive, three-dimensional experiences. Features that will exponentially change the way in which virtual products and services are bought and sold.

Virtual e-commerce consumers increasingly demand unique products that adapt to their expectations and needs, and this is where digital marketing, with the knowledge of their preferences, offers to provide personalisation in all senses, from the virtual rooms themselves to the appearances and garments offered to customise the avatar; or modify their own articles thanks to the NFT.

Digital marketing offers immersive experiences in the metaverse e-commerce, i.e. brands in the metaverse have the possibility to create virtual environments in which

users, with the help of technology, can experience the feeling of being physically present in the rooms, allowing them to interact with virtual products and services, and the rest of their environment, which is not possible in today's e-commerce.

In the future it is expected that, with the further advance of technology, it will be more possible and concurrent live sales in the metaverse, a strategy that provides the possibility for brands to make sales in real moments. Where the seller can answer any questions or suggestions that the customer has about the items or services, at the same time that the customer is interacting with them and with the rest of the community. This scenario will create a more real connection between the interlocutors despite being a completely virtual interaction, and an opportunity for brands to break the distance barrier and reach the consumer in completely innovative ways. Therefore, as opposed to live digital sales and the possibilities offered by virtual worlds, the customer through his avatar will be able to interact with objects and his environment, while being attended live by a salesperson, an occasion that could not be done by making digital purchases in the second dimension.

The SEO strategy in its adaptation towards the development of the metaverse and its effect on e-commerce, it is estimated that it will move its keyword search techniques to more dynamic mechanisms, adapting to cutting-edge technologies such as augmented reality and artificial intelligence. Offering consumers search experiences with greater sensory capabilities, specifically in visualisation, voice and customer immersion between virtual and physical reality.

Another opportunity offered by marketing combined with non-fungible token technology is the marketing of unique products. Marketing practices using NFTs such as collectibles and memberships have been described in the paper. The possibility of marketing unique products allows users to create and profit from their own creations, i.e. to own and trade their own virtual works. In addition, NFTs that are in the nature of memberships provide the possibility for users to trade with other products and services of the company, functioning in this situation as a means of payment.

The diverse marketing practices that are being carried out in the metaverse with the different degrees of immersion and virtuality are driving the creation of new business models such as direct to consumer, which is the new way of reaching leads by making direct contact with their avatar. Therefore, a new challenge that brands must face because they have to satisfy needs that go beyond the physical, moving to satisfy the virtual needs of the digital personification of consumers in the metaverse. At the same

time, other business models are developing, such as virtual to physical and physical to virtual. Businesses that combine marketing between the virtual and the real world. On the other hand, there is no doubt that as the metaverse develops, and companies understand consumer behaviour and needs in virtual ecosystems, new business models will be created that will cause marketing practices to reinvent innovative forms of commercialisation.

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9. ANNEXES

Annex 1. Current retailers in the metaverse.

Primary focus	Companies	Metaverse	Intention/Examples
Extended connection between customer and brand	<ul style="list-style-type: none"> — Burberry — Louis Vuitton — Nike — Ralph Lauren — Zara 	<ul style="list-style-type: none"> — Decentraland — Roblox — 'The Game' 	<p>Create greater connection to customer and enhance brand and community experience</p> <ul style="list-style-type: none"> — Louis Vuitton: Distribution of NFT to celebrate 200th birthday (https://nftplazas.com/louis-vuitton-gamified-nfts-celebrate-birthday/) — Zara: Release of 'Meta Collection' (https://de.fashionnetwork.com/news/Zara-dringt-weiter-ins-metaversum-vor,1392146.html) — Ralph Lauren: Virtual shop for Avatars on Roblox (https://t3n.de/news/ralph-lauren-shop-roblox-1441623/)
New revenue stream and channel	<ul style="list-style-type: none"> — Adidas — Balenciaga — Dolce & Gabbana — Forever 21 — Gucci — H&M — Ikea — Sotheby's — Tommy Hilfiger — Vans 	<ul style="list-style-type: none"> — CEEK — Decentraland — Fortnite — Roblox — The Sandbox 	<p>Boost revenues via complementary sales in many cases together with physical goods</p> <ul style="list-style-type: none"> — Balenciaga: Provides possibility for users to produce digital objects themselves and transform into physical items (https://www.gq-magazin.de/mode/artikel/warum-ist-die-modewelt-so-besessen-vom-metaverse/) — Sotheby's: Users can curate and sell digital artwork or NFTs with the aid of metaverse branch (https://www.sothebys.com/en/articles/next-stop-the-metaverse) — H&M: In a concept cooperation with CEEK City customers have the opportunity to order clothing from physical stores after orientation in the metaverse (https://www.textilegence.com/en/ceek-presented-hm-metaverse-concept-store/)
New channel for information and communication	<ul style="list-style-type: none"> — Carrefour — P&G 	<ul style="list-style-type: none"> — Own environment — The Sandbox 	<p>Drive corporate communication and product information</p> <ul style="list-style-type: none"> — P&G: Consumer can interact with multiple brands for information purposes (https://us.pg.com/blogs/designing-for-the-future-metaverse/) — Carrefour: Host virtual career events (https://themediverse.com/supermarket-carrefour-is-now-holding-job-interviews-in-the-metaverse/)

Source: Deutsche Bank (2022, p.21)

Annex 2. Comparative table of traditional versus blockchain-based E-commerce

	Traditional E-Commerce	Blockchain-Based E-Commerce
Costs	<ul style="list-style-type: none"> • Fees paid to third-party intermediaries due to information asymmetry, moral hazard risk, privacy, and censorship risk • Fees paid to verify transactions 	<ul style="list-style-type: none"> • Decentralized peer-to-peer distributed network system eliminates the need for third-party intermediaries in the verification, storage and transfer of transactions • Peer-to-peer payment with cryptocurrencies • No currency restrictions in international trade • Small-scale payments are possible • Payments are non-refundable
Trust and Transparency in Payments	<ul style="list-style-type: none"> • Personal information provided to payment platforms • Transfer times are between 1 and 4 days • Third-party agents monopolizing personal information • Low payout efficiency • Non-transparent payment processes 	<ul style="list-style-type: none"> • Transactions are public • Elimination of the need for personal information with features such as anonymity and semi-anonymity • Transfer between consumers and sellers with cryptocurrencies and without intermediaries • Real-time transfers
Data Security	<ul style="list-style-type: none"> • Data management • Energy management • Scalability of computing infrastructure data-sharing among international businesses • Violation of the privacy of customers, businesses, and employees due to data leaks • Damage to customer loyalty • Loss of reputation for businesses • Strong centralized structure of large platforms in data management 	<ul style="list-style-type: none"> • Data immutability • Decentralized structure • Prevention of unauthorized use of data • Consumers are able to manage their own data • Tamper-proof data • High level of security with cryptography • High customer loyalty
Supply Chain Management	<ul style="list-style-type: none"> • Different practices of customs, insurance and tax in different regions • High risk of security • High intermediary costs • Lack of a common legal framework, falsified image of goods and services, and ineffective inventory management due to incorrect supply and demand data • Product origin and originality are unknown • The risk of bribery and kickbacks • Quality control performed by third parties 	<ul style="list-style-type: none"> • Cooperative trade between parties • Product origin and originality are known • Faster customs clearance process • Traceability of the order item to its source • Real-time stock management
Reputation Systems	<ul style="list-style-type: none"> • Different perception of quality between the business and the customer • Unfair competition • Uncertain and untrustworthy review and filtering processes 	<ul style="list-style-type: none"> • Reputation points are protected against fraud and manipulation

Source: Scientific article by Aydoğan and Aydemir (2022, p.660).