

The new paradigmatic investments for giant companies in the Metaverse field

الاستثمارات النموذجية الجديدة لشركات العملاقة في مجال الميتافيرس

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This study examines the most significant investment experiences in the metaverse field for digital giant companies such as Facebook, Roblox, Nvidia and others, which will be discussed in the study. Given that the metaverse is a newborn concept emerging from the rapid technological development and dynamics that have created unconventional digital environments, many specialized digital companies have ventured to invest in such contemporary digital environments. This is due to their growing material ambitions and the intensification of competition based on the principle of who will drive this locomotive of the future in order to control today's generations, whose needs, goals and behaviours are different from those of their predecessors. Consequently, these companies strive to win the bet by offering the best deal at the lowest cost to these contemporary communities, while achieving staggering financial amounts based on the quality of the service provided.

Keywords : Digital investments, intelligent media, metaverse, digital currencies.**ملخص:**

تتناول هذه الدراسة أهم التجارب الاستثمارية في مجال الميتافيرس لكبرى الشركات الرقمية العملاقة مثل: الفيسبوك، الروبوكس، نيفديا وغيرها من الشركات التي سوف نتحدث عنها في الدراسة. وبحكم أن الميتافيرس مولود جديد ظهر مع التطور والحركة التكنولوجية المتسارعة التي انبثقت عنها بيانات رقمية خارقة للعادة. ارتأت العديد من الشركات المتخصصة في مجال الرقمية الى خوض مغامرة الاستثمار في مثل هكذا بيانات رقمية معاصرة. وذلك نتيجة لازدياد طموحاتها المادية وشدة التنافس المتعاطم القائم على مبدأ من يقود هذه القاطرة المستقبلية، لكي يستطيع التحكم في الأجيال المعاصرة التي تختلف احتياجاتها و أهدافها وسلوكياتها مقارنة بسابقتها. وعليه، تعمل هذه الشركات على محاولة كسب الرهان من خلال توفير أفضل عرض وبأقل التكلفة لهذه المجتمعات المعاصرة، لكن مقابل تحقيق مبالغ مالية خيالية تكون مبنية على جودة الخدمة المقدمة.

الكلمات المفتاح: الاستثمارات الرقمية، وسائل الإعلام الذكية، الميتافيرس، العملات الرقمية.

Introduction:

Information and communication technologies have played a crucial role in the rapid development and emergence of modern societies that rely on digital foundations to meet their diverse service interests. Today's environment has made it necessary for people to adapt to these technological media, which serve as a compass for the future in the medium and long term. The dynamics of today's societies are different from those of their predecessors, as their ambitions and needs have changed. In particular, in the era of the third millennium, the majority of human requirements depend on what is known as technology, which embodies the words of the Canadian researcher Marshall McLuhan, who stated that the world had become a small village with the advent of the World Wide Web, the Internet. It can therefore be said that the needs of future generations have transcended time and space. In this context, institutions and companies operating

have made more efforts and investments in digital environments, such as the avatar-based metaverse, in order to embody the needs of these contemporary communities in more comfortable, faster and cheaper conditions.

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Consequently, with the emergence of numerous attempts to use the Metaverse as one of the technological factors to attract as many digital customers as possible, many specialized giant companies in the world of advanced media and communication technologies have allocated staggering financial sums to invest in this promising sector, hoping to reap financial returns that exceed the sums spent. They are trying to control the mechanisms of the world based on the so-called Web 3.0, which is one of the essential components of the metaverse. This will lead to a change in the course of life in contemporary society. Based on this, we will address:

- The main models that have made this experience.
- The ways and means of accessing the metaverse.
- The contributions made by these giants in this contemporary digital space.

I-The experience of Second Life in the metaverse:

This virtual space, similar to other virtual spaces such as World Chat, Sims, Habbo and others, is widely popular. The main characteristics that distinguish Second Life are its diversity, its ability to provoke and seduce, and its usefulness. It is dynamic and has a multiple impact on spaces and scenario writing, allowing interaction between users in their virtual world (building and editing elements or spaces). (Dialnet, 2022)

On the other hand, Second Life is considered to be one of the most important virtual spaces offering a range of possibilities in the field of education, including identity determination, student preparation and testing. Therefore, this space contributes to education by offering the possibility to experiment, use and prepare real-time simulations in a double way by sharing materials with other students online through videos, audio documents, texts or images .

In addition, there are many project innovators and experimenters who have collaborated with others to create articles and blogs in Second Life. In 2009 and 2010, the Open University of Catalonia proposed official formations such as the Centre for E-Learning or the Specialization Certificate in Virtual Worlds Applied in Education. This program consists of two courses: the first entitled "The Potential of Virtual Worlds as an Educational Tool" and the second entitled "Designing Training Activities in Immersive 3D Environments". Currently, this university continues to offer lectures in training related to education and information and communication technologies, or what is known as e-learning.

On the other hand, Second Life in the metaverse has been used in the field of pedagogical education by professors and researchers from different disciplines and educational levels. Some notable examples are the virtual complexes in Second Life created by higher education institutions such as New York University, Stanford University, Texas University in the United States, Sheffield University in the United Kingdom, Hong Kong University of Technology and Monash University in Melbourne, Australia (secondlife, 2022).

This form of virtual space, Second Life, is increasingly being used for its effectiveness in language teaching and the creation of educational resources. In this respect, there are international projects focused on the teaching of Romance languages, such as the Avalon project, supported by Life Long Learning, a European Union program that aims to provide training activities and courses for foreign language teachers through Second Life. Another project called Antonella Berriolo specializes in the teaching of Italian.

In addition, the SLATES research team organizes annual Educational Innovation Days to share research related to modern information and communication technologies. Within this framework, many experiments have demonstrated the effectiveness of using Second Life to teach foreign languages to university students. These include the control of teaching tools and virtual worlds and the teaching of French as a foreign language through Second Life as the most effective space for such purposes.

Second Life has also facilitated the provision of free language lessons, including Spanish, Italian, French, English and more. Notable examples include Cypris and Virtlantis for teaching English and Ayuda Virtual for teaching Spanish.

Education, on the other hand, is an organization that operates by renting virtual spaces within Second Life to provide lessons in various educational subjects. These lessons typically include language internships supervised by professors from their respective countries, as well as thematic sessions in areas such as tourism, cooking, architecture, theatre, and more. They also offer activities related to the language of instruction (**maps.secondlife, 2022**).

In conclusion, Second Life, as a form of the metaverse, has been able to meet the needs of teachers and support students in learning foreign languages, making it an effective tool for developing communicative skills, both oral and written. In this context, it can be said that Second Life is a suitable space for practicing language learning, both written and spoken, as it offers a voice function that can be activated as desired and needed (**Baynat & Mercedes, 2020**).

It is important to note that the benefits of Second Life in education, especially in higher education for foreign language teaching, are numerous in real-life settings. One of the main advantages is its effectiveness in preparing students to improve their performance in professional situations.

Moreover, the experiment carried out in the field of education through Second Life, as pointed out by the researcher Baynat Monreal, showed that students created digital stories as part of their virtual professional encounters, which serves as an example of immersion in the Second Life environment, as seen in the case of French students in their specialized field.

Moreover, future scientific indicators show that most institutional business relationships will be managed virtually. What's more, there is every indication that this will be embodied thanks to immersive and three-dimensional spaces similar to Second Life. For this reason, the involvement of university students in related initiatives can serve as an incentive to work in such virtual worlds (**Baynat & Mercedes, 2020**).

In order to materialize the experience of Second Life in the medium and long term, the Law Faculty of Jean Moulin Lyon 3 University in France, in collaboration with research centers and other universities, organized a series of meetings and discussions on the use of the virtual world of Second Life. This was done through the presentation of a book entitled "Law in Virtual Worlds" by Laurence Bich-Carrière, with the participation of specialists in commercial law, criminal law, labor law, economic theory, psychoanalysis and neuroscience. Each participant shared their perspective in their respective field of expertise, exploring how this virtual world, represented by Second Life, can be used.

During the discussions, the participants addressed a fundamental issue, namely the concept of the permeability into metaverse, where the problem was posed as follows: When does the real world affect the virtual world in terms of norms and sanctions? Furthermore, when does the virtual extend into reality in terms of competition, interviews and advertising?

The participants' answer was that the operator is an expert (exomaître) who cannot interfere with the resident's point of view. This means that the operator is a contracting party that can be well positioned for multiplication. Consequently, the possibility of litigation or legal action regarding rights acquired in the virtual world cannot take place outside what exists in reality. According to the participants' report, this suggests that legal fiction is not reality and that the term 'virtual' does not imply fiction (**Bich-Carrière, 2013**).

On the other hand, modern communication and media technologies have greatly contributed to the emergence of numerous electronic platforms that encourage individuals and institutions to continuously develop their services and provide permanent facilitations. Moreover, these advanced technologies have opened up innovative horizons in line with the objectives set, making Second Life the optimal and most effective model in this context.

On this basis, Second Life has a number of characteristics that make it a valuable tool in the field of education, whether for face-to-face or distance learning. This electronic platform provides convenient tools for teachers and students, offering the possibility of delivering lectures that are accessible to everyone, as well as educational and pedagogical resources available to students, researchers and various research activities.

Returning to the main characteristics that have made the Second Life experience one of the most successful Metaverses in the field of education and a leading model as a virtual space based on three-dimensional technology, we find the following: the ability to teach languages, text design, reliance on three-dimensional technology in the activation process and e-learning. In addition, it serves as a space for collaboration and exchange, such as conducting web-based lectures, exchanging texts, organizing virtual meetings using avatars. It also allows access to multimedia resources (audio, image and video) in different contexts and through different platforms. It is therefore important to emphasize that Second Life remains the preferred and most widely used metaverse on the Web.

Since 2003, many institutions have decided to use this three-dimensional virtual space to improve communication processes, hold lectures and organize courses to meet the needs of employees. In the education sector, the use of Second Life as a Learning Management System (LMS) has recently been adopted.

Furthermore, we find that most e-learning institutions and universities have gradually started projects to experiment with Second Life as a distance learning tool.

Similar to the Second Life experience, there are other equally important virtual worlds, including the virtual educational platform Moodle, which differs from other electronic platforms in many ways, as it is based on a Learning Management System. This platform has a unique feature, known as 'open source', which sets it apart. It also uses a more efficient framework that allows for the continuous development of new features. This extensive framework provides a competitive advantage over most commercial Learning Management Systems.

In conclusion, Moodle has been implemented by many universities around the world, particularly in France and Europe in general.

SLoodle is one of the add-ons to the Moodle platform. It was developed by the University of the West of Scotland (Ecosse) and allows Moodle to be used within Second Life.

Although SLoodle is a tool used in Second Life to display images, videos and text, its widespread use has led some to question its effectiveness in education. With this in mind, researcher David Castera provides us with some statistics on the use of this modern technology in education in some advanced countries. The statistics are as follows: United States 45%, United Kingdom 17%, Canada 5%, Australia 4%, Italy 3%, Spain 3%, Germany 3%, Netherlands 2%, New Zealand 2%, and France comes last with a use rate of 1% when it comes to SLoodle, which represents a significant disappointment in this field. This is why the researcher wants to take up the challenge and show the educational community in Second Life that the French have ideas to contribute in this field. (CASTERA, 2022).

Among the efforts made by researchers and specialists to increase the effectiveness of SLoodle technology in the educational field, there are several contributions in this regard. Some of them are the following:

The first contribution is the creation of a tool called SLoodle Présenter, which is one of the tools used in Second Life. It allows the viewing of websites, videos and images within the Second Life environment. This tool, like other SLoodle tools, requires the creation of a prior activity in Moodle for integration.

SLoodle is also known as the Portable Document Format (PDF) as the standard format for sharing documents and trying to find a way to view them in Second Life. It is now possible to view these files through a technology developed called Moodle Activity, which allows any PDF document to be automatically converted to a size acceptable for Second Life using a Uniform Resource Locator (URL) specified by the location of the resource. The user in Second Life simply needs to create the SLoodle Presenter tool and select the appropriate Moodle Activity to view their file in Second Life. It is worth noting that the SLoodle Presenter has replaced traditional video projectors, allowing teachers to present their teaching materials such as slides and videos.

The second contribution is the creation of the SLoodle Download Centre, which is an object created by a working team. The purpose of this technology is to allow the download of documents related

to the teacher's lectures through Second Life. The Moodle interface displays all the lessons that have been downloaded to the teacher's email account. By clicking on the 'add' button, one can participate in any of the files, as the SLoodle download centre suggests the download link to access the lessons directly.

In line with the third post, there is a technology called SLoodle Time Table, which is a timetable that can be controlled through Moodle and viewed through Second Life. It is important to note that this project is currently under development and one of the forthcoming improvements is the ability to synchronize with Google Agenda and Mac OS X's iCal format.

It is important to evolve the timetable as most users feel that the Moodle calendar is too complex, according to the SLoodle community. Therefore, the developers feel that Google Calendar is the best solution as it offers more flexibility.(SLoodle, 2022). So the main goal of the timetable is to simplify the user interface as much as possible and allow individuals to create their own personalized. Timetable.

In addition to the above, there is another equally important contribution known as SLoodle Metagloss. This is a tool developed by SLoodle that allows real-time access to the definition of terms used in the pedagogical framework. In this context, the object is linked to a glossary created in Moodle, which has to be created beforehand. This has led researchers in the field to create a panel that allows these definitions to be viewed through Second Life. It is worth noting that some teachers are accustomed to using a laser pointer in the classroom to draw students' attention to a particular item.

The integration of this tool in Second Life was made possible by adapting the use of a device called the Wiimote, which is a peripheral device connected to the computer, along with the classic controller known as the sensor bar. In other words, they act as an infrared receiver and transmitter.

Finally, this technology also makes it possible to change slide presentations by pressing the "+" and "-" buttons on the Wiimote device.

This is part of the Second Life project, which was announced in 2003 and was one of the first real-life experiments in the field of digital virtual worlds to make significant progress. However, despite its considerable progress, the project has faced technical barriers that have posed challenges along the way.

II - The Artprice Metaverse:

is an immersive virtual space that allows for the emergence and creation of artistic creativity, drawing on 25 years of experience in the creative economy. In this context, artists are challenged to overcome obstacles and technical or technological barriers in order to be free in their creative pursuits within the FabLab. The FabLab refers to an open space, accessible to the public, where various tools, in particular computer-controlled machines and equipment, are made available for the design and manufacture of products.

In the 21st century, an era characterised by enlightenment and a transformative phase in the art world in terms of creativity and virtual economy, the Metaverse d'Artprice represents a reality that adds value and wealth to many artists. Therefore, uniqueness remains a beautiful signature even in the virtual world of the Metaverse.

Furthermore, the Metaverse d'Artprice will give rise to interaction and the creation of an artistic community where curators and artists engage in narrative production based on social immersion, fostering the desired interaction sought by artists. As a result, the art market is being driven towards the Metaverse.

In another sense, the Metaverse d'Artprice encompasses a broad ecosystem based on supply and demand, where market participants, including selected artists, share common content with the artist at the core of the Metaverse. In this way, the space is opened to the artist in real time for the collective group through the Metaverse (Artmarket.com, 2021).

In addition, experiences within the Metaverse (Artprice) will become increasingly immersive for artists, providing simple and low-cost technologies to create a thriving and robust economy.

On the other hand, The Metaverse d'Artprice will occasionally make it possible to follow the progress of art market events such as exhibitions and art salons. Thus, individuals will be able to

constantly recreate themselves through the Metaverse alongside their artistic family, gallery owners, curators and art enthusiasts.

On the other hand, Artprice's White Cube organization and its clouds have transcended continents through their proprietary space technologies, enabling the existence of a hybrid, realistic virtual account that ensures the process of access or transition between the physical world and the Metaverse. The headquarters of the Metaverse (Artprice) has successfully obtained the governing body of the Museum of Contemporary Art to maintain order. In order to create this unique engineering and artistic work by Thierry Ehrmann, the European group TT, specialized in engineering and its three-dimensional dimensions, carried out the complete digitization of 3600 sculptures, annexed buildings and surrounding walls over an area of 7555 square meters, resulting in the digital preservation of a heritage of 1.2 terabytes.

It should be noted that the Metaverse (Artprice) is still under development, and it is therefore necessary to consider abandoning rigid computing, which is a real obstacle to creativity. Thus, it can be said with simplicity that the Metaverse in general will represent the future of the next generation of the Internet, based on Web 0.3, in the medium and long term, in a new universe based on multiplicity.

Therefore, the emergence of the so-called Metaverse Artprice is an invitation to enter the new century of enlightenment.

In addition, the NFTs market experienced a significant development at the level of Metaverse Artprice in the third quarter of 2021, reaching USD 45 billion.

It is expected that Artprice by Artmarkt will generate huge revenues in the future, potentially reaching tens of millions of Euros, considering its digital footprint on the web for nearly 25 years, created through its website as a global pioneer in information, attracting customers and active intermediaries in the art market . (**Artmarkt.com, 2021**).

According to a survey conducted by Harris, 11% of American adults have purchased what is known as NFT, undeniably demonstrating that they represent a pool of buyers for the creation of new revenue streams. However, this is only happening in the United States of America (**Artmarkt.com, 2021**).

On the other hand, analysts at Jefferies and a prestigious American investment bank expect the value of NFTs to double by 2022. The latter could exceed USD 80 billion by 2025. By comparison, the art market is currently worth around USD 10 billion. It is therefore a very strong alternative for the growth and development of this market, which has changed its model.

In this context, it is worth mentioning that Jefferies is considered an influential intermediary, especially in the stock markets, as it has acquired a share of its wealth by bringing together the largest US institutions by capital size, estimated at 1,000 institutions.

In line with this, Brian Armstrong, CEO of Coinbase, a digital currency exchange company based in San Francisco, California, with a market capitalization of \$73 billion, confirms that the sale of NFTs assets may become more important than crypto currency trading. Brian Armstrong adds in a recent announcement about his company's revenues that Coinbase's future may soon shift to the NFTs market.

He also states that they are very excited to enter the NFT market as it will become a large market for digital currency in the future and can also be significant as indicated by companies active in the digital currency field . (**Artmarkt.com, 2021**).

Meanwhile, Caty Tedman, an executive at Dapper Labs and overseer of the NBA Top Shot project, told CNBC that NFTs are here to stay (**Artmarkt.com, 2021**).

According to a news bulletin published by Reuters on 17 October 2021 on the larger space of the NFT market, OpenSea achieved revenues of \$2.6 billion in October 2021, a massive increase compared to the figure recorded in October 2020, estimated at \$4.8 million. (**Artmarkt.com, 2021**)

In the language of numbers, and according to many experts, the NFT market is expected to move from a niche market to a multi-billion dollar market in a few months. This development positions the

entire market, including ArtMarKt.com, to take a significant step forward and become an indispensable player. The market is therefore far from reaching its full potential.

On the other hand, NFTs are still in their infancy, but they are expected to have a bright and promising future, with widespread growth compared to Artprice by Artmarket, making them one of the key players. It is worth noting that Artmarket is the main driver of the art market, while Artprice is the world's leading information bank for prices, indicators and sales results of over 770,000 artists. The website Artmarkt.com is a French institution that regulates the online art market and sells artworks on the Internet, and is listed on the Paris Stock Exchange.

For your information, Blockchain is one of the optional platforms for the Art price by Artmarket institution in its business transactions conducted through crypto currencies, with Ethereum and Ether being among the main open source platforms relied upon by the aforementioned institution. NFTs are considered one of the preferred currencies in the digital art world due to their market value. In this context, major players such as: Sotheby's, Christie's, Phillips and Bonhams have adopted the Ethereum platform (**Artmarket.com, 2021**).

This is due to several reasons, including Art Market's ongoing awareness of the importance of the environment in which it operates, unlike other currencies that are characterised by energy intensity due to mining, which requires significant financial investment. For this reason, the Ethereum platform with Artmarket will be operated according to the lemodestruction principle.

According to Thierry Ehrmann, founder of Artprice and director of the server farm complex, mining cannot require any ethics to return the miners to the era of the digital proletariat.

In reality, the real added value of Artprice will come from the authentication of the artist and his work, starting from the databases it references.

Incidentally, Artprice by Artmarket has an open community of around 765,000 artists and 5.4 million members, including participants and contributors, with 4.5 million enthusiasts and art lovers, as well as 900,000 professionals in the art field, including sales houses, experts, exhibition salons, institutions and private banking offices (**Artmarket.com, 2021**).

The deepening of Artprice by Artmarket will merge its collections into the Metaverse economic system, resulting in accelerated development according to Metcalfe's Law. On the other hand, Artprice by Artmarket will work on sharing its collections within its own circles.

Based on this, the growth of participation is likely to reduce the barriers to entry into the crypto currency ecosystem. After several exchanges with the marketplaces of the NFTs and Artmarket.com, the best communication process remains in particular with the two main NFT markets: Opensea and Rarible.

Furthermore, the optimal choice for Artprice by Artmarket to build its own metaverse is to rely on the Ethereum 2.0 platform and the Proof of Stake path. Looking back at the history of Ethereum, we find that the network developers express their intention to modify the consensus system by moving to the well-known Proof of Stake mechanism in order to propose better performance.

In this context, the ongoing discussion about the energy consumption of crypto currencies and the Proof of Work protocol in general also plays a role in this environmentally friendly decision, which makes Artprice by Artmarket more sensitive. In the case of Proof of Stake, miners are compensated by holding validated nodes. These nodes must have a stake in the address in order to be able to authenticate and add commercial transactions at block level (**Artmarket.com, 2021**).

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By delving into the depths of Artprice, Artmarket will merge its collections into the excellent economic ecosystem of the metaverse, resulting in accelerated development, especially according to Metcalfe's Law. On the other hand, Artprice by Artmarket will work to share its collections within its own circles.

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On another note, Artprice has found recognition for its Proof of Stake guide since 2016, particularly in the writings of Vitalik Buterin, co-founder of the Ethereum platform, which justifies the maturity of the project and its transition to 2.0.

Vitalik Buterin's political and philosophical perspectives are in line with the values that Thierry Ehrmann has been promoting since 1987 through Artprice and the Serveur art club, which is considered a pioneering force on the Internet (**Artmarket.com, 2021**).

The Artprice Artificial Intelligence Community team and its members, including crypto currency enthusiasts, are pleased to confirm the transition to Ethereum 2.0, known as Serenity, from the beginning of 2022, through the re-qualification of the Proof of Stake.

According to Mr Thierry Ehrmann, President of the Serveur art club, founder of Artmarket.com and leading pioneer of the Internet since 1987, as well as the reference contributor to Artprice, he states: To better understand the historical impact of NFTs on the art world in 2021, we must go back to the Renaissance to participate in such a transformative change. We cannot underestimate the power of artists in embodying such a transformation, because the printing press invented by Johannes Gutenberg allowed artists to print their first editions.

This transformative change allowed artists, for the first time in their history, to earn an income and to control their own production in their workshops and factories. This leads us to say that we are currently experiencing a phase of transformative change at the same historical level with what is called NFTs (**Bich-Carrière, 2013**)."

III. Facebook's investment experiment in the metaverse:

This opportunity has not escaped the attention of the major technology giants who have been working to multiply their advertising in recent months. Facebook, now known as Meta, which is directly related to the Metaverse, has managed to acquire ownership of the world's leading virtual reality headset company, Oculus. As the Metaverse is the virtual world that the company is relying on for the future, it has dedicated all its material and technological resources to the development of this new virtual world. The company, through its CEO Mark Zuckerberg, has announced that it will create 10,000 jobs in Europe to develop and manage this new space, as it will enable future control of the technological domains within Web 3.0. (**geopolitique-profonde, 2021**)

These announced positions include collaborators, AI engineers, technicians and others to create its own metaverse, making it one of the pioneering initiatives in this regard (**Solly, 2021**). In this context, Meta aims to be a key player in the virtual and augmented reality industry (**Stein, 2021**). During the Vivatech 2021 salon, CEO Mark Zuckerberg announced that his company will allocate billions of dollars for investments in this type of modern technology to build an exceptional future (**Weldon, 2021**).

On the other hand, the Metaverse represents an opportunity for Facebook, which has changed its company name to Meta, to become one of the leading companies in it, allowing all industries, developers and inventors to showcase and embody this new world and this new chapter of Internet technology.

In addition, Meta's partner, Oculus, is working to become a technology giant in the metaverse by developing its device infrastructure, including glasses. On 26 March 2014, it acquired Oculus VR, a company specializing in virtual reality technology products, for around \$2 billion. It has also developed specific screens for this world, as well as suits and a distinctive new design for the dimensions in which the Metaverse operates, with the aim of being at the forefront of embodying and reaping the early benefits of this new world in a new realistic internet world. (bbc, 2014).

In this context, the General Manager of Facebook in France, Mr Lauraut Solly, says that Meta has worked on the development of virtual reality thanks to the Oculus masks, which contributed to the first feeling of living in this virtual environment. He also says that we have virtual reality glasses that will allow easy access to the Metaverse world for a period of 5 to 10 years. As for the use of the hands in virtual reality, it is similar to their use in physical space (with sensors that help to achieve this dream). Therefore, Meta is currently working hard to realise this dream by reinventing a new way of using hands in virtual reality. Just a few years ago, occult-style helmets were controlled by handles to access the virtual world, but later they were reproduced using gestures. Today, for example, smart technology companies such as Facebook and others have been able to reproduce or embody various physical features, such as facial expressions, in virtual space. All of this suggests that in the coming stage, contemporary society will experience noticeable changes in all aspects of life.

On the other hand, the owner of the Meta company, Mark Zuckerberg, considers the 1992 novel "Snow Crash" by Neal Stephenson, which introduces the concept of the metaverse, to be the holy grail of the Internet. It represents the new chapter in the evolution of the Internet (Solly, 2021). For example, humanity has lived for some years at the level of the Internet, using static and animated images, or what is known as multimedia. In the early days of the Internet, under Web 1.0, it was only possible to publish text. However, with the addition of video later in the use of Web 2.0, there was a noticeable change in the progress of the Internet. Going further, with mobile phones, especially smartphones, which have changed the Internet experience, this is known as immersion in the Internet, meaning that individuals live with the experience. In other words, within the metaverse, a person creates their own avatar that represents them in the virtual world and allows them to engage in social experiences specific to activities within this new world. This is what Lauraut Solly, General Manager of Meta in France, describes as a truly extraordinary technological frontier (Solly, 2021).

In addition, with its new name, Meta Company aims to be one of the pioneers, along with other giants such as Microsoft, in the field of the Metaverse. This mission is seen as a collective construction effort. This is why all the technological ecosystems of major institutions, including Epic Games, which specializes in video game development, have started to invest in it. This is also the case for developers and innovators in studios where virtual reality is used, and France is an example of this.

The rapid technological shift towards a new phase of the Internet, based on what is known as Web 3.0 in the medium and long term, has led Facebook to race to secure its position in this new virtual space called the metaverse. This was achieved by rebranding the company and giving it a new name in line with these developments. It became Meta, which is now seen as the parent company of Facebook, Instagram and WhatsApp. Interestingly, the aforementioned applications have retained their names, unaffected by the parent company's name change.

To embody this modern technological approach, Meta has been working to develop virtual reality headsets that provide access to the metaverse.

These innovative masks will allow individuals to engage in activities such as dancing in nightclubs with friends by embodying an avatar. They will also enable individuals and institutions to hold meetings in fully immersive digital spaces, connecting with counterparts around the world and simultaneously transcending temporal and geographical boundaries.

On the other hand, according to Mark Zuckerberg, Facebook's metaverse will exploit digital possibilities that make video games tangible. This is also the aim of the gaming company Epic Games,

which is trying to create its own Metaverse by incorporating its originally affiliated studio, Fortnite, into this project (**P. Slefo., 2019**).

It is also worth noting that the private company Epic Games is the exclusive advertiser for the global gaming company Fortnite, and the gaming company Minecraft is also a subsidiary of Microsoft.

It is worth noting that the electronic game Fortnite today serves as a survival game and is also considered a fully virtual social platform for the new generation. In this context, the famous rapper Travis Scott organized a virtual concert in February 2021, which gathered more than 12 million people in the metaverse (**Webster, 2020**).

Since Facebook, now known as Meta, acquired the leading virtual reality headset company Oculus in 2014, the initial idea was for Facebook to target the gaming market to enhance its highly successful digital advertising business.

However, the early versions of virtual reality headsets required a direct connection to a powerful gaming computer and there were few titles available, which hindered their significant development into a successful product. However, Meta, along with other specialized companies in the virtual world industry such as Roblox, Epic Games and Nvidia, had other ideas and opportunities regarding virtual reality and the metaverse.

To secure a position in this emerging virtual world of the future, Meta's CEO, Satya Nadella, recently announced that the company is working hard to build its own metaverse.

In this regard, Epic Games, a company specializing in video game development and software, announced in a roundtable discussion that they have made a financial commitment of \$1 billion to support their metaverse building ambitions. This is to ensure their position among the technology giants to participate in the management of this new space, which represents a significant modern direction for humanity in various fields in the future.

On the other hand, the CEO of Zoom, Mr Eric Yuan, announced that his company is considering the important role that both augmented reality and virtual reality will play in the future of work, especially in remote work, which will be the cornerstone for startups that represent the future of the modern economy.

In this context, it is worth noting that Meta has recognized that user behavior is gradually changing, which is why it has taken the first steps in the virtual world. The company has recognized that people need some incentives to access this world.

Meta also launched a new application called "Horizon Workrooms" in August 2021. This application works as a virtual reality application for conducting online meetings and conferences. It allows users to meet in virtual rooms where they can talk to each other and see each other in three dimensions. With various features available in the application, such as multiple screens and the ability to use office tools, users can engage in various activities such as work, learning and remote social meetings (**Horizon-workrooms, 2022**).

The application requires a number of technologies to make the metaverse experience useful, especially when using second-generation virtual reality headsets.

Therefore, according to Meta, this new Horizon Workrooms application helps to bring some of us together with the best new technologies that unite us for the first time in one experience through the second generation of these headsets, using features such as mixed reality desk, keyboard tracking, hand tracking, remote desktop streaming, video conferencing integration, spatial audio and new Oculus avatars. In related news, Meta (formerly known as Facebook) has announced that it has created a different kind of productive experience or a new type of productive experience

(**Meta-Quest, 2021**).

As a result, the initial criticism of the above has turned out to be quite positive, as there has been a noticeable increase in the sense of presence compared to videoconferencing, thanks to the integration of spatial audio, hand movements and facial expressions through avatars present in the room (**Hardawar, 2021**).

In addition, the Horizon Workrooms application also serves as a pioneer in Facebook's long-awaited multiplayer virtual reality arena. Perhaps more importantly, it is competing intensely with Apple on multiple fronts, drawing users' attention away from mobile devices to a new immersive three-dimensional environment where experiences are more innovative and enriching (**Thompson, 2021**).

Facebook, led by its CEO Mark Zuckerberg, has also announced its future ambition to become a pure meta-verse company (**Newton, 2021**). This will be achieved by leveraging its more than 7 years of investment experience in the Oculus virtual reality headset industry, as well as its vast global community of approximately 2.9 billion users (**Kraus, 2022**).

In this regard, Facebook has presented its vision through videoconferencing with Horizon Workrooms, using virtual reality headsets and a variety of tools to enable virtual avatars to play their roles through simulation.

Given the social networking platform's huge user base of 2.9 billion people, it is clear that it is working to select a product tailored to professional users for its initial release (**Krygowski, 2021**).

With the falling prices of virtual reality tools and the growing interest in them, experts believe that Meta is well positioned to connect users to the virtual world (**Lee, et al., 2021**).

IV- Roblox Experience in the Metaverse:

It is unlikely that a single company such as Meta will own or control the Metaverse on its own. However, it is clear that certain companies are better positioned than others to benefit from it and influence its development. In this context, we find Roblox, a company specializing in immersive electronic games, which describes itself as a metaverse gaming company. The number of daily visitors to Roblox's electronic games will exceed 46 million people by July 2021 (**Krygowski, 2021**). This has allowed them to engage in thousands of virtual experiences created by the company's development team. It should be noted that Roblox was originally a massive multiplayer online game launched in 2004 by co-founders David Baszucki and Eric Cassel (**Wikipedia, 2018**).

In addition to being a free game, Roblox generates revenue through in-game purchases using its virtual currency for such virtual transactions, particularly for products such as cars, skins and other items used in virtual experiences.

In the first quarter of June 2021, Roblox Corporation recorded a daily user growth rate of 29% on its digital platforms on an annual basis, as well as a 127% growth in revenue on an annual basis (**Krygowski, 2021**).

On the other hand, the most distinctive feature of Roblox is that users create the game platform themselves, making it similar to YouTube when it comes to video sharing. Based on this, Roblox Corporation is working on providing powerful tools to create free experiences to play with others.

It is important to note that when in-game purchases are made, the revenue generated is shared between Roblox Corporation and the users. Therefore, such a revenue sharing model is not found in other web-based multiplayer games such as Fortnite (**Fortnite, 2022**) or Minecraft (**minecraft, 2022**), where both playing and in-game purchases are imposed on users (**Krygowski, 2021**).

In another respect, the Roblox model turns players and developers into investors in their creations, leading to higher levels of engagement and significant revenue per user. Historically, Roblox has targeted a teenage demographic under the age of 13. However, around 2016, the company changed its strategy through a concerted effort to innovate its financial model. This included attracting new players from older age groups.

For example, Roblox invited famous artists such as Kanye West and Lil Nas to organize in-game music events. The company also launched innovative in-game advertising campaigns, such as "Gucci Garden", which created a special environment for users to visit, explore products and purchase digital versions of Gucci handbags for real money (**roblox, 2022**).

These efforts have also resulted in accelerated user growth, with a gradual shift towards older demographics. With the spread of the COVID-19 pandemic, Roblox's user base exploded, with the number of users doubling every day. In addition, financial spending on Roblox nearly tripled year-on-year, resulting in an increase in the company's market value of around \$50 billion. **(Krygowski, 2021)**

In this context, it can be said that Roblox Corporation has several key drivers to become one of the pioneers of the future metaverse. These drivers include an effective set of game development tools available to beginners, an in-game payment system, and a marketplace for content and related services.

On this basis, the Roblox platform can become an ideal use case for new virtual reality technologies, such as **(magicleap, 2022)** Magic Leap's immersive jumping experiences or Tesla's limited virtual reality training haptic suits **(teslasuit, 2022)**, which are being used in industries ranging from healthcare to manufacturing.

However, despite seeing new virtual reality technologies as a key missing piece, the combination of open industry standards that connect these virtual worlds, including Roblox, Fortnite, Minecraft and others, will be necessary for users to freely navigate the metaverse.

And interestingly, this problem has a real-world counterpart in software simulation, as well as a potential solution in the form of Nvidia's Omniverse platform. It's worth noting that the most popular electronic games, such as Roblox and other global open-world games like Fortnite and Minecraft, are probably the best representations of what these games could look like in the metaverse. The aforementioned games have a massive user base of over 100 million daily users, which qualifies them to lead and dominate this contemporary space for future generations. **(Krygowski, 2021)**

Therefore, according to experts in the field of smart technologies, Roblox represents the best comprehensive and pure play investment opportunity in this space.

V- The investment potential of Nvidia's Omniverse platform in the metaverse:

Nvidia is one of the most prominent companies in the semiconductor industry today and is globally recognized as a leader in the production of silicon chips used in computer graphics and cryptocurrency mining. Importantly, the company's latest engineering is being utilized and its Ampere architecture is in fact being adopted by almost all major cloud computing companies.

Furthermore, in 2018, Nvidia worked on introducing a new generation of graphics cards that produce significantly more lifelike images and videos **(Krygowski, 2021)**. The company used various algorithms to increase the resolution of low-resolution scenes, with the aim of producing realistic images. High refresh rates were also used to make scenes appear natural.

By 2020, Nvidia combined its gaming elements with digital technologies to introduce a new platform called Omniverse, a real-time collaboration platform **(nvidia, 2022)**. It serves as a common plumbing for third-party design software vendors such as Autodesk, a multinational American software company headquartered in San Rafael, California, that provides software products and services for the architecture, engineering, construction, manufacturing, media, education, and entertainment industries, and Dassault, a software company specializing in 3D design, 3D digital mock-up, and product lifecycle management solutions, to work together. **(nvidia, 2022)**

"The Omniverse platform consists of three main components that act as the core, allowing software tools from different vendors to use common definitions for 3D object properties, including shading, lighting and animation. This means that the physics engine determines the consistent and interrelated physical and motion properties of objects.

In summary, simulation robots are used for training and deployment using machine learning algorithms. The result is a feature-rich collaborative platform where software from different vendors can come together to create digital twins that can be fully optimized and validated before being built **(bimmerlife, 2022)**.

In this context, global carmaker BMW is using the Omniverse platform for factory planning across its production network, including training autonomous robots for predictive maintenance and data analysis (**bimmerlife, 2022**).

On another note, the current price for Nvidia's Omniverse platform is \$1,500 per user per year, plus an additional \$250,000 for a core server license, generating over \$27 billion in annual revenue (**cgchannel, 2021**). It will take some time for the Omniverse platform to make a significant contribution to Nvidia's revenues. However, advances in graphics and other areas will clearly benefit future iterations of the platform.

The usefulness of the Omniverse platform has been proven, with many companies embracing virtual collaborative design. As a result, experts in the field believe that there will be strong incentives for further software design packages to deal with this platform. It is also seen as an important step towards a single metaverse based on common industry standards.

With the launch of Nvidia's Omniverse platform in April 2021, companies such as BMW, Ericsson and Industrial Light & Magic were able to design digital twin presentations for their factories using the platform's ability to simulate the propagation of 5G waves (**nvidia, 2022**). This immediately attracted major global companies to the Omniverse platform.

In this context, Nvidia continues to contribute to this new virtual vision as a leader in the design of graphics chips and other products widely used in artificial intelligence and machine learning applications.

Nvidia's products are expected to play a significant role in the creation of realistic visual experiences in the metaverse and the integration of intelligence into production.

As such, there doesn't seem to be anything holding back research and development in this area. At this stage, it seems to depend on user behavior and the rate of integration, which will ultimately be determined by the customer's ability to extract value from the platform.

VI-Metaverse by Havas :

Three Havas Group agencies have announced the launch of their own metaverse called "Metaverse by Havas". The move is a dedicated solution to help brands reimagine themselves on the social web within the metaverse.

In this context, these brands have leveraged their strong experience in virtual worlds, including renowned groups such as Fortnite, GTA, LOL, FIFA and others. Havas Group companies have pooled their expertise to help brands understand, invest in and attract the best metaverses and communities, including (**Havas, 2021**) :

- Identifying the best opportunities for the brand
- Creating and enriching virtual worlds
- Designing avatars
- Liquidity in digital currencies known as NFTs (Non-Fungible Tokens)

Metaverse by Havas is a creative, media and commercial consultancy dedicated to brands in the new space of the metaverse. It addresses the challenges, storytelling, targeted experiences and revenue generation of brands.

In this context, Stéphane Guerry, CEO of the Havas Group, affirms that Metaverses are new and diverse media and open opportunities for brands. However, the question he poses is not "if we will get there", but "when and how we will get there". He explains that they have brought together top experts from three agencies belonging to the Havas Group (Havas Sport-Entertainment, Havas Paris Social and Socialyse Paris) to propose a serious guide for brands present in these virtual worlds.

It's worth noting that Havas has been involved in accompanying brands in these virtual spaces since 2008, starting with Air France in the virtual space of Second Life (**Havas, 2021**).

In 2020 and 2021, several widely popular campaigns were designed in the metaverse, including the creation of a custom avatar for the company Undercover in the video game Fortnite, targeting the

Blue Child Association. This campaign achieved great success and impact. Similarly, rapper Alonzo held a live concert in the virtual city of Los Santos, located in the southwest of the United States, as a promotional event for the Puma brand. Louis Vuitton also used the avatar concept to promote its luxury products, including bags, leather goods, ready-to-wear, shoes, watches, jewellery and sunglasses, through the League of Legends video game. In addition, the second season of the TV series produced by Canal Plus was recently presented in the Los Santos virtual space. (rockstargames, 2022)

These experiences have received a great deal of attention in the French and international press and have won numerous awards at major creative festivals such as Cannes Lions, One Show, Clios and others. (Havas, 2021)

There are other notable experiments in the metaverse, such as South Korea's experience with remote working. South Korea has explored the use of the metaverse to enhance remote work by enabling workers to interact and collaborate virtually, considering them as an integral part of the work team. In this context, participants can better interact with their colleagues in this modern digital space, attend meetings, explore new work opportunities, including contacting clients and starting new businesses (Maire, 2021).

In addition, the metaverse allows users to create avatars and collaborate with others using a virtual whiteboard, stream content to their mobile devices, take notes, gather information and interact with remote colleagues in a virtual meeting room that resembles their physical workplace.

It is therefore likely that these immersive experiences will continue to evolve based on current trends.

Conclusion:

Based on the efforts of the technology giants in the field of the metaverse, it is clear that they are striving to realize the futuristic dream for future generations amidst the emergence of virtual environments that form the backbone of this new creation. The metaverse has the potential to become a driving force for humanity in many areas of life. These major technology companies are working to provide the necessary conditions and capabilities to accompany these generations, while also reaping incredible financial resources that were not achievable in physical environments.

In this regard, the major intelligent technology investment companies are racing and competing to control the development and direction of the metaverse. In doing so, they aim to attract and influence the behavior of contemporary societies, convincing them of the effectiveness and productivity of such a metaverse to meet their diverse, previously unimaginable needs. The establishment of such modern spaces requires technology giants to provide affordable technological tools to access this virtual world, as well as advanced techniques to persuade modern individuals to accept and adapt to these digital environments, which may not be easily adaptable due to the different privacy and social backgrounds of people worldwide.

In general terms, the third generation (3G) of the Internet enabled the widespread presence of instant messaging on the Internet, as well as interaction with the textual content of these messages. The fourth generation (4G) of the Internet made it possible to share multimedia content such as images and videos, especially with the emergence of social electronic applications such as Messenger, Instagram and Tiptop, through which it became possible to view and comment on what was being broadcast and published. As for the fifth generation (5G) of the Internet, it brings with it a new technological ambition.

Furthermore, the fundamental goal behind combining the fastest and most powerful Internet network with virtual reality technologies is to achieve and create a modern virtual space called the metaverse, where users can exist in the form of an avatar and engage in social and economic interactions.

Despite the efforts of technology giants to materialize this contemporary virtual space represented by the metaverse, there are still some limitations that hinder this future project for future generations. Current media, for example, present obstacles to achieving total immersion. The quality of the display depends on imaging tools that are far from realistic. In addition, the interactivity of this modern virtual space requires technological advances. In this respect, there is a device called Quest Pro (Bell, 2022),

which incorporates new sensors designed to track facial expressions, eye movements and body shape through an advanced independent system. This device aims to find solutions to some of these challenges (FNB-Horizons, 2022).

If we look at this newborn (the Metaverse) from an investment perspective, despite the announced competition between technology giants who have allocated significant financial resources to make their mark in its creation, it will take an unknown amount of time to form a complete vision of the Metaverse before it can be realized.

These initial contributions by companies interested in this future project, the Metaverse, have manifested themselves in practical coordination of efforts either directly or indirectly in their operational activities.

Therefore, it can be said that its realization and success will be either in the medium or near future, regardless of the time it will take.

It is worth noting that there are three leading companies in the field of advanced technologies, namely Roblox, Nvidia and Facebook, which have so far embarked on this new experiment.

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