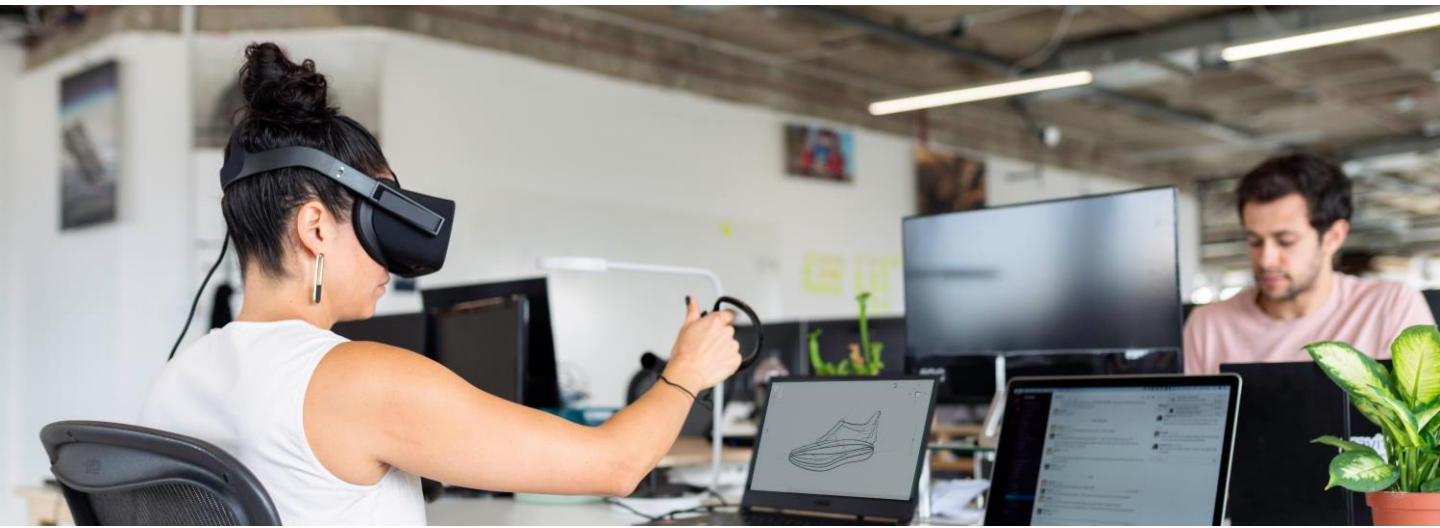


A person is shown from the chest up, wearing a black VR headset and holding two black VR controllers. The person is positioned in the center of the frame against a solid teal background. The lighting is soft, highlighting the contours of the person's face and hands. The overall mood is futuristic and immersive.

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Understanding The Metaverse

Enrique Fernandez-Pino
June 2022



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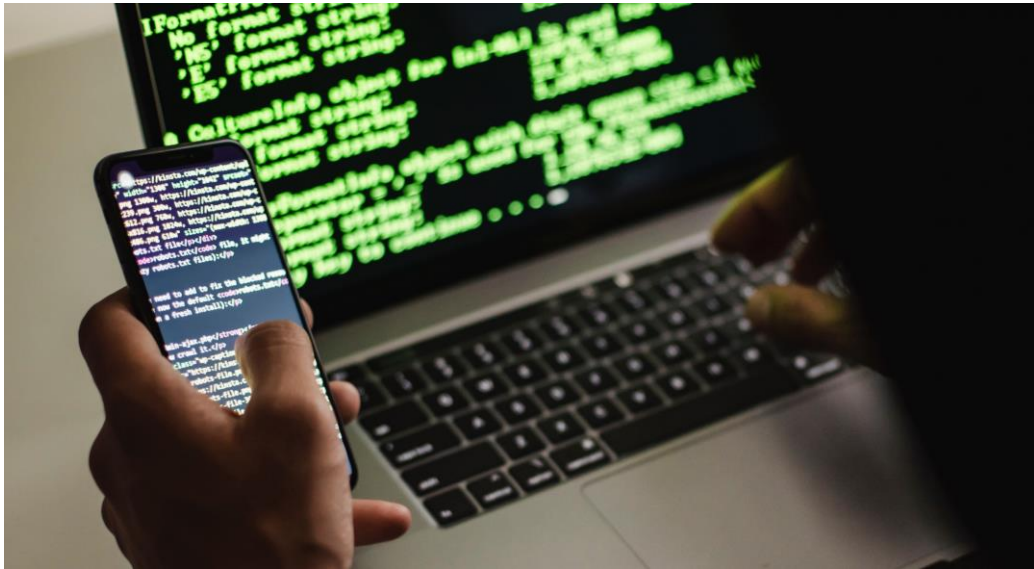
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In late October 2021, Mark Zuckerberg announced that Facebook was changing their name to Meta, converting mighty Facebook into a simple subsidiary of something bigger. The cynical in me thought that this was Mr Zuckerberg's clever way of diverting attention from several recent reputational incidents. However, the non-cynical in me became very curious about sentences like "I've been thinking a lot about our identity as we begin this next chapter". This guy has already proven to be a genius and, in essence, one of the creators of the concept of social media. Is he going to prove for the second time that he has a vision beyond what most humans can see? In his presentation he adds, "in our DNA, we are a company that builds technology to connect people". Could this really be the beginning of something really really big?

Spurred by this event, I started reading and researching about the Metaverse. Is this going to be the next big thing, or this going to be hype and 'vapourware' from great spin doctors? Will my kids live in the Metaverse, or will this just fade into nothing, like many other things?

My believe today is that the Metaverse will be a very real thing. In fact, I do believe that we already live in a 'proto-Metaverse', with large platforms like Roblox or Epic already creating a virtual new world around games. And that this will be just like autonomous vehicles: one day they are a dream, and the next day they are puzzling cops in the streets by behaving like a machine, not like a human. And just to be clear, Facebook have rebranded their organisation quite cleverly as Meta, but the Metaverse has nothing to do with Facebook. Apart from a few 'specialists' like Roblox or Unity (or ByteDance in China), Microsoft have launched their own version called Mesh, and other big companies are also in the process of building and launching their own platforms.

The reality is that the Metaverse is becoming increasingly important for Investors, CEOs and Boards of Directors. This white paper should provide, in non-technical terms, a high-level Executive view for those that want to (or need to) understand the basic building blocks of the Metaverse.

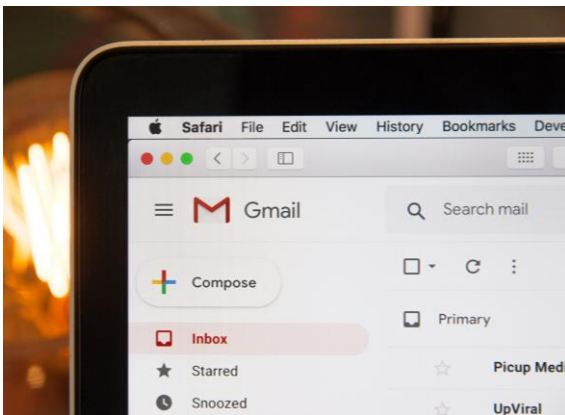


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Web 3

Web1

The first few years of internet were about basic functionality, email, basic browsing, not a lot more. We call this Web1. A little difficult for my parents' generation, some of whom, like my mother, will never get used to the concept of the internet and continue living a 98-100% physical life. Maybe a little WhatsApp. That is it.



Web 2

The 'naughties' and the 'tens' brought us social media and a vastly improved use of the internet: Messaging, WhatsApp, Facebook, Twitter, Instagram, TickTock, mobile apps, Internet of Things, Application Processing Interfaces (APIs), you name it. We call this Web2.

In Web2, we became used to the concept of being constantly online and of 'synchronous communication' (real time messaging, twitter) instead of just asynchronous communication (voicemail, email). And we also became used to the concept of not owning physical things (books, CDs, DVDs, cars) and, instead, to use virtual equivalents (Kindle, Spotify, Netflix, Uber), normally on a 'pay as you go' basis.

A little difficult for some people in my generation, but we finally threw our precious CD collection in boxes (don't think we are quite ready yet to dump it in the bin), and got a Spotify subscription instead, moving to live say only 75% of our life in the physical world, the remaining percent on the virtual one. Disagree? Just think of the amount of time you spend on messaging, virtual forums, Zoom, Teams, or Webinars after the pandemic. Or how many of these you use: email, Facebook, Twitter, Instagram, Snapchat, LinkedIn, online newspapers, Office 365, Kindle, Spotify, Netflix, Disney+, Uber, Deliveroo, Amazon, eBay, BBC iPlayer. The list is endless.

The concept of moving from physical to virtual, specially from owning a physical asset to renting a virtual equivalent, is critical to the understanding of the future of the Metaverse.



Web3

The Metaverse will move us from Web2 to Web3, where we will see a huge development of the virtual world, including owning virtual property, and a massive increment in the percentage of time spent on a non-physical world. The balance could go to 50/50, maybe more. Time will tell...

The Ingredients of the Metaverse

For a virtual world to exist, we need three key ingredients: a platform, a great user interface, and a simple way of exchanging goods and money on that virtual platform.

1 The platform - Gaming

Gaming is at the core of the Metaverse. For some, game designers will become the architects of Web3.

Since the seventies, games like 'pong', or 'space invaders' have provided us with great entertainment. I probably still have my first Sony PlayStation somewhere in the loft. Together with the CD collection. Some games have become hugely popular like Nintendo Mario, Sonic, Pacman, FIFA, Fortnite, or Minecraft. In the last decade or so, games have evolved from simple entertainment, to a much more collaborative and immersive experience, where my kids in the UK can play games online and real time with their cousins in Spain. And where remote controls replicate on the screen the move in the physical world. From the simple Just Dance on the Nintendo Wii, to the full blown Virtual Reality based game 'Star Wars: Squadrons'.

The move from simple entertainment to collaborative and immersive entertainment is critical for understanding the Metaverse.

Gaming provides the core to the Metaverse, with platforms, such as Roblox (<https://www.roblox.com/>), or Unity (<https://unity.com/>) where the Metaverse can evolve.

2 The user interface - Immersive Intelligence

The main user interface to the Metaverse will remain, for now, a [web browser](#) (or web app), or a mobile phone or tablet. Most probably enhanced with extra graph capacity, and fast bandwidth, for a more real experience.

However, one of the tech advances in the 'twenty-tens' has been an embryonic form of immersive intelligence. This refers to digital tools that complement how we see, feel and interact with the physical world.

- [Augmented Reality \(AR\)](#). Augmented reality overlays a virtual layer onto a physical one. Imagine yourself in a very complex train station or interexchange. Abroad. In a foreign language. Crowded with people. Been there? I have. Get your mobile phone out of the pocket (or wear special glasses), open an AR app, look through the phone camera and voilà, this clever AR will overlay a layer of information, together with your route, and get you to the right platform. Irrespective of signs and languages. It will just show you the way. A bit like a satnav. Or think Pokemon Go, where virtual characters are overlaid onto real life streets.



The Ingredients of the Metaverse

- **Virtual Reality (VR).** Virtual Reality offers you, not just an overlay on the physical reality, but a full blown virtual world, separated from the physical one around you. In VR you put some special glasses on, together with other accessories, gloves, shoes, who knows, and the system will make you see and feel like if you were living in that virtual world, instead of the real one. Think gaming, but exponentially enhanced by real pulses and images. Want to feel like Lewis Hamilton feels in his F1 car? Put a special suit and glasses on, hop on a cabin with a replica steering wheel, a replica seat, and the right pedals, and off you go. The system will replicate reality, to the level of making the steering wheel resistant to your desire to move it on corners, and move your chair, including the feel of the G forces on your neck.

While the main user interface is likely to remain a web browser, or mobile app, Immersive Intelligence will provide a much enhanced user interface onto the Metaverse.

3 The commercials - Virtual Property and Non Fungible Tokens (NFTs)

The concept is already started, with currencies (Bitcoin, Ethereum and many others) and Non-Fungible Tokens (NFTs),

where an individual can own a unique virtual object or piece of art on the internet. I am sure that by now you will have read the news that the Jack Dorsey, one of the founders of Twitter, has sold the first 'tweet' as a NFT for short of three million dollars. But why not? According to the Law (at least the Western Law), property is something unique that you own, regardless of where it is located...

Technically, this has been enabled by peer-to-peer technology, something we call blockchain, or distributed ledgers. This subjacent technology allows for a virtual object to be unique, and therefore subject to ownership. In Roman Law a 'fungible' object was something that could be inter-changeable, a commodity, for example money or cereal. You don't tend to own a specific ton of cereal, you own a generic ton of cereal, and it is inter-changeable with another one. A 'non-fungible' object is something specific that can't be inter-changed, for example a house. Or the Mona Lisa. Apply this to the internet, and, so long as objects can be individually identified as unique, they can be owned. A new asset class is born. Like the first tweet. Which by the way, just said "just setting up my twttr". Not much for three million dollars!

Blockchain and NFTs will provide the economy to fuel the Metaverse.



The Metaverse Recipe

We now have all the ingredients for our Metaverse recipe ready: a portal onto the Metaverse (web browser or mobile app, enhanced by graphs, network, AR or VR), some clever content (immersive gaming), stuff that we can buy and own (NFTs), and money to spend on it all (Blockchain, Ethereum, Robux). Mix it all together, add a pinch of salt, and the Metaverse comes out of the mixer, ready for use. Amazingly, there is currently no formal definition of the Metaverse. At the time of publishing this paper, Merriam-Webster does not have one.

In my head, the Metaverse will be characterised by several core evolutions:

1 Gaming. We will soon start to see further and further enhancements on gaming, which will be incorporating aspects of VR, maybe full blown haptic¹ suits. Large software houses have started to position themselves. For instance, Microsoft announced in January of 2022 a deal to acquire Activision Blizzard, the creators of Call of Duty and Candy Crush, for close to \$70 billion (yes, with a 'b').



Since games started, there have been plenty of competitions and tournaments. However, and from the late 'naughties', professional gamers and spectators started converging into a virtual world called esports².

In esports professional gamers play games competitively online and for a huge amount of money, just like professional players play sports professionally in a physical stadium. Imagine professional tennis, but with players competing on a synchronised online game of Call of Duty. Or Fortnite.

The really interesting thing here is not only just that players play professionally online, but also that spectators watch these tournaments also online through streaming platforms like Twitch. My kids do. Yours probably do as well. Just like watching a tennis or a football match on TV.

And just like in the physical world, these tournaments have levels and leagues, where players go up the ladder, just like the ATP or FIFA.

Did you know that Peter Moore, ex CEO of Liverpool FC was recruited in 2021 by Unity, to develop video games, bridging the real and virtual worlds.

Or that mighty Santander Bank has recently announced that they will sponsoring the esports competition 'League of Legends' (top 2 in the 2022 list of most popular esports) in Europe and Latin America?

¹Haptic is defined by the Merriam-Webster dictionary as 'relating to or based on the sense of touch'. Apple uses this term for the different functionalities that we can obtain from our phone depending on the intensity of the touch. I could easily imagine a 'haptic suit' where electric pulses cause different sensations on the person wearing it, to help make the virtual experience more real.

²Esports is an amazing phenomenon. If you are curious, Wikipedia offers a great definition <https://en.wikipedia.org/wiki/Esports>. Back in 2020, Harvard International Review also published a very complete article on the topic <https://hir.harvard.edu/esports-part-1-what-are-esports/>.

The Metaverse Recipe

2 Virtual Worlds.

While we will see huge increases in gaming and social media traffic, these platforms will swiftly evolve into places where people can live a virtual life, as well as a physical one. Suit and tie in the morning (assuming that we still wear these anachronistic things), virtual rock star in the evening from the comfort of your home.

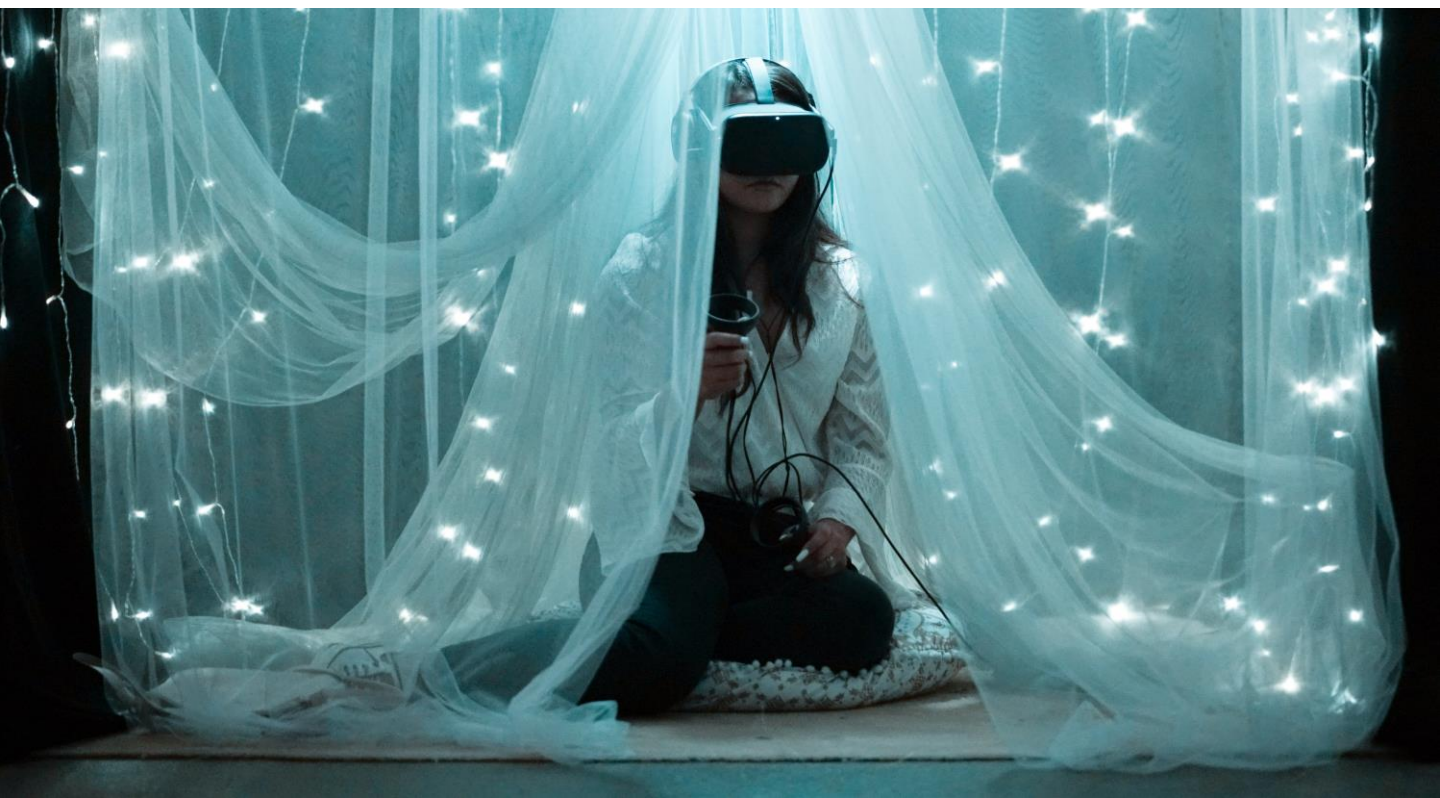
These platforms are likely to evolve into virtual worlds where individuals will have a virtual identity (or many), as well as a physical one, interacting with virtual friends in a virtual world. Think about the Avatar film (2009), one of my favourites when it comes to sensing the future of technology.

Events are also likely to become virtual. Think about it: when we were all locked up in our houses during the pandemic, life continued. Events just happened on line. Just imagine this 'big scale': we will be able to attend a virtual music concert by wearing fantastic earphones that can reproduce the sound, and

VR glasses giving you virtual viewing of the real concert. A theatre production at your fingertips but from the comfort of your home. Or a virtual fashion show. In fact, you will be able to easily produce your own fashion show and offer it to other avatars.

One of your walls at home (maybe one per room) is very likely to become a real size TV screen where access to the virtual world does not happen anymore on a 23" monitor on a desk, but on a 100" real size lightweight screen.

At some point (although I suspect not imminently), all these worlds are likely to converge. And just like pioneers in North America created cities, we will create big virtual cities where people's Avatars will live in a virtual world, obeying their real owners, reflecting their owners' personalities. Humans are social animals and likely to participate in a virtual social world, just like we do in the physical one.



The Metaverse Recipe

Access to these new worlds will democratise very quickly, with users generating content and new games. New generations of code (called 'no-code') and open platforms will allow non-technical individuals to create technical content in a friendly and natural way. There will also be a huge opportunity for Artificial Intelligence (AI) to create content as demanded by the different demographics within the avatar population

Just picture yourself. 6.30am going to an important meeting having to choose a suit or a dress for the occasion. Instead of a mirror, you now have a full real size 2 metre tall lightweight screen with your perfectly measured avatar going through your wardrobe clothes, trying them on. On the screen in front of you. All perfectly measured to your real body, previously scanned, just in case you have put a few pounds over the Xmas period, or that

new routine in the gym is paying out and you're that little bit lighter. Until you get to the suit or dress that you fancy for the day. This is not an approximation on photoshop. It is your full size perfectly measured avatar on 3D imaging. With a virtual collection of your real clothes. You are seeing yourself walking in the suit or the dress. You will be seeing what people will see of you, not a simplified icon or replica.



Just think about it: a virtual world has no limits. It does not know of the laws of physics. Or gravity. Or physical expansions. The Metaverse is, by definition, infinite.

How to Grasp the Opportunity

So, how can businesses benefit from such opportunities? In my view, and apart from the obvious one (building new games, new platforms, or new virtual experiences), there are a number of other avenues that could be of interest.

1 Physical Products.

Firstly, by the creation of physical products that can enable the interface with the virtual world: VR glasses (for example Microsoft's Holo-Lense or HTC Vive), or haptic gear. The 100 inch lightweight real size ultra-thin TVs for the wall. A gadget that can reproduce smells? Who knows... Anything that can help bridge the real and the virtual worlds.



2 Virtual Products.

Secondly, by creating virtual products (fungible or non-fungible) complementary to the virtual worlds. Some businesses have already started, like Balenciaga. The virtual platforms will have great care to not allow the creation of these products 'freely', but in a controlled way, just like in the physical world. To ensure a price and a profit.

3 The Art World.

The Art world could also move to the virtual world, by creating virtual concerts, or theatre representations, or NFT galleries, so you can buy NFTs for your virtual avatar (or avatars), who can show your recently acquired NFT masterpieces to your avatar friends.

4 Branding and Advertising.

Branding and advertising will also be another great opportunity. Want to see your brand on a car in the virtual world of F1? How much are you prepared to pay for it? Unfortunately, the internet will also make forgeries a lot more common. Although blockchain should help businesses prevent this issue. Big bucks...



5 Virtual shops

Businesses can also create, or participate in the creation of these virtual worlds. I can imagine retailers, especially from fashion brands opening 'virtual shops' with 'virtual merchandise' to suit your avatar. Just imagine yourself (well, your avatar), in this virtual world dressing your favourite football team's shirt,

How to Grasp the Opportunity

mingling with your mates' avatar who physically lives in another continent. Or, as kids compete with schools friends in the schoolyard for owning the latest 'sneakers', they could compete to 'proper' dress up their online avatar.

A Gucci NTF bag was recently sold for 350,000 Robux, a virtual currency, equivalent to around \$4,000. Artificial Intelligence can offer ushering services, as a virtual shopping butler, or parking your spanking fabulous new (and virtual) Aston Martin DB11, my favourite. And, speaking of Gucci, at the time of writing this paper, they were selling a full NFT film at Christie's, for what's promising to be a serious large amount of dollars.

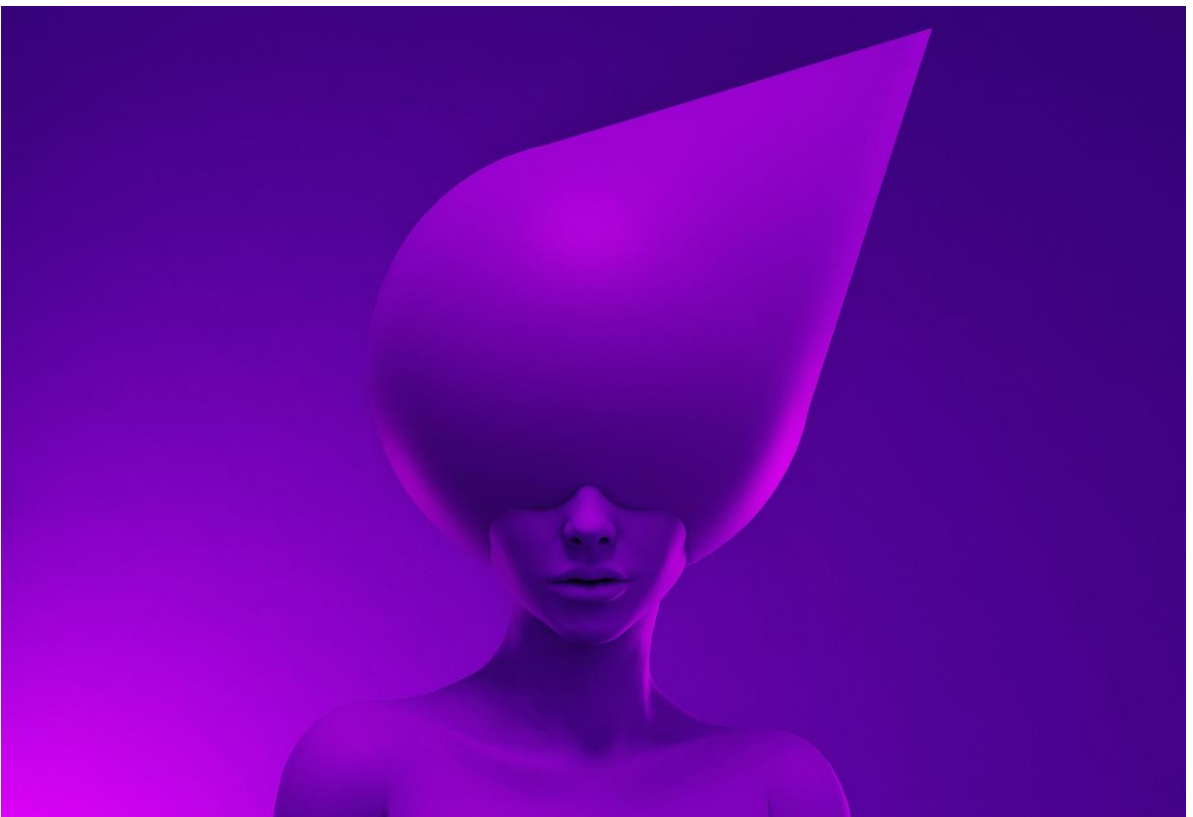
6 Education

Education could be another great area of expansion, with virtual classes and virtual content for students, attending classes from home, saving a fortune in accommodation. Especially as it will fit well with the age population already on the Metaverse.

7 New Virtual Business

Companies and individuals could also come with new virtual businesses that we simply can't imagine today. NFT stamp collections? Buy your own NFT planet? Who knows.

A bank has recently issued a mortgage loan on a virtual real estate NFT deal. Who would have thought...



Final thoughts

"I do not believe that you can do today's job with yesterday's methods and be in business tomorrow."
Horatio Nelson Jackson, physician and automobile pioneer.

I am hoping that, by now, you will agree with me that the Metaverse is a reality and not just a hype. To what extent it will develop, only future generations will tell.

The opportunities are mind-blowing. The Metaverse can, not just provide us with a lot more entertainment and business, but it could also provide social opportunities to housebound people that, otherwise, could not have them.

But the complexities are also mind-blowing. The Independent published a few days ago an article with the title "Woman says she was virtually 'raped' in the metaverse while others 'passed around a bottle of vodka'". I suspect that the calls for regulation that we are seeing with regards to social media will only become more intense with regards to the Metaverse. A recent report titled "Metaverse: another cesspool of toxic content" gives a bit of a clue about how the dark side of all of this could look like.

As the Metaverse starts with gaming, the very likelihood is that children will come onto it from a very early age, what brings thoughts about the need for education and strong teaching of awareness of the risks involved. Schools may have to adapt their syllabus to introduce moving in the Metaverse as a life skill.

One of the aspects that, I believe will surprise us (or maybe not) is the speed at which this new world will develop. The first league in eSports was established by Blizzard Entertainment in 2016 (Overwatch), and there are already talks about giving them Olympic Games recognition. The speed at which NFTs are being sold at the moment is, simply, astonishing.

I can imagine the first 100 inch lightweight TV real size being sold in say three years from now, and concepts like Avatars entering 'main-stream' within the next five years.

Very interesting will also be the development of Quantum computers and how their extraordinary power will affect the critical need for encryption, at the core of the security around NFTs.

And who knows, it might not work at all. 3D TV was supposed to revolutionise television, and I still have two pairs of glasses in the loft, together with my PlayStation and my CDs collection. It simply didn't catch on.



Contact us

E: enrique@simplerchange.co.uk

W: www.simplerchange.co.uk

T: +44 (0)7773137774

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