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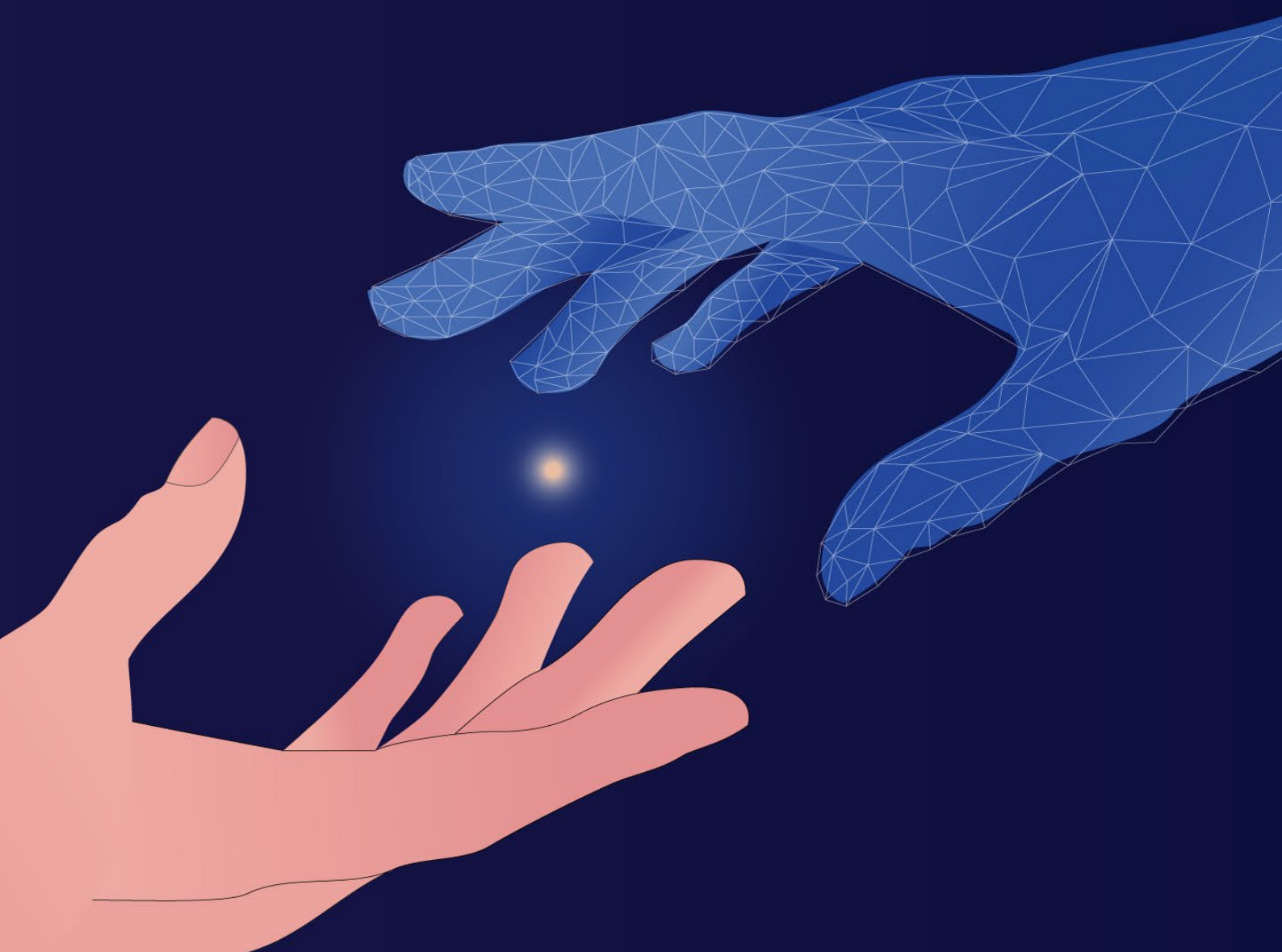
The State of the Metaverse in 2022

BUILDING AN OPEN WORLD



Building an Open World: The State of the Metaverse

The next step in an ever digitalized ecosystem

March 2022

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To Fellow Entrepreneurs

2022 is so far, a year of mixed feelings. It is the year of the tiger in the Chinese zodiac, the year of the French elections and the year of the much-yearned-for world cup. 2022 is also a time where geopolitical conflicts are unfolding in the east, coveted by grudges of the cold war and ambitions of fallen empires. But looking ahead, 2022 is also the third and (with any luck) final year of the COVID pandemic. In this 'new normal', which everything is but 'normal', the first message I personally want to relay to our Nextrope community is one of hope, hope that despite the adversities you are facing, you are enduring.

Against this background, Nextrope is doubling down its efforts to bring our clients sutainable and innovative solutions while consolidating our operations both domestically and overseas. In hindsight, I look back with great pride to all that was accomplished. 6 years ago, in 2016, albeit initial difficulties (the market's general skepticism towards the Blockchain solution), I made a bet on Web3, and today it finally pays off. Every major industry is shifting its gaze towards the third age of the digital era, and proof is in the slow but sure mobilization of assets on that front. It is not anymore, a question of 'if' it will happen, it is now simply a matter of 'when?' and I believe that time to be now.

I set out with a vision to create a venture house and a venture house I have built, securing the necessary instruments to realize a wider dream; The idea that a vast and far-reaching digital universe could become a home to hundreds of thousands of developers that pursue their one true calling: software creation. And beyond that, it is my prerogative to demolish the digital divide between those who welcome this transition as a necessary step in mankind's progress and those who are threatened by it, those who do not understand that our future, whether they like it or not, is digital.

Dreamers, doers. Old wisdom has never been truer for our brave new world — the best way to predict the future is to create it. The Metaverse is the old unwritten tale of uncertainty, so fear at your peril. It's time to invest and build, to push the boundaries of the impossible, and pave the way for better persons to come and to build upon our legacies. To all fellow entrepreneurs and like-minded dreamers, I urge you to join me. Come with me on this new odyssey, and in the footsteps of the great innovators, be a blink in the eyes of mediocrity.

Mateusz Mach
CEO
Nextrope

Foreword

Last November, when we published our editorial on NFT project game development, it was already clear that the Metaverse's global economic impact would be far from negligible. Some months later, the picture meets our expectations. As markets slowly mature a sustainable coexistence with the COVID pandemic, physical and digital dimensions blend into 'phygital' realities. Indicators generally point towards a significant but geographically uneven distribution of the technology. Yet it remains to be seen how public authorities will regulate upcoming developments.

At Nextrope, we believe that our times' trials have left us with a trail of techcrumbs, one that organizations need to quickly pick up on should they want to stay ahead across markets. Multinationals are staring through a fog of uncertainty, thinking about how to best position themselves once the pandemic is over and a degree of normality is restored. But what does the 'other side' look like? In due time, we believe that there will be a paradigm shift towards Web3, an iteration of the web founded on Blockchain technology that embeds models of decentralization and token-based finances. In this report, we synthesize market-relevant stories of Metaverse development with the intent of addressing the questions that businesses want answered.

With a collection of over 120 publications, our firm specializes in Blockchain technology and the practical applications through which it disrupts the market. We have collected and curated a number of these articles into our report with the idea of injecting 'transversal knowledge' to our readers. We explore different sectors, players, and strategies, all to give you, a business specialist wanting to support the growth of your company, the ability to see the world as it changes. Our objective is to assist companies in making informed decisions on how to efficiently restructure their organizations, better manage assets and successfully mitigate the risks lying ahead. At Nextrope, we are frontrunners to the Metaknowledge, and this is thanks to a tightly knitted fellowship that tirelessly works to understand and predict change.

With that said, we would first like to thank our collaborators and experts in their respective fields of knowledge. With their invaluable expertise, our efforts have culminated towards the creation of this compendium, with the hope that it will guide organizations in defining a critical course of action and purpose that will endure in time.

You can download this report at WEBSITE, as well as find this and our entire collection of individual insights at https://nextrope.com/en/blog/. We look forward to your feedback at d.cognigni@nextrope.com.

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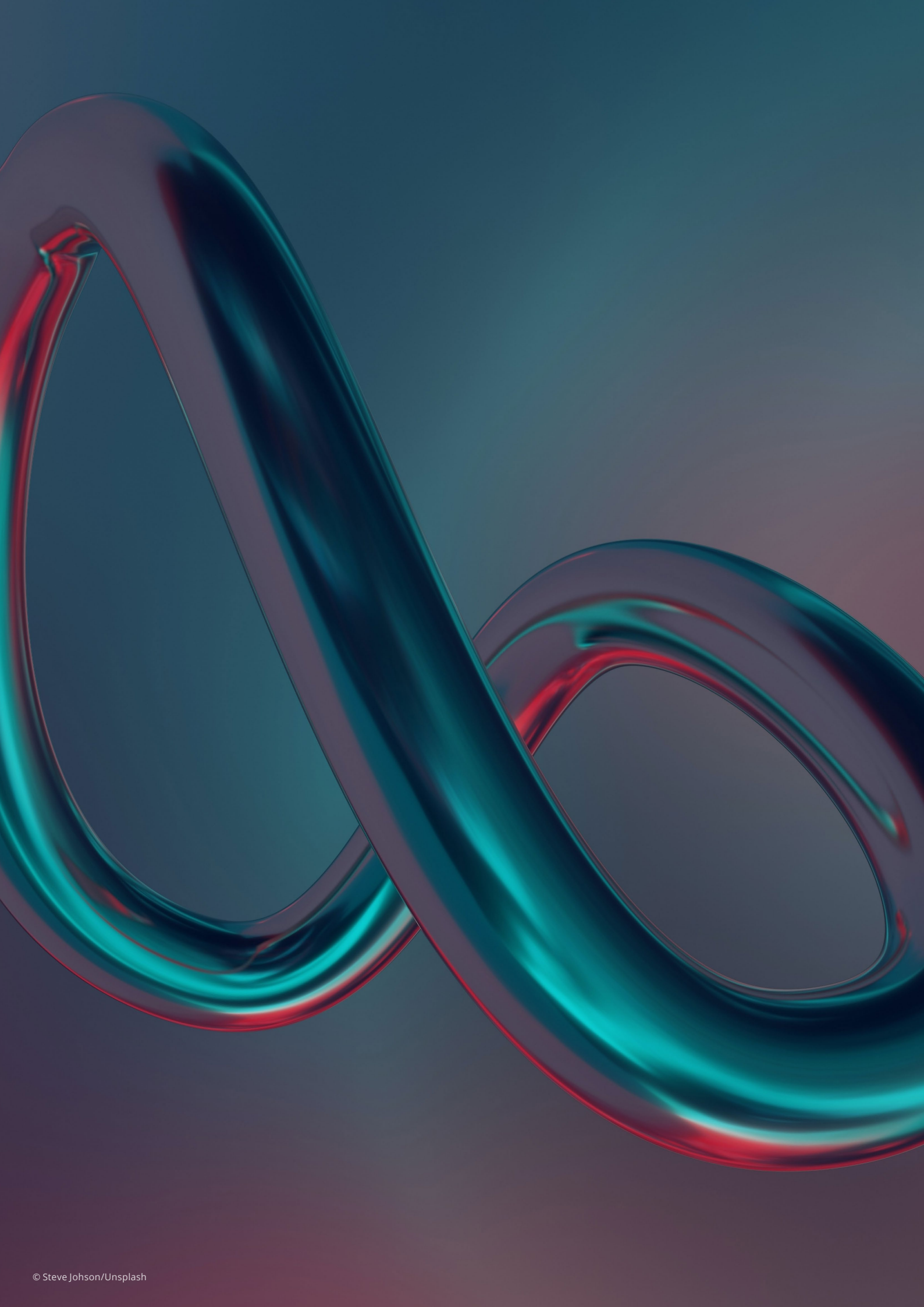

Introduction: Metaverse Origins

On October 28, 2020, Mark Zuckerberg formally announced that Facebook would change its name to 'Meta', underscoring the technology's potential to replace the mobile internet. The US mogul asserted that the company's purpose would now be entirely devoted to transitioning its users to the Metaverse. A month later, Microsoft announced Mesh, considered to be the natural successor of Teams. Since, firms like Google and Sony followed suit by 'opening up' their respective agendas to the wider community. Amidst public and market speculation, it became apparent that the tech monoliths had charted a new path.

In this new cycle, consumers are eager to explore the potentialities hidden within the Metaverse. A Tidio research detailed that 39% of those surveyed, view it as an opportunity to overcome real-time obstacles[1], although the first-time obstacle may very well be familiarizing the technology to the general population. Surveys conducted by Ipsos revealed that only 38% of Americans are familiar with the concept of the Metaverse - with substantial differences by age; '53% of those 18 to 34, 45% of those aged 35 to 54 and 20% of those age 55 or older report familiarity with the term.'[2] This is certainly to be expected says Adam Swann, Chief Strategy and Innovation Officer at MMB: 'It's like talking about e-commerce in the early days of the Internet.' Popularity in early stages of development does not necessarily predetermine the success of a technology, rather it becomes a measure of the rate at which it integrates into regional, national, and global markets. The first signs, Tidio shows, are encouraging: 'Almost 46% think that 10 years from its release, people will live and coexist mainly in the Metaverse. Work possibilities (52%), art and live entertainment (48%), and money investment (44%) are the most popular reasons to voluntarily join the Metaverse.'[3]

However, businesses must also be aware that consumer survey data are projecting uncertainty as recent announcements have polarized the public on the long-term effects of the technology. 77% of respondents believe that the Metaverse invites substantial risks: They 'perceive addiction to a simulated reality (47%), privacy issues (41%), and mental health issues (35%) as the biggest perils of the Metaverse.' Moving forward, concerned businesses will have to inject one or two doses of reassurance, should they want to avoid their Meta projects failing consumer product market testing.

What is certain is that many expect it to be a long wait, a distant time rooted in science fiction and futurism, the likes of 'Matrix' or Steven Lisberger's 'Tron'. However, the reality is that we already live amid proto Metaverses, primitive versions of digital environments that will be the bedrock to the next virtual ecosystems. Fortnite concerts, Second Life dates, Decentraland real estate, H&M meta stores, the list goes on – it's a global phenomenon, conceived as the next step in digitalization, where we do not just 'connect' to the Internet, rather, we become a part of it.

Popularity in early stages of development does not necessarily predetermine the success of a technology, rather it becomes a measure of the rate at which it integrates in regional, national, and global markets.

What it is or what it will look like is the same question asked in the 80s about the Internet of the 2020s, and the answer was as inexplicable then as it is today with the Metaverse. Movies like 'Ready Player One' or 'Minority Report' suggest that it will be a projection of our reality into a byte dimension. The world we are born to manifested in a computerized setting with experience-based adjustments. Where there are elements of truth to it, this co-

ception is still limited just in the same way that in Tron, the Internet is shown as a hologram highway – appealing but idealized. We are at a too early stage in technology development to predict where it will go or how it will evolve. Nonetheless, we can still idetify core attributes that will define the Metaverse. Drawing on venture capitalist Matthew Ball's[4] work, the Metaverse will be:

Persistent: Continuous and indefinite, analgous to the concept of time. It does not go back, halt or skip forward.

Synchronous and live: It will operate in real-time and be available to everyone.

Inclusive: Removal of limits and obstacles to concurrent users, yet simultaneously providing individuals with a personal and distinct sense of presence. Anyone can be part of the Metaverse and partake in all it has to offer, together and at the same time. Hundreds of thousands if not millions will be able to participate in a single moment.

A fully functioning economy: Individuals and businesses are enabled to create, own, invest, sell, and be remunerated for an extensive range of products and services that generate value recognized by others.

An inter-dimensional experience: It reaches both into the physical and digital world, in public and private grids and open and closed platforms.

Of enhanced interoperability: Digital posses sions, whether items in a videogame or simply data, can be shared across experiences. For instance, say you buy a rare sword in 'Skyrim': in the Metaverse, you can share and use this item in another game, e.g., 'Assassin's Creed' and so on. A user can also donate an item through various social media apps. Today that is not possible as virtual possessions are mostly restricted to the experiences they are originally intended for.

Contribution-based: The 'Meta-terra' will be inhabited by 'content' and 'experiences' generated and controlled by a vast number of operators, which can be private individuals, groups, or corporations.

Open definitions

The above are by no means closed definitions, rather a preliminary outlook on technologies that await regulatory intervention. In time, as analytics takes us further into our understanding, are we able to capture its many expressions and create formulas that satisfy both legislative and industrial agencies. Until then, our mission partly hinges on the expetise of technicians that have made machine learning their life's work. One of them is Shaan Puri, who differently from Ball, claims that the Metaverse may not be a place after all, but a point in time.

Puri uses the analogy of AI and 'singularities', moments in time 'where artificial intelligence becomes smarter than humans.' Here Puri claims it would be 'the moment where our digital lives are worth more to us than our physical ones.' A sweeping statement through and through, though it adds a layer to what Ball says is predominantly a technological shift. Puri calls it a sociological transition. He points to the fact that every aspect of our lives has gone digital – from friendships to work, from art to sports and to our very own identities. He addresses the culture of social media where users upload themselves to subjectively look better (through editing) than as they see themselves off-screen. The virtual identity prevailing over the real one is justified by the ability to create narratives where they improve on perceived deficiencies and turn who they are into who they want to be.

'Our attention used to be 99% on our physical environment. TVs dropped that to 85%, computers down to 70%, phones to 50%. And where attention goes, energy flows. If 50% of our attention is on our digital screen, then 50% of our energy will go to our digital life. Soon, some company will make smart glasses that sit in front of our eyes all day. We will go from 50% attention on screens to ~90%+ That's the moment in time when the Metaverse starts. Because at that moment, our virtual life becomes more important than our real life.'[5]

Our starting point

Whichever of the above it may be, if not all, we expect the Metaverse to comprise a collection of virtual sharing spaces that work on the combination of Physical Reality, Online Gaming, Augmented Reality (AR), Virtual Reality (VR), Blockchain and Cryptocurrencies. Within, people will likely be able to go shopping, own a pet, work, travel, go to the movies and 'eat' out – all the things one would traditionally expect to do in real life. Industry applications include (and are not limited) to e-commerce, human resources, sales, marketing, and finance. There is not just one Metaverse, but many in which each setting is tailored to an intended experience. 'A key part of that journey is making an open platform where any developer can create anything they want,' says Zuckerberg.

Moreover, the report focuses on the current state of Metaffairs. It first engages a historical perspective to understand where our conception of the technology derives and as such what image of the Metaverse we are driving forward. The report also considers the conditions behind which this reality is emerging, aiming to contextualize its growth in a market that can vastly capitalize on its development. Furthermore, it will delve into the knowledge behind the technology itself and the key players around it, thus defining the practical applications that it holds. Progress drives a hard bargain and as with every scientific milestone, a challenge corresponds. With that in mind, at Nextrope, we seek to identify the regulatory aspects, the key legal issues, and the ethical considerations that a program of this scale anticipates. We hope these insights begin to light the path towards an interdimensional future – and inspire leaders to help forge what in time will become the next new normal.

History and Evolution

60’

In 1962 one of the **first-ever VR systems** was invented by Morton Heilig – the Sensorama.

In 1968 Ivan Sutherland and his apprentice Bob Sproull present the first VR / AR head-mounted display - Sword of Damocles.

80’

In the early 80s computers arrived on the domestic market. The likes of Acorn Electron and Commodore 64 made computing accessible for the first time.

On January 1, 1983 ARPANET adopts the TCP/IP standard, and the Inter-net is born.

In 1989 Tim Berners-Lee invents the World Wide Web while working at CERN.

90’

The term “Metaverse” first appears in Neal Stephenson’s 1992 novel “Snow Crash”. Set in a dystopian future, the US is a confederation of privately owned states. Hiro Protagonist, a hacker who delivers pizza for the mafia is catapulted into the Metaverse to shed light on a mysterious virus and find the mythical Tower of Babel.

In 1992 US Air Force’s Research Laboratory creates a completely im-mersive AR system.

In 1993 the “Metaverse” was introduced in computer jargon and was soon associated with security systems and email spam. “Proof of Work” would become a “go-to” technique to authenticate transactions on the Blockchain, in particular Cryptocurrency mining.

In 1994 IBM releases its first smartphone – the Simon Personal Communicator (SPC).

00’

In 2001, cell phones access the internet on the 3G network.

In 2002, Michael Grieves, at the time undergrad at Michigan University, introduces the idea of “Digital Twins” – the virtual equivalent of an object, presented as part of product lifecycle management. In other words, the “content” of the Metaverse.

In 2003, Philip Rosedale develops an online virtual world called Second Life, a game program that repli-cates the dynamics of life on a vir-tual platform. This is generally ac-cepted as the predecessor to the “Metaverse.” The core issues were low bandwidth and elevated resolu-tion times which made the experi-ence sub-par, but not any less popu-lar.

In 2006, Roblox comes out and users can suddenly build their games and join experiences created by other users. It counts almost 50 million users daily and holds its currency called “Robux.” One of the most popular virtual worlds on the mar-ket, hence the comparison with the Metaverse.

In 2007, Google Maps Street View becomes available.

In 2009, Satoshi Nakamoto launches the Bitcoin network in response to the 2008 financial crisis. Bitcoin has since been seen as an alterna-tive form of payment that would run autonomously from central au-thorities, removing the intermedial functions of banks and clearance houses in transactions.

On the same day, Blockchain is born, purposed to act as a public register for Bitcoin transactions. In July, Bitcoin was traded at $0.09/coin and today it sells at $42,128, a 46,808,800% increase. The economic exchange of Web3 is enabled by cryptocurrencies.

2010’

In 2011, Ernest Cline publishes his novel “Ready Player One” and world-renown director Steven Spielberg adapts it into film in 2018. The story unfolds in a very advanced form of virtual reality, as such making the movie a reference point when addressing the Metaverse.

In 2012, Non-Fungible Tokens (NFTs) are introduced. Not interchangeable with other items (as opposed to fungible tokens) due to their intrinsic qualities. The first NFT was the “Colored Coin,” a cryptocurrency “injected” with additional information to make it non-fungible.

In 2014 Facebook purchased Oculus VR company for $2 billion.

In July 2015, Vitalik Buterin co-created the Ethereum network and Blockchain. Ether is the cryptocurrency of the Ethereum universe. It’s the major platform for decentralized apps. Trailblazer in smart contract technology and decentralized finance, Ethereum’s Blockchain welcomes some of the most important players in the Metaverse.

In 2016 Microsoft releases their first VR Headset called the HoloLens.

In 2016, the Decentralized Autonomous Or-ganization was created through a crowdfunded token sale that would become the largest crowdfunding in history at the time. The idea was to replace venture capital funds with a decentralized model. Decen-tralized models are seen as the fu-ture substratum to the Metaverse.

In 2017, Decentraland was launched as vir-tual real-estate. It’s an open-source 3-Dimensional virtual world where users can purchase virtual plots of land as NFTs via the MANA crypto-currency, some of which cost c. $2 million. It’s viewed as a pre-Metaverse.

In 2017, popular videogame Fortnite was re-leased counting a user base of 350 million players in 2021.

In 2019, Microsoft release their second-generation HoloLens.

In 2019, Forbes calls it the year where “virtual reality becomes real.” As of Q1 2021, Facebook’s Oculus Quest sold 1.87 million units worldwide. Sony PlayStation VR traded 5 million units by January 2020.

In November 2019, the first known case of COVID out-break was registered in Wuhan, Hu-bei, China. This significantly increased involvement in VR-based activi-ties.

2020’

In 2020, Decentralized apps saw 6 key Blockchain platforms overtake the $2 billion mark.

In April 2020, Travis Scott and Marshmello go live in the first-ever Meta-concert in Fortnite, with an audience of 30 million people.

As of 2021, PWC calculated that around 85 million VR headsets will have been used in China.

As of 2030 GlobalData predicts that VR will be a $28 billion market and AR a $76 billion market.

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Why now?

In 2020, Meta drew the blueprints to a new enterprise. The multinational, umbrella to 78 businesses, with 3.5 billion monthly active users on its core products alone, has infused the project with visibility that is unprecedented.[6]
The announcement feeds into a broader conversation concerning digital workspaces and how the pandemic is disrupting the ways we conceive our surroundings. The necessity of restructuring to adequate models of operation is the target for most companies in their quest to find the 'next normal'. In a trickle-down effect of sorts, the attention given will thrust the Metaverse to the forefront of public and corporate debate.

Raja Koduri of Intel, Vice President of Accelerated Computing Systems and Graphics Division, assessed the Metaverse's viability in our current times. Asked the question of only why now Intel is publicly discussing the Metaverse, Mr. Koduri replied that 'Because the first building blocks – the high-performance graphics – are within a few months of launching. Before it was speculative.'[7] In a second interview, competitor Jensen Huang, CEO of Nvidia, revealed that the creation of a digital universe is not necessarily just the by-product of strong quarterly financial results, rather an improvement in AI technology.[8] Deep learning has progressively transitioned from research to applied engineering and since operative models are high-intensity on computing, they need a step-change in systems performance.

Much of the growth registered in technology is contingent on market laws, one of which, demand and supply, and sectoral demand is mostly driven by gaming (though not entirely). Virtual reality in said industry is forecasted to rise by a CAGR of 33% between 2021-2026, quantified by NewGenApps as a 216 million collective surge in AR and VR based game users by 2025. 59% of experts believe that this will make gaming the primary investment target for the next decade.[9] And as we near the pandemic's end, many will have developed lockdown-induced behaviors that will spill over to a post-COVID period and will require time to readjust to a pre-pandemic regime. Thus, we can expect those numbers to steadily rise as consumers continue finding alternative solutions to personal wants. For industry leaders, this opens a unique opportunity to innovate their products. Companies must also look to adopt strategic partnerships that improve the ecosystem building capabilities they'll require to compete moving forward, especially as industry boundaries are set to cross over. Most reports agree that the technology will be a dominant force in the markets. But business units want to understand why this matters now.

Jim Blascovich, a Psychology Fellow, and Jeremy Bailenson, Professor of Communication at Stanford explain that 'The Internet and virtual realities easily satisfy social needs and drives' and that 'The proliferation of affordable [VR] will dramatically increase the size of the population for whom more highly immersive perceptual and psychological experiences are available.'[10] Where there certainly are psychogenic reasons for what can be well described as "escapism," this report addresses the specific historical moment in which global consumer patterns are being logged. Overall, worldwide spending on AR/VR headsets, software and services soared to $12 billion in 2020, a 50% rise from 2019, at the onset of the COVID pandemic.[11] Given the limitations imposed by governments, it is expected that this phenomenon exists, that it has grown and cemented itself as a social norm.

All things considered, 'Why now?' comes fudamentally down to (i) visibility (ii) availability of

technology, and (iii) demand. The question now is: are we ready for something of this magnitude? The answer is not clear cut. From a technological standpoint, results are judged against the benchmarks we set ourselves. If we're discussing primitive Meta experiences such as Meta, then we can argue that de facto we already are in the Metaverse.

However, for that wondering mind that elicits Hollywood hits, the answer is not yet. The full realization of the Metavision is decades away, and we are nowhere near the accomplishment of a fully operational digital universe, at least not one as intended by Zuckerberg. Koduri assessed the viability of the Metaverse in terms of sensory/graphic experiences. He estimates that to achieve the level of involvement that movies like 'Ready Player One' provide, we necessitate a minimal thousand-fold improvement of our current computing infrastructure.

'You need to access to petaflops [one thousand teraflops] of computing in less than a millisecond, less than ten milliseconds for real-time uses. Your PCs, your phones, your edge networks, your cell stations that have some compute, and your cloud computing need to be kind of working in conjunction like an orchestra.' [12]

A higher computing power may inevitably require a higher energy supply. Computers, data storage units and networks spend 10% of the world's electricity. The breakdown of that consumption by separate categories of devices is as follows: 30% powers terminal equipment such as mobile devices and computers. Another 30% flows to data centers and the remaining 40% to the network.[13] Since 2010, global Internet users have doubled, as online traffic has increased over 15 times, an approximate compound rise of 30% per year.[14] And while the EU Commission, governments and international organizations are still discussing the actors (nuclear power, hydrogen, solar energy etc.) needed to meet rising energy demands, big corporations like Meta are already building a new stage. The result is that there is currently no infrastructure to support our imagined end-state of the Metaverse.

Metaverse: The subtle divide between hype and potential

In Friedrich Hayek's 'Fatal Conceit', the Austrian economist famously remarks on man's limit to the knowledge he holds in his bid to imagine the future. To him, economics is the piece of the puzzle that demonstrates how little we effectively know about the imaginaries we are capable of designing. If so, and should our limits periodically reiterate before us, then, logically speaking, we are episodically also reminded of our 'ceilings' – the furthest stretches of the futures we think we can build. And If economics is the branch of knowledge that deals with production, consumption, and more generally speaking, transfer of wealth, and if the future is minimally even just a by-product of that, then the Metaverse cannot be reduced to a simple notion of 'hype', rather it be one those many 'futures' envisioned by Hayek. And by looking at where investments are heading, that very well appears to be the case.

In 'Fatal Conceit', Hayek presents his key arguments for the free market while criticizing the logic behind socialist economies. The title 'Fatal Conceit' derives from the idea that 'man is able to shape the world around him according to his wishes.'

A Hitchhikers Guide to Assessing Macro risks in Metaverse Financial Decision Making

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As the amount of time people collectively spend in the 'Metaverse' increases, and their online presence becomes an even greater extension of their perceived physical consciousness, the natural evolution is for 'Metasocieties' to mirror societies at large, at least from an economic and social class.[15]

Financial decisions are amongst the most important decisions we make in our day-to-day lives, the Metaverse as an extension of that is no different. A society's collection of financial decisions, both individual and organizational, is arguably one of the single biggest factors that shape its trajectory and outcomes. Naturally, the Metaverse as a theatre for economic and social decision-making may be able to rely on an analysis of financial decisions as a good proxy to measure its future development.[16]

Financial decision making in the Metaverse is interrelated and refers to decisions surrounding: (1) user spending on goods, services, and products to be consumed in the Metaverse, and (2) investments intended to generate returns and economic activity both within an actual Metaverse and outside of it.

Beyond some basic elements of supply and demand, classical economic theory won't be of much value when understanding the seemingly irrational, emotion-driven, decisions that arise in the Metaverse, just as it isn't in our 'real world'. Therefore, we will try to shed light on Metaverse development through the lens of economic history, behavioral economics, and broader behavioral sciences. Particularly, as they relate to finances and the allocation of capital that incentivize participation in a virtual society.

Amongst the 35,000 decisions that we make on a daily basis as members of 'regular' western society, we face a never-ending barrage of financial decisions; like which subscription services should we keep, what brand of cereal to buy, how much money to save, is our rent acceptable, are market conditions right for a mortgage, and so on.[17] Decisions involving money are extremely difficult during the 'best of times', and understanding those decisions is an even greater challenge.

Typically, our financial decisions are driven by static perceptions of our 'future selves' that we take for granted, allowing these decisions to be dictated by emotions. The cognitive basis on which many of these decisions rely on are shaped by a combination of lived experiences, incentives, stress, education, hereditary traits (i.e., risk tolerance), occupation, and perceived societal status.[18]

1. Who is there and why does it matter?

To understand how all of the above factors will shape the financial future of the Metaverse, it is important to take a step back and understand the core profiles of individuals currently building and inhabiting the 'Metaverse'. We can lump them into three broad categories: (1) builders, (2) early investors, and (3) early adopters.

Builders: Builders (alongside investors to a slightly lesser extent) are the ones who have a vision for the Metaverse and its functionalities and are currently engaged in turning their vision into alternate virtual realities for us to inhabit.

Early Investors: Recognize the potential of what is being built by the builders and view the Metaverse as an opportunity to generate outsized financial returns, inspired by the recent trajectory of 'crypto' markets.

Early Adopters: Are typically those most excited to try out the technology/its biggest true believers and are likely crossing over from related domains such as gaming, cryptocurrency, or are a combination of builders and early investors.

With the lack of a global regulatory environment and with some pressure potentially arising from 'early investors', 'builders' over the short-term may lack concern or incentives to facilitate processes by which participants in a Metaverse ecosystem responsibly spend and allocate capital. There are a few competing forces that further exacerbate this trend such as (1) deference to 'tokenomics' growth and validation seeking, (2) the neural reward system, and (3) FOMO.[19]

2. The Competing Incentives Shaping Investment in the Metaverse

'Tokenomics' is a popular term that has arisen to articulate the purported mathematical and psychological forces/incentives that shape a specific cryptocurrency or decentralized/digitized asset. 'Tokenomics' are based on the intended functioning that a digital asset or space is supposed to facilitate on the basis of their design and in many respects can be equated to a 'use case'. The purported intrinsic value of a digitalized ecosystem is often tied to its 'tokenomics'.[20]

'Builders' and 'early investors' will justify the flow of capital and economic activity in the Metaverse based on the success of their respective 'tokenomics'. Behavior associated with the growth of 'tokenomics' is often looked at as a key success metric and validating of the idea itself. Given the incentives of 'early investors' and 'builders' alike, not enough attention is paid to the health of such growth for both 'early adopters' and future users over the longer term, as 'builders' and 'early invetors' are justifiably concerned about building the actual capacity of the Metaverse and/or maximizing return on investment.

In part, some of the movements that have significantly moved digital asset prices in the Metaverse are driven by the fear of missing out (FOMO), as opposed to the 'tokenomics' they claim to be based on.[21] The idea of companies, brands, consumers, coming together and living economic and social lives in a virtual world is exciting. However, the Metaverse is collectively at an early stage and mostly incomplete. Many investors are likely more concerned with missing out on what is touted as the next big opportunity for return after the stark rise in cryptocurrencies, and it is why we see a lot of investment flowing in from major companies, financial institutions, celebrities, and beyond, just in case it becomes the next big thing. Instead, investments should be based on deeply thought out and measured business decisions.[22]

3. The Psychology and Neuroscience of Decisions in the Metaverse

There are some relatively well-understood behaviors that are influencing social and financial decisions in the Metaverse. The easiest place to start is the reward system, which refers to structures in the brain that are activated by rewarding or reinforcing stimuli.

When a human brain is exposed to novel stimuli that it finds interesting or rewarding, it responds by releasing a neurotransmitter called dopamine.[23] Dopamine is the primary neurotransmitter that regulates feelings of pleasure in your brain. With the Metaverse providing a high level of visual, perceptual, and overall experiential novelty, it will provide a strong surge of dopamine to many people as they experience it. Studies looking at gamers, who might provide the closest proxy to early adopters and investors in the Metaverse, have uncovered three discrete phases of the reward system with respect to heavy gaming. (1) Early on when novelty is highest, engaging with a new game provides feelings akin to a high with large amounts of dopamine flooding reward pathways, (2) however, as more time is spent engaging with a game, it does not create a high anymore but still helps people overcome emotional lows, until eventually (3) it becomes a habit that doesn't carry enjoyment, however, is engaged with despite not feeling good. By the time the third phase is reached, it creates a vicious loop where while not feeling good, in order to try and lift their mood, the individual keeps engaging with the stimulus hoping to lift their mood, failing to do so and then trying even harder as dejection grows.[24]

The implication for decision making and especially financial decision making in the Metaverse

is twofold. Firstly, when dopamine is drastically increased in a person, they are more likely to engage in increased risk taking, particularly in gambling tasks[25], and secondly, once individuals try to engage in a behavior for the purpose of lifting their mood but fail to do so, they begin to experience increased amounts of stress, which takes away cognitive resources from making optimal decisions, especially financial decisions.[26] Stress may potentially play a larger role even in earlier phases of engagement with the Metaverse as global instability surrounding armed conflicts, pandemics, and climate change amongst others, develop an increased demand for escapism in virtual worlds.

Typically, our financial decisions are driven by static perceptions of our 'future selves' that we take for granted

An increased risk appetite in financial decision making, particularly when making investment decisions in the Metaverse is a potential driver of short-to-medium term bubbles, as investment decisions are made more on the basis of emotions and FOMO than they are on rational driven investment theses and articulate business cases. Moreover, recent market activity pushing Metaverse prices quickly into the mainstream consciousness will probably serve to embolden early investors and adopters, leading to increased bubble risks in Metaverse assets.

The effects of increased risk appetite are further compounded by stress which detracts from cognitive resources that could help make rational decisions by putting the body into fight or flight mode, leaving decisions to be made in an environment stuck in immediate details without deference to longer-term impacts. Stress could come immediately as a manifestation of escapism from the realities of global uncertainties, in the near future as a result of maturation of the 'gamer-addiction cycle', or as a response to Metaverse asset bubbles collapsing. Taken altogether, behavioral indicators would point to the possibility of significant market corrections in the medium term within the collective Metaverse, particularly as the competing 'Metaverses' go through stages of iterations in maturing their technologies in terms of developing stable 'tokenomics' and developing their technologies to fulfil their promises as use cases begin to clearly emerge.

In conclusion, the rise of the Metaverse seems to be inevitable over the long run and it will surely influence much of how society functions economically. However, in the short to medium term, the technology still needs to go through significant development. Albeit, given the behavioral incentives at play, it seems that it might be a more painful process than necessary with important decisions being influenced by suboptimal neuro processes.

However, asides from the long-term promise of unlocking new levels of economic activity and growth, there may be reasons for short-term optimism as well. It would be rooted in thoughtful Metaverse builders augmenting their experiences with tools, particularly AI, that could recognize when important financial decisions are being made by users and notify them to step back and think about the broader potential implications of their financial decisions and allow them the opportunity to take more consideration. It would seem that the triumph of a Metaverse over the long-term might actually be creating the cognitive stability necessary to help users make the most rational financial choices, which would over time build the most stable and prosperous economy. What is the promise of the Metaverse if not to allow us transcension, and thereby create benefits that flow between the 'real' physical and the real imaginary?

Metaverse Development


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The report will now address the main technologies leading the Metaverse expansion: (i) Virtual Reality, (ii) 3D reconstruction, (iii) Augmented Reality, (iv) Blockchain & Cryptocurrencies, (v) Internet of Things, and (vi) Artificial Intelligence. It is important that readers understand that there are instruments not explored in this piece that work towards new generation industries. However, for efficiency purposes, we will discover those categories of machine-based works that other minor developments depend on. Simply put, technologies that are far more consequential.

Augmented Reality (AR) and Virtual Reality (VR)

AR and VR pioneer the immersive 3D experience that consumers associate with the Metaverse. AR necessitates a camera-equipped device embedded with AR software that when pointed towards an object in its surroundings, the software identifies the item through computer vision technology. The device (i.e., tablets or smartphones) then downloads information from the cloud after which, the item's 'digital twin' is created through applications that digitalize physical objects.

VR technology eliminates real life sceneries, whereas AR combines virtual creation with the physical setting. For instance, in Pokémon Go, individuals may see a Charizard hover over the Colosseum or a Regirock resting in the valleys of the Grand Canyon. In VR, you would see neither unless virtually reproduced. AR integrates the two and allows users to control the transmission of real-time data using gestures, touchscreen, or speech. Movement will automatically adjust AR to the person and result in a new input of information that invites new graphics in front of the user.[27]

VR is entirely computer generated and transitions the physical environment to the digital one. Users need to purchase headsets or utilities like Haptic gloves to obtain this kind of experience. They are equipped with accelerators, magnetometers, and gyroscopic sensors to study how individuals interact with their space. The headset is also attached to external cameras that are linked to a computer where users can adjust settings and connect to other applications. VR technology also functions on spatial audio to reflect the audio landscape a person would sense in the real world, thus emulating the dynamics of direction and distance of noise. Headsets that adopt 6 degrees of freedom also pin-point a person in a room and analyze the movement and tilts of the head.[28] Combined, the technologies stimulate an individual comparably to the way that their surroundings would in real life.

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Artificial Intelligence (AI)

Artificial intelligence is a leader in the day-to-day operations of significant industry divisions. From military drone control to banking and fintech, the technology facilitates the process of innovation. And now, engineers have envisioned an application of AI to the Metaverse. The rate and scale at which AI can collect and analyze data, combined with ulterior machine-based processes can provide an in-depth analysis of the Metaverse. This is particularly important at take-off as we start to learn about digital ecosystems and how user experiences change over time.

Inside the Metaverse, AI holds the potential to improve features such as quality of Non-User Characters (NPCs), bodies created to involve and respond to player characters. AI can simulate a genuine dialogue that does in fact resemble a convincing interaction between actual persons, which often is amusingly not the case. Its application extends to storylines, quests, and the general dynamics of engagement between users and their virtual environment. AI may also apply to avatar creation by scanning 2D images or looking at facial details such as eyebrows and jawline to mold a live-like character based on a person's profile.

AI is also a tool for interface optimization. Computers are improving their gesture recognition skills which in turn eases our interaction inside a digital platform. Eventually, they will be trained to analyze the meaning behind body language, particularly within an emotion-response based framework – an attempt of the machine to physiological understanding. Doing so, interactions that operate on these deductions will theoretically gain authenticity, as AI also begins to predict how relationships evolve over time.

Eye-tracking will be essential for rendering. The highest resolution perception stems from the fovea, a region in the eye where photoreceptors are most concentrated, other areas being peripheral. VR will have to render the information of a scenery before your eyeline to determine a point of focus and one of periphery. AI will be used to predict the visual landscape as to create the best possible rendering in advance. And these are just the rudiments of what futurists like Elon Musk are concocting; ideas of biotechnology and 'Machina in anima' project work. An envisioned stretch of AI analytics takes a neural route. A prominent case is Neuralink, a project that looks to the study of a primate's mind through AI analysis on data coming from implanted hardware in the monkey's brain.

3D Reconstruction

3D reconstruction is an alternative to an on-field presence and inability to physically reproduce items. For instance, in Pompei, historians from the University of Lund have used the technique to recreate 3-Dimensional images of the city before it was tragically taken by the Vesuvius. In modern applications (e.g., Real Estate), it is used to recreate properties so that potential buyers may visit without having to book a viewing. This has been particularly useful during the pandemic where restrictions prevented social contact.[29]

The end goal of the Metaverse is to reproduce the real world. A multiview 3D Reconstruction is designed to extrapolate a geometrical structure of a landscape taken from a set of images. The placement of cameras and internal parameters are presumed or estimated by looking at said images. By using more than one picture, we can obtain segments of 3D information by untangling the pixel correspondence problem. The challenge is in determining which fragments of one image correspond to which parts of another and where dissimilarities can be explained by movements of camera or any other unit in the background. Estimations however need inputs that typically come in the form of assumptions, such as flat surfaces or triangular roofs. This information, alongside 4K HD photography is then transmitted to computers to be internally processed. In turn, computers then produce a digital image in the Metaverse for users to experience.[30]

Blockchain and cryptocurrencies

Blockchain is essentially a carriage-link storeroom system for information that makes it virtually impossible for hackers to corrupt. It is a digital ledger, meaning a complete record of transactions that are duplicated and circulated to all computer systems participating in the Blockchain network. Individual blocks in the chain hold a select number of transactions, and for every new transaction, a record of it is added to the ledgers of the participants involved. Before each confirmation, a node verifies the new block. As such, it is impossible to alter the historical records of a transaction. The technology is decentralized, meaning that control is withdrawn from any Metaverse: the evolution of technology through interest groupsnetwork of users. The database which said participants manage is known as the Distributed Ledger Technology (DLT.) Decentralization produces greater transparency in terms of proof of ownership, transfer of items, security, interoperability, and oversight of operations.[31]

Cryptocurrencies are digital currencies attainable either through mining or standard purchase on cryptocurrency exchange platforms. They provide for secure online commercial processes, which differently from traditional methods of web payment, do not need third-party intermediaries. The term ‘crypto’ indicates the numerous encryption

algorithms and cryptographic techniques that shield new entries. Cryptocurrencies practically imitate the ratio behind signatures as they ensure the authenticity of a transaction. They are based on complex mathematical reasoning that secures data by storing and transferring information only to the intended terminal. The recipient has certainty of provenance – the known sender – and that the stored data was not altered on the way to their wallet.

Web3 will be the foundation of the Metaverse. It will work on Blockchain-enabled decentralized applications that drive an economy of cryptocurrency assets and data information. Blockchain will function as the historical memory of financial transactions in the Metaverse.

Internet of Things (IoT)

The technology transposes anything within our physical reality to the Internet via devices and sensors. These can be humidity sensors, pressure sensors or level sensors. Once online, these instruments possess a specific identifier and the capacity to send or collect information without human intervention. It has everyday applications, from traffic monitoring to robotics and medical devices.[32]

IoT will bridge the details of the physical world with digital, increasing the precision with which the virtual sphere reproduces elements of the material one. The most straightforward examples are weather and meteorological conditions which will run accordingly to the actual weather outside – and recreate the 'feeling' of seasons. IoT is indispensable to creating a seamless process. According to a study by Statista, 'the total number of connected IoT devices will reach 75 billion by 2025, with almost 30% installed in industrial environments.' However, it is not shy of criticism as privacy concerns over access to confidential data have been raised. Even so, it is considered a driving force behind the fourth industrial revolution.[33]

Metaverse: the evolution of technology through interest groups

In the late twentieth century, a school of thought known as 'social constructionism' challenged technological determinism and theories of autonomous technology. The constructionists claimed they were naïve to assume that technology followed a predetermined course of development with an entire logic of its own. They contended that progress was fundamentally driven by interest groups which through external pressures, would determine certain outcomes over others. Wiebe Bijker's 1995 study of bicycles supported this theory. He saw that different models would be enhanced for speed, though at the cost of stability and safety, which in early prototypes was really an 'either/or'. At the time, faster bikes had enlarged front wheels which were harder to balance and would throw over a biker from a greater height if tipped. In previous designs, the front was smaller but significantly safer. It emerged that the faster model appealed to a younger and sports active demographic while tourists and families preferred the latter. The result was a bicycle that incorporated both features.

Wiebe E. Bijker is a Dutch professor Emeritus, former chair of the Department of Social Science and Technology

Paulina Lewandowska
Business Relations Lead at Nextrope

Metaverse Landscape: Most Influential Players and Projects

In the past sections of this compendium, we took a multi-angled look at the very idea of Metaverse, attempting to define it. The key challenge in such exercise lies in its multi-faceted nature. What the Metaverse 'really' is? A more 'creative' definition would tend to the philosophical consideration of subjects, space, and time. The economic approach focuses on network effects between Meta-entities and the microeconomic forces guiding their behaviour – whether businesses, investors, or ordinary users are concerned.

In this section we explore, how the Meta-ecosystem, currently in its most dynamic phase of development, is shaped by its leading players that develop modular elements of the reality that step-by-step is turning into an all-encompassing Meta-reality. As such, its blueprint can only invariably spin around a string of companies working in each other's footsteps, as interests cross over and come together. At Nextrope, we provide you with a holistic overview of what this ecosystem looks like, by scrutinizing some of the biggest players out there.

Microsoft

Last November, the company unveiled Mesh for Microsoft Teams, set for re;ease in mid-2022. It is a video-conference platform where users design their own 3D avatars and through VR headsets (Microsoft HoloLens), access the virtual office based in AltspaceVR (purchased by Microsoft in 2017). This is the company's front runner in advancing the Mixed reality project.[34]

Initially, Microsoft admits that professionals will only appear as virtual avatars to their colleagues. Eventually, the vision is to access holoportation technology, meaning users can directly appear as themselves in the Mesh space and teleport between settings.[35]

Statista predicts that Microsoft's Mesh and HoloLens could offer a market capitalization opportunity of almost $2 trillion by 2025, which nears today's Microsoft's entire capitalization of $2.4 trillion.[36]

In early November 2021, Microsoft announced Teams upgrades along with Dynamics 365 Connected Spaces to which it wants to integrate Mesh.[37] With 365, businesses can collect data about their physical spaces and gain insights using AI. For instance, they can monitor traffic in a retail store, measure interest in specific products or store areas by following consumer movement. Applications can range from storage efficiency to reducing checkout lines at a till. In the context of Mesh and the Metaverse, it will serve as a better handle on data as organizations can identify areas of improvement in the offered experiences.

In the short term, Microsoft's projected growth is driven by its core cloud business, personal computing, and productivity software.

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Meta

Rebranding is part of a wider strategy, and not just a response to Facebook's recent political scrutiny. The company's mission is to instil the idea that they're not just a social media organization anymore. 'From now on, we will be Metaverse-first, not Facebook-first. That means that over time you won't need a Facebook account to use our other services,' Zuckerberg said. [38]

This 'break-away' began in mid-August, when Meta, at the time Facebook, presented its Horizon Workrooms VR Remote Work App, which is similar to Mesh in terms of the 'presence' it offers. The main difference in experience is that Horizon is routed towards simpler office meetings, where user engagement and productivity is facilitated. AltspaceVR is more customizable and is channeled towards virtual collaboration for groups needing a more complex organization.

HoloLens is primarily designed for environments where users can access virtual information without having to change their physical setting. That means virtual navigation does not correspond with real movement, a prerequisite in Oculus. The Rift also has a built-in head tracking system that monitors rotation through an external camera that observes light-emitting diodes on a headset. HoloLens does not.

'Microsoft's more gradualist approach - and the fact that 250m people use Teams at least once a month, compared with the 7m paying users Facebook has for its existing workplace communications software - make it the more likely place for workers to experience the new Metaverse technology, according to experts in the field. Mixing avatars and real faces in group meetings was a clever way to get people to start feeling comfortable interacting with cartoon versions of their colleagues.'

The Oculus Quest series, now at generation 2, is the company's headset technology that will virtualize reality for its users. Meta is currently working on 'Project Cambria', considered the successor of Gen2. It is reported that Cambria boasts eye-tracking features that provide users with an alternative method of input, allowing engineers to implement foveated rendering, an adaptive scaling technique that provides high resolution for a user's sightline while scaling down everything out of view. This has a dual function, one in refining visual quality and the other in preventing waste of processing power.

On October 18th, Facebook announced that it would create 10,000 jobs in the EU with the sole purpose of Metaverse creation. In 2021 alone, Meta invested $10 billion in the Metaverse.

The Oculus Quest series, now at generation 2, is the company's headset technology that will virtualize reality for its users.

Apple

Tim Cook, CEO of Apple disclosed that Apple's presence in Augmented Reality is 'alive and well,' underlining its centrality to the organization's future projects.[39] 'We've always said that AR is a core technology, and it's a technology I get super excited about,' Cook said.[40] 'I think it's profound in terms of the things that you can do with it and the enhancement to people's lives ... but humanity has to be at the center of it.'[41] Apple possesses the world's largest AR platform, with hundreds of millions of AR-enabled devices, as well as thousands of AR apps on the Apple Store.[42]

Since Meta's name change and project reveal, share prices have risen by 6.7%. Apple has comparably soared by 18% to $175 by mid-January.[43§]

Long-time Apple analyst Katy Huberty of Morgan Stanley raised her price target for the company's stock from $164 to $200, to include future value generated by emerging products. 'New product categories need to get priced in,' she wrote in a memo to investors in December. 'In conversations with venture-backed AR/VR companies, the consensus view is that the real catalyst for mass-market AR/VR adoption will come when Apple enters the market.'[44] Apple analyst Ming-Chi Kuo and Bloomberg's Mark Gurman have suggested that the headset will be set for release in 2023, and the glasses soon after.[45]

The AR/VR headset is reported to include A-series procesors that will place performance on the same level as MacBooks.[46] Bernstein Analyst Toni Sacconaghi disclosed to investors that Apple could supply 22 million augmented reality devices by 2030, potentially increasing revenue by 4%. Bernstein adds that AR/VR appliances could account for more than 20% of total revenue by 2040.[47]

Apple's market reach may be the reason why it will lead the Meta-race. To be more specific, China. Apple is the only company that has significant operations in a country where other top contenders do not. In 2021's fiscal year, Apple registered 21% of its income from China.[48] China counts 3 times the number of internet users compared to the US. and 18% of the world population. The World Bank stated that just in the last decade, the red giant drove 47% of the global GDP growth.

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Unity Software

Unity Software is considered the best platform for developers to build and operate their 3D content in real-time.

The company takes a two-pronged approach: 'Create' and 'Operate.' The first concerns game manufacture engine which accounts for 30% of the company's revenue. Over half of mobile games are made on its enterprise Software as a Service (SaaS) platform. Operate accounts for an additional 60% on advertisements and monetization. It counts 3.4 billion users every month and is one of the world's largest advertisement networks.

In the mid-third quarter of October 2021, the company saw revenue growth of 42.6% bringing it to a ball-point figure of $286 million. The acquisition of Weta Digital for $1.6 billion, a company that specializes in visual effects, generated an increase of almost 3% in trade stocks, projected to add a value of $70 million in revenue.

The integration of Weta is explained by Unity's desire to strengthen its position in the film industry and close in on Epic's Unreal engine and Roblox. Where Unity appears to be ahead in terms of AR and VR, Unreal is dominant in more complex gameplay, console games and HD graphics. Fortnite is a leading example of that.

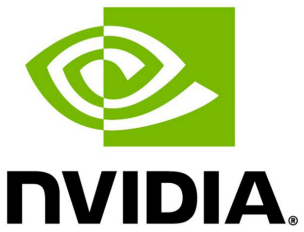
Weta combines with Unity's Create platform to support the continued growth of its proprietary graphics and VFX instruments. It also adds art/design features accessible through a cloud-based workflow.[49]

Nvidia

November's quarterly results speak of a company's strong commitment to Metaverse development. CFO Collette Kress discussed new entries in product inventory. The first is a replicator service that will enable a "seamless inter-twinement of real-world and fully synthetic data" (Daniel Newman) — allowing developers to physically simulate 3D worlds in their entirety. Industrial application includes autonomous vehicles and robotics.

The second announcement was the Omniverse Avatar, a platform designed to create interactive AI Avatars. "This platform will tie together a number of core Nvidia SDKs including AI, Speech, computer vision, NLP, simulation and recommendation engines." At the Nvidia GPU Technology Conference, the company revealed the creation of AI avatars capable of dialoguing intelligently with customers at a restaurant.

Nvidia's future monetization plans spell licensing, as announced by Jensen Huang himself. Omniverse revenue will be 50% hardware and 50% licensing.



Nvidia stated in the new year that it made agreements with four marketplaces – TurboSquid by Shutterstock (SSTK.N), CGTrader, Sketchfab and Twinbru – granting rights for their marketplace content to be available in Nvidia's Omniverse software suite.[50]

Roblox

David Baszucki, co-founder and CEO, identified the company as the "shepherds of the Metaverse." [51] Roblox went public the following month, opening at $41.9 billion. [52]

Roblox counts 20 million+ experiences, enabling users to play, chat, create and interact with one another through LEGO-like block avatars. The Roblox suite allows users to create and monetize from their own games.

Between the first quarters of 2018 and 2021, Roblox's daily active users rose by 308.7%, from 10.3 million users to 42.1. Total engagement in hours soared by 362.9% – 2.1 billion to 9.7 hours. Analysts project Roblox's revenue to increase by 19% to $3.14 billion as the pandemic is expected to slow down.

Expansion plans are posited around the increased number of users abroad other than the U.S. and Canada, who make up 70% of its DAUs and 32% of revenue in 2021's first quarter. One of the targeted markets is China, where the company has partnered with Tencent Holdings, the world's largest video game publisher.[53]

A concern going forward is that 67% of its users are under and at the age of 16. As customers grow up, they are drawn by games that provide a more age-suited type of experience. The company will need to understand how to tap into this age demographic.[54]

Matthew Ball claimed that Roblox 'has, by far, the most robust and multi-faceted economy... If you're a developer, for example, you can generate income not just by selling your experiences to consumers, but reselling your creations (a house, a car) to other developers via the Roblox marketplace."

Roblox's popularity derives from the unique relationship between its personalized avatar system and the millions of game options it provides. When users enter a world, their avatar does not change to a character a storyline offers. The chosen avatar remains constant throughout all experiences, reinforcing the principle of player identity the company supports.

The platform allows individuals to express themselves through a wide range of features, amplified further by collaborations with external designers, such as Gucci and Nike. For instance, Gucci has sold on the platform bags pricing between $3,000 to $4,000.[55]

The cooperation with designers and external brands has, according to Roblox's investor pitch, generated $329 million in 2020. Chief Product Officer Manuel Bronstein explains that the potential and success of the company in leading the Metaverse derives from its agenda to include different types of operations. He says 'These experiences are not just in a single category, like gaming. In fact, we see them as a combination of media, gaming, entertainment and commerce, and the future of social interaction.'

Epic Games

Co-Founder and CEO Tim Sweeney revealed that 'It's no secret that Epic is invested in building the Metaverse,' and that their short-term movements are geared to securing 'great creative talent who know how to build powerful games, content, and experiences.'[56]

In May, Epic raised $1 billion in funding for its mission to build the Metaverse. This places the company's equity valuation at $28.7 billion. Of that $1 billion raised, Sony invested $200 million in a strategic move to strengthen what already is a close relationship between the two. Sweeney adds that 'Their investment will help accelerate our work around building connected social experiences in Fortnite, Rocket League, and Fall Guys while empowering game developers and creators with Unreal Engine, Epic Online Services, and the Epic Games Store.'

Sony CEO Kenichiro Yoshida 'formalized' their good relations in a press release, stating that Epic delivers 'revolutionary experiences through an array of cutting-edge technologies that support creators in gaming and across the digital entertainment industry.' We can therefore expect this partnership to persevere for the foreseeable future.

Firms investing in Epic are Appaloosa, Baillie Gifford, Fidelity Management & Research Company LLC, GIC, funds and accounts counselled by T. Rowe Price Associates, Ontario Teachers' Pension Plan Board, funds and accounts managed by BlackRock, Park West, KKR, Alliance Bernstein, Altimeter, Franklin Templeton, and Luxor Capital.[57]

To a series of partnerships, Epic Games has added a number of assets including Tonic Games and therefore Mediatonic, which is the studio behind battle royale hit 'Fall Guys: Ultimate Knock-out'. The game, other than its popularity which still adds to an already important inventory, ticks the experience 'boxes' that Epic is forwarding as a company. The game per se isn't the organization's target acquisition but is a benchmark for what Mediatonic can create – a social experience Epic Games wants to recreate and build on.

'Fall Guys found success by creating its own self-contained universe in and outside of the game. Its memefueled Twitter account created a large community of fans who were ready to joke along with the team. That netted the account over a million followers, which is unheard of for a game of this scale. If Mediatonic could unite that many people on an indie budget, what can it do with an Epic-sized one?'[58]

Epic Games is also funding Spire Animation Studios and giving them access to its Unreal game and technology development engine which Spire says will support them in 'building out worlds and experiences for the Metaverse.' The studio concluded that 'By creating movies in Unreal Engine, Spire will be able to seamlessly port story assets worlds and characters — into the Metaverse.'

Headset comparison

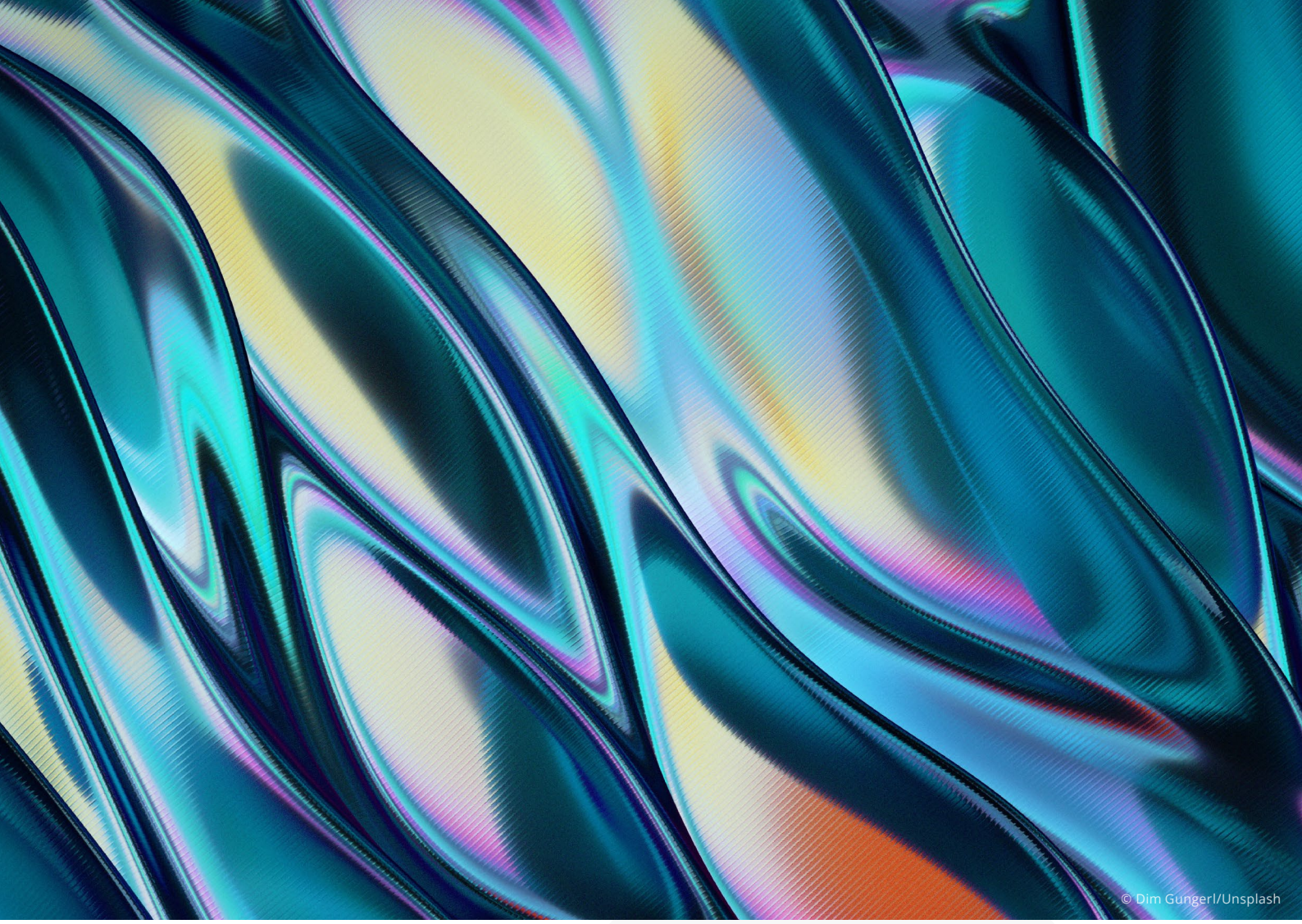
We identified some of the key VR/AR headset technologies that allow us to keep up with Metaverse development, all to provide you, a closer look at the components that support these hardware experiences.

	Oculus Quest 2 2021 Liquid Crystal Display (LCD)	Microsoft's Hololens 2 2019 See-through holographic lenses	Valve Index 2019 Active-matrix organic light-emitting diodes (AMOLED)	Sony PlayStation VR 2 Unreleased Organic Light Emitting Diode (OLED)
MAX RESOLUTION – PER EYE	1832 x 1920	1440 x 936	1440 x 1600	2000 x 2040
MAX REFRESH RATE (HZ)	120	60	144	120
FIELD OF VIEW (DEGREES)	Horizontal: 97° Vertical: 93°	Horizontal: 43° Vertical: 29° Diagonal: 52°	Horizontal: 107° Vertical: 104°	Horizontal: 90° (estimate) Vertical: 90° (estimate)
CHIPSET	Qualcomm Snapdragon XR2	Qualcomm Snapdragon 850	Dual core	-
GPU	Adreno 650	Adreno 630	Nvidia GeForce GTX 1070	-
CPU	Octa-core Kryo 585	Octa-core Kryo 385	Quad-core	-
STARTING PRICE	$299	$3,500	$999	$399*

	HTC Vive Pro 2 2021 Liquid Crystal Display (LCD)	Samsung Odyssey + 2018 2x Amoled	iQIYI Qiyu 3 2021 2 x LCD	Varjo Aero 2022 2 x Mini LED binocular
MAX RESOLUTION – PER EYE	2448 x 2448	1440 x 1600	2160 x 2160	2880 x 2720
MAX REFRESH RATE (HZ)	120	90	90	90
FIELD OF VIEW (DEGREES)	Horizontal: 116° Vertical: 96° Diagonal: 113°	Horizontal: 101 Vertical: 105	Horizontal: 95° Vertical: 90°	Horizontal: 102° Vertical: 73°
CHIPSET	-	-	Qualcomm Snapdragon XR2	-
GPU	-	-	Adreno 650	-
CPU	-	-	Octa-core Kryo 585	-
STARTING PRICE	$799	$500	$540	$1,999

	RealWear Navigator 500 2021 Single LCD monocular	Canon MREAL Unreleased Single Micro LED binocular	Xiaomi Smart Glasses 2021 Single Micro-LED monocular
MAX RESOLUTION – PER EYE	854 x 480	1600 x 1200	640 x480
MAX REFRESH RATE (HZ)	-	120	50
FIELD OF VIEW (DEGREES)	Horizontal: 20°	Horizontal: 45° Vertical: 34°	Diagonal: 29°
CHIPSET	Qualcomm Snapdragon 662	-	ARM SoC
GPU	Adreno 610	-	-
CPU	Octa-core Kryo 260	-	Quad-core ARM CPU
STARTING PRICE	$2,500	$38,500	$200**

	Simula One 2021 2 x LCD binocular	Pimax Reality 12K QLED Unreleased 2 x QLED binocular
MAX RESOLUTION – PER EYE	2448 x 2448	PC-VR mode: 6K per eye. Standalone mode: 4K per eye
MAX REFRESH RATE (HZ)	90	200
FIELD OF VIEW (DEGREES)	Diagonal: 100°	Horizontal: 200° Vertical: 135° Diagonal: 240°
CHIPSET	Intel i7 – 1165G7	Qualcomm Snapdragon XR2
GPU	Integrated Iris Xe Graphics	Adreno 650
CPU	Octa-core i7	Octa-core Kryo 585
STARTING PRICE	$3500	$2399



NFTs and the Metaverse

The digital revolution has bypassed the conventional ways in which we structure our day-to-day operations. The exponential rise of ‘tokens’ has begun to redefine social network paradigms of user engagement, socialization, and transaction in the digital world. To summarize, a token is a fragment of data that replaces another more valuable piece and is stored on a Blockchain. In its virtual form, it holds no value but represents something that does. An analogy would be a voucher. Vouchers substitute money in the experience they offer, relieving inexpressive paper with a hedonic gift idea. You cannot use them as a replacement for cash, but you can exchange them for an item that has their representative value. As such, tokenization works by extracting that valuable in-formation from a digital environment and inserting the token to fill the ‘gap.’

Tokens come in 2 main types: utility tokens and in focus, non-fungible tokens (NFTs).

For instance, you cannot exchange a fridge with a typewriter or a lamp with a book. Conversely, fungible items can be swapped, because they are defined by their value, not their properties. A standard example would be Bitcoin or other cryptocurrencies such as Cardano which can be purchased and sold for money on crypto marketplaces.[59]

Where it was prior thought that their application was limited to a world 'unseen' by regular consumers, now they are on billboards in Times square, newspaper advertisements, sponsors and stadiums, a gradually integral presence in our society. Public awareness soared with the proliferation of 'Cryptokitties' an online game where players can breed and collect virtual cats. Of $12 million raised in investments alone, some of the 'cats' were sold for over $150,000 an item.[60] The videogame was later added to the ERC-721, a free and open standard that trains users to build tokens on the Ethereum Blockchain, thereby coining the token for the very first time as an NFT. With an overall sale of $250 million in 2020, Dap Radar's data registered $2.47 billion in the first 6 months of 2021, an increase of 888% in the space of just 1.5 years.[61]

The token's growing popularity derives from its efficient ownership alternative, connecting buyers to items without having to compromise with media platforms and third parties. Ownership terminates only when the titleholder decides to sell the item. The unique and integrated Blockchain mechanism indicates ownership history and easily detects the authenticity of an NFT, guaranteeing buyers the quality expected of the transaction. Moreover, the potential is believed to be transformative. As DLT market infrastructures grow and the benefits of decentralized economies become undeniable to key investment players, there will be a shift towards decentralized finance. Tokens, amongst which NFTs, are the "lifeblood of this new system'.[62]

Prototype Metaverses reside in said new system since they're intended to run on decentralized exchanges. Spaces such as Decentraland operate on economic principles such is adjacency of land. All virtual territories are contiguous to one another on a fixed territory within a finite geographical area, which means scarcity of land and therefore limited property availability. The degree of rarity will correspond to a higher or lower asset value. Within this dynamic, NFTs allow for property transactions and effectively replace a land deed by providing indisputable proof of a title.

Play-to-earn guilds will complement the experience by easing NFT acquisition in the Metaverse. Players are enabled to loan assets from guilds should they not have the capital to purchase the item upfront.

Eric Anziani says 'For Metaverse property rights, you simply cannot fake it because of the way smart contracts are defined, and the NFTs programmed... You know you own an asset and can demonstrate ownership fully. Based oron the terms and conditions of that virtual environment, you can then assert ownership rights.'[63]

More generally, users can import their assets and services into the digital while maintaining the ability to earn. Companies are striving towards interoperability of assets on the Blockchain and to achieve that level of connection, innovative models of gaming are being developed, one of which is the play-to-earn standard. This route allows users of Blockchain-based games to rely on NFTS as a financial key

to access in-game economies and benefit from rewards that participation generates.

Play-to-earn guilds will complement the experience by easing NFT acquisition in the Metaverse. Players are enabled to loan assets from guilds should they not have the capital to purchase the item upfront. Players can then use said assets to earn virtual currency and gradually pay back the guild. This supports the development of an open market by reducing barriers to play-to-earn mechanisms and undermines an obvious class system that automatically places wealthier users at the top. The digital assets and tokens also have reverse value as they are tradeable on NFT marketplaces such as Binance thus incurring value in the real world. It ensures user flexibility in tailoring portfolios to their respective interests.

NFTs will inevitably deepen user experience by extension of their identity – fostering the community benefits the Metaverse purports. NFT assets are more than just token currency, rather take a symbolic function of a person's standing in their community. For example, NFT avatars can be designed to have wedding rings to indicate marital status or have a t-shirt design to suggest political affiliation. Select avatars will translate into exclusive experiences users can access through grants.

"Vibrant examples of such identity-shaping avatars include the Bored Ape Yacht Club and CryptoPunks collections, which grant their holders exclusive rights and access to closed communities of affluent users with locked content and even offline private events. Exclusive parties with NFT-associated entrance fees highlight NFTs' role as value carriers that bridge the digital and the real worlds."[64]

As it stands, the role of NFTs in the Metaverse is hypothesized and judgments fall on specific dynamics that do not yet function at the heart of a wider system. As the Metaverse grows, only then can we draw conclusions on the larger implications that the technology holds. However, at Nextrope, as we project the future outlook of data and value in the Metaverse, we predict that NFTs are the most fit and currently the most feasible technology in realizing the Meta vision in concrete terms. In an uncertain world, organizations are adopting strategic foresight as means to systematically assess the impact of future ideas on operations and strategy. Sason Tertehrian, V.A.T specialist at BDO, released an exclusive on some of the company's starting assessments.

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Tax Regimes for NFTs? A BDO Perspective

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Non-Fungible Tokens can disrupt mainstream transactions through their volatility and intangibility in the decentralized environment that is the Metaverse. In the context of taxation and more specifically value-added tax, the treatment of these new resources raises an abundance of questions.

While the status of cryptocurrencies has recently been somewhat addressed in the CJEU Hedqvist case, with consideration that the exchange of virtual coins for traditional currencies was equivalent to the exchange of legal tenders, it cannot be presumed that the same rationale will be applied to NFTs. In fact, these new categories of crypto assets serve a fundamentally different function and the trading in NFTs would be prone to qualify as an exchange of goods or services. Another consideration is the recent success of NFT sales which have reached a total of $24 billion in 2021 compared to $94 million in 2020, further attracting new investors. This trend for NFTs and their rapid increase in popularity stresses the need to address their tax treatment.

As mentioned, the trading of NFTs would, in the eyes of many practitioners, qualify as a supply of services and in particular, digital services. The European Commission's definition of digital services is as follows: 'services which are delivered over the Internet or an electronic network and the nature of which renders their supply essentially automated and involving minimal human intervention, and impossible to ensure in the absence of information technology'. It would indeed capture the mainstream sales of NFTs that typically consist of digital art or in-game items. Assuming that the type of supply is defined, many more questions arise on the nature and actors of these trades. For instance, in the case of an individual taking a picture and selling it as an NFT through one of the many digital platforms available. Would they qualify as a taxable person for VAT purposes or would the occasional nature of the transaction, in the context of the private individual, prevent such consideration? How would one determine the location of the parties involved? Authorities have yet to provide more guidance on the application of VAT on this new category of trade.

Finally, the rise in trade of digital art and intangible assets alike raises the question of its use in enabling VAT fraud. With this new trend, many believe that we may experience situations similar to now historic VoIP and CO2 emissions allowance cases where tax authorities have lost hundreds of millions in revenue to the abuse of VAT fraudsters. Online marketplaces with high-value digital products are indeed favourable environments for the implementation of the classic missing trader fraud. Considering the global reach of such transactions and the volatile value of the goods involved, the control and investigation over this new kind of trade would undoubtedly challenge the tax authorities.

It is clear that the NFT market has had a non-negligible rise in popularity over the recent years and is there to stay. In the context of its VAT implications, there currently is a lack of proper coordination and guidance. This inability to capture these trades in the current VAT ecosystem also implies a significant loss in tax revenue for the authorities. Yet, considerations must also be given to the impact that tax fraud could have and the difficulty for the authorities to monitor a decentralized market.

Sason Tertehrian is a Tax Advisor at BDO. After completing his Tax Law major, he decided to pursue his passion for the law through a post graduate program in Luxembourg. Currently specialized in V.A.T, his interests in technology and finance have made him a point of reference on matters concerning tax regimes and crypto technology.

Industrial Applications

I. Gaming and Metaverse

Computer games are the entertainment that we look at as one of the most joyful moments of our teen years. Discussing the nature of video-games, academic studies point out to the commonality of using technology for entertainment, one set in a fictional context. The inspiration drawn from stories is what attracts us to video-games, and makes them into a believable experience.

The National Research Council elaborated on two characteristics that make videogames into a wider phenomenon with relational implications:

1) they provide feedback to measure the player's progress toward goals, and the second that the player's actions;

2) overall gameplay strategies influence the state of the game—the overall digital 'world' and the player's further interactions with it.[66]

In the US alone, Reuters reports that it generates 90.3 billion in annual economic output (2019), supporting nearly 429,000 jobs.[65] DFC Intelligence adds that, as of mid-2020, there are over 3 billion video game users globally. It is beyond doubt that video games form an essential part of our modern culture.[66]

"Studies focusing on the potential positive outcomes of videogame play have found links to positive emotions for players" (Ryan et al., 2006; Kutner and Olson, 2008; Wang et al., 2008; Przybylski et al., 2009a; Allahverdipour et al., 2010). Moderate videogame use has been found to support emotional stability (Przybylski et al., 2011) and limiting emotional disturbances in children (Hull, 2009). Significantly, video-game play has been advocated as a means of relaxation and stress reduction by regular players (Russoniello et al., 2009; Wack and Tantleff-Dunn, 2009; Snodgrass et al., 2011b). [67]


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Research by Qutee (Forbes cited study) found that over 40% of participants admitted to emotional well-being derived from experiences with video gaming.[68] Given a common misconception that the topic is correlated to violent and anti-social behavior, company policies are certainly steered towards addressing this, and the Metaverse is a golden opportunity to do that.

Games were once considered a type of interactive entertainment. They quickly evolved into something more substantial, complete with narrative, and filled with remarkable characters. They gradually

became more than just a pastime hobby and with the advent of eSports, they found a new competitive edge in a dimension that other industries are starting to capitalize on.

Ordinary gamers are now (thanks to NFTs) beginning to perceive gaming as a type of financial investment, although relatively few depend their livelihood on it yet. The Metaverse adds to the fun of gaming by transforming it into something only seen in movies and literature. Fortnite's Tim Sweeney has a more business take on it. The game is credited with bringing together various brands into a unified ecosystem. While DC and Marvel compete in various mediums, Fortnite allows you to pit Thanos against Superman in battle. Trademarks and royalties aside, it really boils down to that. Sweeney wishes businesses to inter-connect between the physical and digital worlds, releasing the same assets at the same time, and not just unifying competitors.

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Another key Meta developer Roblox allows anyone to create their own worlds and games inside its larger Metaverse as an online game plat-form and game production system. Nerf, Hot Wheels, and Sony Music are among the brands that have partnered with Roblox. Films are getting in on the act as well; the musical 'In the Heights' hosted a virtual block party in a Roblox reproduction of New York City's Washington Heights. Gamers are willing to spend money on virtual events, skins, avatars, and other items. Roblox virtual currency transactions increased 161% to $652.3 million in the second quarter of 2021. 'People are starting to develop a deeper connection with the digital world via things like cryptocurrencies, NFTs, avatars and immersive gaming experiences,' says Doug Scott, Chief Managing Director at gaming and e-sports company Subnation Media. 'And as people further develop their digital identity, platforms like Roblox are providing a home for the community.' To meet community demands, it is critical that companies build a solid digital customer service foundation.

Supporting teams with technology will take service assistance to the next level. It is simple to see how an in-game conversational bot could add to a more immersive experience while also guiding users throughout the Metaverse. Creating a roadmap for marketers working to prepare their player support teams for the Metaverse can come in handy.

According to Roblox CMO Messing, this may necessitate some extra innovation and out-of-the-box thinking. But, as Messing puts it, 'What emotions and memories do I want them to take away from this experience? How do I want them to come back and engage with me again?'. Ball emphasizes that these touchpoints are crucial. The sheer presence of the Metaverse does not imply that it is a desirable location to visit. Brands will play a significant part in filling the Metaverse and making it a popular virtual gathering place.[69]

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II. Social media and Metaverse

Websites and programs that emphasize on communication, content-sharing, community-based input, engagement, and collaboration are referred to as social media. People use these instruments to sustain contact with friends, family, and the wider reaches of their communities. Businesses also operate on social media to increase their outreach, market their products and keep track of latest consumer trends that translate into wider profit margins. In 2020, over 3.6 billion users accessed social media, with that number projected to 4.41 billion by 2025. [70] With a new account generated every 6.4 seconds, each individual user has 7.6 social media profiles on average, on which, they spend about 142 minutes daily.[71] The level and size of increased interconnectivity is well summarized by market strategist Kim Garst: 'Conversations are happening whether you are there or not.'

The move to integrated virtual reality may be difficult for influencers and creators to adjust to at first but can later welcome new opportunities. They can reach audiences in new imaginative ways, supported by the unlimiting qualities of communicating with people via holograms and avatars wherever possible. For example, Gucci launched the Gucci Garden

3.6 bn

People accessed social media in 2020 (4.4 bn expected in five years)

on Roblox in May 2021, a virtual experience to accompany the Gucci Garden Archetypes, a real-world installation in Florence, Italy. Vogue Business reported that users could 'mingle with others exploring the space and could buy digital pieces created in collaboration with Roblox creator Rook Vanguard.'[72] The collaboration shows precisely how creators can be far more inventive in the digital than they are in reality – let alone with the presence of significantly larger and more engaged audiences. Creators will build new channels of communication, but should they join at the appropriate time, their social media channels can significantly benefit from such a move. Using keywords like 'Metaverse' and 'Meta' in chan-

Global influence of social media

Key impact indicators

7.6 accounts

Social media accounts are owned on average per user across platforms

4x Social media user base expected to grow four times faster than the world population

142 min

Average time spent daily on social media per user

6.4 s

Time in-between the creation of a new social media account

nel 'bios' can enhance social media traffic, which could lead to brand partnerships – especially as boutiques like Nike, Gucci, and Disney are starting to build their own virtual networks.

Marketers are flocking to the Metaverse for several reasons. It is brand new, and faster connections are finally available to manage rapidly expanding workplace demands. The most significant reason is that marketers want to maintain Millennials and Gen X involved with their products, and the Metaverse certainly plays a part in that. Where that is the case with an older demographic, it will take more effort to raise a relatively low turnout of Gen Zs (born between 1997 and 2012), with only 38% believing it to be 'the next big thing' and that it 'will become part of our lives in the next decade.' This figure already bumps up to 48% amongst millennials aged between 25 and 40. However, Harris says that of the Gen Zs interviewed, only 2/3 understood what the Metaverse is and so engagement numbers will stabilize at a more reflective value once B2C product clarity is achieved.[73]

Because they are in the digital realm, the larger Metaverse platforms, such as Fortnight, Decentraland and Roblox can provide brands with a vastly amplified outreach. According to the Wall Street Journal, the Anaheim-based skateboard company Vans presented its virtual skatepark in Roblox to provide gamers new in-game skill moves and earn points that can be reinvested on avatars in their virtual store. The Metaverse, according to Vans' management team, is set to raise consequential brand awareness among their main demographic of 13 to 35. Since advertising, marketing, and branding are yet to be defined in the Metaverse, campaigns are at minimal prices, thus offering advantageous conditions to investors looking to move in. The company states that their online park has already received more than 48 million visitors – the size of engagement that bigger brands can witness in the Metaverse.[74]

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III. Education and Metaverse

The Metaverse will transform sectors that have been relatively unaffected by the internet era, one of which is education. Remote learning, according to technologists, will profoundly re-shape and supersede in-person interactions. If COVID has accomplished anything for the division, is that it has demonstrated how ineffective Zoom-based learning and long-distance didactics are, as well as highlighting the importance of individual presence and socialization in the development phase of a young person.

In a McKinsey survey, teachers emphasized that a remote learning experience is a poor substitute for classroom dynamics. When it was initially implemented in response to school closures between March and July of 2020, McKinsey polled instructors in 8 different countries to assess its performance. Teacher score averaged a 5 out of 10 – fairly subpar.

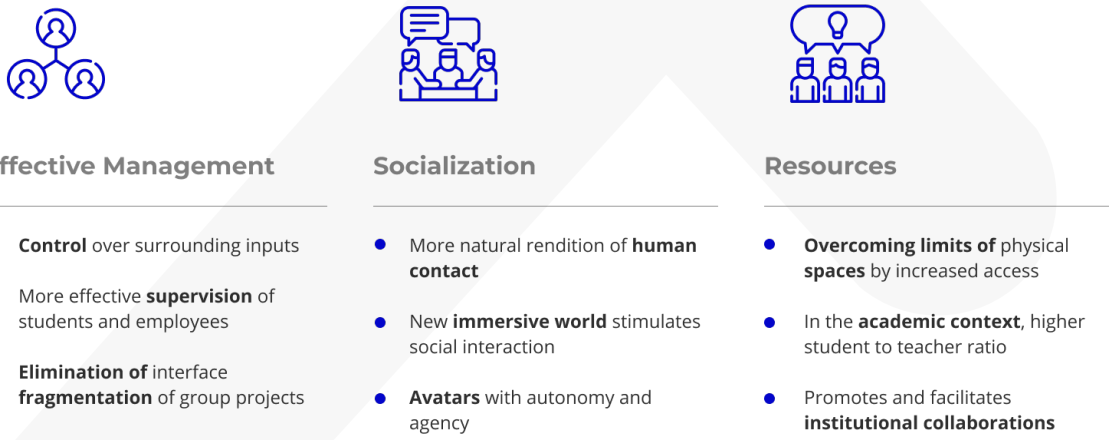
‘Only comprehensive training on the integration of mobile technologies and appropriate pedagogical methodologies, as well as necessary subject matter knowledge, can equip teachers with adequate initial skills to design and faci itate mobile learning practices.’

The situation grows considerably worse for those who can't access these technologies, making it virtually impossible to operate a class for those low-income households that lack internet or dedicated space studies.

'The disparities in basic conditions for learning are reflected in the results of formative assessments taken this fall. We analyzed assessment data from the Curriculum Associates i-Ready platform and found that students in their sample learned only 67% of the math and 87% of the reading that grade-level peers would typically have learned by the fall. On average, that means students lost the equivalent of three months of learning in math and one-and-a-half months of learning in reading. The learning loss was especially acute in schools that predominantly serve students of color, where scores were 59% of the historical average in math and 77% in reading.[75]

By fall, WHO guidelines suggested that school closures should be 'considered only if there are no other alternatives' The extensive impact of changing educational platforms can be dichotomized in many spheres of psychological relevance – isolation, depression, distractions, insomnia, etc. However, all the above gravitate around one central element: human contact. The Metaverse would theoretically enable students to participate in vastly populated educational settings, with complete agency and autonomy through avatars endowed with complex facial and body animations. By no means will the Metaverse replace the primordial forms of social interaction but can emulate them in a way that users may come closer to a sense of contact than they do on Zoom and programs alike. The analysis above denotes a qualitative approach to the didactic method. However, there is also a quantitative consideration, one that concerns an increasingly scarce and equally precious resource: teachers. The Economic Policy Institute asserted that 'The teacher shortage is real, large and growing, and worse than we thought'.[76] If VR classes can bypass the limitations of physical boundaries, then larger spaces where professors can connect to more students are a possibility. This means we would not have to subdivide classes into smaller fragments with more teachers. However, fewer teachers to more students equally reduces the attention each student individually receives, and feedback is accepted as an integral part of the educational process. But for those whose access to education is not a given, this is a strong starting point.

Lessons Learnt in Remote



IV. Trade and Metaverse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The development of the creator economy will grow simultaneously with Metaverse expansion. New marketplaces will emerge for commissioning and selling generated virtual goods. Digital art bazaars such as SuperRare and OpenSea host architects that auction their collections will populate the new digital environment. But the possibilities go further. Consultancy to engineering to education, the replication of an in-world economy will partly transfer with it the labour market that comes with it.

At Nextrope, we envision exclusive content being passed from reality to the Metaverse. Movies are an example. A company could hypothetically provide exclusive rights to a virtual cinema to reproduce a specific movie only within their halls. A consumer would then be obliged to acquire VR headsets to access that service and in doing so, businesses can create demand by shifting commodities. Since workspaces are initially driving Metaverse related projects such as HoloLens, it is somewhat implied that these rooms can take on educational spaces. It is not farfetched to then imagine private tutorials that may take place in the private residences of users. It can reduce the impact of change as we connect to individuals across the globe and still be in their presence. This will be particularly helpful to those who perhaps want to continue therapy with their longtime psychologist for example. That is the opinion of Dr Salisha Afridi, clinical psychologist in Dubai's LightHouse Arabia. It takes us out of our comfort zone while at the same time, preserving its value.

Virtually performed labour has exponentially grown at the turn of the decade. A number of users employed by larger corporations typically come from low-income regions, and whose job involves the assortment of digital resources which are then sold in or out of game. If the Metaverse is to be an extension of the digital universe, then these tendencies can and will increase. It follows that additional hiring platforms such as Upwork will follow or more generally, Metaverse points that allow for advanced outsourcing of labour to foreign markets in an increasingly global economy. As consumers step up their economic activity, this will result in further job demand. Crypto investors may want to look for services that store their items or virtual agencies to protect their properties. There may be a need for in-house consultancy boutiques that can recommend strategic investments in the new world. Marketing & Advertising will also be disrupted through digital billboards, 'end-to-end brand storytelling experiences like Nikeland, with downloadable brand offerings that reinforce product recall for physical stores'.[77] Companies must understand that this transition is threefold.

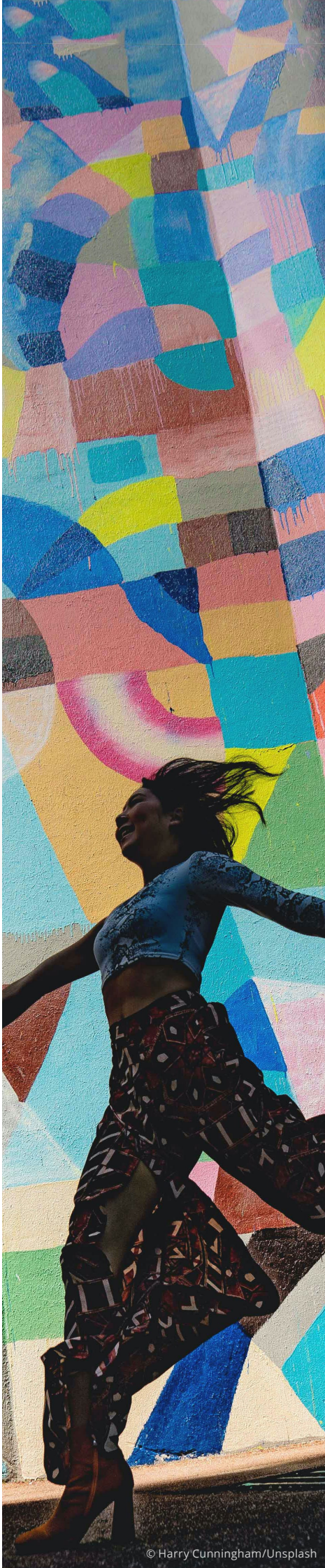
The first prong concerns modality of services. Firms must successfully replicate their current activities in the digital world since practices in the digital will also pertain to events in the real one. Therefore, it is the mode of operation that changes, not necessarily the content, making the first step, adaptation. The second prong is content, so actual services. These will be partly tailored to a new digital economy and the transactions that underlie it. This means familiarizing with the technologies that comprise the Metaverses and understanding how they interrelate. The third prong is partnerships. If a company establishes itself in the Metaverse, it will likely be a touch-point between dimensions so to speak. To keep a vast network of services operating between real and virtual, there will have to be third parties that facilitate "field operations".

V. E-Commerce and Metaverse

E-commerce referred to also as electronic commerce or online commerce, is the purchasing/selling of goods and services through the internet, as well as the transfer of financial information and data required to complete these transactions. It is frequently used to indicate the online sale of real goods, but it can also comprise any type of economic transaction that is enabled by the internet. The retail sector is progressively geared towards its newest buzzword – the "omnichannel." In their mission to create a comprehensive platform that allows for consistent experiences, they are met by more than one difficulty. Tailoring every customer step of the shopping process necessitates the unification of data across all points of interaction and that is something major brands have hit a wall with. The result is a shift towards a new platform type, one that integrates the benefits of offline and online experiences.

The integration of e-commerce and Metaverse has already begun. Tech giant Amazon has embedded AR technology within its services through applications like Room Decorator, which allow consumers to picture how furniture fits into the home ecosystem they are building. Similarly, apps like Topology Eyewear allow you to see how a pair of glasses fit on you with a simple scan of the face, without having to actually enter a store. The risks that traditionally accompany online shopping, namely item fit, are significantly mitigated. Consumer shopping reports have positively reacted to this, as a survey by Invesp registered that over 61% of respondents chose AR incorporated sites over absent ones. This model has a dual function, one that permits the immersivity of a physical retail experience while ensuring the conveniency of computer-based shopping.

Personalization of services has become the entry ticket to any form of customer loyalty. Startup Bonsai, a business resource site, revealed that 80% of customers are more likely to buy from a company that delivers personalized experiences over those that do not. However, personalization often stops at simple recommendations and do not create the sense of belonging that brands are wanting to implement through product culture. The Metaverse is intended to bridge that distance.[78] Houses like Gucci are amongst the first to expand their economic activity in the virtual sphere, creating events that deepen user interest. The Gucci Garden, a two-week art project aimed at raising brand awareness among young clients is an example of that. [79] Ecommerce-based companies can place themselves ahead by investing in community-building projects in a market where social proof and recommendations from fellow consumers are more powerful than any other type of marketing. By encouraging consumer-led activities, businesses allow users to project their 'wants' in their brands. This not only strengthens a commercially symbiotic relationship but allows brands to understand the direction their businesses should evolve in and periodically renew themselves in the market.



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VI. Workspace solutions, Communication and Customer Service

In a Microsoft study, 66% of businesses are revamping their workplaces to support integrated hybrid models. Employees want an optimal experience between in-office and remote, with 73% indicating flexible remote operations as alternatives to staying in, while 65% prefer face-to-face interactions with their co-workers. The evidence is clear: the post-pandemic workplace will be defined by hybrid models which however comfort-enabling, do present complications. Since the Metaverse will likely fall in the out-of-office category, the section will explore the challenges that remote operations invite and therefore what the Metaverse will have to "rectify" going forward, should it want to assert itself as an office technology.[80] There are three main issues:

i. The first is **resources.** After a year at home, 42% of employees said that they are not equipped with sufficient office supplies, and 1/10 cannot access internet to meet their obligations. Furthermore, more than 46% claimed that their employers do not reimburse them for charges incurred in remote.
ii. The second is **digital overload**. In 2021, 82% of employees claimed that productivity stayed the same or went overtime. In a global survey, 1/5 of participants stated that their seniors do not consider their work-life balance, 54% feeling overworked. These observations are quantified in the numbers Microsoft logged between February 2020 and February 2021, at the end of which a x2.5 increase in work time was measured, with meetings lasting on average 10 minutes longer. Enhanced work digitalization has resulted in an increased work rate.
iii. The third issue is **lack of innovation**. Isolation in the social sphere has matured into work isolation. Several studies have shown that the pandemic pulled closer networks that were already in a proximal "distance" but ebbed those at a further distance. This suggests that during the lockdown, we turned to immediate support groups without consulting our outer circles. Within these 'inner circles', where it first seemed that interactions would only increase, over time, these too declined. A reduced collaboration translates into reduced communication and confrontation of ideas.

We're deeply encouraged by the benefits: from bridging gaps and connecting customers to easy-to-access digital twins of our products

The Metaverse enters a grey area since it reproduces elements of inpresence and remote office, and instead of substituting either modality, it integrates them both into a single dimension. In Hololens or Oculus Quest, we can review certain practical examples of this. If a worker is in a video-conference and needs to move, the conference can follow him as he carries out other tasks and should there be the need, directly share his screen(s) with others. Hololens is equipped with "word-lock" which means that items will be fixed to a specific place. A user may need their digital agenda to be on a virtual desk that they can go to between meetings and not have it constantly in front of them. They can tap a seat, reach it with their avatars and sit down or stand up, position themselves at the front of the room and give a presentation with an integrated office system.[81]

In Oculus, there is a strong focus on virtual whiteboards with endless real-time sketch space. Users can adopt the controller to imitate a writing gesture, flip a board or erase errors. The perks are that users can pin findings of the internet to these boards, import and export material without restriction. This is all carried out in a room of their choice, designed and configurated around the needs of the user. These rooms have setting options that allow for a specific arrangement to the type of event requested – conversations, presentations, debates etc... factoring in the number of attendants. All in all, a movement-based experience renders the technology more natural and socially expressive, two elements that lacked in traditional remote settings. It is clear that out-of-office dynamics need to be redefined and improved, and not treated as an opportunity to squeeze workers into meeting objectives. In other words, sustainable practice, and a few are more sustainable than our colleagues at DSM, a science-based company that operates transversally in a range of industries. Guilherme Augusto, technology specialist explains how the company lived the pandemic and what their thoughts are on a potential infusion of Meta technology.[82]

Boundless boundaries. Eternal abundance, and the solution for the limits of existence itself. Perhaps there is no other single emerging trend wrapped by more hype than what we're seeing with the Metaverse today — a lot of hype. Indeed, for most who have only had a few meagre and unimpressive VR experiences to date, the added Web3 context probably puts some off from engaging, especially when we add crypto and NFTs to the mix. I wear two hats when it comes to this topic: one as an incredibly privileged employee who's helping shape one of our company's most significant building blocks for its own 'Metaverse' answer to customer and workplace engagement, and secondly as a critical student of innovation from a science and technology studies perspective. Let me start with the former, it's in its infancy but it's incredible.

We at DSM spotted the trend from a slightly different angle back in mid-2020. During the onset of this grim, deadly pandemic, I was not only lucky to be in a position of good health - I was nominated to take part in an agile strategy development assignment sponsored by our Executive Committee to shape what has become our 'Next Normal' Hybrid Workplace approach. Honored to be a member of a team of DSM colleagues from across the organisation and key partners like Microsoft and Unilever, the ask was simple: engage with all the uncertainty unleashed by the pandemic, map trends, generate insights and envision our collective future — fast.

Fast forward today, and our success speaks for itself when we look at the recognition we've been awarded as a leading employer in the last two years. Yet, that's far from the full story: it was within that incredibly diverse team that the seeds for the Metaverse building blocks we're investing in today started. We saw clearly and urgently then that traditional Experience Centers were already not holding the line: space itself could never be as liquid and dynamic as what we envisioned customers and employees increasingly demanded and imagined.

After all, how could we meaningfully connect people with our brand, products and purpose when their mobility was unprecedentedly restricted, everywhere, for an unmeasurable future? How could we delight and nurture belonging when fatigue, mediated by repetitive spaces, and groundhog days became the order of things? This is what drove us to invest in VR experiences such as a virtual tour with our partners at pro-cycling Team DSM (https://www.team-dsm.com/virtual-tour/), and — among others — a completely scalable Proof of Concept of our first DSM Virtual Experience Centre.

Though it's early days, we're deeply encouraged by the benefits: from bridging gaps and connecting customers to easy-to-access digital twins of our products, thrilling experiences and experts across our value chain, to offering our people an even deeper understanding of who we are and what we do. It's a recipe for success. In a nutshell, what we have created is a fully immersive VR experience that gives you a tour of DSM: you get to see our production sites, understand key aspects of our business, hear customer testimonials, and experience all the immersive content we have created to date and will continue to produce.

Early days, and yet for sure a step change compared to what customers and employees had previously available — and on top of that, what excites me even more is our vision and strategy: this is only the beginning. For one thing, the buzz around 'Metaverse' is proving that by and large the technology and possibilities are already here - as always, they're just not equitably distributed. We're raising the bar, and I expect soon enough that our DSM virtual shops and offices will look a lot like my favorite video games. Watch this Metaspace.

Now putting that second hat on, 'who' and how will the history of this hype be written? What will be key events that'll drive its development towards paths that contingently reinforce themselves over and over until new breaking points? What players within what networks will shape key decisions, and what will influence their agencies? What social norms will we translate to our virtual spaces, and how are we going to sustain all that it'll demand of and by us? More than just excitement, I have flickering hopes that this time it'll be different — that instead of disruptive fixations, this will be the one that fulfils the promise of old technology and innovation countercultures. Yet beyond hope, I'm invested. The meteor has landed long ago, and it's up to us to build the next unforgettable customer and employee experiences.

Guilherme Augusto Laidens Feistauer
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The Netherlands

Guilherme Augusto Laidens Feistauer is a Business Transformation Consultant at DSM, a keen student of Science and Technology Studies, and a volunteer mentor at Soul Bilíngue. A digital business transformation thought leader in one of the most innovative and exciting sustainable companies in the world today, he's involved as an early adopter in realizing the Metaverse's full complexity and potential for customers and citizens.

VI. Fashion and Metaverse

Last December, Ralph Lauren added a new location to its stores, an establishment in gaming platform Roblox that counts almost 50 million users daily. The business never closes and, in a click away, users can purchase trousers, caps, jackets, coats and any other item for as cheap as $5. Iconic brands, the likes of Gucci and Nike, are opening virtual stores across platforms. That, in combination to events promoting their digital products, have led financial service institutions such as Morgan Stanley to project the future value of digital fashion at $50 billion. Shamin Vogel, Editorial Director & Co-Publisher at WeAr Global Magazine, explains why so much worth is estimated onto Meta fashion.

1. What challenges may Metaverse solutions encounter in the fashion industry?

The fashion industry is vast and doesn't rely on only a few players. While leading brands can and will fiercely establish themselves in the sector, the entry barrier for young, creative firms and designers, SME and those players that mainly focus on the quality of physical items, rather than harvest contacts with digital companies, might be very high. The Metaverse is still at its beginning - will there be a fast return on investment? or will it take too long to attract the average consumer? When is it the right moment to access this new world for fashion brands to have the desired audience?

As it stands now, the Metaverse either attracts mega brands or small, digitally talented designers.

A crucial question to solve is: who is the consumer in the Metaverse? What makes the average fashion consumer? What does s/he want? Some fashion companies focus on older target groups - would it even be relevant for them to create a presence in the Metaverse, which presumably will mainly attract younger generations? New models for multi-label outlets in the Metaverse (retailers), so consumers can discover new brands and styles. Brands and retailers won't necessarily have the technical knowledge to participate. They will require hands-on help of people both knowledgeable in the technology but also with a good insight into the fashion industry. Clearly, there is still a high degree of uncertainty and to do investments, companies need certainty.

The fashion industry is forward-thinking and yet it relies heavily on physical items - garments are created from different fabrics, different touches and have different fits. All this cannot be translated digitally. Cashmere and silk are physical points. Metaverse solutions will have to focus on design only. Entire brand's business models only rely on wholesale - that means selling directly to stores rather than directly to consumers - as this is the first step most brands take and D2C can be difficult to achieve as it can be incredibly high in marketing costs and unpredictable in terms of production. As it stands now, the Metaverse either attracts mega brands or small, digitally talented designers. There needs to be a middle level.


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2. How may the fashion industry use Metaverse? What new possibilities will it create, and which issues can it solve?

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3. How does the industry react to the Metaverse?

Fashion and trends go hand-in-hand and at the moment, the word 'Metaverse' itself is a trend. So of course, it's treated with curiosity and excitement. Many industry leaders are already working hard to find solutions that well position their brands and that identify possible consumer target groups. Regardless, the Metaverse is not the primary focus at the moment: the main focus for most brands is to recover from the effects of the pandemic, to create more sustainable fashion, to combat fast-fashion and to create a successful online presence. There is still a long way to go. However, with the right solutions, data and support, interest will be high and many industries will at least give it a try – but then, it must be successful to keep the momentum going.

Shamin Vogel
Editorial Director & Co-Publisher WeAr Global Magazine
CEO Prime Global Media, London

Legal and Regulatory Challenges

Inside the Metaverse, we will see increased types of data; new streams of information processed from physical and physiological changes that manifest in response to virtual environments users engage in. This will drive the necessity of data collection as industries seek to better understand how to optimize experiences at the onset of the Meta experiment. Given the market's natural proclivity towards competition, we may likely witness in the process, the same unethical behavior that defined the better part of the last decade, Cambridge Analytica docet.

Data collection will start with VR headsets that we will need to enter the virtual sphere. These hold the potential to scrutinize elements from a user's real environment, taking information on a person's private home or information to which the user has not granted permission to collect. This may comprise special categories of personal data, enshrined under Article 9 of the General Data Protection Regulation (GDPR) which include but are not limited to "racial or ethnic origin, political opinions, religious or philosophical beliefs…". Article 5 enumerates a list of principles that the Metaverse will also have to comply with, namely minimization and purposed limitation of data collection. The Metaverse and the creators behind them will have to closely look at the data controversies of our time and understand that to restore consumer trust, boundaries must be set in place.

"Personal data shall be processed lawfully, fairly and in a transparent manner in relation to the data subject" ('lawfulness, fairness and transparency'). Where an elaboration of this can be rendered with somewhat ease on a document page – the traditional form through which an individual is presented a list of conditions to read and accept (often long-winded, and overall, a not so easy read), this will not be practical in the Metaverse. If a user enters a virtual shop, they expect an immediate experience, not delays in screening documents that define the conditions under which shop owners can collect their information. It will have to be synthesized in a way that is understandable to the consumer. In line with article 15 GDPR, "the data subject shall have the right to obtain from the controller confirmation as to whether or not personal data concerning him or her are being processed," what this data is, why it is being processed and where this information will go to. The Metaverse is tied by growingly rigorous rules that European institutions are pushing forward yet is faced with the task of facilitating the exercise of user rights – not an easy assignment.[83]

Responsibility of controllers and processors will be joint between platform operators and businesses that will relocate to the Metaverse.

Beyond the technical challenges, we need to question the structure of over-sight. Responsibility of controllers and processors will be joint between platform operators and businesses that will relocate to the Metaverse. However, strategically, companies are likely to pass overburden of control to minimize risk and liabilities. With Schrems II, it also becomes apparent that the challenges that previously existed will have to be addressed. It seems surreal to think that international data transfers and regulations attached can be circumvented through a new virtual playground.[84]

Non-Fungible Tokens: Financial Assets and Implications

MiCA, acronym for Markets in Crypto-assets, is the EU's most recent regulation draft in its bid to keep up with crypto technology and related novelties. However, it omits NFTs from its scope of application. Article 4 (2) states that 'crypto-assets are unique and not fungible with other crypto-assets' and as such, are exempt from an elaboration that takes the form of white papers. Given the distinctiveness of many tokens, a white paper for each and every item is unrealistic. Moreover, the draft does say in its recitals that select parts of an NFT are not deemed unique and consequently fall under the scope of MiCA. It continues that should an NFT provide its issuer/possessor rights connected to financial instruments – e.g., profit rights, then MiCA applies. When that happens, NFTs are treated as security tokens and that raises further questions.[85]

From a regulatory standpoint, crypto-assets are difficult to classify and therefore corresponding them to an adequate regulatory regime is a problem. The complexity and likewise their simplicity makes it difficult to outline a uniform framework. For the former, the scenario is thorny. Take cases where an NFT is split into parts with each fragment individually tradeable. Some may qualify as financial instruments where some others will not. Since most NFTs are bound by smart contracts, these invoke payment rights. How do we then treat them? How do we treat an NFT which has parts that resemble financial instruments and parts which do not? What happens when over time, their complexity increases to capture different services and products into one single item? Various scenarios are left unanswered by MiCA.[86]

There is also the problem of ownership. Should NFTs become mainstream, then it is likely that more and more items will be unlawfully tokenized as commercial upsides of their market become widespread knowledge. Unlawful alludes to a lack of permission from the owner to the individual that tokenizes the real item. If so, when the "digital twin" is then sold, who effectively is the author of that work and who therefore holds property rights to benefit from the sale?[87]

NFTs also need to be addressed for royalties. Most NFTs are issued as ERC-721 tokens, which means that when a creator sells their token to a buyer, that will be the only time at which they will be compensated. If the purchaser sells the item on a secondary market, then the original artist does not make a percentage off the secondary sale. Royalties, therefore, necessitate interoperability, meaning platforms will need to identify the internet protocol address of the original work and automatically wire a percentage of future profits to the first right holder, regardless of if it sells in perpetuity. Platform interoperability is not a given with NFTs and therefore, royalties are also not guaranteed. This concept is relevant if we consider the music industry for example.[88]

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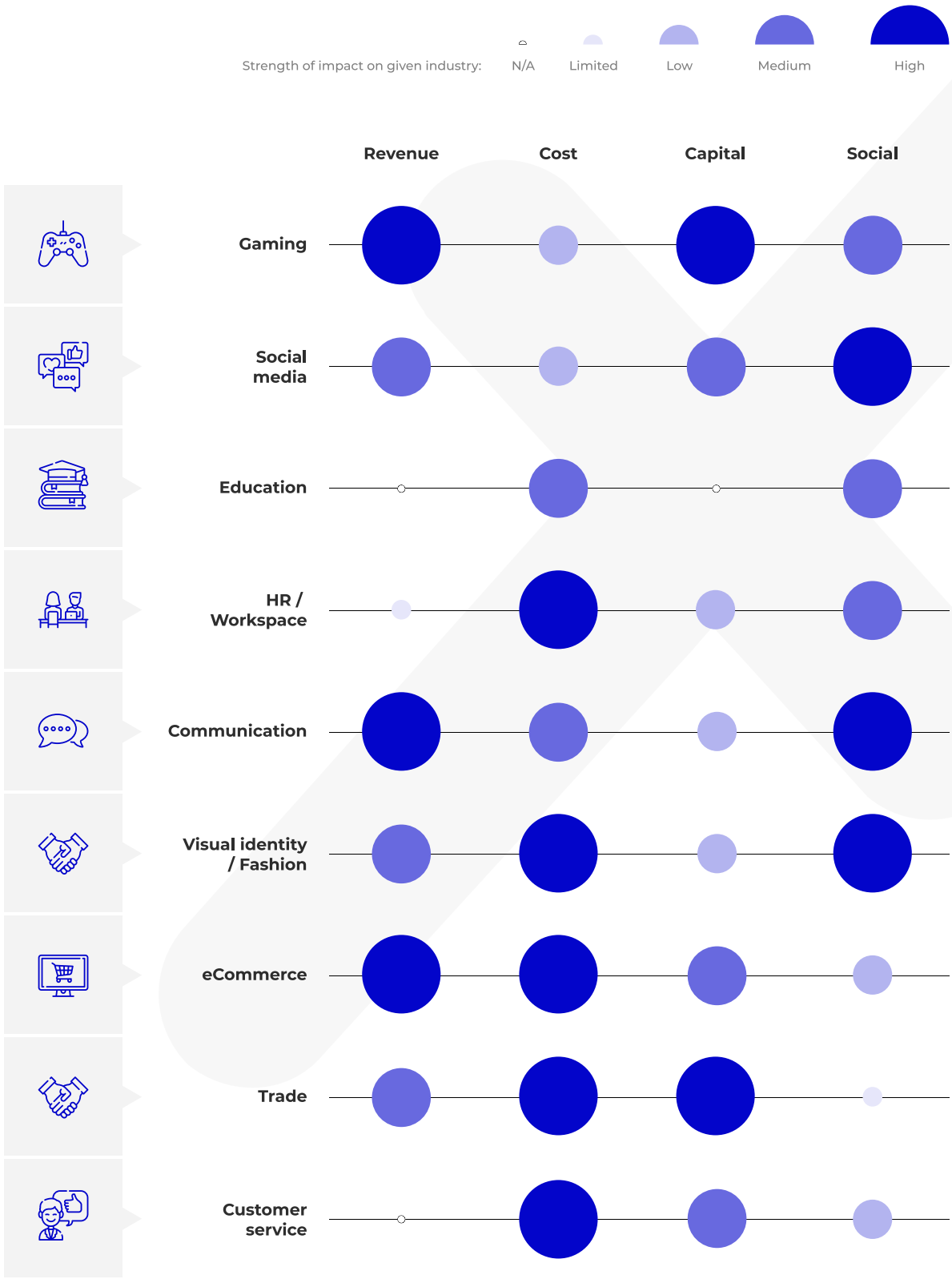
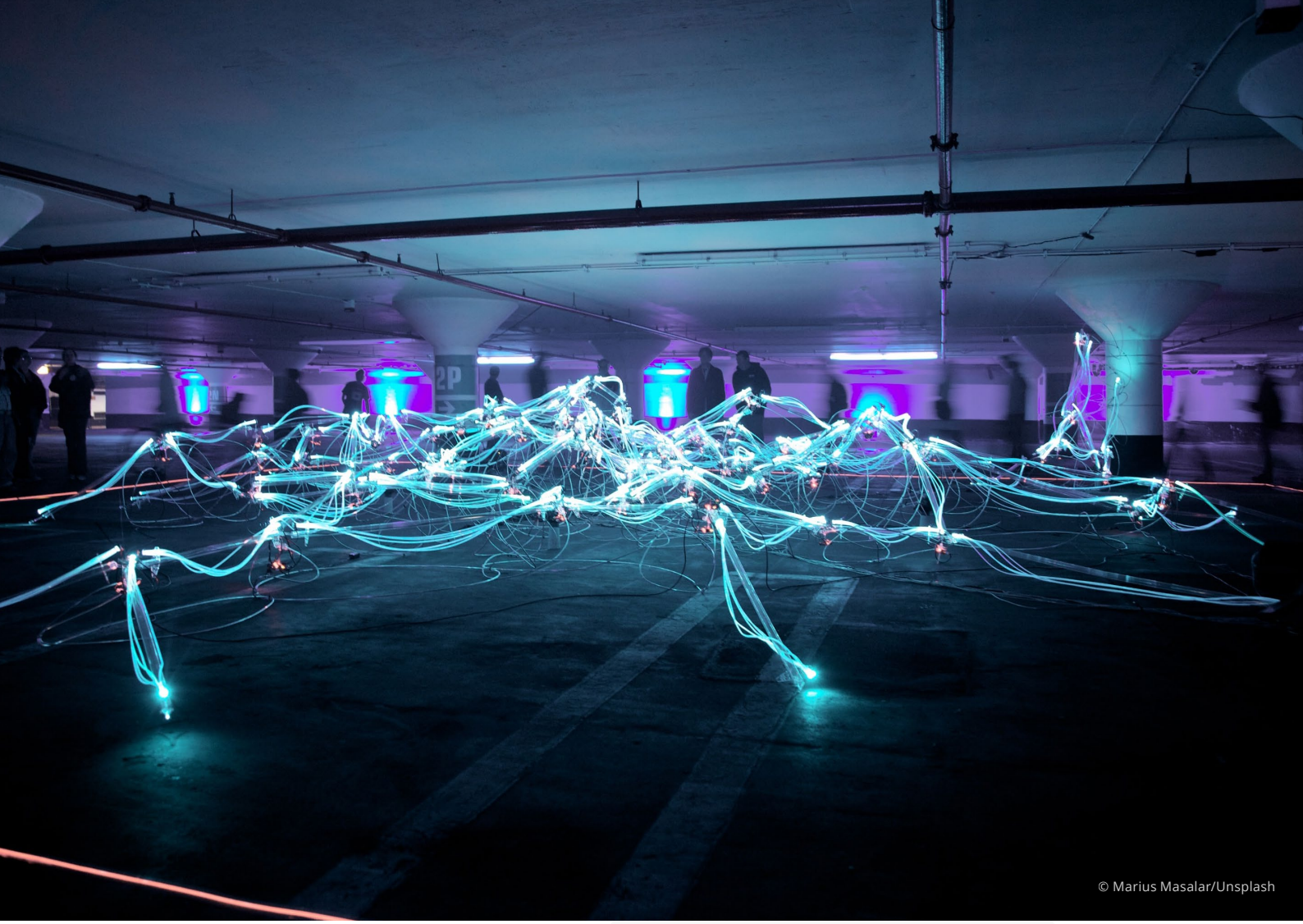
Value Proposition of the Metaverse in Industries[1]



(1) Infographic based on in-house qualitative macro-assessment of Meta-opportunities.



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A Common Standard for Integration

One of the, if not the most exciting part of the Metaverse is the ability to seamlessly travel throughout its digital universes. Users expect an accessible experience that is compatible with all devices and gadgets currently available on the market. To deliver said environment, companies will have to collectively define a set of standards that allows them to interoperate across different worlds. Should they not agree on terms, businesses that want to virtually relocate will have to conform to the technological limitations set up by the enterprises before them. This means that they need to obtain licensing rights to use the principal technology underlying the existing Metaverse if they are to build their own. Thus, a lack of interchange standards and instruments would eliminate the concept of Metaverse, rather leaves us with a deepened virtually immersive version of today's internet.

Rendering on local devices is a prime example of why interchange is vital to building the Metaverse. All operating systems in video game consoles have decided to avoid open or third-party rendering application programming interfaces (API) such as CUDA or WebGL. We see that Microsoft's Xbox solely operates on Microsoft's DirectX while Sony's PlayStation on GNMX. The distinct use of inhouse programs, as opposed to using a common touch-point encourages market competition in terms of pricing, innovation, and content investment. This is the case when it comes to platforms as companies 'let loose' in terms of feature involvement, using anything out there to entice customers. They will argue that their propriety programs are tailored to their operating systems and therefore is only logical for developers to adopt them in software creation. In other words, a circular business arrangement.

As platforms grow in importance, they usually adopt protectionist stances, endorsing ideas that forward their position in the market but obstructing those that do not, but which may benefit the wider community. Matthew Ball states that "Due to digital network effects (which span developers and end-users), plus zero-marginal-cost revenues, this strategy is often potent and damaging."[89] Until recently, companies such as Sony denied cross-play functions between applications on PlayStation platforms and other houses such as Nintendo or Xbox. It was suggested that PlayStation's policy was guided by the perceived effects that a move like this would have on its market dominance. This revelation was inferred from a 2016 interview, where the division's lead stated that the 'technical aspect could be the easiest' development in opening up the PS network. Sony's historical dismissal of cross-play was made clear during Epic vs Apple's antitrust trial, where the company demanded compensation should the organizations want to support cross-play on their games. In 2017, they initially stopped cross-functioning for games such as Rocket League and Minecraft, but after a 'comprehensive evaluation process', they decided for it. Now, in 2021, PlayStation CEO Jim Ryan, interviewed by Axios, said 'We support and encourage cross-play', assuring that in time the 'numbers will continue to grow'.[90]

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Ethical Considerations

At Nextrope, we believe that negative disruption by Metaverse technology will primarily stem from circumstances analogous to the concept of hikikomori. The phenomenon initially tells the story of individuals who retreat to their quarters for months and years on end, entirely cutting ties with the environment around them. It was predominantly seen as a Japanese singularity, a byproduct of a society with hyper rigid socio-economic caveats. Japanese Cabinet Office research detailed that between 2015-2018, more than one million people, between the ages of 15 and 64, lived as hikikomori.

However, the fact resulted to be present in a geographical perimeter of Asian countries, the likes of China, South Korea, and Singapore. Conclusions on motives differed according to cultural contexts, but a commonality was detected throughout: the hikikomori described the virtual world in a way similar to how a person describes the real one, indicating an effective reality substitution.[91]

Technological variables are held catalysts to this process. In 2017, a regional symposium asserted that online gaming would produce addictions pivotal in fomenting the rates of social withdrawal. Technology has surpassed the in-game experience, and now facilitates user needs in many daily undertakings, delivery services and employment to name a few. Where before, individuals were forced to exit their premises and enter a supermarket or an office, thus entertaining a degree of social engagement, now they are one click away from product delivery or project consultation, all from the comfort of their homes.

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At all levels, technology has allowed commodities that progressively necessitate less interaction. This begs the question as to how the Metaverse will affect this growing dynamic. If easy access and limitless experiences become available, it is somewhat logical that society will grow to indulgence and comfort, perhaps even justifying these as ethical choices. 'After the creation of an immersive Metaverse, how long might it be before a virtual trip to a ski resort or beach is sold or consumed as the low-carbon, morally correct choice?'[92]

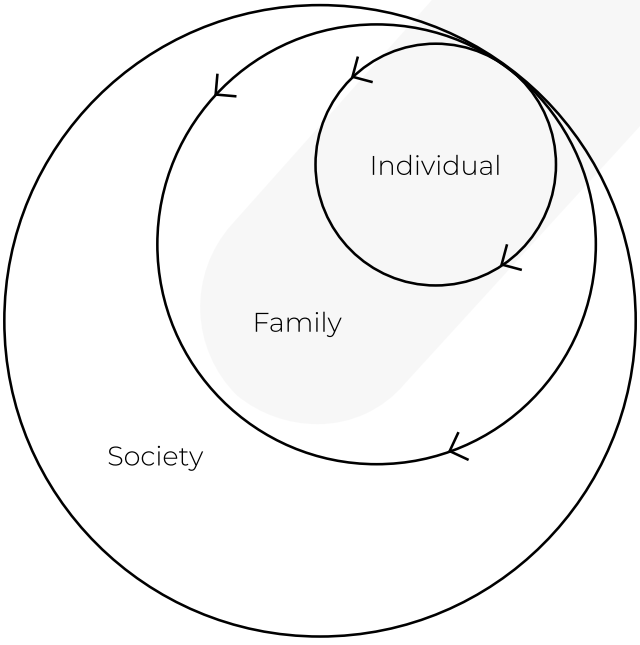
The China Institute of Contemporary International Relations (affiliated to the Ministry of State Security), one of the country's most relevant think tanks, pointed to the potential for 'digital drugs.'[93] They enquired on the long-term effects that extended periods of isolation could have on young persons and how these would then be integrated back into their respective communities.

Regardless of what will be complicated policy deliberations – the reconciliation between technological development and societal wellbeing – it will be interesting to see whether the concept of hikikomori will be normalized and thus rebrand said "victims" to the new "voyagers" of our generation. How does a hypothetical change in 'status' modify the acceptability of the phenomenon in a social context and therefore the symptoms that come with it? The answer to this question will hugely impact the timeline at which the Metaverse integrates into communal living and at which it turns regular households into guilds of Meta travelers.

The Hikikomori System[1]

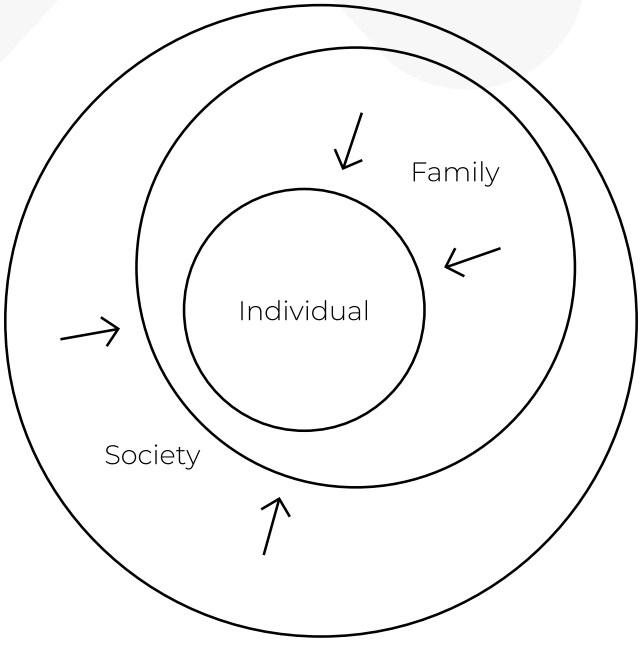
Ordinary System

Circles represent the borders between dimensions. The first graphic shows a standard relationship inter-partes – contact with boundaries.



Hikikomori System

The three dimensions are separated completely. The forces that work between them apply stress in the domain to which they are exposed, thus exacerbating the vicious cycle.



Top Metaverse Influencers

Dirk Lueth

Entrepreneur actively engaged in numerous web 3.0 projects in Europe and the United States. In 2018 he co-founded "Upland" - a Metaverse property trading game paired with a decentralized economy. Dirk is also co-founder of Financial Times Deutschland and a best-selling author.

Teddy Pahagbia

Metaverse advisor and keynote speaker. In 2019, he launched BLVCK PiXEL - Metaverse and Digital Innovation consultancy company. BLVCK PiXEL's vision is to unlock new opportunities and reinvent user experience by implementing an interdisciplinary approach that combines groundbreaking technology and anthropological findings.

Hrish Lotlika

Co-founder and CEO of "SuperWorld" - a virtual world based on augmented reality technology. The platform's main objective is to allow brands and users the possibility to create, discover and monetize content in AR. He is also actively engaged in the entertainment industry as co-founder and CBDO of "Rogue Initiative Studios".

Amber Allen

Advisor, speaker, and one of the leading experts in Metaverse technology. Amber Allen founded Double A Labs - a company that stands behind Double A Metaverse platform, which optimizes sales, employee training and customer experiences in a fun and engaging way. Amber Allen is also an active board member of the UniversityTexas's Game Development and Design Program, and the Fashion Institute of Technology (FIT).

Emma-Jane Mackninnon-Lee

In 2020, she co-founded "DIGITALAX" - a web 3.0 platform that is a trailblazer in the fashion economy within the open Metaverse. Additionally, "DIGITALAX" launched "Diggyfizzy", a Metaverse magazine focusing on the NFT industry and its creators. Currently, she's working on Web3 Fashion Week, which will take place in June 2022.

Matthew Ball

Venture capitalist, advisor, and influential author currently focused on Metaverse technology and its implementation. Ball was one of the first experts who noticed the Metaverse's potential and began to publish articles on the subject. He is responsible for the creation of Ball Metaverse Index, the first global index designed to track the performance of the Metaverse.

Lindsey McInerney

Tech futurist and leader in web 3.0, actively engaged in Metaverse projects. As Global Head of Technology and Innovation at Anheuser-Busch InBev, she led the collaboration between Stella Artois and "ZED RUN", a crypto horse racing game. Currently, McInerney is the CEO of "Sixth Wall", which she also founded. The company explores the interactions between web 3.0 solutions and the entertainment industry.

Evo Heyning

Evo is a systems designer specializing in spatial interfaces, engagement strategy, AI and XR in workspaces and collaboration networks. She became one of the most prominent consultants for Metaverse projects. Since 2021 Evo Heyning co-chairs the Open Metaverse Interoperability Group.

Krista Kim

Artist and founder of "Techism" - Krista Kim believes that artists should be at the forefront of technological innovation. "Techism" is a movement that promotes the confluence of art and technology whilst exploring the idea of using innovation as a medium to further the development of digital humanism. She has collaborated with Lanvin, the Tokyo Museum and the Museum of Modern Art of Paris.

Kevin Paffrath

Kevin Paffrath is a financial analyst and youtuber known as Meet Kevin. His channel ammounted over 1,8 million subscribers, thus making him one of the most popular authors focusing on web 3.0 subject. In his videos, Paffrath talks about Metaverse use cases and the transition from the internet as we know it.

Ryan Gill

CEO and co-founder of Crucible, a company that aims to develop the blueprints for an open Metaverse. Their main product is Emergence SDK which provides engine developers with access to Web 3.0 technologies, including portable digital identity.

Humphrey Yang

Ex financial advisor and youtube creator - Yang focuses on current financial affairs aiming to explain them in simpler terms to viewers. On his channel, he describes what the Metaverse is and how to become an early investor in its technology.

Michael Wrubel

Entrepreneur, youtuber and founder of "BelBoy" and "WrubelConsulting". Wrubel focuses on web 3.0, cryptocurrencies and Metaverse development. At present, his channel is one of the most popular and respected sources of Metaverse trends on youtube.

Akash Nigam

Founder of "Genies" - the world largest avatar technology company. Essentially, "Genies" is an avatar building platform, enabling anyone to own their digital identity and express themselves across Metaverses. So far, the company has 99% celebrity avatar market share, collaborating with giants such as Universal Music or Warner Music Group.

Paul Barron

Award-winning journalist, author, and futurist with a mission to promote understanding of new technologies among the public. Barron particularly focuses on Blockchain technology, AI, web 3.0 and Consumer tech. On his youtube channel, he not only supplies viewers with a dose of Metaverse analysis and prognosis but also interviews the industry's leading experts and change agents.

David Baszucki

Founder and CEO of Roblox. Baszucki, without a doubt, can be called a modern Metaverse pioneer. Considered a proto-Metaverse, Roblox is an online game unifying over 20 million subscribed players. In collaboration with well-known brands, including Italian fashion house Gucci, Roblox aims to deliver its users immersive gaming experiences.

Cathy Hackl

Tech futurist, business executive and globally recognized web 3.0 and Metaverse strategist. Hackl has experience with working in Metaverse-related fields with companies such as Amazon Web Services, HTC VIVE, or Magic Leap. In 2020, she founded Futures Intelligence Group - a leading Metaverse consultancy agency. As a Forbes contributor and host of Adweek's Metaverse Marketing podcast with over 100,000 followers on LinkedIn, she is one of the most influential voices in the growing Metaverse industry.

Enara Nazarova

Marketer and entrepreneur focused on new generation digital products in media and technology. In January 2021, she founded "ARMOAR" - a digital fashion platform and identity incubator for avatars. Blending fashion and performing arts background with technology, she follows a vision of web 3.0 solutions that allow people to express themselves in the Metaverse.

Evelyn Mora

Awarded strategist focusing on sustainable art, fashion, and technology. Mora is an inventor of the village protocol social blockchain User Interface. She is also a founder of Digital village - a Social Metaverse based on community-led Blockchain technology.

Conclusion: Metaverse and the Myth of the Promised Land

Pietro Violante
Cooordinator of LL.M. in European Business and Social Law
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In the beginning, there was Myth. Freud and Schopenhauer taught us that man needs to fabricate an imaginary self to make sense of his existence. Ancient myths reflected a cyclical view of time, in which the future existed only as an eternal recurrence. Modern myths, on the contrary, are all future oriented. The Metaverse fits squarely into the strand of promised land myths. Zuckerberg has defined Meta as what comes “beyond” our world.

The myth of the promised land originated with the linear view of time inaugurated by Judaism. With the Christian revelation, the message of redemption unfolded in all its power, foreshadowing the overcoming of the limits of biological life and the triumph of a being made in the image and likeness of God. From being a creature among others, subject to a cycle of death and rebirth, the human being becomes the chosen one, destined for eternal life.

Equally dramatic turns have marked our history in the field of communication. The passage from orality to writing allowed the myth to live beyond the physical life of the narrator. Plato already feared the risk that the new medium of writing would make us lose track of the difference between reality and fiction, starting the debate between apocalyptic and integrated highlighted by Eco. The debate had already moved into the field of visual media at the time of the struggle between Gregory the Great and the iconoclasts. Medieval Catholicism was the first religion to exalt the representation of the divine and its creatures.

The second major shift in communication was the move to printing, which made possible the virtually unlimited reproduction of the exact words of the myth and their dissemination on a global scale, while at the same time tending to fix them, to make them dogmatic. This novelty was combined with the enlargement of the known world. The discovery of America represented, for Europeans, the confirmation that the limits of their world were not fixed but were destined to give way under the force of their will. The overcoming of the limits of human experience became tangible under the eyes of the conquistadors.

At this time, with the diffusion of printing and geographic discoveries, modern Europe was born and a thousand-year-old technological and ideological paradigm old had changed. Man is the creator of his own destiny and therefore, implicitly, also of his own limits and their overcoming. The new technological and scientific model borrows from economics the name of rationalism. Descartes sets the standard for the verification of experimental truths the mind of man (cogito ergo sum) as if it were the only limit that hinders the individual, while the real limits are the laws of nature that man cannot defeat. Kant also elevates reason to the role of judge of a universal tribunal, but unlike Descartes, realizes that the jurisdiction of this tribunal covers only the finite and limited domain of the human mind, thus excluding the possibility of knowing an absolute truth.

The technologies of virtual and augmented reality will help us to be the leading actors of our experiences to the degree that they will be suitable for passing through the places and times of our lives, without aspiring to break down their limits

Virtual and augmented reality will quantitatively expand our possibilities in space, they will constitute technical surrogates for teleportation, reducing our distance from any point on the globe to virtually zero. But they cannot extend beyond normal biological limits our possibilities in time. The potential co-presence with anyone anywhere, combined with the limitation of time, generates a state of frustration. We would like to be everywhere at all times; however, we can only be everywhere, but not at all times, because the moments of our day are not in-

finite. The limitedness of our subjective time, in fact, is the very condition of our existence. This assumption was implicit in Augustine's notion of subjective time but has also been reaffirmed by modern thinkers such as Nietzsche and Heidegger. Thus, our choice of where we want to be in each moment becomes increasingly central. The real unknown is if we will be able to be actors of our choice, or if we will just be spectators with the possibility to choose among a very high number of programs all homologated among them.

Avatars and robots are externalizations of our longing for limitlessness. They collide, however, with the fact that without the limitation of our experiences there could be no identity. As wonderfully shown in Blade Runner, without the construction of a single, limited identity, not only is there no happiness or fulfilment, but there is no man. Transhumanism, or the overcoming of the physical limits of our existence, will not be achieved by either bio robotics or the Metaverse. The path to failure was already marked by the punishment of Prometheus, cyclically and endlessly repeated. From Prometheus to the Metaverse, despite the noble and sometimes artistically valuable attempts to imagine a human-sized paradise, the most vivid descriptions of human futures are all dystopias. Utopias are always open-ended narratives; dystopias are far more detailed and realistic, from Huxley's hellish Brave New World to Isaac Asimov's intergalactic wars, to the Metaverse in Snow Crash and the human plantations in Matrix. This triumph of dystopia is not the result of the ineffability of the heavenly Jerusalem, but is the result of human nature, limited, imperfect and ultimately irrational.

Zuckerberg has imagined the Metaverse as a dimension in which we can all 'feel present with the people we care about' and at the same time 'be present with everyone'. These two goals are both unattainable, but they are also contradictory to each other. The limitedness of our affections and our experiences and choices in life, of which time is a fundamental measure, inevitably clashes with the unlimitedness implicit in the desire to embrace all the people in the world and share with them all possible experiences. If we want to preserve ethics of limits, the former is a goal worth fighting for, while the latter is a goal that makes no sense to set. In a world in which ethics will be reduced to the handmaiden of technology, however, the second of the two objectives will certainly prevail, while the first will remain a legacy. We can already feel its echo in the subtle sense of guilt that we feel when we send greetings to a dear friend via WhatsApp instead of paying her a visit. It is the legacy of a pre-Christian ethic that still places human action within the limits of a geographically delimited identity. In Greek, meta means not only 'beyond', but also 'through'. The technologies of virtual and augmented reality will help us to be the leading actors of our experiences to the degree that they will be suitable for passing through the places and times of our lives, without aspiring to break down their limits, just as the technologies of video calling allowed us not to lose visual contact with our loved ones during the pandemic. The ethics of the limit is the mediation between the freedom of human action and the limitation of his bodily condition.

Bibliography

[1] G. Szaniawska-Schiavo, “Metaverse: Would You Remain Yourself in a Virtual World?,” 23 March 2022. [Online]. Available: https://www.tidio.com/blog/metaverse/ .

[2] IPSOS, “38% report familiarity with the metaverse, but less than one in five Americans (16%) can correctly define the term,” January 24 2022. [Online]. Available: https://www.ipsos.com/en-us/news-polls/metaverse-opinion .

[3] K. Hein, “Facebook beware? Study shows most Americans don’t care about the metaverse,” 1 November 2021. [Online]. Available: https://www.thedrum.com/news/2021/11/01/facebook-beware-study-shows-most-americans-don-t-care-about-the-metaverse .

[4] M. Ball, “The Metaverse: What It Is, Where to Find it, and Who Will Build It,” 13 January 2020. [Online]. Available: https://www.matthewball.vc/all/themetaverse.

[5] S. Puri, “@ShaanVP,” 29 October 2021. [Online]. Available: https://twitter.com/shaanvp/status/1454151251260686338 .

[6] J. Wise, “Meta Platforms Inc Statistics 2022: Revenue, Users, Acquisitions & Shares,” 14 March 2022. [Online]. Available: https://earthweb.com/meta-statistics/.

[7] S. Nover, “Intel wants to take you inside the metaverse,” 13 December 2021. [Online]. Available: https://qz.com/2101581/intel-is-ready-to-talk-about-the-metaverse/ .

[8] D. Takahashi, “Jensen Huang interview: The physical world and the metaverse can be connected,” 21 August 2021. [Online]. Available: https://venturebeat.com/2021/08/21/jensen-huang-interview-the-physical-world-and-the-metaverse-can-be-connected/ .

[9] R. A. MARKETS, “Global Virtual Reality In Gaming Market (2021 to 2026) - Growth, Trends, COVID-19 Impact, and Forecasts,” 22 February 2021. [Online]. Available: https://www.globenewswire.com/news-release/2021/02/22/2179688/28124/en/Global-Virtual-Reality-In-Gaming-Market-2021-to-2026-Growth-Trends-COVID-19-Impact-and-Forecasts.html .

[10] M. Kim, “The Good and the Bad of Escaping to Virtual Reality,” 18 February 2015. [Online]. Available: https://www.theatlantic.com/health/archive/2015/02/the-good-and-the-bad-of-escaping-to-virtual-reality/385134/ .

[11] S. Vardomatski, “Augmented And Virtual Reality After Covid-19,” 14 September 2021. [Online]. Available: https://www.forbes.com/sites/forbestechcouncil/2021/09/14/augmented-and-virtual-reality-after-covid-19/ .

[12] V. Ramirez, “The Metaverse Will Need 1,000x More Computing Power, Says Intel,” 17 December 2021. [Online]. Available: https://singularityhub.com/2021/12/17/the-metaverse-will-need-1000x-more-computing-power-says-intel/.

[13] L. Cailloce, “CNRS NEWS,” 23 5 2018. [Online]. Available: https://news.cnrs.fr/articles/new-technologies-wasted-energies .

[14] G. Kamiya, “Data Centres and Data Transmission Networks,” November 2021. [Online]. Available: https://www.iea.org/reports/data-centres-and-data-transmission-networks.

[15] F.-Y. Wang, R. Qin, X. Wang and B. Hu, “MetaSocieties in Metaverse: MetaEconomics and MetaManagement for MetaEnterprises and MetaCities,” IEEE TRANSACTIONS ON COMPUTATIONAL SOCIAL SYSTEMS, pp. 2-7, 2022.

[16] N. Ferguson, The Ascent of Money: A Financial History of the World, Penguin Books, 2009.

[17] The Decision Lab, “TDL Study: Improving Financial Decision-Making,” 2022. [Online]. Available: https://thedecisionlab.com/insights/finance/tdl-study-improving-financial-decision-making.

[18] M. Housel, The Psychology of Money: Timeless lessons on wealth, greed, and happiness, Petersfield: Harriman House LTD, 2020.

[19] A. Lee, “In the metaverse, brands’ FOMO is competing with consumers’ burnout,” 28 January 2022. [Online]. Available: https://digiday.com/marketing/in-the-metaverse-brands-fomo-is-competing-with-consumers-burnout/ .

[20] N. Eliason, “Tokenomics 101: The Basics of Evaluating Cryptocurrencies - DeFriday #19,” 17 December 2021. [Online]. Available: https://every.to/almanack/tokenomics-101#:~:text=%E2%80%9CTokenomics%E2%80%9D%20has%20become%20a%20popular,affect%20its%20value%20long%20term. .

[21] J. Lyu, “Op-ed: Most deals in the metaverse are FOMO and YOLO,” 22 February 2022. [Online]. Available: https://cryptoslate.com/op-ed-most-deals-in-the-metaverse-are-fomo-and-yolo/ .

[22] A. Paleja, “The Metaverse is seeing a surge in real estate prices. Don’t panic,” 11 March 2022. [Online]. Available: https://interestingengineering.com/metaverse-real-estate-prices .

[23] NeuroScientifically Challenged, “Know your Brain: Reward System,” 2022. [Online]. Available: https://neuroscientifically challenged.com/posts/know-your-brain-reward-system .

[24] HealthyGamerGG, Director, How Gaming Affects Dopamine Reward Circuitry | Episode 004 Video Game Addiction. [Film]. 2019.

[25] Society for Neuroscience, “High levels of dopamine may lead to increased risk-taking,” 7 July 2015. [Online]. Available: https://www.sciencedaily.com/releases/2015/07/150707213245.htm#:~:text=Boosting%20levels%20of%20the%20neurotransmitter,in%20people%20with%20Parkinson’s%20disease. .

[26] S. Krastev, D. Pilat, M. Martin, M. C. Montenegro and D. B. Struck, “Construal level as a mediator of stress-induced bias in financial decision making,” 16 January 2020. [Online].

[27] M. Porter and J. Heppelmann, “How Does Augmented Reality Work?,” December 2017. [Online]. Available: https://hbr.org/2017/11/how-does-augmented-reality-work.

[28] Iberdrola, “Virtual Reality: another world within sight,” 2022. [Online]. Available: https://www.iberdrola.com/innovation/virtual-reality .

[29] Euronews , “Ancient meets modern in 3D reconstruction of Pompeii home,” 26 October 2016. [Online]. Available: https://www.euronews.com/next/2016/10/26/ancient-meets-modern-in-3d-reconstruction-of-pompeii-home .

[30] BINANCE, “Top 7 Technologies that Power the Metaverse,” 22 December 2021. [Online]. Available: https://academy.binance.com/en/articles/top-7-technologies-that-power-the-metaverse .

[31] A. Hayes, J. Brown and S. Kvilhaug, “Blockchain Explained,” 5 March 2022. [Online]. Available: https://www.investopedia.com/terms/b/blockchain.asp .

[32] ORACLE, “What is IoT?,” [Online]. Available: https://www.oracle.com/it/internet-of-things/what-is-iot/ .

[33] statista, “Internet of Things - number of connected devices worldwide 2015-2025 Published by Statista Research Department, Nov 27, 2016 By 2025, forecasts suggest that there will be more than 75 billion Internet of Things (IoT) connected devices in use. This would,” November 2016. [Online]. Available: https://www.statista.com/statistics/471264/iot-number-of-connected-devices-worldwide/ .

[34] Microsoft , “Microsoft Mesh,” 2022. [Online]. Available: https://www.microsoft.com/en-us/mesh .

[35] T. Warren, “Microsoft Mesh feels like the virtual future of Microsoft Team,” 2 March 2021. [Online]. Available: https://www.theverge.com/22308883/microsoft-mesh-virtual-reality-augmented-reality-hololens-vr-headsets-features .

[36] Z. Analyst, “Microsoft Positioned To Dominate The Metaverse Of Work,” 20 December 2021. [Online]. Available: https://seekingalpha.com/article/4476133-microsoft-msft-positioned-dominate-metaverse-work.

[37] J. Mello Jr., “Microsoft Enters Metaverse With Mesh for Teams and Dynamics 365 Connected Spaces,” 3 November 2021. [Online]. Available: https://www.technewsworld.com/story/microsoft-enters-metaverse-with-mesh-for-teams-and-dynamics-365-connected-spaces-87326.html?__hstc=95181763.6fa385653ecd7c9674ba06f089848 86d.1637193600221.1637193600222.1637193600223.1&__hssc=95181763.1.1637193600224&__.

[38] M. Zuckerberg, “Founder’s Letter,” 28 October 2021. [Online]. Available: https://about.fb.com/news/2021/10/founders-letter/ .

[39] A. Knoll, “Apple’s Tim Cook talks crypto, NFTs, the metaverse and Steve Jobs,” 10 November 2021. [Online]. Available: https://capital.com/apple-s-tim-cook-talks-crypto-nfts-the-metaverse-and-steve-jobs.

[40] S. Mukherjee, “Apple hasn’t fallen for the metaverse hype,” 14 January 2022. [Online]. Available: https://analyticsindiamag.com/apple-hasnt-fallen-for-the-metaverse-hype/.

[41] J. Simons, “Tim Cook on the ‘Basic Human Right’ of Privacy and the Technology That Excites Him the Most,” 19 September 2021. [Online]. Available: https://time.com/6099169/tim-cook-apple-privacy/.

[42] Apple, “Augmented Reality,” 2022. [Online]. Available: https://www.apple.com/augmented-reality/ .

[43] Morgan Stanley, “Morgan Stanley Says Apple Can Still Run 20%,” 2022. [Online]. Available: https://thehungrybull.com/apple-price-target-is-big-announced-from-morgan-stanley-in-note-on-tuesday/ .

[44] T. Higgins, “Apple’s Metaverse Prospects Produce Real Optimism for Investors,” 12 January 2022. [Online]. Available: https://www.wsj.com/articles/apples-metaverse-prospects-produce-real-optimism-for-investors-11641983407.

[45] S. Stein, “Apple AR, VR Headset Rumors: Release Date, Pricing and More,” 22 February 2022. [Online]. Available: https://www.cnet.com/tech/computing/apple-ar-vr-headset-rumors/.

[46] Surur, “Apple AR/VR headset will reportedly come in 12 months, be more powerful than a Mac,” 26 November 2021. [Online]. Available: https://mspoweruser.com/apple-ar-vr-headset-will-reportedly-come-in-12-months-be-more-powerful-than-a-mac/ .

[47] P. Ausick, “What’s Up With Apple: Pricing in the Metaverse, Getting Sued and More,” 12 January 2022. [Online]. Available: https://247wallst.com/technology-3/2022/01/12/whats-up-with-apple-pricing-in-the-metaverse-getting-sued-and-more/.

[48] J. Goodfellow, “Apple says it earned nearly one-third of 2021 revenue from emerging markets Read more at: https://www.campaignasia.com/article/apple-says-it-earned-nearly-one-third-of-2021-revenue-from-emerging-markets/473602,” 29 October 2021. [Online]. Available: https://www.campaignasia.com/article/apple-says-it-earned-nearly-one-third-of-2021-revenue-from-emerging-markets/473602 .

[49] Z. Analyst, “Unity Software’s Metaverse Opportunity,” 22 November 2021. [Online]. Available: https://seekingalpha.com/article/4471322-unity-softwares-metaverse-opportunity .

[50] D. Newman, “Opinion: This is how Nvidia plans to make lots of money from the metaverse,” 20 November 2021. [Online]. Available: https://www.marketwatch.com/story/this-is-how-nvidia-plans-to-make-lots-of-money-from-the-metaverse-11637246368 .

[51] T. Cross, “Roblox wants to build the Metaverse. Can it?,” 4 July 2021. [Online]. Available: https://www.wired.co.uk/

article/roblox-metaverse .

[52] Technology For You, “Roblox goes public at $41.9 billion valuation in direct listing,” 10 March 2021. [Online]. Available: https://www.technologyforyou.org/roblox-goes-public-at-41-9-billion-valuation-in-direct-listing/ .

[53] L. Sun, “Where Will Roblox Be in 5 Years?,” 16 June 2021. [Online]. Available: https://www.nasdaq.com/articles/where-will-roblox-be-in-5-years-2021-06-16 .

[54] P. Mazloumian, “THINKING OUT OF THE ROBLOX: INSIDE THE WORLD OF ROBLOX,” 28 April 2021. [Online]. Available: https://wearesocial.com/au/blog/2021/04/thinking-out-of-the-roblox-inside-the-world-of-roblox/.

[55] Jing Daily , “A digital Gucci bag sold for US$4,000 on gaming platform Roblox – will virtual fashion really become a US$400 billion industry by 2025?,” 7 June 2021. [Online]. Available: https://www.scmp.com/magazines/style/news-trends/article/3136325/digital-gucci-bag-sold-us4000-gaming-platform-roblox .

[56] epicgames, “Tonic Games Group, Makers of ‘Fall Guys’, Joins Epic Games,” 2 March 2021. [Online]. Available: https://www.epicgames.com/site/en-US/news/tonic-games-group-makers-of-fall-guys-joins-epic-games .

[57] epicgames , “Announcing a $1 Billion Funding Round to Support Epic’s Long-Term Vision for the Metaverse,” 13 March 2021. [Online]. Available: https://www.epicgames.com/site/en-US/news/announcing-a-1-billion-funding-round-to-support-epics-long-term-vision-for-the-metaverse.

[58] G. Colantonio, “What is Epic Games’ metaverse? And what does Fall Guys have to do with it?,” 6 March 2021. [Online]. Available: https://www.digitaltrends.com/gaming/fall-guys-epic-games-metaverse/https://www.digitaltrends.com/gaming/fall-guys-epic-games-metaverse/.

[59] R. Conti and J. Schmidt, “What Is An NFT? Non-Fungible Tokens Explained,” 15 February 2022. [Online]. Available: https://www.forbes.com/advisor/investing/nft-non-fungible-token/ .

[60] Nextrope, “How NFTs can increase fan engagement in the sports industry?,” 11 January 2022. [Online]. Available: https://nextrope.com/en/how-nfts-can-increase-fan-engagement-in-the-sports-industry/.

[61] Nextrope, “Creating NFT – the best tools for issuing tokens of the future,” 24 February 2022. [Online]. Available: https://nextrope.com/en/creating-nft-the-best-tools-for-issuing-tokens-of-the-future-2/ .

[62] D. Schiener, “ NFTs are part of a larger economic development in finance capital,” 29 March 2021. [Online]. Available: https://techcrunch.com/2021/03/29/nfts-are-part-of-a-larger-economic-development-in-finance-capital/ .

[63] Financial Times , “NFTs: The metaverse economy,” [Online]. Available: https://www.ft.com/partnercontent/crypto-com/nfts-the-metaverse-economy.html .

[64] Binance, “Why NFTs Are The Keys To Accessing The Metaverse,” 8 12 2021. [Online]. Available: https://www.binance.com/en/blog/nft/why-nfts-are-the-keys-to-accessing-the-metaverse-421499824684903085 .

[65] Entertainment Software Association , “THE VIDEO GAME INDUSTRY 2020 Economic Impact Report,” 2020. [Online]. Available: https://www.theesa.com/industries/economic-impact/.

[66] A. Bankhurst, “Three Billion People Worldwide Now Play Video Games, New Report Shows,” 15 August 2020. [Online]. Available: https://www.ign.com/articles/three-billion-people-worldwide-now-play-video-games-new-report-shows .

[67] M. Honey and H. Margaret, “Learning Science Through Computer Games and Simulations National Academies of Sciences, Engineering, and Medicine. 2011. Learning Science Through Computer Games and Simulations. Washington, DC: The National Academies Press. https://doi.org/10.17226/13078.,” 2011. [Online]. Available: https://www.nap.edu/read/13078/chapter/1.

[68] K. Anderton, "The Impact Of Gaming: A Benefit To Society [Infographic]," 25 June 2018. [Online]. Available: https://www.forbes.com/sites/kevinanderton/2018/06/25/the-impact-of-gaming-a-benefit-to-society-infographic/?sh=6e0cb383269d.

[69] Telus International, "The metaverse and the future of gaming," 14 October 2021. [Online]. Available: https://www.telusinternational.com/articles/the-metaverse-and-the-future-of-gaming .

[70] statista , "Number of global social network users 2017-2025 Published by Statista Research Department, Jan 28, 2022 How many people use social media? Social media usage is one of the most popular online activities. In 2020, over 3.6 billion people were using social m," July 2020. [Online]. Available: https://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/ .

[71] K. Smith, "126 Amazing Social Media Statistics and Facts," 30 December 2019. [Online]. Available: https://www.brandwatch.com/blog/amazing-social-media-statistics-and-facts/.

[72] A. Faridani, "Why The Metaverse Is Marketing's Next Big Thing," 21 December 2021. [Online]. Available: https://www.forbes.com/sites/forbesbusinessdevelopmentcouncil/2021/12/21/why-the-metaverse-is-marketings-next-big-thing/?sh=75c5fb5c25f0.

[73] H. Robertson, "Wall Street hopes young people will drive a metaverse boom — but only 38% of Gen Zs think it's the next big thing," 8 December 2021. [Online]. Available: https://markets.businessinsider.com/news/stocks/metaverse-gen-z-millennials-crypto-land-sales-investing-virtual-worlds-2021-12.

[74] A. Bruell, "Brands No Longer See Metaverse-Like Worlds as Abstract Gimmicks," 29 November 2021. [Online]. Available: https://www.wsj.com/articles/brands-no-longer-see-metaverse-like-worlds-as-abstract-gimmicks-11638190802.

[75] E. Dorn, B. Hancock, J. Sarakatsannis and E. Viruleg, "COVID-19 and learning loss—disparities grow and students need help," 8 December 2020. [Online]. Available: https://www.mckinsey.com/industries/public-and-social-sector/our-insights/covid-19-and-learning-loss-disparities-grow-and-students-need-help.

[76] E. G. a. E. Weiss, "The teacher shortage is real, large and growing, and worse than we thought," 26 March 2019. [Online]. Available: https://www.epi.org/publication/the-teacher-shortage-is-real-large-and-growing-and-worse-than-we-thought-the-first-report-in-the-perfect-storm-in-the-teacher-labor-market-series/.

[77] XR Today, "How Will Businesses Trade in the Metaverse?," 31 December 2021. [Online]. Available: https://www.xrtoday.com/virtual-reality/how-will-businesses-trade-in-the-metaverse/.

[78] B. Owens, "Ecommerce and the metaverse: What we can expect," 7 December 2021. [Online]. Available: https://whiplash.com/blog/ecommerce-and-the-metaverse/ .

[79] Gucci, "Gucci," 2022. [Online]. Available: https://www.gucci.com/us/en/st/stories/inspirations-and-codes/article/gucci_garden .

[80] B. Wiseman, "The Next Great Disruption Is Hybrid Work—Are We Ready?," 22 March 2021. [Online]. Available: https://www.microsoft.com/en-us/worklab/work-trend-index/hybrid-work .

[81] Microsoft, "Microsoft HoloLens 2," 2022. [Online]. Available: https://www.microsoft.com/en-us/hololens.

[82] Oculus Blog, "INTRODUCING 'HORIZON WORKROOMS': REMOTE COLLABORATION REIMAGINED," 19 August 2021. [Online]. Available: https://www.oculus.com/blog/workrooms/.

[83] P. Lau, "The metaverse: three legal issues we need to address," 2 February 2022. [Online]. Available: https://www.brunel.ac.uk/news-and-events/news/articles/The-metaverse-three-legal-issues-we-need-to-address.

[84] E. Parliament, "The CJEU judgment in the Schrems II case," 2020. [Online]. Available: https://www.europarl.europa.

eu/RegData/etudes/ATAG/2020/652073/EPRS_ATA(2020)652073_EN.pdf.

[85] E. Commission, "REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Markets in Crypto-assets, and amending Directive (EU) 2019/1937," 24 August 2020. [Online]. Available: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020PC0593 .

[86] L. von Gerlach and J. Salmon, "Non-fungible tokens: NFTs and the silence of the EU legislator," 28 October 2021. [Online]. Available: https://www.engage.hoganlovells.com/knowledgeservices/viewContent.action?key=Ec8tea-J9VaoLC8ssK%2BaGP8xgHJMKLFEppVpbbVX%2B3OXcP3PYxlq7sZUjdbSm5FIetvAtgf1eVU8%3D&nav=FRbANEucS95NML-RN47z%2BeeOgEFCt8EGQ0qFfoEM4UR4%3D&emailtofriendview=true&freeviewlink=true .

[87] Osborne Clarke, "What are the legal issues around NFTs?," 14 October 2021. [Online]. Available: https://www.osborneclarke.com/insights/what-are-legal-issues-around-nfts .

[88] J. Beck, "Can NFTs Crack Royalties And Give More Value To Artists?," 2 March 2021. [Online]. Available: https://consensys.net/blog/blockchain-explained/can-nfts-crack-royalties-and-give-more-value-to-artists/ .

[89] M. Ball, "Interchange Tools + Standards and the Metaverse," 29 June 2021. [Online]. Available: https://www.matthewball.vc/all/interchangemetaverse.

[90] S. Totilo, "Sony wants more PlayStation cross-play," 18 June 2021. [Online]. Available: https://www.axios.com/playstations-fortnite-minecraft-sony-22acafe7-86c7-4a37-b6cd-b1789fd40c46.html .

[91] Nippon , "Survey Findings Suggest Japan Has More than 1 Million "Hikikomori"," 5 June 2019. [Online]. Available: https://www.nippon.com/en/japan-data/h00463/survey-findings-suggest-japan-has-more-than-1-million-hikikomori.html .

[92] L. Lewis, "With new technologies and the metaverse, are social recluses and hikikomori still a problem?," 10 November 2021. [Online]. Available: https://www.todayonline.com/commentary/new-technologies-and-metaverse-are-social-recluses-and-hikikomori-still-problem.

[93] X. Shen, "Chinese state-owned think tank flags national security risks of metaverse, citing potential political and social problems," 1 November 2021. [Online]. Available: https://www.scmp.com/tech/tech-trends/article/3154447/chinese-state-owned-think-tank-flags-national-security-risks .

[94] S. Totilo, "Sony wants more PlayStation cross-play," AXIOS, 18 June 2021. [Online]. Available: https://www.axios.com/playstations-fortnite-minecraft-sony-22acafe7-86c7-4a37-b6cd-b1789fd40c46.html. [Accessed 25 March 2022].

[95] S. Totilo, "Sony wants more PlayStation cross-play," AXIOS, 18 June 2021. [Online]. Available: https://www.axios.com/playstations-fortnite-minecraft-sony-22acafe7-86c7-4a37-b6cd-b1789fd40c46.html. [Accessed 25 March 2022].

[96] UNESCO, "A lifeline to learning," 2018. [Online]. Available: https://unesdoc.unesco.org/ark:/48223/pf0000261278.

[97] Q. 7. Capital, "Nvidia: Keep Your Money," 18 November 2021. [Online]. Available: https://seekingalpha.com/article/4470549-nvidia-keep-your-money .

[98] Capital7Quad, "Nvidia: Keep Your Money," 18 November 2021. [Online]. Available: https://seekingalpha.com/article/4470549-nvidia-keep-your-money.

[99] G. Colantonio, "What is Epic Games' metaverse? And what does Fall Guys have to do with it?," 6 March 2021. [Online]. Available: https://www.epicgames.com/site/en-US/news/announcing-a-1-billion-funding-round-to-support-epics-long-term-vision-for-the-metaverse .

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