

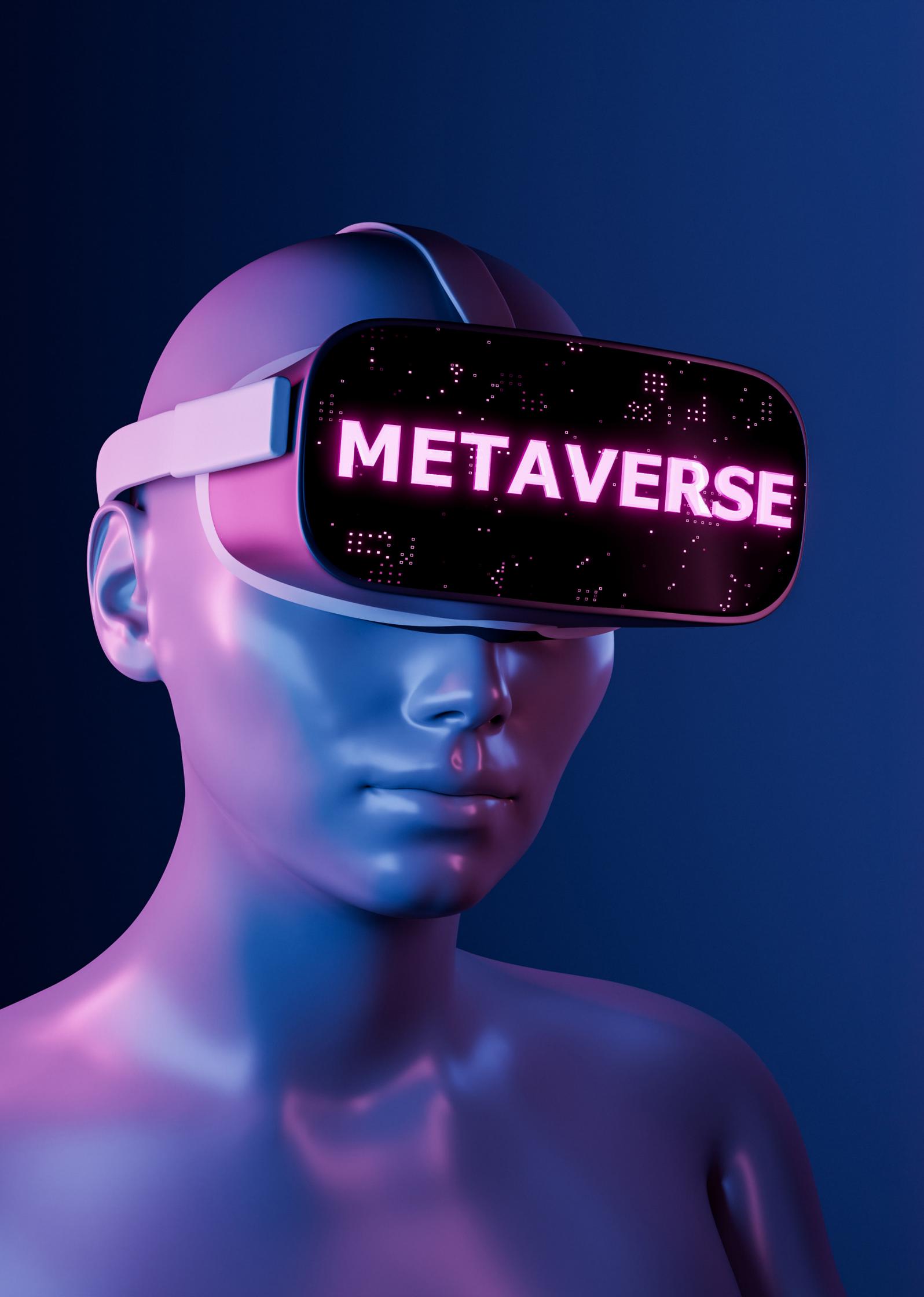


cifs.dk/metaverse

Whitepaper

THE FUTURE OF THE METAVERSE

This whitepaper explores four plausible future scenarios on the immersive Metaverse developed by the Copenhagen Institute for Futures Studies to challenge and inspire perspectives on the future and help readers get a better and deeper understanding of the critical uncertainties shaping the Metaverse.



METAVERSE

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Introduction

The Metaverse has emerged as the next big thing after mobile internet, and the term "Metaverse" has exploded in popularity over the last year. However, the phrase is often used without a definition, and when it does have a definition, it is often rather vague – and the implications are often challenging to comprehend.

At the Copenhagen Institute for Futures Studies, we believe that the Metaverse is a concept that we need to dive deeper into when it comes to the possible futures. Rather than defining what it is today, we find it more productive to define what it might become. Once the technologies and use cases supporting the concept have matured, the Metaverse will revolutionise our society. This creates a need for anticipation and preparation.

The following scenarios were envisioned by the Copenhagen Institute for Futures Studies to provide a set of qualified and possible developments of the Metaverse with a focus on immersive and spatial aspects. The scenarios were created to challenge and inspire perspectives on the future of the Metaverse and help readers get a better and deeper understanding of critical uncertainties.

WHAT IS THE METAVERSE?

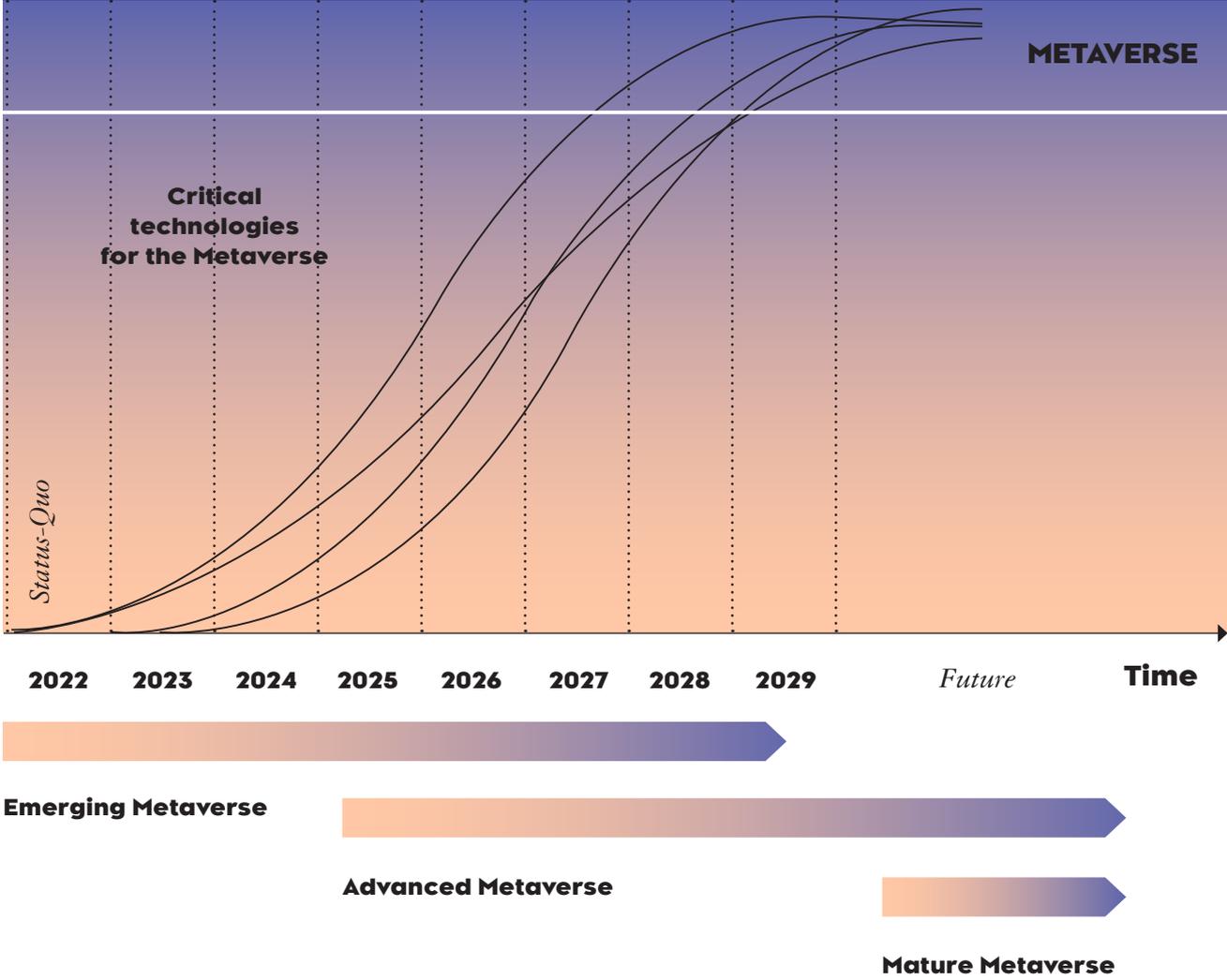
Before moving into the scenarios, we want to create a common understanding of what we believe the Metaverse as a concept currently stands for. In our view, the Metaverse overall is the seamless convergence of our physical and digital lives. A core aspect of this convergence will be a set of interoperable virtual spaces where we can work, play, learn, relax, socialise, communicate, interact, transact, and own digital assets. These spaces will create a sense of belonging – bringing people, spaces, and things together in virtual or augmented digital worlds.

In this whitepaper we distinguish between the elements of immersiveness and the underlying infrastructure. Web3 is primarily concerned with who will own and govern the internet of the future, enabled through e.g. blockchain technology, digital assets, social tokens, non-fungible tokens (NFTs), personal avatars and, in general, a higher degree of user participation like Decentralized Autonomous Organisations (DAOs). In contrast, the immersive Metaverse is more concerned with how people will interact and experience the internet of the future.

We hence summarise under the term '*Metaverse*' our daily reality once a set of technologies is fully developed, scaled, and adopted by the mass market. This set of critical technologies from fields such as Virtual Reality (VR), Augmented Reality (AR), Web3, and the Internet of Things (IoT) will enable a more seamless convergence of the physical and digital reality. We believe it is vital to prepare for this new reality today, to recognise what is likely to change and how to adapt accordingly.

What does it take for the Metaverse to evolve?

Illustration: Copenhagen Institute for Futures Studies, 2022. Combined with Gartner, "Evolution Spectrum for the Metaverse", 2022.



"The development of the Metaverse will depend on a set of technologies that are fully developed, scaled, and adopted by the mass market. Critical technologies such as Virtual Reality (VR), Augmented Reality (AR), Web3, and the Internet of Things (IoT) that will enable a more seamless convergence of the physical and digital reality."

BETAVERSES AND METASPACE

Following our description, the Metaverse is already beginning to emerge. Today, we see fragments of what will eventually become the Metaverse – fragments that we call ‘betaverses’. We believe there exists a confusion of these ‘betaverses’ with ‘the Metaverse’, wherein individuals and companies believe the fragments we see today are true Metaverses. This leads to what we describe as ‘metawashing’, wherein companies claim to be part of the Metaverse based on a simple immersive or blockchain-based initiative.

In the spirit of building a solid foundation on which we can build our future work on the Metaverse, this whitepaper will focus on a central aspect of the Metaverse: *Metaspaces*, I.e., virtual worlds and digital layers augmented on top of our physical world.

We believe that in any version of the Metaverse, a user will be able to access (one or more) home spaces with ways to be connected to selected private or public digital environments – *metaspaces* – for all sorts of purposes, whether it be shopping, gaming, entertainment, education, socialising, or all the above. Some commercial metaspaces may require tickets or membership for visits, while others rely on “in-space” purchases, much like the “in-game” purchases we see in today’s gaming industry. Some sell virtual accessories that can be added to avatars without changing the basic avatar – a way to dress your avatar up for special occasions or simply to show off virtual ‘bling’. You can also decorate your home spaces with purchased art or furniture, or you can make your own or choose from a vast selection of open-source content. Commercial or personally created accessories and other content have registered ownership, e.g. with NFTs.

OUR SENSE OF REALITY

The Metaverse is also challenging our sense of reality as our traditional understanding of physical reality as ‘more real’ than virtual realities might no longer be sufficient. While older generations will have a hard time grasping this, younger generations already view virtual interactions, skins, and digital assets as being just as ‘real’ as their physical counterpart and having equal (often higher) value than physical clothes and objects.

HOW TO USE SCENARIOS

In an era where forecasts are insufficient, scenarios help to foresee potential outcomes 'beyond the numbers'.

- **Scenarios are plausible narratives about potential futures that can create a common framework for understanding and discussing critical strategic uncertainties and future challenges.**
- **Scenarios can guide and inform companies about future developments and help identify key areas for R&D, innovation, and risk mitigation.**
- **Scenarios will rarely play out in isolation and will more likely unfold in a mix of the different scenarios.**

Uncertainties shaping the Metaverse

There are many uncertainties related to the development and shape of the Metaverse: What technologies will be included? Who will implement it? How will it be accessed? Will it be centralised or decentralised?

There are also a set of uncertainties regarding how the Metaverse will be used: Will it be mainstream or niche? What will users mainly use it for? How widely used will it be? Will it be plagued by crime (e.g. phishing, Ponzi schemes, identity theft, abuse of data and images), and what social dynamics will arise that are unique to the Metaverse?

The new virtual economy also leaves a lot of issues regarding accessibility, representation, and equity, since the Metaverse might – instead of becoming a democratisation of value – become an amplifier of the dynamics of the world we live in today – a struggle of rich vs poor, young vs old, woman vs man, etc.

The Metaverse could end up as a polarising machine where the privileged and/or tech-savvy have the upper hand. We might see a Metaverse where these people can participate and profit from the immense value-creation, while the less privileged or not so resourceful will quickly be excluded from participation on equal terms. Even though Web3¹ is said to be synonymous with the democratisation of value – and the virtual land of opportunity – there are many different scenarios that can unfold.

Among the many uncertainties there are related to the development of the Metaverse, there are two critical uncertainties that we have identified: **Open versus Proprietary** and **Convergent versus Separate**:

1 Web3 (also known as Web 3.0) is a proposed new iteration of the World Wide Web based on blockchain technology, which incorporates concepts such as decentralisation and token-based economics. (Source: en.wikipedia.org/wiki/Web3).



Open

versus

Proprietary

Will a universal Metaverse be created around open, non-proprietary protocols, much like those that govern the internet, e-mail, and blockchain-enabled technologies like Bitcoin, Ethereum, and other cryptocurrencies? Or will there be several centralised, commercial, and proprietary ‘Metaverses’, quite possibly with one or a few being dominant, the way that in the Web2 era, Google has been the dominant search engine, Facebook and TikTok the dominant social media platforms, Amazon the dominant e-commerce platform, and YouTube the dominant video-sharing platform?

In the Open outcome, everybody can access and add content to the Metaverse without asking or paying any commercial interest, and content is solely owned by the creators. The software and protocols enabling the Metaverse are updated by a voluntary organisation rather than by a commercial entity. Even so, the universal Metaverse is likely to be inhabited (perhaps even dominated) by commercial entities, as is the case in the current state of the World Wide Web. However, like on the World Wide Web, there is also room for non-commercial entities that might radically change the overall power structure. The interoperable and open-source culture serves as a step towards democratising ownership over data and digital assets (the Internet of Value). We can compare this with the Open Document Format ODF), which can be used freely by any application for creating and editing documents, whether free or commercial, unlike proprietary formats, the use of which may require paid licences from a commercial entity. We also see a range of self-organising communities, such as decentralised autonomous organisations (DAOs), changing how organisations are structured. The underlying technologies are (mainly) open-source and working on shared standards, supporting a high level of interoperability between different services.

In the Proprietary (closed) outcome, competing Metaverses will have incompatible protocols and exist as separate entities, much like the Windows, macOS, and Android operating systems. Content is only available across platforms if they are ‘localised’ for the different platforms – and there may be a fee or ‘tax’ to pay by commercial users, much like how Amazon and Apple get shares of income from content published and sold on their platforms. There is only a limited degree of interoperability in these scenarios, with the Metaverse split into several competing commercial platforms (with possibly one being dominant). This centralisation is driven by the attention economy and the allure of profit, either directly or through consumer data harvesting. The Metaverse’s merging of offline and online spheres presents many new opportunities for value-creation and -extraction, and Big Tech will prefer to own the platform(s) rather than seeing a single, open, decentralised Metaverse that may be harder to exploit. Like today’s ‘dark web’, a decentralised Dark Metaverse may exist alongside the proprietary ones, but its universal operability is limited, relegated to an often exclusive, criminal, or tech-savvy underworld.

Convergent

versus

Separate

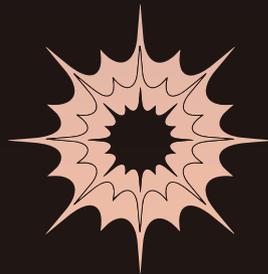
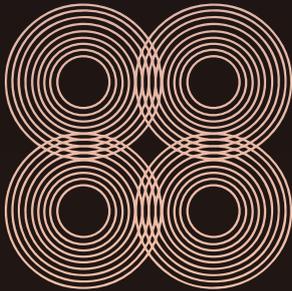
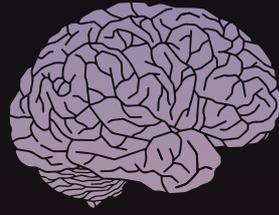
Will the Metaverse become a universal, default, virtual three-dimensional interface to online content, products, and experiences, the way that the World Wide Web is the ubiquitous two-dimensional interface today – or will the Metaverse be one or more separate entities accessed via the World Wide Web or apps, where people go at times for specific purposes? Will the Metaverse be a (true or de-facto) replacement for the WWW or several, non-interoperable add-ons to the WWW?

In the Convergent outcome, the Metaverse will grow to become the dominant way of online access, with multiple XR (*Extended Reality*, e.g. VR and AR) devices and haptic interfaces (manipulating virtual features with hand or body movements) increasingly replacing screens and keyboards, allowing for a far more immersive experience where the physical and virtual worlds increasingly merge. Just as the WWW has grown onto the earlier internet to the extent that most people use the terms interchangeably, the Metaverse will grow onto the WWW and be considered simply the ‘new WWW’, with a virtual 3D interface replacing today’s browsers as the primary interface. This Metaverse could, like the WWW, be based on open-source protocols, or it could be a commercial, proprietary entity that has become so universally preferred by users that no real alternative exists, much like how Generation Z tends to prefer Facebook’s closed and proprietary ecosystem (which includes Messenger, WhatsApp, Instagram, and more) for communication over the open and non-proprietary e-mail or text-messaging systems.

In the Separate outcome, the World Wide Web, perhaps with some minor Web3 additions, will remain the dominant interface for general online experiences. Add-on options exist, commercial and/or open-source, that allow full 3D immersion and the merging of physical and virtual settings, but they have not become ubiquitous the way WWW has, and the several add-ons tend not to be interoperable, each using their own protocols for 3D representation and user interaction – we could call them ‘betaverses’. People will mainly use these betaverses for specific purposes where they want a more immersive experience than what the World Wide Web offers, such as gaming, social activities, or specific job functions like remote-controlling devices. The betaverses will be something we ‘dial into’, not a Metaverse that we automatically log into whenever we use the internet.

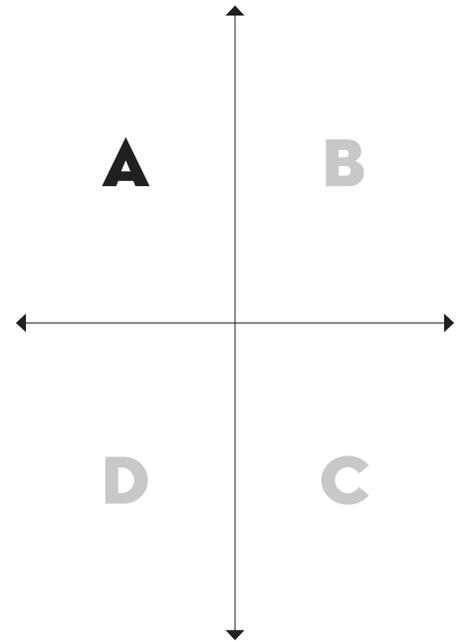


**FUTURE
SCENARIOS
FOR THE
METAVERSE**



The Free Metaverse

Scenario A *Open and Convergent*



In this scenario, groups of interested people – some voluntary, some commercial – come together to create a Metaverse that they see as the replacement of the World Wide Web (or ‘Web2’), a new decentralized, interoperable go-to interface to the internet; one that blends the physical world with a shared virtual universe using various XR technologies. This scenario incorporates blockchain technologies that enable decentralised proof of ownership of both digital and physical assets (via NFTs and smart contracts) and native support of cryptocurrencies, including as a ‘masked’ underlying currency that is converted in real-time into the individual user’s preferred (local or international) currency, allowing seamless payments all over the Metaverse. In this scenario, we see a new range of business models where decentralised autonomous organisations (DAOs) own many of the big brands, and where new ‘Web3-native brands’ have grown to become the biggest and most powerful in the world.

This scenario comes to be known as ‘the Free Metaverse’. It is built around non-proprietary open protocols for how virtual 3D objects, spaces, and digital assets are represented and interacted with, making it easy to use the same digital assets across multiple instances, much like a JPEG image can be imported into all sorts of content. Virtually created objects, characters and spaces can be added as augmented-reality overlays to the physical world, and physical objects, people and spaces can be copied into purely virtual settings (augmented virtuality). Acknowledging bandwidth limitations, 3D content is typically represented digitally in simplified versions, with complex textures added and animated locally on users’ devices, which can be set to different levels of detail according to the device’s capacity. Different users in the same virtual setting may hence view the same scene in different levels of detail, from the cartoony to the high-fidelity hyper-realistic, and may even choose different styles of visual representation based on the same simplified representation.

The primary interface technology for The Free Metaverse consists of various AR or VR devices such as goggles and lenses for output and haptic devices, laser scanners, or cameras for input. Many of these products have built-in cameras or

infrared laser scanners that track hand movement, allowing interaction with virtual objects much like you interact with physical objects. Feeling textures, weight, and solidity requires haptic feedback from gloves or even full-body suits – though few users want to go that far, except for dedicated gaming or specific virtual reality experiences. Voice control and eye-tracking add to a seamless experience, and special sense-pads such as lickable screens (like the 'Taste the TV' prototype presented by the Meiji University's School of Science and Technology in Tokyo in the early 2020s) allow getting more immersive experiences like taste and smell.

On the other end of the scale, you can still access the virtual parts of the Metaverse with a screen and a mouse. The Free Metaverse is very simple to use because of the intuitive similarity to real-world experiences, and children and the elderly find it easier and more instinctive than using the traditional internet. Once the inevitable teething troubles in the system are dealt with, it becomes the standard way to access and share digital content, whether purely in a virtual space or overlaid on the physical world as augmented reality. Just as the World Wide Web replaced earlier ways of accessing the internet, such as bulletin boards and Usenet, the Free Metaverse quickly replaces the World Wide Web, though this still exists as an underlying content layer.

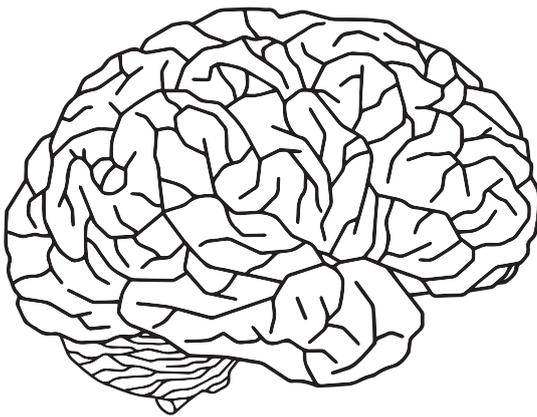
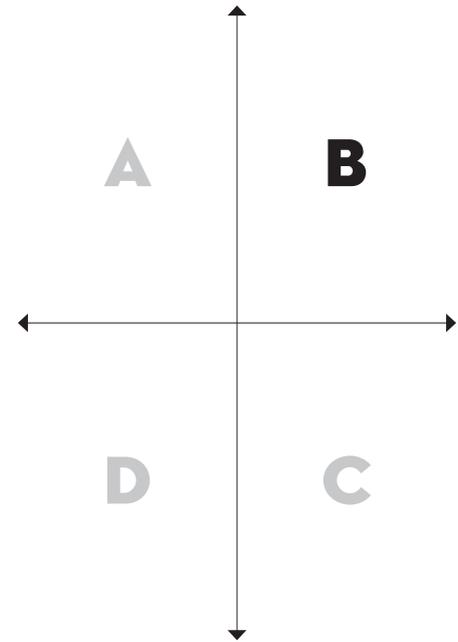
When users create avatars, they automatically gain the rights to the looks and close variations thereof, with an NFT proving ownership across the Free Metaverse. Ownership can be sold, but no single user is allowed to own more than a score of universal avatars to prevent commercial interests from claiming rights to every conceivable shape and colour. Because the NFTs denote ownership of avatars, it is difficult to get away with harassing or swindling other presences in the Metaverse because the identity behind the avatar can be established. There is no limit to the number of specialised avatars users can have for specific purposes, such as games, but these avatars can't be exported to the overall Metaverse if this means that the avatar limit is exceeded.

Companies or organisations may also create unlimited AI-created and AI-controlled synthetic characters for their presence in the Metaverse. AI systems have become so convincing that it is impossible to distinguish between humans and AI. Therefore, it has become legally required in most jurisdictions to inform humans that they are currently interacting with an AI, although it is difficult for the different systems to determine if a purportedly real person is, in fact, synthetic.

Because of the decentralised nature of the Metaverse, there are few rules beyond those hardwired into the protocols, but many metaspaces have codes of conduct – such as no virtual nudity and abuse of other users – and have integrated “personal boundaries” tools such as setting limitations of personal interactions. There are also several paid or voluntary moderators (both human and AI) that can warn or ban offenders. This makes much of the Metaverse safer for the users, unless, of course, they are lured away from the safe regions. Parents can limit their children's access to third-party approved or certified metaspaces, but bright kids can as always find ways around this. Some bad experiences have led organisations to call for strict governance of the Metaverse, but due to the decentralised nature of The Free Metaverse, it is impossible to ensure complete 'purity', and criminals lurk in the dark corners, hidden from standard search engines and access points.

Nerdverse

Scenario B *Open and Separate*



Much like in Scenario A, groups of interested people are working on creating the Metaverse as a successor to the World Wide Web, but sustained interest turns out to be limited once the initial curiosity has passed. Much like earlier ‘betaverses’ like Second Life, the Metaverse does not offer anything that most users feel they really need, the technologies around the Metaverse haven’t really proven their worth, and the big ‘legacy’ brands who invested heavily in entering the Metaverse didn’t manage to integrate the new Web3 logics into their solutions, hence failing to understand the new consumer needs of co-creation and co-ownership. An example of which was Nike suing Web3 creators in the early days of the Metaverse that eventually resulted in a lot of users not supporting their Web3-solutions. Hence, the Metaverse in this scenario is a world where the ideology of Web3 failed because of politics and power struggles of the new virtual economy.

The Metaverse only brings few improvements to the existing World Wide Web with the addition of some blockchain technologies and limited options for using VR and AR (like how the option of using smartphone touchscreen interfaces was introduced in the 2010s), and people, in general, are satisfied with what they

have. The Metaverse's focus on high-quality 3D graphics also somewhat excludes users with worse connections or low-end devices, including much of the developing world since the connection from satellites like Starlink fail to deliver the same broadband as urban hi-tech users have access to.

This does not mean that nobody uses the Metaverse. It does offer levels of immersion that the traditional internet does not, and that attracts enthusiasts of visual experiences and lifelike interactions in, e.g. fitness and work-related activities. The main part of the core users of the Metaverse, however, are most likely to be those who have invested heavily in gaming equipment or early VR and AR devices in the past. These users do not object to being called tech nerds or Metaheads – they are more likely to take pride in the terms – and hence, the Metaverse is often jokingly called the Nerdverse. This image becomes self-reinforcing, since only self-proclaimed nerds want to use a Nerdverse.

Experienced users sometimes make fun of less tech-savvy users or enforce strict codes of conduct, and a considerable amount of friction in the structure scares casual users away. With few users, little oversight, and built-in anonymity in blockchain-enabled transactions, the Metaverse has also become a hotbed of hate speech, conspiracy theories, and criminal dealings. Far from the unified Metaverse the creators envisioned, the Metaverse is fragmented into many metaspaces with very limited interaction between them.

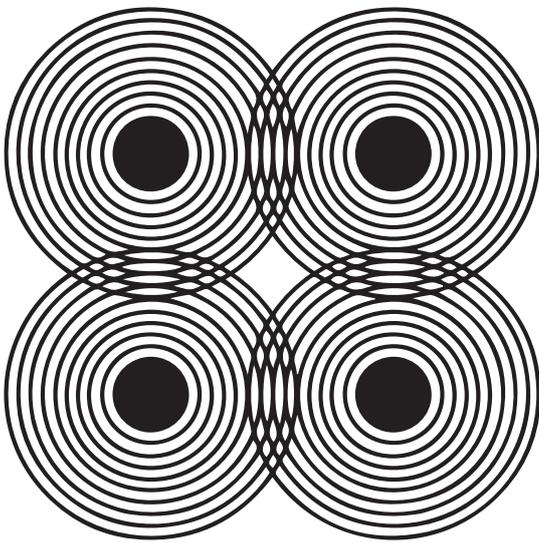
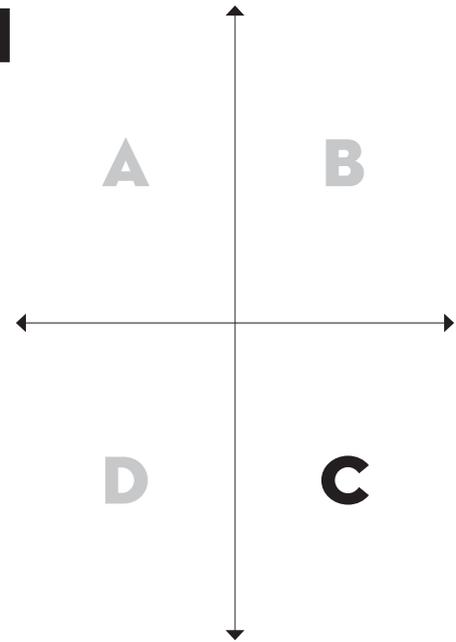
But there are also bright sides to the Metaverse. It is where the latest VR and AR technologies are tested, including full-body haptic suits of a sort that casual users would never use, even if they could afford to. Besides a few high-end commercial games and experiences like interactive pornography, the advanced haptic technology is also used by networks of people cooperating to create complex worlds that offer very realistic, immersive experiences, where users can feel the wind blow in their hair, the effort of walking up a hill, the touch of other bodies, the smell of flowers, the taste of food, and much more. For some users, such virtual worlds become more important than the real world, and they spend every free moment exploring or adding to their favourite world and interacting with other people in them. Some even go as far as to volunteer for experimental brain-machine interfaces, even neural implants, accepting the risks of such experimental devices as a small price for a greater degree of immersiveness.

Requiring less extreme technology, other users of the Metaverse combine AR lenses with location technology and scanners to create overlays of the real world, either to give an extra layer of information to guide them through the day, e.g. visual traffic notifications or add-on visual layers in order to make the day prettier or more exciting or for gaming purposes, ranging from pervasive games as seen with Pokémon Go to live-roleplaying scenarios that add scenery, creatures, and magical effects to mundane spaces. Outsiders shake their heads when witnessing these activities that they only see half of, but true Metaheads are never bothered by what 'outsiders' think.

Because of the relatively few, often private or even furtive users, many of the teething troubles of the Metaverse are never addressed; instead, users find workarounds or just live with the occasional bugs and glitches. This instability of the Metaverse also scares many newcomers away and contributes to making it niche.

Betaverses disunited

Scenario C *Proprietary and Separate*



In a rush to cash in on the (somewhat nebulous) hype of the Metaverse, a dozen major Big Tech companies each come forward with their own product they say is the Metaverse. Superpowers like China and Russia make their own public, censored versions. About all they have in common is the use of virtual 3D metaspaces that can be accessed by XR technology as well as by more conventional interfaces. None aim to replace the World Wide Web as a general internet interface but are basically virtual social spaces where you can represent yourself with an avatar, interact with others in public or private metaspaces, and buy all sorts of things from virtual marketplaces – with the company behind the individual ‘metaverse’ taking their cut. These ‘Metaverses’ are better-termed *Betaverses*, since their lack of interoperability and limited options prevent them from becoming what we see as a ‘true’ Metaverse: the seamless convergence of our physical and digital lives, creating an interoperable virtual space.

Not wanting to be left out, most companies make sure they have a presence in all the Betaverses, or at least the major ones, even though this means adapting their

software to the different protocols and requirements of the different Betaverses. This is not unlike how app companies today must adjust their software to work on Android, macOS, and Windows operating systems to reach all potential users, with the result not always being quite the same. Users in one proprietary Betaverse find it impossible to interact with users in another Betaverse, much like today, where Messenger, Telegram, WeChat, and Signal can't send messages to each other. You must either join all the Betaverses or accept that there are some people you can't meet and interact within the same metaspaces.

Users can create their own content, including personal avatars, but the company that owns the Betaverse is charging a large fee for using its services. You can't easily move content to other Betaverses, and if you sell your content on a marketplace, the owner takes its share, or 'tax', of the sales price. The Betaverses compete in offering the best conditions for content creators in the creator economy, although the 'tax rate' is the same everywhere since the companies realise that competition in this aspect would hurt them all. The Betaverses are ripe with advertisements of all sorts, often seamlessly integrated into metaspaces, such as billboards in virtual cityscapes or popular music played in the background of social spaces, with easy opportunities to buy. This advertisement is a major source of income for the Betaverse owners, but they take measures to not overwhelm users with advertisements to the extent that they become an irritant.

The World Wide Web not only survives alongside the Betaverses; it is a portal to them, though the Betaverse companies prefer that you use their apps rather than a browser to access them (and offer a little extra functionality if you do). Apps keep users inside the company's closed ecosystem, so they can't be tempted away by competitors.

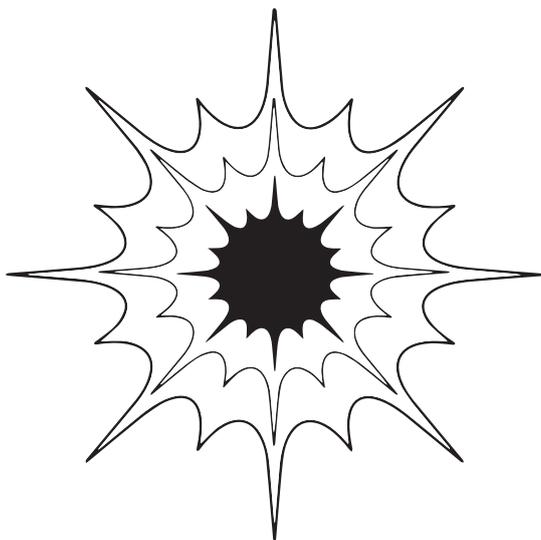
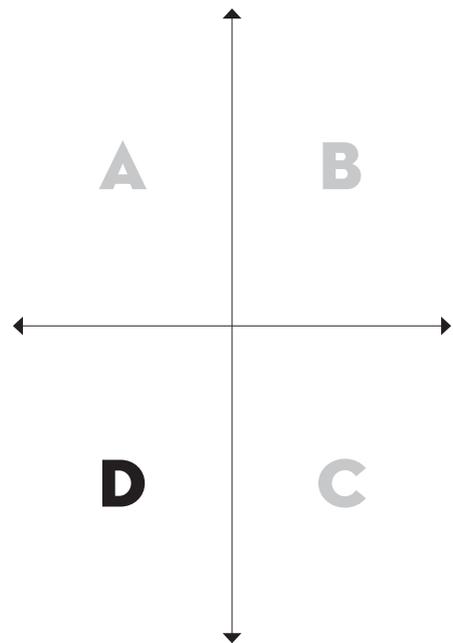
Because the Betaverses are centralised and proprietary, the owners know everything going on in them. They use this to harvest user data for various commercial purposes, and in some countries that allow it, sell the data to data brokers (and sometimes also share them with intelligence services). However, perhaps more importantly, the data is also used to police metaspaces in the Betaverses to prevent criminal activities or activities the owners consider amoral, like hate speech, sexual predation, fake news, or nudity, at least outside closed metaspaces paid for and run by political or commercial interests. The benign aspect of this is that the Betaverses can be made safer for kids and 'safe for work' unless users pay to get into the closed metaspaces and/or prove they are adults. In this regard, parents can consider the Betaverses safer for their children than the old-fashioned World Wide Web with its dark corners and alleys.

Some non-profit groups attempt to make a decentralised, open-source, 'true' Metaverse. However, they have difficulties attracting both funding and users, since most people are quite satisfied with what the Betaverses offer and don't mind being locked into closed, commercial ecosystems if that's the price for getting smooth-running functionality and instant gratification – after all, they know that there is no such thing as a free lunch.

The limited character of the Betaverses makes it challenging to invent entirely new social dynamics. In the end, the Betaverses are not much more than prettified 3D versions of things we have known for decades.

One Metaverse to rule them all

Scenario D *Proprietary and Convergent*



As in Scenario C, many Big Tech companies rush to build their own versions of the Metaverse. However, one of them quickly becomes far more popular than the others, either because of better functionality, better conditions for the creators, having the best advertisement campaign on the right channels, or simply being a successful first mover. This popularity becomes self-reinforcing as the greater income deriving from the greater popularity allows continual improvement and expansion of the functionality and aesthetic experience of their Metaverse to a degree that the competitors can't follow – and, of course, users want to go where other users are. After all, it isn't much fun bowling alone. This is an example of *inclusive value* from having the same as everybody else, as opposed to *exclusive value* – not that the dominant Metaverse, by whatever name, lacks opportunities for purchasing exclusive content and functionality.

As functionalities are added to this Metaverse, it grows to become a unified Metaverse where people can work, play, learn, relax, socialise, communicate, interact, transact, and own digital assets. That this version of the Metaverse is proprietary doesn't bother most users, who are used to everything being proprietary. The Web3 pioneers/evangelists have not been successful in persuading the general Web2 community to integrate blockchain into the basic web protocols. The users are fully aware that data is the product, that we can never fully own our own data, and they trust that regulation is removing the worst exploitation of data.

The open-source community has fallen on hard times because authorities demand governance and certification that the decentralised open-source organisations find it difficult to live up to, such as checking all content against copyright and trademark violations and policing forums against hate speech and fake news. Most successful open-source systems have been de-facto acquired by commercial interests that can afford to handle the complex and extensive regulations.

Blockchain technologies and applications like NFTs and cryptocurrencies become part of the Metaverse, but in versions that ultimately are strictly monitored by the gatekeepers of the Metaverse “for added security”. This claim has a great deal of truth to it as the Metaverse administration does strike down on Ponzi schemes and other swindles within the Metaverse and has the option to block ill-begotten digital wealth and ban repeat offenders. Those hit by these interventions have the option to sue, but this is rarely successful, in part because the central Metaverse administration is situated in a jurisdiction that makes such lawsuits difficult to win (as well as being a tax shelter). Since the Metaverse requires documentation of identity from all users, e.g. an associated bank account, it is easy to document who is responsible for an offence and provide evidence of the crime. This contributes to making the Metaverse a safe, if Orwellian, space for all.

Advanced users use brain-scanning headsets that allow interaction with the virtual world by pure thought, but feedback directly into the brain (brain-machine implants) is only being used in experimental devices aimed at disabled (e.g. blind) users, since such brain input is coarse and can be dangerous. It is possible that implanting neural nets inside the skull eventually will enable experiencing virtual worlds with all senses, including smell, taste, touch, and balance. However, until then, the majority is entirely satisfied with the visual and auditory output, perhaps with the addition of limited haptic feedback.

To avoid anti-monopoly regulation, the Metaverse owners actively support the continued existence of their competitors, even allowing them to use some of their software, though not enough to allow them to become serious competitors. The unspoken threat is that if one competitor tries to become too big, they will stop getting aid from the ruling Metaverse.

There is a lot of censorship and regulation in the Metaverse in this scenario, but most of it is localised. Nudity is forbidden in some countries, sexism and racism in others, criticism of religion or rulers in yet others. This locks users in some jurisdictions out of certain metaspaces, but a lot of censorship can be handled by simply having AI trained to locally remove or replace offending content, e.g. by automatically removing swastikas if users post them or deleting or blacking out offensive words or images. The technology can also be used to remove elements in the users’ daily lives, such as removing exposure to commercials or trash in the street with Diminished Reality (DR).

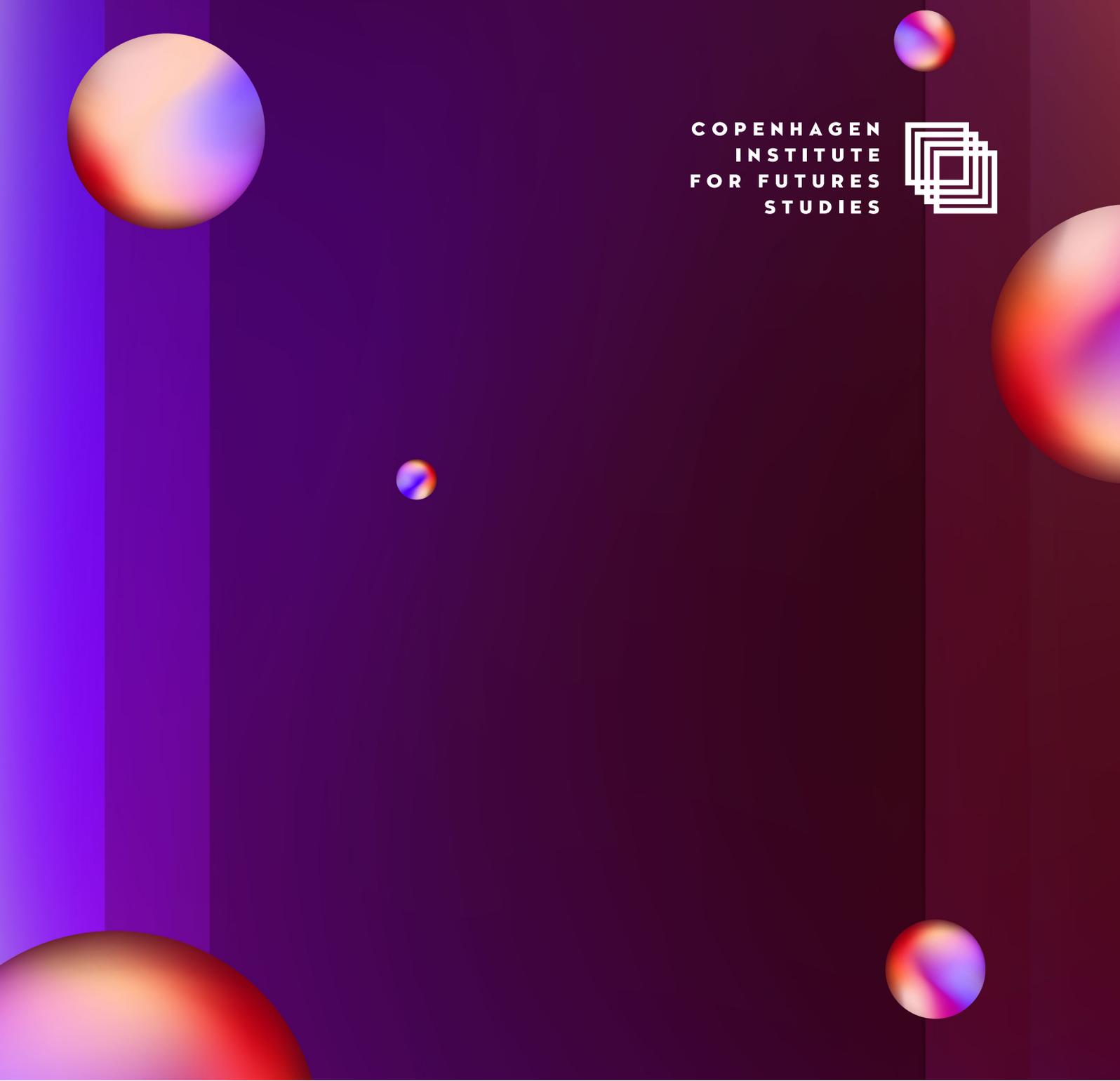
The Metaverse owners want to have good relations with all jurisdictions; it is better to offer limited functionality to some users than not having these users, as would be the case if the Metaverse was banned locally. Some criticise the Metaverse for going too far with censorship, for example when classical art is censored, but better safe than sorry.

QUESTIONS TO ASK WHEN SHAPING THE FUTURE OF THE METAVERSE

In this whitepaper, we have provided a set of qualified and possible developments of the Metaverse, focusing on immersive and spatial aspects built upon a set of critical uncertainties.

When it comes to shaping the future of the Metaverse, there are a great number of important questions that need to be explored in depth. Examples include:

- **How will the Metaverse be regulated, and by whom?**
- **What is the role of individual users, communities, platform owners and governments?**
- **What role will AI play in the creation, moderation, and governance of the Metaverse?**
- **Will user identities be anonymous, pseudonymous, or public?**
- **To what degree will users own and control the content we create?**
- **How will the Metaverse affect our society? How will it affect democracy?**
- **What will the social dynamics be in the Metaverse?**
- **How can we encourage a positive, healthy culture in the Metaverse?**
- **Do we need to ensure immersive literacy in the general public?**



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Want to know more ?

How is the Metaverse going to effect your company or organisation?

Feel free to reach out

Contact Futurist, Senior Advisor and Head of Media, Sofie Hvitved, shv@cifs.dk.

Read more about the future of the Metaverse

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