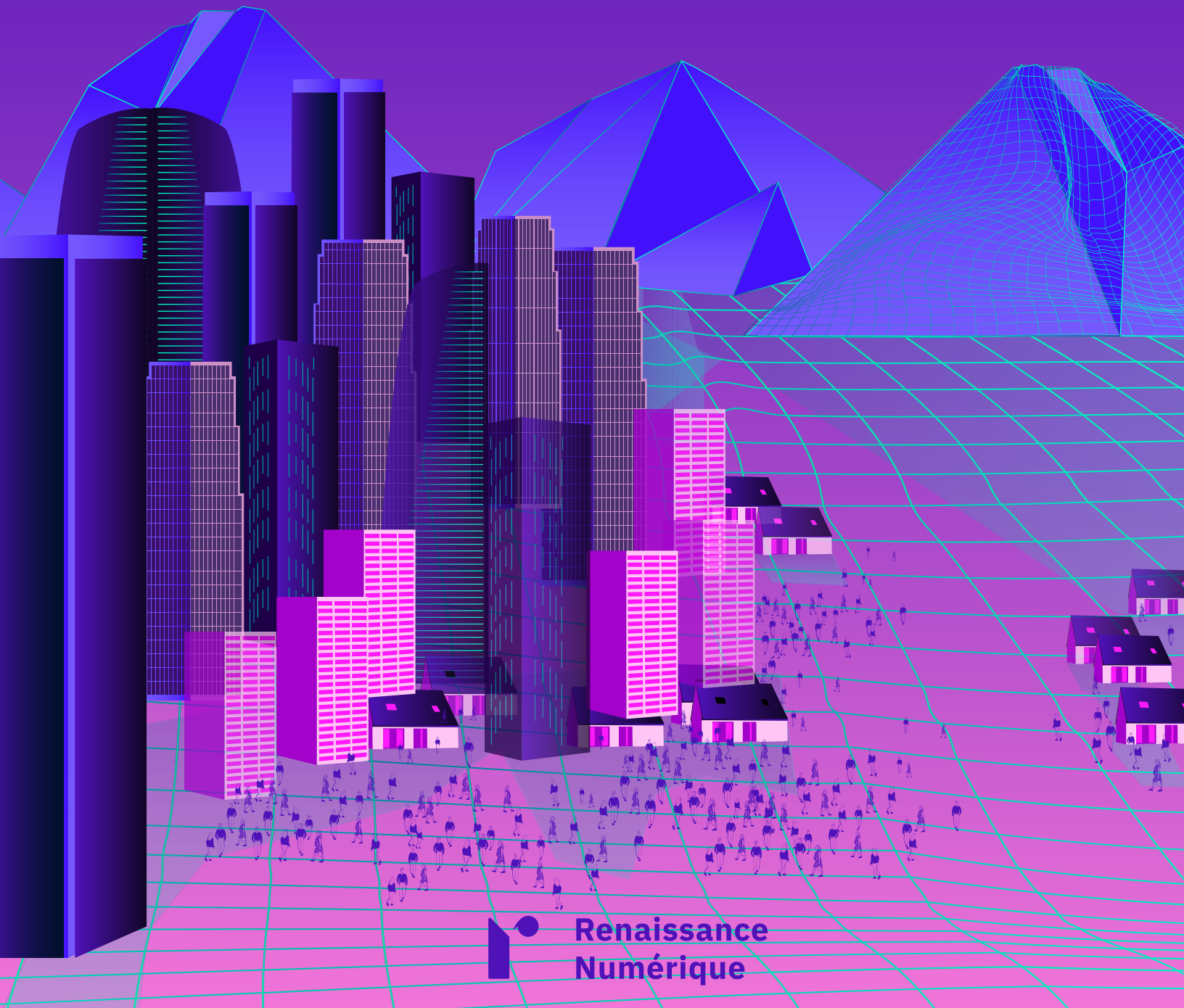# Governing the Metaverse and tomorrow's internet

Governing the Metaverse and tomorrow's internet

Table of Contents

Objectives and methodology

Report objectives

1.   Shed light on the debates surrounding the stakes and issues related to the Metaverse, by offering an interpretation through the lenses of the humanities and social sciences, the history of science and technology, and economics and politics. This is done from the viewpoints of various stakeholders: academic researchers, institutional and economic players, in particular.

2.   Draw up recommendations, and useful questions to ask, aimed at decision-makers, especially politicians, regulators, and even researchers.

3.   Continue to foster dialogue with all the experts and civil society around the future of our immersive digital interactions.

Methodology

Représentations et usages du Métavers

Une étude qualitative menée par

Renaissance Numérique L'OBSOCO L'Observatoire Société & Consommation

the metaverse dialogues
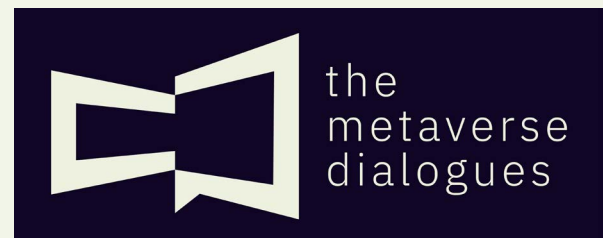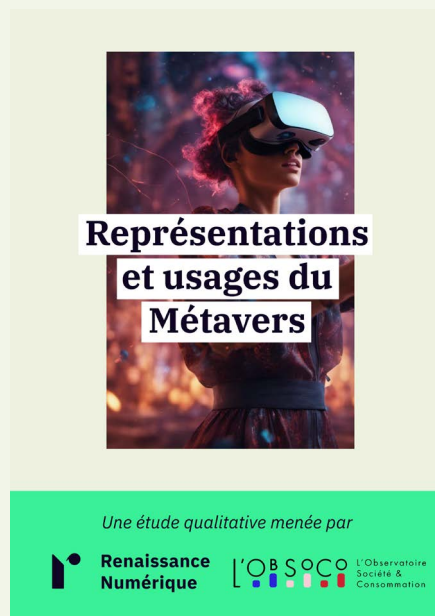
        This report is based on the many discussions that took place as part of, and alongside, the three-day *Metaverse Dialogues*[1], organised by Renaissance Numérique, on a wide-ranging analysis of the literature on the subject (books, reports, articles) and on the results of the qualitative study «Metaverse representations and uses», which the think tank published in October 2023[2].

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1. Renaissance Numérique, "Renaissance Numérique launches the "Metaverse Dialogues"", 13 December 2022: https://www.renaissancenumerique.org/en/news/renaissance-numerique-launches-the-metaverse-dialogues/

2. Renaissance Numérique (2023), «Représentations et usages du Métavers», 68 pp.: https://www.renaissancenumerique.org/publications/representations-et-usages-du-metavers/

This report and the *Metaverse Dialogues* were produced with Meta's financial support, obtained as part of the XR Programs and Research Fund aimed at supporting academic and independent research across Europe into metaverse issues and opportunities. As such, Renaissance Numérique is a member of the European Metaverse Research Network.

Like all the think tank's work, this report has been produced completely independently.

Explore this report online

You can explore the content of this website in an interactive way at www.metaversedialogues.org. You'll discover an alternative narrative architecture, allowing a different kind of immersion in the findings and recommendations of this collective exploration. We wish you a pleasant immersion in the governance of the Metaverse and of tomorrow's internet!
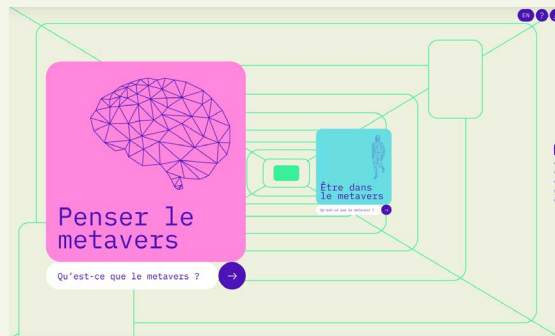
Executive Summary

The Metaverse will probably never exist. Metaverses will. The Metaverse, as a universe of interoperable digital worlds and environments, enabling an unlimited number of people to enjoy immersive, collective, and synchronised experiences, seems hardly feasible today. And undoubtedly undesirable, given the environmental resources required, for possible uses that currently offer little added value compared with those that already exist. However, billions of interactions in immersive worlds, particularly video games, take place every day. These foreshadow emerging metaverses, whether or not they are proprietary or centralised, but probably limited in their interoperability and synchronicity.

The Metaverse is a boundary object. It is a catalyst for diverse and varied representations, which set in motion and gather around it ecosystems of heterogeneous players who initially evolve in different worlds. As a result, there is a great deal of confusion about what the Metaverse is, could be or should be, since a wide range of cultures, interests, knowledge, representations, imaginations and know-how continually meet and clash around this «concept-object»[3]. In 1992, Al Gore described the information superhighways as a performative utopia that would set the world in motion and give rise to numerous technological investment programmes for the construction of a planetary communications network. In 2021, Mark Zuckerberg did the same with the Metaverse, even though the concept already existed.

The Metaverse is a heuristic and practical laboratory. It enables us to collectively imagine and discuss what we want tomorrow's internet to look like, whether it's immersive or not. By bringing together a wide range of social, economic, environmental, cognitive, ethical, and legal issues that are being raised today in relation to digital uses, the Metaverse enables us to envision ourselves in tomorrow's internet. Without wiping the slate clean of the past, but by taking root in what already exists, in what works and what doesn't, in what is satisfactory and what isn't, the Metaverse enables us to envisage together the ways in which we want to communicate, socialise, cultivate, entertain ourselves, trade, and so on. This collective discussion enables us to review laws, principles, and values from a more egalitarian, inclusive, ethical, and environmentally friendly perspective – in other words, responsible, for the society we want to build and see emerge – than they are today.

While legal frameworks already exist to protect individuals from a wide range of criminal offences and harmful conduct that may take place in metaverses, both nationally and internationally, this framework could

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3. Musso P., Coiffier S., Lucas J.-F (2015), *Innover avec et par les imaginaires*, Manucius, pp. 71-75.

be improved by making definitions more harmonised; for example, there is no common definition of online hate at European level. This is a major gap in the European legal system concerning the protection of internet users. Furthermore, although the legal framework applicable to metaverses is relatively comprehensive, it suffers from inconsistency. This legal inconsistency, and the lack of prioritisation between the various existing rules, results in a somewhat ineffective framework. Thus, more immersive social interactions, in which bodies are involved, call for a renewal or updating of our approaches, or at least our questioning, with regard to inclusion, ethics, multiculturalism, and viewpoint diversity. These developments provide an opportunity to rethink internet governance, by including all stakeholders, particularly users and citizens. They offer the opportunity to implement governance that is truly multi-stakeholder, more agile, and that leaves more room for experimentation, for everyone's benefit.

The Metaverse is therefore an opportunity to bring together "all the questions surrounding the development of digital technology in the years ahead"[4]. In this respect, it represents a fantastic opportunity to collectively question the digital world and the internet we want. Renaissance Numérique seized this opportunity by organising the *Metaverse Dialogues*. This report is an expanded and substantiated presentation of the conclusions reached. The think tank encourages furthering the discussions that the Metaverse has engendered in order to draw up, with all the stakeholders concerned, the outlines of a desirable and responsible digital society.

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[4]. LINC (2023), *Data, footprint and freedoms. Exploring the overlaps between data protection*, freedoms and the environment, IP Reports, Innovation and foresight, n°9, p. 25: https://linc.cnil.fr/sites/linc/files/2023-09/cnil_ip9_data_footprint_and_freedoms.pdf

Our 6 key recommendations
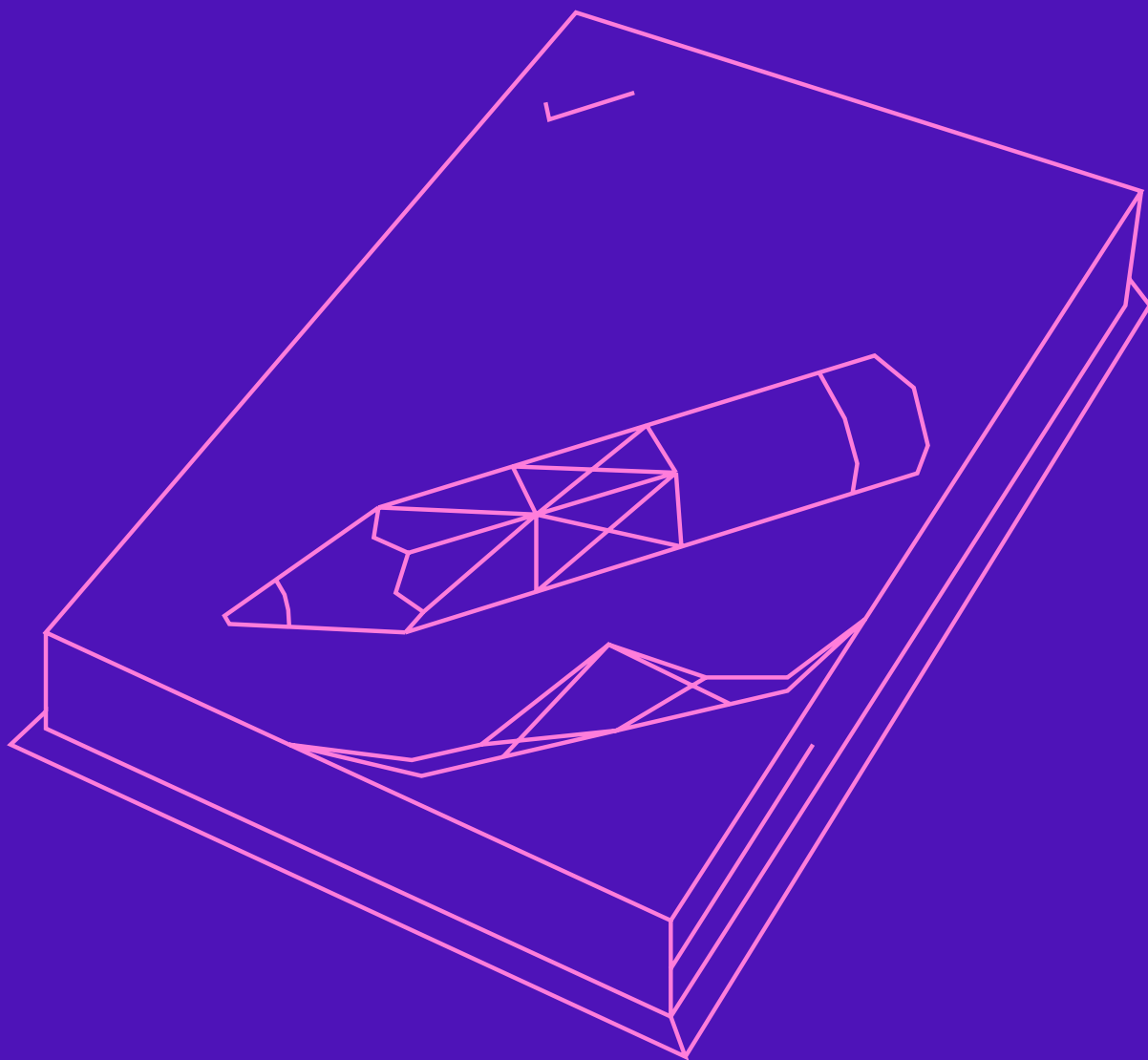
The Metaverse, metaverses, or virtual worlds... Regardless of the name given to the immersive realities that can be experienced collectively and synchronously in digitised environments, the development of these solutions, and to some extent that of their uses, raises broader questions about the governance of tomorrow's internet.

In this regard, Renaissance Numérique recommends:

1. Differentiating between existing immersive uses and possible uses, which all too often have no reality other than its prescribers' promises. In this respect, it is also important to take a close look at existing regulatory and moderation systems, which already cover a number of possible uses for metaverses.

2. Making legal consistency and enforceability a priority for legislators, particularly for the next European Commission. The possible advent of the Metaverse appears to be a perfect laboratory in this respect.

3. Implementing standardisation and "compliance by design", by incorporating a number of ethical and even legal principles into the standardisation process, in addition to security and interoperability standards. This does, however, require the technical operationalisation of these principles. Operationalisation and auditability aspects must therefore be considered.

4. Developing experimental multi-stakeholder processes (e.g. via regulatory sandboxes or policy prototyping), in order to analyse the relevance of the existing legal framework with regard to the Metaverse, and put forward recommendations relating to the technical operationalisation of concepts such as privacy, the protection of personal data, or the prevention of cyber-bullying.

5.

Putting in place agile, multi-stakeholder governance mechanisms to structure every person's rights and duties in tomorrow's internet. The next European Commission should encourage and develop the implementation of this kind of approach at European level.

6.

Encouraging online service providers to involve users in the moderation of content and behaviour, and more generally in the regulation of metaverses.
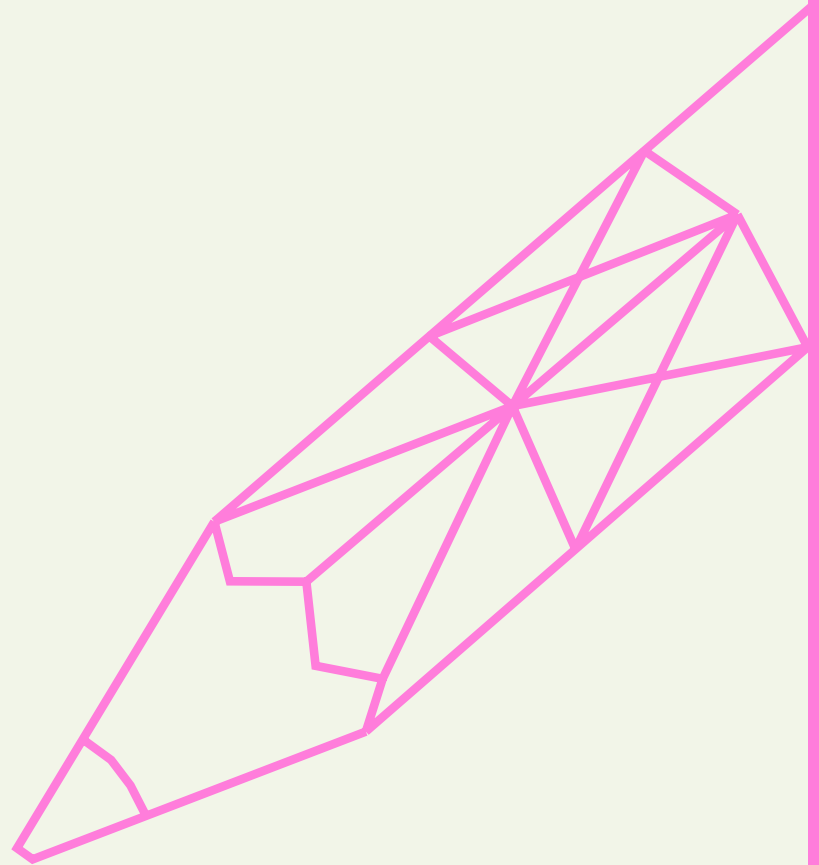
Why should we (still) be interested in the Metaverse in 2023?

1

"We are at the beginning of the next chapter for the internet"

On 28 October 2021, at the annual Connect conference[5], Mark Zuckerberg declared that "we are at the beginning of the next chapter for the internet"[6]. This new chapter is the "Metaverse", a "platform" that will be "even more immersive – an embodied internet where you're in the experience, not just looking at it [...] It will touch every product we build".

For the founder of Facebook, which became Meta on that same autumn day in 2021, most digital social interactions, whether family or work-related, individual or collective, recreational or educational, will take place in the Metaverse in the not-too-distant future. Tomorrow's internet, the one that "will be the successor to the mobile internet", as he puts it, will offer the possibility of being "in" the internet, and no longer just "on" the internet. In this vision, the Metaverse is not simply a "virtual world", i.e. an environment simulated in three dimensions in the way that video games can be. It is a digitised everyday space in which we can act in augmented reality (AR)*[7] or mixed reality (MR)* thanks to display devices (headsets, glasses, holograms, but also computers and mobile phones). According to this approach, the Metaverse is moving away from the conventional screens we are familiar with to play with the intertwining of virtuality scales[8].

The idea that the Metaverse will be the next internet is widely debated. For some, it is a successor to the mobile internet. The Metaverse will require new standards and new infrastructures, probably a review of the history of the internet protocol suite (TCP/IP), new devices and equipment, and could even change the balance of power between the tech giants, independent developers, and users"[9]. For others, the Metaverse will develop in tandem with the evolution of the internet, the next iteration of which could be Web 3.0 (see "Metaverse business models: "business as usual" or "another world"?", p. 47). Regardless of what Web 3.0 covers (decentralised networks, open architectures, content authentication, etc.), there is nothing to say that the Metaverse will be based on its principles and will have the same uses: "The Metaverse is therefore not the future of the internet, as some people claim, confusing these two concepts and their uses. If someone is looking for information, the current internet

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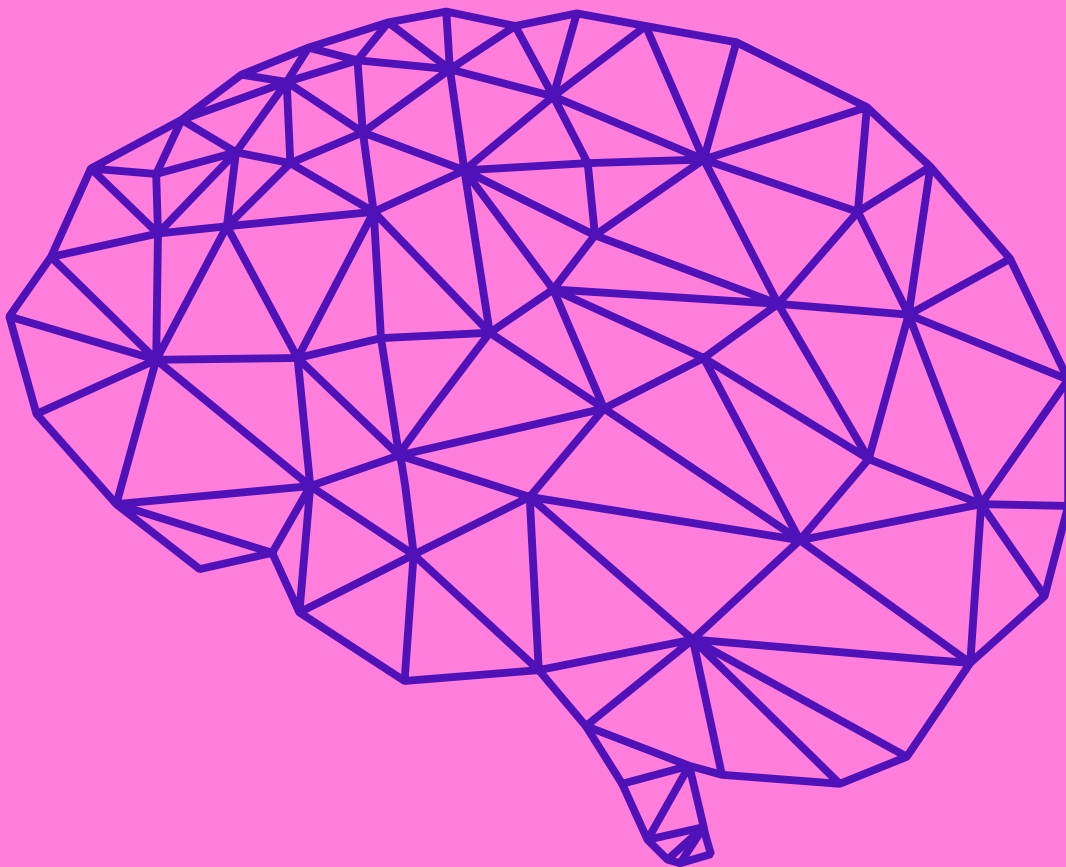5. Meta Connect conferences are annual conferences at which the company makes strategic and new product announcements.

6. Zuckerberg M. (2021), *Founder's Letter*, 28 October 2021: https://about.fb.com/news/2021/10/founders-letter
   See also the "Facebook Connect 2021" video: https://www.facebook.com/Meta/videos/577658430179350/

7. The stars refer to the glossary at the end of the document.

8. Milgram P., Kishino F. (1994), A taxonomy of mixed reality visual displays, IEICE, T*ransactions on Information Systems*, Vol E77-D, No.12.

9. Ball, M. (2022), *The Metaverse. And how it will revolutionize everything*, Liveright Publishing. Note that all quotes taken from this book were translated from the French version, as authors did not have access to the original version of Ball's book.

is enough, with its advantages and disadvantages"[10].

Either way, the Connect 2021 conference sent shockwaves through the technology and media worlds. One of the most powerful companies in the world had just embarked on the Metaverse, taking with it thousands of companies and commentators, and potentially billions of people... and billions of dollars in turnover.

A damp squib?

Several signs, parameters, and events quickly called into question the enthusiasm expressed for the Metaverse at the end of 2021.

THE METAVERSE AS SOMETHING DIFFICULT TO ENVISION

At the Connect conference in October 2021, Mark Zuckerberg said on several occasions that he did not have all the answers to the questions that might arise from the presentation of his vision of the Metaverse, and that it would take years to build it, but a myriad of questions set the technology world abuzz within minutes of the end of his presentation:

▶ What is the Metaverse? Is it a virtual world? A virtual reality environment? Mixed reality? All of the above?

▶ How will users be able to access it? Will they be able to do so from home as well as in the street? With what equipment? A virtual reality headset? A phone? A computer? A hologram?

▶ Will it be an open universe that is interoperable with other solutions? Are we talking about a Metaverse specific to a franchise or a Metaverse that allows connection with other simulated universes produced by other players and solution providers?

▶ Will a virtual reality headset from a brand other than Meta be able to connect to this Metaverse?

▶ What will be the environmental impact of such a Metaverse?

▶ Etc.

Immediately after the Connect 2021 conference, the many unanswered questions, as well as the gap between the proposed vision and the reality of existing solutions, only added to a conceptual vagueness steeped in the imaginaries of science fiction[11]. As a result, and even if we can consider that "we've had versions of this

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10. Fuchs P. (2023), «De la réalité virtuelle aux métavers», *Techniques de l'ingénieur*, Innovation | Innovations technologiques, p. 12: https://www.techniques-ingenieur.fr/base-documentaire/technologies-de-l-information-th9/realite-virtuelle-42299210/de-la-realite-virtuelle-aux-metavers-te5973/finalites-et-definitions-de-la-realite-virtuelle-de-la-realite-augmentee-et-du-metavers-te5973niv10001.html

11. The term metaverse first appeared in the *Snow Crash* novel by Neal Stephenson. In this book, the metaverse (spelt with a lower-case m) describes, without ever giving a specific definition, a persistent virtual world that is hybridised with all humans and their activities.

phenomenon for decades – people coming to-gether online to play, to create, to communicate, and to build a community"[12], until today, the Me-taverse has remained more of a concept than a tangible object, which is difficult to explain and therefore difficult to appropriate.

A LACK OF USERS

Meta's first incarnation of the Metaverse is the three-dimensional digital environment Ho-rizon Worlds (or Meta Horizon Worlds). In Oc-tober 2022, the *Wall Street Journal* reported that Horizon Worlds had fewer than 200,000 mon-thly active users, less than half Meta's target of 500,000[13]. Since then, users still don't seem to have embraced this universe, and even the com-pany's employees don't seem to want to use it[14].

"Metaverse platforms" such as Decentra-land and The Sandbox have also been criticised for having between a few hundred users for the former, and between 1,000 and 4,500 daily ac-tive users for the latter, despite being valued at a billion dollars. As a reminder, at the end of 2011, the Second Life virtual world was registering up to 48,000 simultaneous connections per day[15].

MASSIVE LOSSES AND REDUNDANCIES

In 2022, as a result of a massive fall in the company's market capitalisation, Meta lost 65 billion dollars, including 13.7 billion dollars (12.9 billion euros) from Reality Lab, the divi-sion responsible for building the Metaverse. In the first half of 2023, this division is estimated to have lost 7.2 billion, making a total loss of 21 billion dollars in just a year and a half.

In 2023, Meta announced 10,000 redun-dancies, following an initial wave of 11,000 re-dundancies in November 2022. Similarly, Micro-soft "shuttered its virtual-workspace platform AltSpaceVR in January 2023, laid off the 100 members of its 'industrial metaverse team', and made a series of cuts to its HoloLens team. Dis-ney shuttered its Metaverse division in March, and Walmart followed suit by ending its Roblox-based Metaverse projects"[16]. Recently, Chinese companies such as Tencent and Bytedance have also closed divisions that were working on the Metaverse or specific aspects of virtual reality.

However, this trend cannot be attributed solely to the non-adoption of Metaverse solu-tions. The major tech companies have been ex-periencing an unfavourable economic climate for almost two years (war in Ukraine, inflation, etc.)[17].

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12. "Enabling the next iteration of the internet: The metaverse", *MIT Technology Review*, 11 April 2023: https://www.technologyreview.com/2023/04/11/1069559/enabling-the-next-iteration-of-the-internet-the-meta-verse

13. "Company Documents Show Meta's Flagship Metaverse Falling Short", *Wall Street Journal*, 15 October 2022: https://www.wsj.com/articles/meta-metaverse-horizon-worlds-zuckerberg-facebook-internal-docu-ments-11665778961

14. "Meta's flagship metaverse app is too buggy and employees are barely using it, says exec in charge", *The Verge*, 7 October 2022: https://www.theverge.com/2022/10/6/23391895/meta-facebook-horizon-worlds-vr-social-network-too-buggy-leaked-memo

15. Lucas J.-F. (2013), *De l'immersion à l'habiter dans les mondes virtuels* : le cas des villes dans Second Life. Thèse : Sociologie, Rennes, Université Européenne de Bretagne, Rennes 2, pp. 77-78.

16. "RIP Metaverse. An obituary for the latest fad to join the tech graveyard", *Insider*, 8 May 2023: https://www.businessinsider.com/metaverse-dead-obituary-facebook-mark-zuckerberg-tech-fad-ai-chatgpt-2023-5

17. "Facebook plans to reduce hiring as revenue growth slows and inflation concerns increase", *CNBC*, 4 May 2022: https://www.cnbc.com/2022/05/04/facebook-plans-to-reduce-hiring-as-revenue-growth-slows-.html

Will the Metaverse exist?

In answer to this question, we could argue that the very nature of the future is to be unpredictable. In our case, however, the answer to this question depends first and foremost on how we define the Metaverse. Some may consider that the Metaverse already exists! Nonetheless, it is still interesting to outline the various arguments that are fuelling debate on this issue:

▶ Limiting the Metaverse to Meta is extremely simplistic since, in the words of a company representative, it is "a constellation of technologies, an interconnection of systems, without national borders, which needs to be built, operated and governed by several institutions". It is therefore important to pay particular attention to the various initiatives working towards the development of the Metaverse, which is a long-term, iterative project on a global scale, while trying to distinguish the genuine will to develop projects from hype.

▶ Analysing the positioning of all the players in the Metaverse value chain (see "The Metaverse value chain", p. 37) is key to preparing for its development, since "large enterprises such as NVIDIA and Unity are investing heavily to lay the foundational infrastructure, while Roblox, Decentraland, and Sandbox are jockeying to be the preferred portal, and Web3 studios such as Touchcast and TerraZero are working with leading brands to expand their market share"[18]. In addition, although many arguments often confuse the Metaverse with industrial digital twins (see "Digital twins",

p. 28), the market for virtual reality and mixed reality headsets needs to be watched carefully, as they are increasingly moving into business markets and generating colossal investments.

▶ Not thinking that 2022 was the year of the Metaverse, and that 2023 is all about artificial intelligence (AI). In addition to the many observers who believe that more and more companies, including Meta, seem to have "pulled the plug" on the Metaverse in favour of AI, that investment and teams dedicated to the Metaverse in many companies have been reduced, and that the media have turned their backs on the subject, certain statements suggest that the structuring of the Metaverse is underway: "the Horizon Workrooms virtual workspace is a first step towards an office in the Metaverse. And, thanks to the Presence platform (mixed reality, sense of social presence, etc.), new types of applications will be created. [...] We are convinced that the Metaverse is the future of computing and that it must be built around people"[19].

In particular, the Connect 2023 conference reinforces this argument, since the Meta Quest 3 headset, the development of artificial intelligence, and the connected glasses that have been announced as flagship products for 2024, and which have been presented as "Metaverse technologies", are all about the ongoing hybridization of our daily digital experiences. In other words, the construction of the Metaverse, such as it was presented to Facebook teams in the summer of 2021.

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18. "Yes, the Metaverse Is Still Happening", *Harvard Business Review*, 12 May 2023: https://hbr.org/2023/05/yes-the-metaverse-is-still-happening

19. «Meta : «Nous sommes convaincus que le métavers est l'avenir de l'informatique»», *Le Monde*, 19 March 2023: https://www.lemonde.fr/economie/article/2023/03/19/meta-nous-sommes-convaincus-que-le-metavers-est-l-avenir-de-l-informatique_6166153_3234.html

Beyond the "Metaverse", collectively questioning what we want the future to hold for our digital interactions

The "Metaverse object" allows us to question possible developments in our digitised social interactions, and therefore the underlying business models, or the changes in our relationship with technology, as well as the values that may characterise or support them.

For example, over the next few years, will our interactions using digital devices become increasingly immersive? If so, will they happen through the use of an avatar, i.e. a digital representation of an individual on a screen (be it a computer screen, a mobile phone, or the lenses of a virtual reality headset)? Will they take place in simulated three-dimensional worlds, or in a constant interrelation of different types of mixed reality experience and virtualised representations of the world? Who will build these spaces, who will regulate them, what rules and mechanisms will protect users, and what role will users play in all these matters? Or, while European regulations have been multiplying for several years to regulate the protection of personal data, prohibit the targeting of advertising to under-age children, open up application shops to competition, allow algorithms to be deactivated on request, or promote moderation, will new legislation be necessary as a result of the gradual construction of the Metaverse? Or will the existing ones need to be updated? For example, to regulate the collection and processing of behavioural and biometric data* made possible using virtual/mixed reality headsets, whether for the purpose of improving user experience, moderating content and behaviour, or regulating advertising targeting in these simulated universes? What's more, given the geopolitical stakes and regulatory differences between Europe, the United States, and China – to name but a few – will we see the emergence of a single metaverse, or several?

There are a great many questions, and they are often presented in a new light because of the possible emergence of the Metaverse, and the complexity of grasping this concept. However, given that billions of interactions already take place online every day, for example in shared and persistent video games, it is not so much a question of knowing whether or not the Metaverse will exist as such, but rather of being able to sketch out, at this stage, what the nature and formats of these interactions and uses will be in the coming years.

Because that future may not be all that far away! Just two years after the Connect 2021 conference, the Metaverse is gradually taking shape in the connections that are emerging between everyday digital uses infused with artificial intelligence and the development of immersive virtual reality and mixed reality experiences, as demonstrated by the latest headsets from Apple (Apple Vision Pro) and Meta (Meta Quest 3). While Mark Zuckerberg did not talk about the Metaverse as such at the Connect 2023 conference, he did present "metaverse technologies"[20].

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20. Meta, "Meta Connect 2023: Quest 3, AI Advances, Next-Gen Smart Glasses, & the Road to the Metaverse", 27 September 2023: https://www.meta.com/en-gb/blog/quest/connect-2023-quest-3-ai-ray-ban-smart-glasses-meta-verse/

The Metaverse, an elusive object

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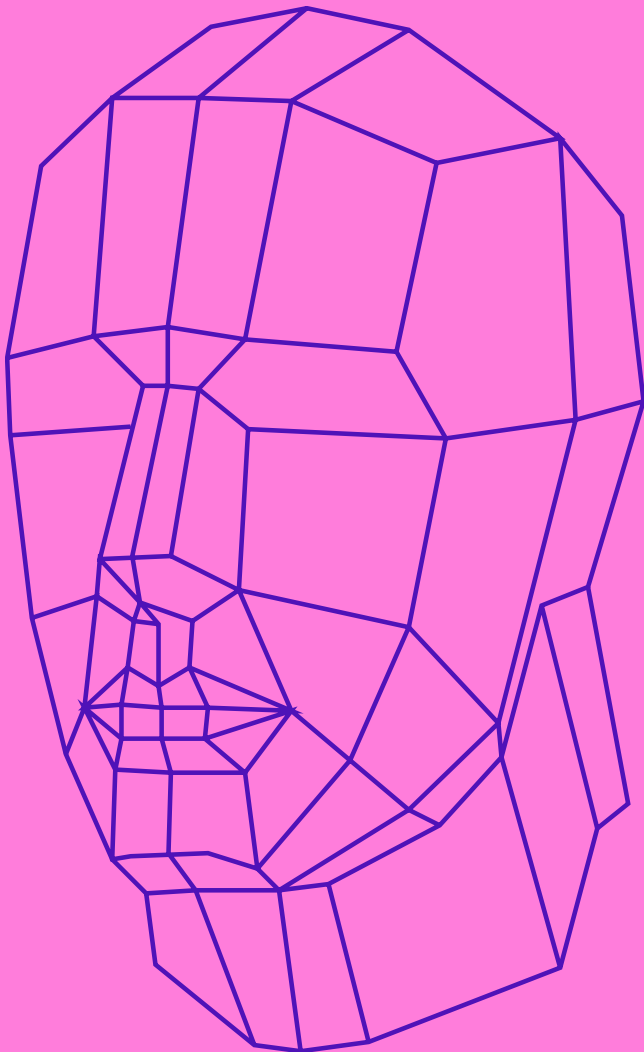
A wide range of definitions

A SLOW ACCULTURATION PROCESS

The "Metaverse" has a multitude of definitions, both in scientific literature and in the media. For example, while "the concept of the 'virtual world' underlying the Metaverse has been assimilated by the public [in particular] thanks to the imaginary universe deployed in the entertainment industries, […] its definition is still unclear to consumers, who do not grasp its significance or the scope of its use"[21].

According to a study by Wunderman Thompson, the number of consumers worldwide who had heard of the term had risen from 32% in July 2021 to 74% in March 2022[22]. In June 2023, the latest study by the *Centre national du cinéma et de l'image animée* (CNC, National Centre for Cinema and the Moving Image) on immersive uses confirmed this estimate, indicating that 71.9% of respondents said they were familiar with the term "the metaverse", with 33.8% of them believing they knew exactly what it meant, and 38.7% not knowing exactly what it meant[23]. The qualitative study conducted by Renaissance Numérique on the representations and uses of the Metaverse also shows that although the term Metaverse is known among early adopters* of virtual reality headsets, it is considered to be particularly vague[24].

> *"It's all a bit vague for me. It reminds me a bit of Second Life fifteen years ago. This other world that we created simultaneously didn't work at all. It worked for a micro-niche, but it didn't work from a global point of view. I have the impression that for the wider public, the Metaverse is a very, very long way off. I think it's for insiders. I'm trying to take an interest in it, to understand it, but for me it's really a blur."*
>
> **Éric, 52,**
> Banking project manager[25]

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21. Galienni S., Truphème S. (2023), *La vague Web3. Maîtriser les nouveaux codes du marketing 3.0. Blockchain, NFT, DAO, Métavers…*, Dunod, p. 116.

22. Wunderman Thompson (2022), "New realities: Into the Metaverse and beyond", p. 5.

23. Centre national du cinéma et de l'image animée, «Les usages immersifs, de la réalité virtuelle au métavers», 1st September 2023: https://www.cnc.fr/professionnels/etudes-et-rapports/etudes-prospectives/les-usages-immersifs-de-la-realite-virtuelle-au-metavers_2022269

24. Renaissance Numérique (2023), *op. cit.*

25. *Ibid.*, p. 33.

Another sign of acculturation can be seen in the recent additions of the word "Metaverse" to various dictionaries. In 2023, for example, it made its debut in Le Robert dictionary, which defines it as "a persistent three-dimensional virtual universe offering its users, which are represented by avatars, an interactive and immersive experience"[26].

MANY DEFINITIONS, BUT COMMON FEATURES

Given that there is no consensus on a definition of the Metaverse, it is worth highlighting the similarities and differences that may exist between the ways in which it is conceived and defined. While its many definitions naturally illustrate different visions, they also reflect strategic issues and player positioning. Consequently, here are a few definitions to capture the full range of characteristics that can define the Metaverse:

▶ Matthew Ball, who runs an investment, consultancy, and production company for television shows, films, and video games, defines the Metaverse as "a massively scaled and interoperable network of real-time rendered 3D virtual worlds and environments which can be experienced synchronously and persistently by an effectively unlimited number of users with an individual sense of presence, and with data continuity"[27].

▶ The authors of the report on the exploratory mission on metaverses, commissioned by the French Ministry of the Economy, Finance, and Industrial and Digital Sovereignty, consider metaverses to be "a virtual, persistent space, with three-dimensional synthetic data, which is interoperable"[28].

▶ Alexandre Bouchet, director of the Laval Virtual international trade fair, believes that the Metaverse is "a wide network of persistent 3D worlds and simulations, calculated in real-time, which, through interoperability, support the continuity of identity, objects, data, and rights, and which can be experienced synchronously by a very large number of users, each with an individual sense of presence and embodiment"[29].

▶ Philippe Fuchs, professor emeritus specialising in virtual reality, believes that "the purpose of metaverses is to enable an unlimited number of users to simultaneously share collective, public, or private sensory-motor, cognitive and emotional experiences in an artificial, persistent and evolving world, digitally created on the Internet, for use in social, recreational, economic, professional, artistic, or cultural activities"[30].

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26. Le Robert, Dico en ligne (online dictionary), «*métavers*» entry: https://dictionnaire.lerobert.com/definition/metavers

27. Ball M. (2022), *op. cit.*

28. Basdevant A., François C., Ronfard R. (2022), «Mission exploratoire sur les métavers», p. 34: https://www.economie.gouv.fr/files/files/2022/Rapport-interministeriel-metavers.pdf

29. «Qu'est-ce que le métavers?», *Techniques de l'ingénieur*, 10 March 2023: https://www.techniques-ingenieur.fr/actualite/articles/quest-ce-que-le-metavers-121160/

30. Fuchs P. (2023), *op. cit.*, p. 5.
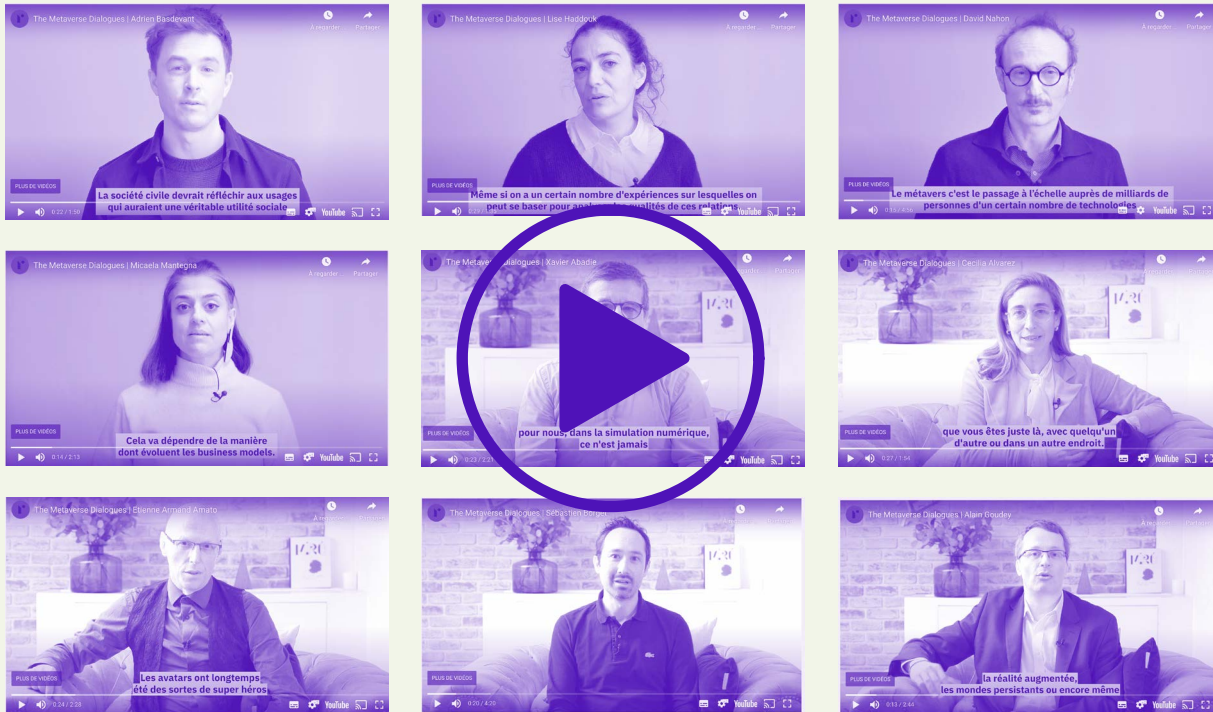
In the definitions given by the experts who took part in the Metaverse Dialogues, you will find some of the structuring or fundamental elements of Metaverse: 3D simulation, interopera-bility, real-time, experiential synchronicity, per-sistence[31], a sense of presence, etc.

The eight "fundamental building blocks" of the Metaverse, according to Mark Zuckerberg

During his presentation in October 2021, Mark Zuckerberg presented eight "fundamental building blocks" that allow us to trace the contours of the Metaverse, as well as identify its shortco-mings, namely:

▶ The feeling of presence, which provides "the feeling of being there, with other people" and which he sees as "the essential quality of the Metaverse". He believes that advances in the transcription of facial expressions and body

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31. Creates a simulated environment that is accessible 24/7, that evolves in the absence of connected users and that accumulates their actions.

language will offer communicative experiences that are not currently available.

▶ Avatars, which provide a "living" three-dimensional representation of users in the Metaverse, in particular through their ability to transcribe the expressions and gestures of the individuals they embody. The same user will be able to have several avatars and will have "a wardrobe of virtual clothes for different occasions, designed by different creators, and from different apps and experiences".

▶ Personal space, or "home space", is a space that can be set up, in which it is possible to invite people and carry out different activities (chatting, playing, working), and to store or display objects (such as photos or videos). This "home" is also the point from which an avatar can "teleport to any place they want". While this aspect may seem anecdotal, this form of online habitat incorporates some of the structuring principles of the narrative architecture that individuals themselves can build around their own experience[32].

▶ Teleportation, which allows users to go to the space of their choice (games, meeting rooms, or any other space created by another user) via their avatar, just like when we click on a link to go from one website to another.

▶ Interoperability, which should, in Mark Zuckerberg's words, "unlock the potential of the Metaverse". If teleportation allows avatars to move from one place to another within the Metaverse, it must also allow them to take with them all the characteristics that make up their appearance (shape), their clothing or costume (skin)[33], but also their possessions, their experience, the user's money, etc. At the Connect 2021 conference, Meta's founder assured the audience that "you're not going to be locked into one world or platform. You want to know that you own your items, not a platform". This implies open standards.

▶ Privacy and safety should make it possible to protect all interactions (communicational, financial, etc.) between users. People can also choose when they want to be in the presence of other users. To do this, they can prevent an avatar from coming into their space, or "take a break and teleport to a private bubble to be alone".

▶ "Virtual goods", i.e. various objects, clothing, etc., that are created, bought, or rented in the Metaverse by a person, but also those "brought into the Metaverse from the physical world", i.e. "almost any type of media that can be represented digitally: photos, videos, art, music, films, books, games, etc.".

▶ Natural interfaces, which must offer new ways of interacting with equipment and devices. For example, hand gestures, recognition of body movements and expressions, voice, and thought should all be used to interact in and with the Metaverse. Thanks to these so-called "natural" interfaces, Meta's CEO believes that the fluidity of interactions should reinforce the feeling of presence.

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32. Lucas J.-F. (2013), *op. cit.*, p. 333.
33. The understanding and definition of the terms "skin" and "shape" may vary considerably.

The Metaverse may never exist, but metaverses will

For many commentators, some of the Metaverse's fundamental building blocks appear difficult to achieve, or even impossible or undesirable because of the resources they would require.

INTEROPERABILITY: A MIRAGE?

Interoperability raises the question of which devices can be used to experience the Metaverse. In other words, will it be possible to use a headset or other equipment from a specific brand to enter a world produced by another player? It looks like these possibilities are now available, since on 27 September 2023, at the Connect 2023 conference, it was announced that users would be able to connect to and use Microsoft's online gaming solution (Xbox Cloud Gaming) on Meta's latest headset, the Meta Quest 3, as from December 2023.

Furthermore, recent developments mean that Meta Horizon Worlds and Roblox, for example, can be used both on a computer screen and via an immersive headset, reinforcing the interoperability between software solutions and technical devices.

However, when it comes to interoperability between different simulated worlds (i.e. being able to simply move from one world to another with the same avatar and all its features, for example), this seems more problematic, since "almost all virtual worlds today have their own rendering engines (many publishers use several),

save objects, textures, and player data in completely different file formats [and] have no clear way of recognising each other, nor do they have a common language, let alone consistent, secure, and comprehensive communication [. ...] There is no quick or clear way of establishing standards and finding solutions"[34]. Many solutions are being explored to meet this need for interoperability. Ready Player Me, for example, aims to create an avatar that is interoperable between several hundred web applications, virtual reality applications, and virtual worlds... However, the solution is limited to reproducing a graphical appearance, and does not allow other attributes (such as an object that plays music) to be transposed and operated from one world to another or from one application to another. Other projects, such as Gravatar and Solid, allow users to store all their data in a centralised and secure way.

Third-party solutions thus seem to be an interesting way of developing this interoperability in the Metaverse, since they could enable the development of libraries describing the properties of an avatar and all its objects. However, this poses a number of technological, aesthetic, functional, or even cost-related challenges.

THE ILLUSION OF SYNCHRONICITY

Another of the Metaverse's promises is to connect an unlimited number of individuals. However, due to technical limitations, it is generally impossible to bring together more than a hundred users (and therefore avatars) in the

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34. Ball M. (2022), *op. cit.*

same digital space (except in the case of special digital environments that require fewer resources). Moreover, the technical limit is not only relative to the number of avatars present in the same digital environment, it is also conditioned by the way in which it is produced: a very detailed digital environment will require more resources than a less detailed environment. It will therefore be able to accommodate a smaller number of avatars than the latter.

Thus, there are not millions of avatars attending the same online event in the same place at the same time. They each attend replicas of the same event, known as instances. The example of rapper Travis Scott's concert in Fortnite is often cited in this respect, since the 12.5 million spectators claimed to have attended were spread across 250,000 replicas of the event. So they weren't all in the same place, at the same time; the start of the concert was staggered to spread the load.

THE "METAVERSE" AS A CONCEPT, METAVERSES AS EMBODIMENTS

The Metaverse embodies the idea of a network of virtual worlds, a galaxy of digitally simulated and interconnected universes. It's a concept, an ideal. In this respect, it is interesting to draw a distinction between "the abstract concept of the Metaverse 'with a capital M' (as we refer to the Internet 'with a capital letter'), which describes a concept of immersion, [and the] metaverses in lower case. The term metaverse in lower case is used to describe instantiations or implementations of the Metaverse principles. In other words, the Metaverse concept holds within it a multitude of possibilities, services, and spaces, which are open, to a greater or lesser extent, and which will hereafter be referred

to as 'metaverses' with a lower-case 'm'"[35]. This distinction is interesting, because the use of the term "metaverse" reflects the reality of today's digital worlds and simulated universes, in all their differences, heterogeneity and plurality.

We can therefore assume that there will not be just one large Metaverse, but rather several metaverses, each constituting a sort of galaxy of worlds governed by large companies, public authorities, and various communities, or even users. As a result, "some leaders, like Tim Sweeney, are convinced that, in the end, each company will have to run its own virtual world, both as individual planets and as stakeholders in the main virtual world platforms, such as Fortnite and Minecraft. As Sweeney put it, 'in the same way that, a few decades ago, every company created its website, and then, after a while, every company created a Facebook page'"[36].

Moreover, adds the author, "over the past 15 years, what we call 'the internet' has become increasingly regionalised. All countries use the internet Protocol suite, but each market's platforms, services, technologies, and agreements have diverged, in part due to the emergence of non-American tech giants. [...] If the metaverse is to play a greater role in human society and the workplace, then it is likely that its emergence will also lead to more and stronger regional players"[37]. This perspective needs to be taken seriously, at a time when the European Commission, as well as countries such as the United Kingdom and China, among many others, are communicating about projects and strategies linked to the development of their Metaverse; even if these are often "digital" strategies that are closer to industrial digital twins (industrial metaverse) than to the concept of Metaverse that we have just described.

35. Basdevant A., François C., Ronfard R. (2022), *op. cit.*, p. 9.
36. Ball M. (2022), *op. cit.*
37. *Ibid.*

The Metaverse's alter egos

Metaverses, virtual worlds, digital twins, video games, proto-metaverse, virtual reality, augmented reality, or mixed reality... Many terms and expressions overlap and are often awkwardly confused when trying to describe the Metaverse. So, when some people use the term "Metaverse", others point out that they could simply use the expression "virtual worlds". In other cases, some people may consider Fortnite or Grand Theft Auto (GTA) to be metaverses, while for others they are "just" video games... Lastly, it is important to note that uses, functionalities, purposes, and even technologies and equipment are often mixed up in attempts to understand and define the Metaverse. It is therefore important to clarify a few points at this stage.

VIRTUAL WORLDS AND SIMULATED ENVIRONMENTS

Whether in 2D, 2.5D (a set of imaging techniques and technologies halfway between 2D and 3D) or 3D, a "virtual world" can be considered as a "persistent, multi-user digital environment, accessible via the internet and in which users interact with it and with other users through an avatar, their graphical representation on the screen"[38]. Consequently, when digitally simulated environments are neither persistent nor multi-user, as is the case for many video games, they are certainly "simulated" or "virtual" environments, but not "virtual worlds".

The Metaverse's promise would therefore be to interconnect a multitude of virtual environments (whether virtual worlds or simulated environments of all kinds) based on fundamental building blocks (see above).

VIRTUAL REALITY

As Philippe Fuchs suggests, we need to distinguish between virtual reality (VR), which "should enable a user to act physically in an artificial environment", and the systems (headsets, glasses, CAVEs*) that enable this "acting"[39]. According to this definition, VR can include any simulated environment or any virtual world as long as a user is immersed in it and can act within it. This distinction is important, because virtual reality was built on this rapprochement between simulated environments and the systems, interfaces, and devices that enable users to act in them; since it is precisely the latter that reinforce "the fact of believing what does not exist", which for Coiffet is the main objective of virtual reality[40].

As a result, Fuchs correctly points out that sensorimotor experiences in virtual reality or in metaverses "will share some similarities", although there are some notable distinctions: the Metaverse is or allows "a very large number of users simultaneously; [a] persistent and ever-evolving artificial world; accessible from anywhere; commercial transactions"[41].

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38. Lucas J.-F. (2018), «Les figures de l'habitant dans les mondes virtuels», *Sciences du jeu*, 10 | 2018: https://journals.openedition.org/sdj/1353

39. Fuchs P. (2023), *op. cit.*, p. 3.

40. Coiffet P. (1995), *Mondes imaginaires, les arcanes de la réalité virtuelle,* Paris: Hermès, p. 31.

41. Fuchs P. (2023), *op. cit.*, p. 4.

WEB 3.0 AND WEB3

If current discussions on the Metaverse are often mistaken for those on Web3 (sometimes written in lower case depending on the authors' considerations), it is mainly because they set out the terms of a debate that questions both digital services and their business models, as well as the players behind them. Metaverse, Web3, blockchain, and cryptocurrencies encompass various concepts, technical architectures, technologies, principles, and values that are not consubstantial. Moreover, many discussions attempt to distinguish between Web3 and Web 3.0, with arguments that are not always the same. Our objective here is not to offer exhaustive definitions of these terms, but rather to illustrate their differences and underscore that they are not specific to the Metaverse.

Web 1.0 is about the interconnection of digital resources through hyperlinks. It is a "consultation" web, where most users visit websites produced by experts or organisations (or on their behalf). Web 2.0, on the other hand, represents the web of interactions, content creation, and sharing (text, images, videos, audio, etc.) by users themselves (referred to as User Generated Content or UGC), as well as their online participation. It witnessed the proliferation of social media platforms.

There is subsequently some confusion as to what Web 3.0 is, would be, or could be. On the one hand, some consider that "Web 3.0, also known as Web3, is the third generation of the World Wide Web [and is] designed to be decentralised, open to everyone (with a bottom-up design), and built on top of blockchain technologies and developments in the Semantic Web, which describes the web as a network of meaningfully linked data"[42]. On the other hand, some

suggest that Web 3.0 should be differentiated from Web3, considering that "the term 'Web3' is different from the concept of 'Web 3.0', which refers to the Semantic Web, theorised by Tim Berners-Lee, the founding father of the World Wide Web. The concept of Web3 was first used by Gavin Wood[43] in 2014, referring to a 'decentralised online ecosystem based on blockchain'. The idea of a Web3 gained popularity towards the end of 2021, largely due to interest from cryptocurrency enthusiasts and large investors"[44].

While Web 3.0 focuses on enhancing the semantic understanding of data to provide users with an improved internet experience, Web3 denotes a decentralized internet, sometimes reminiscent of the early utopias of the internet and the web. It positions itself as an alternative to the major Web 2.0 platforms' business models. According to Matthew Ball, Web3 represents a somewhat "ill-defined Internet of the future, one built around users and independent developers rather than the dominant aggregation platforms like Google, Apple, Microsoft, Amazon, and Facebook. It represents a more decentralized version of today's Internet, with many believing it would be better served by blockchain technology"[45]. The prospects for Web 3.0 and Web3 aren't inherently incompatible, but they pursue different objectives.

As a result, while "Metaverse and Web3 both represent the 'next stages' of the current Internet landscape, their definitions diverge significantly. Web3 does not directly require 3D, real-time rendering, or synchronous experiences, while the Metaverse does not require decentralisation, the distribution of databases, blockchain technology, or a shift of online power or platform value towards users. Blending the two is akin to confusing the evolution of democracies with industrialization or electrification – on the one

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42. "What Is Web 3.0 (Web3 definition)?", *Avast*: What Is Web 3.0? Guide and Definition | Avast

43. Gavin Wood is a computer scientist and founder of the Euthereum cryptocurrency.

44. Galienni S., Truphème S. (2023), *op. cit.* p. 21.

45. Ball M. (2022), *op. cit.*

hand it's about the formation of a society and its mode of governance, on the other it's about technologies and their development"[46].

If that was all it took to muddy the waters, some, like the European Commission, have taken the liberty of outlining the contours of a Web 4.0 (spelled randomly, with or without capitalisation, depending on the document) that will "allow an integration between digital and real objects and environments, and enhanced interactions between humans and machines"[47].

DIGITAL TWINS

"A digital twin is a dynamic digital model of an object (car, building, city, etc.), a process (production, training, etc.) or a physical or biological system (human body), fed by data from the corresponding real-world model over its entire life cycle"[48]. In short, "a digital twin is neither the environment or the 3D model, nor the database that feeds it or an activity, nor the physical benchmark model: it is the combination of all three"[49].

This type of device can be used, for example, to simulate behaviour, optimise processes and yields (in industry, in a factory, in agriculture, etc.), monitor infrastructure, equipment, urban and natural environments, perform predictive maintenance or simulate crisis scenarios (pollution spikes, fires, floods, etc.). Digital twins are increasingly being used in a wide range of fields (design, training, health, etc.), using either a screen or a virtual reality headset.

For some, digital twins are considered precursors of an industrial metaverse, or even a Business to Business (BtoB or B2B)* Metaverse that has existed for decades. However, it is important to clarify from the outset that certain fundamental elements at the heart of the Metaverse definition cannot be compared with the reality, challenges, and objectives of digital twins. Whether we are talking about industrial digital twins (aircraft, factories, etc.), digital twins relating to the human body, or digital twins specific to cities and regions, they do not address the same issues, problems, or objectives as those of the Metaverse.

If, like Building Information Modelling (BIM) or City Information Modelling (CIM), a city's digital twin needs to render a large number of interoperable data (mobility, air quality, various flows, etc.), software and applications (directly with each other or via APIs), it does not need to offer a shared, simultaneous, and persistent experience to millions of individuals; when these are the founding elements of the Metaverse definition. Conversely, the Metaverse is not intended to have a scientific basis, as is the case with digital twins. Finally, most simulated environments and other virtual worlds that are assimilated to the Metaverse generally offer the possibility of financial transactions, which digital twins do not.

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46. *Ibid.*

47. European Commission (2023), "Towards the next technological transition: Commission presents EU strategy to lead on Web 4.0 and virtual worlds", 11 July 2023: <u>EU strategy to lead on Web 4.0 and virtual worlds (europa.eu)</u>

48. Lucas J.-F. (2022a), «Imaginaires et traditions des jumeaux numériques urbains», *in* P. Musso (dir.), *La Renaissance Industrielle*, Paris : Manucius, pp. 70-80.

49. Lucas J.-F. (2022b), «Traditions et imaginaires des jumeaux numériques urbains», presentation given to l'Institut des hautes études pour la science et la technologie (IHEST), 2021-2022 National training programme "Mobilising resources for transitions, transformations, breakthroughs, and metamorphoses", 10 February 2022.

Metaverses' current and prescribed uses

A FEW LEARNINGS ON THE METAVERSE´S USES FOR THE WIDER PUBLIC

Beyond the fundamental elements that make it possible to understand the Metaverse (or metaverses), its uses, existing or envisaged, in the short and medium term, occupy a large place in discourses and debates. This report intentionally avoids an exhaustive exploration of the Metaverse's applications. The lack of consensus around a universally agreed-upon definition for this concept opens up a vast number of potential uses, making it difficult to encompass all of them within the scope of this report, unless it were specifically dedicated to that purpose. This report does not set out to do that, as this has already been addressed by other sources.

There are, however, a number of learnings that can be shared about the use of metaverses for the wider public (or Business to Consumer – BtoC*):

▶ Although statistics do exist, it is often complicated to ensure that they are reliable, since their sources and calculation methods may differ.

▶ There are not many actual applications of metaverses, as described in this report. Consequently, the applications are more often presented on the supply side than on the demand side; and although a few studies on

the representations of the Metaverse do exist (in particular those mentioned above, carried out by the CNC and by Renaissance Numérique in 2023), we have little insight into the actual practices that users adopt within these universes. As a result, the mentioned uses are often theoretical possibilities rather than real-world implementations, and discussions about the (potential) applications of the Metaverse often serve as prescribers.

▶ The potential uses of the Metaverse often relate to the fields of entertainment[50] (video games, viewing immersive 360° videos), culture (virtual tours, virtual or live stream concerts, artistic productions, etc.), education (training) and socialisation (meeting people, communicating, playing together, etc.).

▶ Many of the applications presented as innovative have already been tested or experimented with in the past. All too often, the promoters of the Metaverse ignore the past in terms of uses and user experiences. For example, if artists in 2023 are still boasting about being the first to offer immersive, interactive, and 3D musical events in the Metaverse, we should remember the exploratory and innovative experiments that the city of Rennes and the Rencontres Trans Musicales festival have been offering with mixed reality concerts since 2007[51].

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50. See: Renaissance Numérique (2023), «Représentations et usages du Métavers», pp. 16-24

51. See the websites dedicated to these projects in 2007 (http://trans2007.blogspot.com) and in 2008 (http://trans2008.blogspot.com).

▶ In contrast to previous years, the user experience can now be influenced by a range of factors, including the advances of immersive devices such as virtual or mixed reality headsets, of user interfaces, and the massification of online experiences, which is changing both collective and social interactions.

NOTABLE ABSENTEES IN THE METAVERSE: THE MILITARY AND PORNOGRAPHY

The army and the pornographic industry are at the root of numerous innovations and developments in the field of communication techniques and technologies (postcards, photographs, cinema, video tapes, Minitel (early online service in France that provided information and communication through text-based terminals), the web, etc.).

In 2007, the creator of Second Life stated: "Sex is a sign that the virtual world is solid and prosperous [...] In many ways, the presence of sex as a creative expression and playful behaviour is a healthy aspect of the platform because it shows that we are doing something right [...] The presence of sex is also a sign that people are connecting with the community, with each other"[52].

However, these two fields are not currently part of the Metaverse usages, or they are barely visible and poorly represented. On the second day of the Metaverse Dialogues, a spokesperson from the French company Dorcel remarked that:

▶ virtual reality headsets are not considered a particularly relevant device given their customers' consumption preferences (paid content, large percentage of consumption by couples);

▶ the quality of virtual reality headset experiences is not considered to be as satisfactory compared with other experiences on offer;

▶ there is currently no technology or technique that can provide 100% assurance that users within the Metaverse are of the right age to access this type of content.

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52. "Sex In Second Life", *Information week*, 20 May 2007: https://www.informationweek.com/software/sex-in-second-life-2

"White paper: Towards more sustainable technologies, applications, and immersive experiences"

LIVRE BLANC

« Pour des technologies, usages et expériences immersives plus responsables »

Une démarche synthétique, prospective et multi-parties prenantes autour des impacts positifs et négatifs de la XR et des métavers

SIMPLON FOUNDATION
SIMPLON.CO
AGEFIPH & PLUS DE 30 ACTEURS

Simplon.co, the Simplon Foundation, Agefiph, Renaissance Numérique and more than 30 committed players have been working together for a year on a process of group reflection and collaboration in order to identify the key issues, map out existing solutions and use cases, and put forward a roadmap for increased responsibility in technologies, applications, and immersive experiences.

In a digital world that is constantly (r)evolving, immersive technology in all its forms occupies a pivotal position alongside Web3, artificial intelligence, and soon quantum computing. The relative and temporary decline of media interest in metaverses has not halted investment, projects, and progress – some of which have in fact been accelerated by generative AI – and it is important and pressing to ask the right questions and provide as many answers as possible about the impact of these technologies. "It's precisely because metaverses don't yet exist and extended reality (XR) is still looking for its uses and its place in the digital ecosystem, that we need to work on the questions of responsibility and sustainability that concern them. After that, it will be too late," says Frédéric Bardeau, Chairman of Simplon.co and the Simplon Foundation.

All the in-depth discussions and contributions have been summarised in a white paper covering the following points:

▶ Definition and scope of contributions: all technologies, applications, and immersive experiences, including but not limited to metaverses;

▶ 4 key topics: regulation-governance, health, ecology-biodiversity-climate, and inclusion-diversity-accessibility;

▶ For each topic: thorny questions; use cases, key players, and noteworthy initiatives; what to do here and now; 2030 outlook; what "protopias"[53] to envision and which resources to leverage for further progress.

Find out more about the white paper and the approach: https://xrmetaversresponsables.carrd.co

53. "An alternative to the disarming dystopia and the comforting utopia, protopia
envisions a desirable future in which societies improve their living conditions and those of the planet gradually and with accessible tools. Theorised
by author and futurist Kevin Kelly in 2010, this concept is now emerging as
the solution to the crisis of the imaginary." Echaroux E. (2023), «La protopie
– un futur plus désirable que l'utopie et la dystopie réunies», *Usbek & Rica*,
23 May 2023: https://usbeketrica.com/fr/article/la-protopie-un-futur-plus-desirable-que-l-utopie-et-la-dystopie-reunies

(Inter)play between stakeholders and ecosystem structuring

3
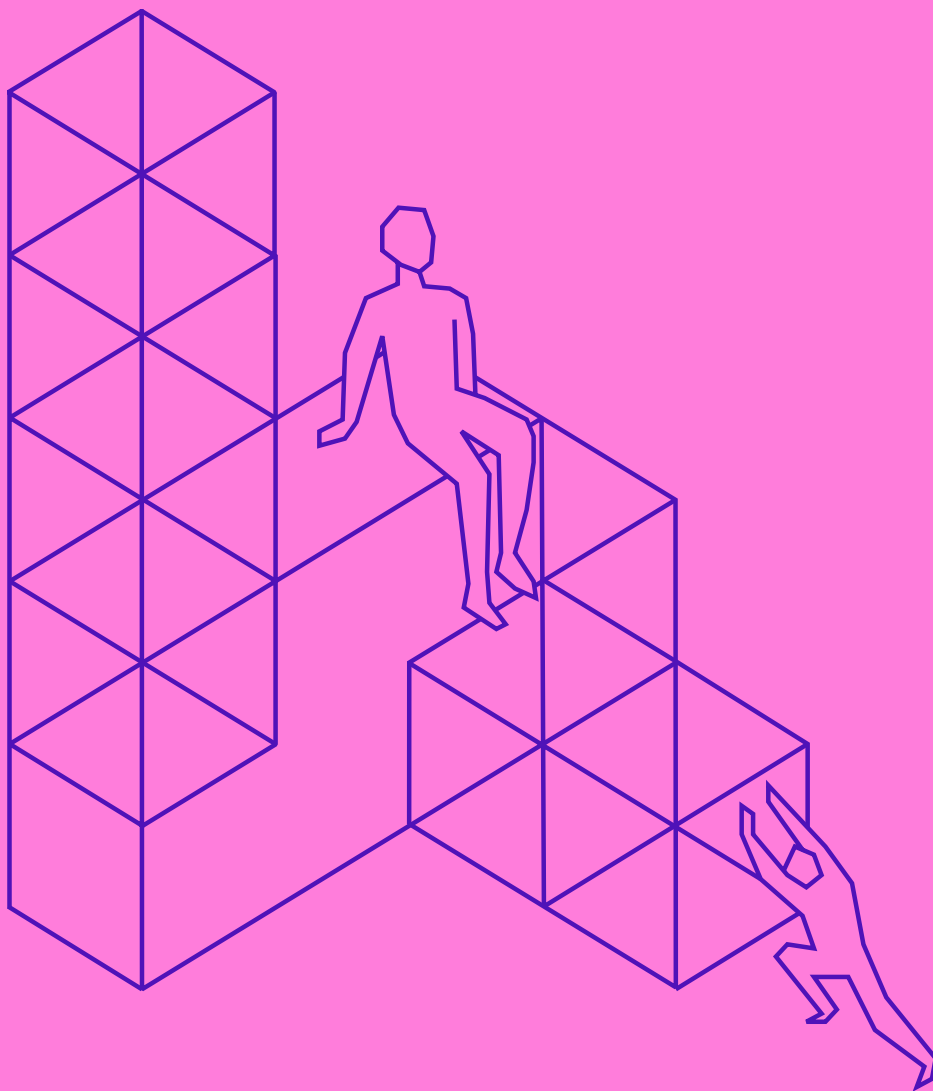
Don't miss the Metaverse boat

EVERYONE IS JUMPING ON THE METAVERSE BANDWAGON

"Mira is a hyper-realistic metaverse. We hate to call it a metaverse, but in fact it's an immersive world, a 3D virtual world that allows creators to publish their content. [...] We've been working for six years on a project that has all the properties of a metaverse. It's built on a video game engine, it's not a video game, there's a gamification layer, there's a very important social, multi-user layer, and it's designed for different creators, different audiences and so on. In this context, one could say that it has all the properties of a metaverse, but we've never called it a metaverse. Quite simply because a metaverse is the connection between all these 3D worlds. We're doing our little bit, and that will be part of something that will probably be called the Metaverse, if the Metaverse evolves as we expect it to".

━━━ **Gaspard Grioud,**
CEO, Mira[54]

Suddenly, from the end of 2021, those who produced or designed video games, virtual reality (VR), augmented reality (AR) or mixed reality (MR) experiences, digital twins, or even devices and solutions that somewhat resembled a 3D virtual world, claimed to be producing metaverses or participating in their development. The CEO of Reddit even went so far as to claim that his community website "was already a metaverse before its time, but with a deliberately minimalist user interface"[55].

The attraction, for these solution providers is not so much the design of the Metaverse, or part of it, but rather being included in the media hype surrounding it. Unlike the virtual worlds of the early 2010s (Second Life, Habbo Hotel, Poptropica, Club Penguin, etc.), the Metaverse, in its 2021 version, is embodied by Meta, one of the world's largest multinationals. This company's positioning in relation to the Metaverse has had an immediate and phenomenal knock-on effect on a large number of digital players (business players, academics, institutions, etc.). So, if most

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54. Coin Station, «Mira, ce métavers va tout changer», video: https://www.youtube.com/watch?v=19fyIBoQtw4

55. «Steve Huffman, cofondateur et CEO de Reddit : «Reddit était déjà un métavers avant l'heure mais avec une interface utilisateur volontairement minimaliste»», *Forbes*, 8 June 2023: https://www.forbes.fr/technologie/steve-huffman-cofondateur-et-ceo-de-reddit-reddit-etait-deja-un-metaverse-avant-lheure-mais-avec-une-interface-utilisateur-volontairement-minimaliste/

of [Mark Zuckerberg's] "counterparts and competitors had taken the same kind of initiatives and made the same kind of statements in the preceding months"[56], it has to be said that the ripple effect would not have been the same.

As a result, "the term 'Metaverse' has been used in every possible way, with every company and every executive going to great lengths to cite the Metaverse as a future element in their profitability, good for customer satisfaction, and a way to fight off competitors"[57]. Some also see it as a way for many companies to present what they are already doing in a new light, more "futuristic than the internet", and which is "generating enthusiasm among investors and the media"[58].

YET ANOTHER "NEW ECONOMIC EL DORADO"

This opportunism was in response to the lure of the economic windfall that Metaverse potentially represented, which was quickly fuelled by numerous economic analyses, of varying degrees of accuracy, nurturing the prospect of a "new economic El Dorado".

Some studies estimate a "market opportunity of over one trillion billion dollars in terms of annual revenues"[59], while others go further, estimating that the "total addressable market for the Metaverse could be between 8 and 13 trillion dollars by 2030, with total Metaverse users […] numbering around five billion"[60]. Behind these figures there are, above all, very different methods of calculation and scopes of analysis,

which call for the utmost caution when they are quoted or even manipulated.

In short, there is a strong probability that the internet will see economic growth over the next few years, an increase in sales of virtual/augmented/mixed reality headsets, and more and more immersive experiences supporting the development of a specific economy. But comparing figures, as long as they don't relate to the same objects, is of little interest. Some studies even go so far as to consider that it is "impossible to predict, *a priori*, all of the areas in which metaverse technologies will be used, the extent of adoption of the metaverse, the innovations that will be developed that build upon the metaverse, and all of their associated economic impacts. Similarly, it is not possible to quantify all of the displacement effects of the metaverse to derive the net economic impact. In other words, there is no 'metaverse' to measure today"[61].

56. Ball M. (2022), *op. cit.,* p. 9.

57. *Ibid.,* p. 10.

58. Robertson A., Peters J, "What is the metaverse, and do I have to care? One part definition, one part aspiration. One part hype", *The Verge*, 4 October 2021: https://www.theverge.com/22701104/metaverse-explained-fortnite-roblox-facebook-horizon

59. Grayscale Research (2021), "The Metaverse. Web 3.0 Virtual Cloud Economies".

60. Cities (2022), "Metaverse and Money. Decrypting the Future", Citi GPS: Global Perspectives & Solutions.

61. Christensen L., Robinson A. (2022), "The potential Global Economic Impact of the Metaverse", Analysis Group, pp. 11-12.

TEST AND ACCULTURATE AS SOON AS
POSSIBLE

"Brands are starting from scratch. We're seeing the same kind of attempts as in the days of Second Life. The use cases involve reproducing what we do in real life, but in the virtual world. There's no thought given to the choice of platform, why this one rather than another, what added value is going to be produced, etc."

Alain Goudey,
Deputy Managing Director, Neoma Business School

Beyond the promotional rhetoric that would have us believe the opposite, very rarely do companies give in-depth thought to the added value of the scenarios they are testing in the Metaverse. Their primary aim is to pre-empt possible disruptions and not "miss out" on the Metaverse bandwagon should it reach safe harbour. They are there to test, to experiment, and to learn.

Structuring ecosystems around an object "in the making"

Beyond a technological conception of the Metaverse, it should be seen as a "boundary object"[62], i.e. a "point of friction" between numerous digital worlds, whether work related or not. The Metaverse is an object "in the making"[63], that's complex to grasp and understand because it brings together not only technologies, but also players, and therefore knowledge, practices, and cultures, and consequently heritages, traditions[64], domains, and different representations (from the world of video games, science fiction, the industrial world, the world of business, education, etc.).

62. Star S.L. (1988), "The structure of ill-structured solutions: Boundary objects and heterogeneous distributed problem solving", *in* Huhns M. and Gasser L. (Eds), *Readings in distributed artificial intelligence*, Menlo Park, CA: Kaufman.

63. Latour B. (1989), *La Science en action,* Paris, La Découverte, «Textes à l'appui. Série Anthropologie des sciences et des techniques».

64. Manovich L. (2001), *The Language of New Media*, The MIT Press.

65. Quote from the Renaissance Numérique study (2023), p. 22.

"There's a degree of hybridisation between video games and the cultural events industry. We can see clearly that Fortnite has become a platform that offers virtual concerts, whereas it was originally just a competitive video game. Inevitably, the lines are getting blurred. We are a fledgling industry within the video game sector. We're trying to mix different industries together: video games, events, live entertainment, but with a business model that's similar to the smartphone industry, given that our virtual reality applications are hosted on stores belonging to VR headset manufacturers."

Maud Clavier,
Associate Executive Director, VRROOM[65]

In this way, the Metaverse constitutes "a leading contemporary communicational, cultural, and social node"[66], towards which companies converge, but also a multitude of sub-ecosystems, organisations, and communities, propelling or being the result of a vast production of knowledge, sometimes at state or supranational level, and of possible funding.

The Metaverse value chain

The convergence of players towards the Metaverse is not simply an effect of opportunity; it is necessary for its emergence. Behind the "application" layer of the Metaverse, the one that is visible and embodies its uses, there are many technical layers required for it to function. Consider the web for example, which requires network infrastructure (fibre, cables, mobile networks, etc.), hosting infrastructure (cloud), traffic management, secure transactions, digital service visibility (advertising, referencing in search engines and app stores, etc.), digital logistics (downloads) or physical logistics (delivery), and so on.

The Metaverse does not require fundamentally different layers to those of the web, but it does (potentially) reshuffle the cards for players, some of whom have acquired dominant positions. Analysis of the Metaverse must therefore take into account the structuring of its ecosystem of players, digital business models, and the range of usage dynamics that have developed over the last twenty-five years.

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66. Péquignot J., Roussel F.-G. (2015) *Les métavers. Dispositifs, usages et représentations*, Paris : L'Harmattan, Questions contemporaines, Série Question de communication, quatrième de couverture.

In order to understand the (inter)play of stakeholders and ecosystem structures, we recommend using Jon Radoff's[67] multi-layered representation of the Metaverse value chain (see diagram hereafter). This representation has been criticised for various reasons (normative risk, restricted vision, aiming to serve its author, etc.), but we believe that this type of illustration nevertheless provides an interesting first heuristic entry point for a fairly simple explanation of stakeholders' (inter)play and "what is at stake" between the different layers. This type of representation[68] must therefore be considered with caution, and above all in the context of their comparison. It's also in the way the layers interact with each other.

Diagram 2: The Metaverse value chain, according to Jon Radoff

1.	Games, Social, Esports, Theater, Shopping
2.	Ad Networks, Social Curation, Ratings, Stores, Agents
3.	Design Tools, Asset Markets, Workflow, Commerce
4.	3D Engines, VR/AR/XR, Multitasking, UI, Geospatial Mapping
5.	Edge Computing, AI Agents, Microservices, Blockchain
6.	Mobile, Smartglasses, Wearables, Haptic, Gestures, Voice, Neural
7.	5G, Wifi 6, 6G, Cloud, 7nm to 14 nm, MEMS, GPUs, Materials

Source: Jon Radoff, 2021.

▶ The "Experience" layer (1) represents uses, which cover a very wide range of possibilities depending on the definition we give to the Metaverse.

▶ The "Discovery" layer (2) refers to the processes and mediations that lead people to discover new experiences (advertising, for example). This layer is already crucial in today's business models, and will be just as crucial in immersive worlds, where the question of how content is organised and accessed will be decisive for the creation of economic

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67. Radoff J., (2021a), "The Metaverse Value-Chain": https://medium.com/building-the-metaverse/the-metaverse-value-chain-afcf9e09e3a7

68. There are several of them, including McKinsey & Company's, which presents a ten-layer diagram, divided into four main categories (McKinsey & Company (2022), "Value creation in the metaverse. The real business of the virtual world", p. 16). For its part, Meta proposes an approach based on three major layers: the "foundations" (protocols, hardware, standards), the "ground floor" (platforms, networks), and the "first floor" (user experiences) (Clegg, N. (2022), "Making the metaverse: What it is, how it will be built, and why it matters" : https://nickclegg.medium.com/making-the-metaverse-what-it-is-how-it-will-be-built-and-why-it-matters-3710f7570b04

value. In this respect, Radoff points out that NFTs* and the sharing of experiences and events in real-time are important drivers of online sociability that will be reinforced in metaverses; social practices that are already well identified and documented in video games and other online virtual worlds.

▶ The "Creator Economy" layer (3), which embodies the ease with which anyone can produce and share content (texts, videos, audio, objects, etc.) on the web. In his October 2021 presentation, Mark Zuckerberg mentions the term "creators" nearly forty times (in almost 1 hour 15 minutes), indicating that creators, and artists in particular, will be able to produce and offer their products, services, and experiences directly to their "audience" (or target). As will become clear later on, there are two opposing visions as to how this creator-driven economy should be conceived, between continuing with the predominant existing (centralised) models or more open, decentralised models.

▶ The "Spatial Computing" layer (4), which for the author symbolises the increasingly strong hybridisation between the physical world and the simulated world. It includes, for example, motion and voice recognition interfaces and systems, data, or even graphics rendering engines. A large number of players are positioning themselves, or attempting to position themselves, in this layer, including designers of 3D engines such as Unreal Engine (Epic Games[69]) and Unity. They could become powerful players in this value chain through the licences they offer. Under its basic licence, Unreal Engine, the video game engine developed by Epic Games (which is behind Fortnite, among other games), receives a 5% royalty for any game that incorporates Unreal Engine code

and generates gross revenue in excess of one million dollars. In this case, the first million dollars is exempt from royalties.

▶ The "Decentralisation" layer (5), which diagrammatically refers to two opposing worldviews on how to build the Metaverse, or its various embodiments.

On the one hand, the transposition of current business models, mainly developed since the emergence of the major online platforms. If the Metaverse business models evolve in this direction, metaverse publishers could, based on the model of today's platforms, deploy models in which each user who undertakes a commercial activity is charged a commission, as in today's application shops.

On the other hand, the emergence of one or more decentralised metaverses, based on the Web3 ideology. Certain players already occupy a central position in virtual worlds based on blockchain. Players such as Ethereum and Polygon, which provide the infrastructure for blockchain and its management, play a pivotal role in these models. The same applies to NFT exchange infrastructures, which are the equivalent of property titles in these spaces. A marketplace such as OpenSea plays a pivotal role.

▶ The "Human Interface" layer (6) refers to the terminals and devices through which users access an immersive experience, as well as the type of experience they will be able to have. This layer occupies a very visible part of the debates and speculation around the Metaverse, since while virtual reality/mixed reality headsets are often put forward, others evoke a spectrum ranging from telephones to neuronal interfaces.

69. Park G. (2021), "Epic Games believes the Internet is broken. This is their blueprint to fix it", *The Washington Post*, 28 September 2021.

▶ The "Infrastructure" layer (7) groups to-
gether the technologies (networks, proces-
sors, etc.) that "activate our devices, connect
them to the networks, and distribute
content"[70]. The Metaverse promises mean
that fibre optic infrastructures and mobile
networks (5G, 6G...nG) will have to be deve-
loped with ever-higher performance.

The value created by services and expe-
riences in the metaverses will depend, for many,
on the costs associated with infrastructures and
their technical means of access (hence the va-
rious "satellite constellation" projects and strate-
gic issues at stake between the major web and
social networking platforms around the under-
sea telecommunications cables through which
the vast majority of the world's digital data tran-
sits). Moreover, as with current digital platform
models, many technical and economic players
have succeeded in building services that are
imposed on websites and applications (hosting,
payment, traffic management, advertising, etc.).

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70. Radoff J. (2021b), *op. cit.*, p. 77.

The body in action

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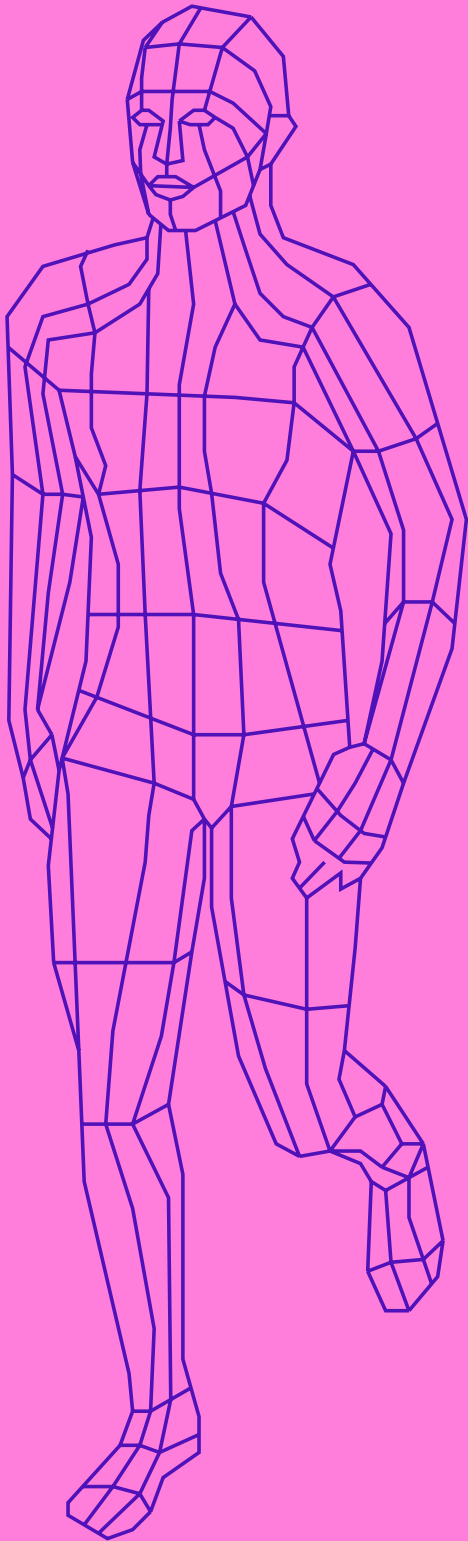
Experiencing the "inside"

When Mark Zuckerberg promoted his vision of the Metaverse in October 2021, he promised users an "even more immersive" experience, where they would be "in the experience", inside it. This feeling of "being inside" a computer-simulated environment has been defined by the concept of immersion since the early 1990s. Bernard Guelton defines it as reflecting "a strong sense of absorption of the physical and/or mental subject produced in a real situation or in apprehension of a representation that is itself realistic or illusory. Visual, auditory, and kinaesthetic perceptions and awareness are all different and complementary ways of evoking this powerful feeling of physical, mental, and emotional absorption"[71].

A vast array of scientific literature from different fields (human-computer interaction, information and communication sciences, sociology, psychology, etc.) has been debating the concept and modalities of immersion in digitally simulated worlds for many years now, bringing into conflict, for example, the concepts of presence, attention, and engagement. While many immersive models are based on experiences such as virtual reality and video games, sociologist Dominique Boullier describes immersion as a specific form of attention that is extended to the web[72]. Several types of immersion can be identified: perceptive or sensory immersion, narrative immersion, gameplay, social immersion, and yearning immersion (immersion désirante)[73][74].

The importance of sensory immersion

Sensory immersion can be described and achieved through different dimensions: the visual dimension (enabled by cinema or computer screens, 3D, virtual/mixed reality headsets, CAVEs, simulators, etc.), the auditory dimension (enabled by music, sound effects, spatialization of sound, etc.), the haptic dimension (achieved through controllers with or without force feedback, suits, movement recognition, etc.), or the olfactory or gustatory dimensions.

As far as the Metaverse is concerned, the visual dimension is often emphasised, since the use of a virtual reality headset provides intense and immediate immersion - much more so than

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71. Guelton B. (2014), «Introduction. Figures de l'immersion», in B. Guelton (dir.), *Les figures de l'immersion,* Rennes, Presses Universitaires Rennes, pp. 9-22.

72. Boullier D. (2008), «Le Web immersif», *Quaderni*, n° 66, pp. 67-80. DOI: 10.3406/quad.2008.1848

73. *Ibid*.

74. Lucas J.-F. (2018), *op. cit.*

any other visual device (telephone, computer, etc.). The haptic dimension is also increasingly mentioned, as the recognition of an individual's movements, and the reproduction of these in a simulated environment, is thought to enhance the feeling of being online, and therefore of immersion.

However, the history of virtual worlds and their uses (or lack of them!) shows, even recently, how much perceptive immersion without narrative immersion (producing or participating in stories) and social immersion (experiencing shared involvement[75]) is limited to experiences that are often episodic. In other words, once the "wow" effect of immersion has faded, nothing else happens... Conversely, the complexity of the gameplay of a virtual world like Second Life, as much as its lack of narrative, has proved to be an obstacle to immersion and to the mass adoption of uses beyond an ever-faithful community; at a time when online socialisation was developing more rapidly on emerging social networks, such as Facebook.

So, perceptive immersion (and in particular its visual dimension) is a fundamental springboard for the intensity of immersion, but not for its longevity, which requires a combination with other types of immersion (narrative, playability, social and desire), which solution providers need to take into account if they want to ensure their own long-term survival.

Online co-presence

Online co-presence is a fundamental dimension of immersive experiences, as far as their social dimension is concerned. It results from the synchronous sharing of a spatialised reality between several people, and gives "substance" to the world and the experience that are enjoyed collectively.

Consequently, the prospect of wanting to "populate" metaverse environments with non-player characters (NPCs) or "bots" (short for robots) in order to create the illusion among users that they are not alone, thanks to the development of AI for example, is a short-sighted and somewhat uninspiring perspective, but one that is undoubtedly reassuring for investors.

75. Calleja G. (2007), "Digital Game Involvement. A conceptual model", *Games and Culture*, vol. 2, n° 3, pp. 236-260.

The body, its avatars, and its identities

"Your soul is becoming insensitively detached from your body [...] your spirit now only holds on to your flesh by a thread; but we are going to tie a good knot in it."

Théophile Gautier,
in Avatar[76]

AN AVATAR IS AN INDIVIDUAL'S CONCRETE MANIFESTATION

Over the last twenty years or so, the term avatar has become increasingly popular, thanks to video games, the development of numerous films (Avatar, Ready Player One, etc.) and its use in a growing number of websites and mobile applications.

Whatever the medium or format, avatars are never "arbitrary symbolic entities", but always the representation, "albeit distant and virtual, of real human beings, men and women who delegate to them a shred of legitimacy by proxy"[77]. Whether we call the avatar a "digital double", a "puppet", a "partner", a "clone", an "extension" or even a "character", we are talking about "concrete manifestations", as Anne Cauquelin calls them[78].

Thus, people's on-screen representation in a digital environment, and more specifically in a virtual world, where their avatars can be personalised using dozens or even hundreds of parameters, "is not limited to [the] graphic representation of the avatar on the screen. It is made up of a whole raft of criteria and affiliations, including 'operators' (clothes, pseudonym, etc.), 'qualifiers' (status, skills of the character, etc.), 'relational' (friends) and 'possessives' (videos, photos, land owned, objects produced in the world)"[79].

ONLINE IDENTITIES

One of the internet's and the web's promises is the ability to use, play with, and juggle several characters, pseudonyms, avatars, and therefore several identities. The practices of constructing identities, staging and publishing oneself online are well documented in relation

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76. Gautier T., *Avatar*, Les Editions du Sonneur, 2010. Première édition 1856, p. 18.

77. Quéau P. (1993). *Le virtuel, vertus et vertiges*. Champ Vallon: Milieux, 215 p., p. 73.

78. Cauquelin A. (2010), *À l'angle des mondes possibles*, Paris: PUF, Quadrige, Essais Débats, 2010.

79. Georges F. (2010), «Identités virtuelles. Les profils utilisateur du web 2.0», Collection L>P: Questions Théoriques, p. 95.

to the web[80][81], video games, and other virtual environments.

The negative conceptions of deviant behaviour that might be permitted in the Metaverse have resurrected old debates about the links between official identity and digital identity, between privacy and data control. In this respect, it is useful to recall, following Dominique Cardon, that internet users know how to manage their online presence far more than is commonly believed: "it is wrong to think – as we often hear – that Facebook knows everything about the lives of people who post on it. Far from being the result of objective and complete data on people's lives, online reputation is the fruit of intense work by internet users to subtract, disguise, partition, and select some of this data"[82]. Fanny Georges has clearly demonstrated the link between the three components of an online identity which people compose: declarative identity (what we declare or don't declare), active identity (what we publish, how we develop our identity) and calculated identity (which is based on status and notoriety using indicators)[83].

From this point of view, the Metaverse does not readdress the question of online identity, since "the same person can have several identities, because the identity presented depends on the context in which it is used (civil status, social life, work life, online games, etc.) and on the trust that is placed in it"[84]. This is another of the Metaverse's promises: to be able to continue to play several identities and avatars, depending on the context.

BODY DATAFICATION

The development of metaverses and the deployment of the technologies behind them (virtual, augmented, and mixed reality headsets and glasses, haptic sensors, etc.) are opening up new possibilities for collecting (body tracking, eye tracking, etc.) and processing so-called emotional, biometric, and behavioural data...

In January 2022, an article in the *Financial Times* reported, based on an analysis of hundreds of patent applications filed by Meta with the United States Patent and Trademark Office (USPTO), that "pupil movements, body postures, and nose wrinkles are some of the manifestations of human expression that can be harnessed by Meta to build its metaverse"[85]. While this data is *a priori* intended to enhance the user experience (reproduction of movements, emotions, etc.), questions immediately arose about its possible monetisation.

What's more, the aggregation of data relating to users' bodily characteristics, movements, and habits could give rise to the emergence of a virtual double of each one of us, whether for recreational or work-related applications, along the lines of the rapidly developing field of digital twins in health. Several uses have already been identified:

▶ Improving the appearance of digital bodies: cosmetics brands are working hard to create a virtual double that would have the characteristics of a person's skin, pigmentation,

80. Cardon D. (2008), «Le design de la visibilité. Un essai de cartographie du Web 2.0», *Réseaux*, 6, n°152, pp. 93-137.

81. Ertzscheid O. (2013), *Qu'est-ce que l'identité en ligne? Enjeux, outils, méthodologies*. Marseille, OpenEditions Press.

82. Cardon D. (2019), *Culture numérique*. Paris: Presses de Sciences Po, p. 181.

83. Georges F. (2010), *op. cit.*

84. CNIL (2023), «L'identité numérique», *Dossier thématique*, February 2023: https://www.cnil.fr/sites/cnil/files/2023-03/CNIL_Dossier-thematique_Identite%20numerique.pdf

85. "Facebook patents reveal how it intends to cash in on metaverse", 18 January 2022, *Financial Times*: https://www.ft.com/content/76d40aac-034e-4e0b-95eb-c5d34146f647

and other features, in addition to developing virtual looks and other make-up for avatars.

▶ Treating and sustaining physical bodies, thanks to a medical double that is a 3D representation of the digital health space. This would display the history of procedures performed on the body (surgical interventions, current and past treatments). It could be built using MRI technologies and would be accessible to healthcare staff, who would have access to a complete view of the patient's health history. However, in this case, closed virtual reality systems might be more appropriate than the Metaverse.

▶ Enhancing physical bodies, whether on the cognitive side (education, training) or the sensory side (various experiences, intimate relationships).

Metaverse business models: "business as usual" or "another world"?

5

NFT

web 2.0
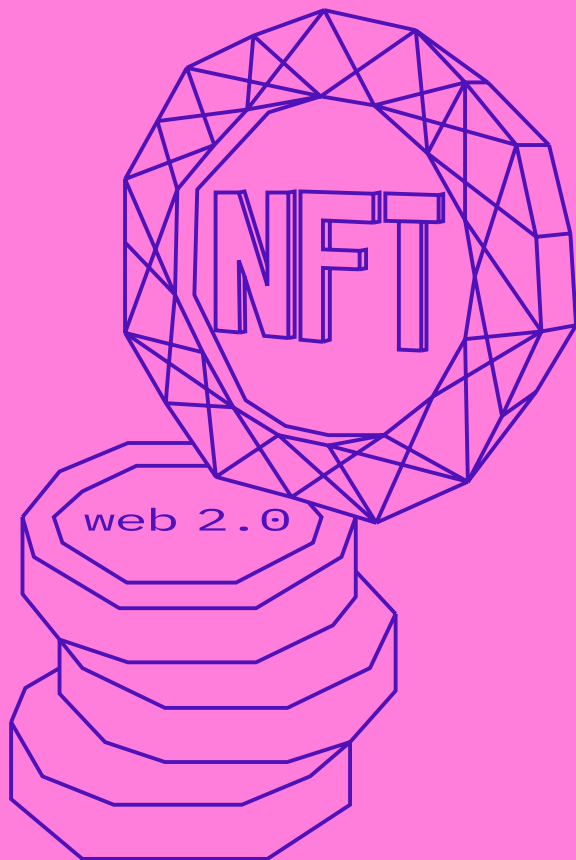
The complexity of forecasting business models

The three rapporteurs of the French exploratory mission on metaverses admit they were "struck by the complexity of the digital economy topic and by the difficulty of thinking through this complexity"[86]. Indeed, questioning the business models of one or more metaverses is a complex task, since visions, definitions, technologies, equipment, and applications diverge so widely depending on who is describing them. Or is it simply the Metaverse's lack of current uses that makes the exercise so complex?

While it is likely that several business models will coexist, based on a relatively mature mix of existing possibilities, no one can predict if one will be predominant and which. However, by shedding light on the possible business models, we can better forecast their development, and potentially regulate some of their aspects.

A BtoC and BtoB approach to business models

Metaverses' BtoC models, both current and emerging, are based on the models that currently prevail in the organisation of digital sociability and online trading. They appear to be variations or combinations of the monetisation models widely used in the world of video games and Web 2.0 (particularly by online platforms). From this perspective, the classic models for monetising attention would continue to develop in metaverses, as would transactional models, which would be given a new lease of life by their extension to digital goods.

From a BtoB perspective, most of the business models that can be observed in the fields of training, healthcare, and workplace relationships currently represent a limited version of the Metaverse concept, in that they originate from or relate to the fields of professional software, digital twins, and virtual reality. Often, revenue models involve selling or renting a digital space or immersive experience, depending on the size and characteristics of the simulated environment and the number of users. These spaces, or the experiences offered in them, often have a limited lifespan (in the sense that they have an objective to achieve, for example) and most of the time relate to internal training

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86. Basdevant A., François C., Ronfard R. (2022), *op. cit.*, p. 68.

matters for employees or external communication matters through pre-established scenarios. However, this type of approach diverges from the concept of the Metaverse, for reasons discussed in the sub-section "The Metaverse's alter egos" (see p. 26).

"Private versions" of metaverses are marketed in the form of software purchased by an organisation, either as a licence or as a Software as a Service (SaaS)* subscription. For example, players in the collaborative working software sector are attempting to transform their current virtual meeting services into immersive

digital spaces by introducing avatars instead of video streams from personal webcams. Microsoft Mesh, which is compatible with Microsoft Teams, is an example of this attempt to move professional practices towards immersive digital spaces by arguing that online co-presence enhances participation (and productivity), or that it combats "zoom fatigue", which is linked to prolonged exposure to online meetings[87].

The presentation that follows offers a perspective that draws on both BtoC and BtoB models.

The expansion of advertising models

NEW DATA AND NEW SPACES FOR "BETTER TARGETED" ADVERTISING?

Online advertising models are based on the collection and analysis of numerous behavioural traces: browsing data, interaction data (with the interface, content, other users, etc.) and online transaction data. The data collected depends, to a large extent, on the technologies used and the regulatory frameworks governing user privacy. For example, the introduction of smartphones, through the use of tactile and visual interfaces (touch screens, cameras, sensors), has already introduced the collection of data relating to users' bodies (fingerprints, facial recognition, physical activity), whether for non-monetised use (unlocking the phone or accessing applica-

tions through authentication) or monetised use (free service in exchange for access to data).

With the Metaverse, new advertising formats could be developed by capturing data linked to the use of a virtual/augmented/mixed reality headset and body movements. For example, it is possible to deduce certain emotions from data relating to eye movements, facial expressions, movements, or even voice intonation.

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87. Shockley K.M. et al. (2021), "The Fatiguing Effects of Camera Use in Virtual Meetings: A Within-Person Field Experiment", *Journal of Applied Psychology*, Vol. 106, No. 8, 1137–1155: https://psycnet.apa.org/fulltext/2021-77825-003.pdf. See also: "Three Cures For Virtual Meeting Fatigue, According to New Microsoft Research", *Forbes*, 16 July 2020: https://www.forbes.com/sites/carminegallo/2020/07/16/three-cures-for-virtual-meeting-fatigue-according-to-new-microsoft-research/?sh=ad2c13ae6d11

"Tracking what our eyes are looking at, the expressions on our faces, the inflections and textures of our voices – these are just some of the elements that can be fed into algorithms to analyse our behaviour and emotions. In this context, the use of video headsets, glasses, or connected glasses or lenses will help to democratise these methods of capture. The development of metaverses therefore poses a significant challenge, that of preserving our mental spaces and data, which, up until now, has been scarcely, if at all, gathered, but which will undoubtedly become highly coveted".

━━━ Report of the French exploratory mission on metaverses, p. 90

This could lead to an intensification of behavioural marketing, with the risk of "monetising our attention, gestures, and emotions in real-time", marking the culmination of a kind of "cognitive capitalism"[88]. What's more, since metaverses are based on spatialised experiences within three-dimensional digitised environments, it is not hard to imagine that the Metaverse's territories, ranging from the smallest parcel, or even the smallest pixel, to the largest space, could represent infinite possibilities for advertising, to the point of saturating vision and attention.

FROM BOTS TO INTELLIGENT SALES REPS

In virtual worlds, autonomous (i.e. programmed) agents can advertise in a variety of ways, for example by wearing branded clothing, or by tailoring a message (via text, voice, gestures, etc.) as soon as they detect a nearby user. In the Metaverse, and thanks to advances in artificial intelligence, a new digital version of the "sandwich man" could be born. For Louis Rosenberg, these avatars have "specific intentions, look and act like other users but are actually simulated personas controlled by AI. They will engage us in 'conversational manipulation', targeting us on behalf of paying advertisers without us realizing they aren't real. This is especially dangerous when the AI algorithms have access to data about our personal interests and beliefs, habits and temperament, all while monitoring our emotional state by reading our facial expressions and vocal inflections. If you think targeted ads in social media are manipulative, it's nothing compared to the conversational agents that will engage us in the metaverse. They will pitch us more skilfully than any human salesperson, and it won't just be to sell us gadgets – they will push political propaganda and targeted misinformation on behalf of the highest bidder"[89].

It is worth noting that this expansion of advertising models could be applied to individuals, not just autonomous agents. In addition, and as a result of these prospects, we may see the emergence of bypass strategies (such as ad blockers) or "premium" type economic models, which would allow this type of advertising to be removed in exchange for monetisation of the experience.

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88. Basdevant A., François C., Ronfard R., *op. cit.*, p. 86

89. "The metaverse will be filled with 'elves'", *Tech Crunch*, 12 January 2022: https://techcrunch.com/2022/01/12/the-metaverse-will-be-filled-with-elves/

The expansion of the online trading model

THE ROLE OF MARKETPLACES

For many metaverse projects, the trading of digital products is an initial extension of the marketplace model* that is easy to imagine insofar as such practices are already widely prevalent in the world of video games and virtual worlds (The Sims, Second Life, Roblox, etc.). These digital environments offer brands and designers an unlimited digital extension of marketplaces, be it in terms of appearance (the shape), clothing (the skin), or all the objects that make up three-dimensional environments, whether these have been created specifically in and for virtual worlds, or whether they are digital replicas of physical objects.

On the Steam platform, for example, players can trade items, resources, rewards, or even a "Steam gift" (an extra copy of a video game). The Unreal Engine Marketplace embodies an equivalent model, probably even closer to that of metaverses, since it doesn't relate to a virtual world in particular (as the Second Life Marketplace does for Second Life, for example), but is specific to a graphics engine. In addition, marketplaces for digital assets that enhance the user experience, world extensions, or additional content (commonly known as "plug-ins" or "downloadable content" –DLC) that add functions to the initial experience, are models that could be easily adapted to these immersive universes.

FROM 3D MALLS TO HYBRID SHOPPING CENTRES

Online marketplaces have become a central and dominant model for online commerce, even as their physical versions are in decline, as in the United States[90] and Western Europe.

Due to the perceived potential of metaverses, numerous brands are venturing into 3D realms by opening spaces or shops, starting with retailers who sell body-related products (clothes, shoes, cosmetics, etc.). On the one hand, as was the case in Second Life for example, entire zones in simulated universes can be assimilated to 3D commercial zones. On the other hand, the hybridisation of digital and physical goods has been growing steadily for several years, raising the question of new business models at the interface of these two practical aspects of our societies.

So while the promise of interoperability in the Metaverse questions the feasibility of transposing a virtual object from one technical solution to another, or from one world to another, hybridisation between the digital and the physical worlds raises the issue of replicating a good or service in the world from which it does not originate; in other words, in the digital world if it originates in the physical world, and vice versa. Playing on this hybridity, rarity, and community effect, the worlds of art and luxury have swiftly embraced this opportunity. The hybridisation of business models around goods exchanged or

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90. "The Great American Shopping Mall: Past, Present, and Future", The Issue Spotter, *Cornell Journal of Law and Public Policy*, 12 October 2021: http://jlpp.org/blogzine/the-great-american-shopping-mall-past-present-and-future/

transposed between the physical world and the simulated world thus lays out the contours of a "corporeity" model, a model in which objects, attributes, and physical and digital characteristics, as well as property regimes and rights, hybridise and reconfigure within various aspects and embodiments of the same body.

The expansion of the spatial model monetisation

The Sandbox model is based on a finite digital world: there is a limited number of parcels (166,464 lands), i.e. online "lands" or "spaces", that can be acquired. In this solution, these are acquired mainly by brands, which develop services for their fans and communities. The Sandbox manages these spaces by organising their distribution across the space in order to increase the value of the co-location of several spaces and avoid concentration phenomena, which create little value. The lands, which are non-fungible tokens in the case of The Sandbox, can be resold on a secondary market, in this case on the OpenSea marketplace. Here we find many of the commercial approaches seen in the first versions of metaverses, such as Second Life's business model, which is largely based on the sale and rental of digital land (whether built or not).

This extension of the spatial model's monetisation will undoubtedly open up a wide range of avenues, depending on the solutions' commercial strategies and the rights granted to the owners, tenants, or residents of the online spaces (rent, commission, royalties, etc.).

A revival of digital asset trading thanks to tokens?

The Web 2.0 User Generated Content (UGC) model is one in which contributors play a central role: without them, there would be no content, and therefore no audience to monetise with advertisers. With a few exceptions (streamers, influencers, etc.) who make a living from monetising the views they generate or from product placements, Web 2.0 contributors-creators get a share of the value that is not very favourable to them, most of it being captured by online platforms. What's more, they have no control over the rules for sharing value and how they evolve. The many criticisms made of this model have led to the emergence of alternative solutions in which contributors, and more generally users, own their creations, whatever their nature. While these alternatives are not necessarily new, they

are enjoying renewed interest – or visibility – thanks to the recent promotion of the Metaverse, and the constant development of technologies and computing power.

In this model of digital owners, exchanges (sale, rental, donation) of objects, virtual spaces, or data, between users themselves or with brands, would be enabled by blockchain technologies, smart contracts*, and NFTs. This promise, of which there are many examples to date, enables the creators of content and experiences to control their properties (authentication, transfer), their rights, and their values. By registering a token in a distributed blockchain-type register, which is considered to be tamper-proof, the existence and uniqueness of the token can be guaranteed, making the exchange of digital services and goods more secure and easier. In addition, it recreates one of the characteristics of the physical economy within digital spaces: scarcity at the root of value, which gives rise to a great deal of speculation.

The possible development of engagement commoditisation

User engagement is at the heart of digital sociability models. However, those that have been built to date, on user-generated content (UGC) platforms, have all come up against the 1/9/90 rule: 1% of users produce the content, 9% comment on it and 90% consume it. Engagement is therefore relatively limited.

Some people recommend rewarding metaverse users for their engagement, using digital tokens. These would offer rewards that could be monetised inside or outside the universe being played, or even outside the Metaverse. This gamification* of engagement already exists in the world of video games with the play-to-earn model. This model rewards players according to the actions they carry out in the game, depending on their nature, frequency, or intensity. The rewards come in a variety of forms: points, items, money (often cryptocurrencies), etc. The key to the model lies in the value placed on a player's involvement: the more they engage in a game, the higher the rewards, and the more value they create for other players and the game itself, whether through objects created in the digital environment for the benefit of the collective, through the acquisition of skills that can help others, through reaching a new level and therefore being more competitive, or through acquiring a new object and reselling it.

Is there a third path?

In today's digital economy, digital services are based on the general currency equivalents, such as contracts and so on. There is a clear temptation in some current initiatives to free themselves from this by using crypto-currencies and blockchain. However, while they are often presented as alternatives to the model of the major online platforms by their advocates, the models emerging from Web3, based on blockchain, smart contracts, and NFTs, raise a number of questions, as we have seen.

Furthermore, under the pretext of a better distribution of digital assets' value due to each person being able to own all their data (objects created, behavioural data, etc.), an excessive commoditisation of human activities in the digital space could quickly emerge due to the absence of intermediaries, and therefore reduced or even zero transaction costs[91]. The risk of widespread commoditisation of our digitised social interactions should also be of concern to us, because of the possibility of monetising, and therefore promoting, immersion. This prospect is not without raising a number of questions relating to people's health (with regard to capturing their attention, screen time, etc.) and ethics.

We should also note that while interoperability is often considered from a technical point of view (interoperability of headsets, operating systems), from an avatar and user identity point of view, or from a digital asset point of view, it is rarely considered from an economic transactions and value point of view (or only to a limited extent, to address currency and transaction payment matters).

Consequently, will these immersive universes be able to generate a robust atmosphere of trust, capable of drawing in and consolidating exchanges and transactions, and establish themselves as the *de facto* standard? Would it be possible, and even advisable, to build standards in this field, given that current projects and experiments seem to diverge in terms of the digital environments they wish to offer?

Business opportunities, or at least the hopes that fuel them, seem to take precedence over the actual uses of metaverses. While there needs to be room for innovation and the emergence of a variety of different business models, it is also important to monitor their deployment in order to minimise any adverse effects on users. The governance of these metaverses needs to be considered in all its various dimensions.

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[91]. For an understanding of the challenges, promises, and limits of Web3, as applied to social networks, see: Renaissance Numérique (2022), «Réseaux sociaux décentralisés : vers un Web3 éthique?»: https://www.renaissancenumerique.org/publications/reseaux-sociaux-decentralises-vers-un-web3-ethique/

Governing tomorrow's internet
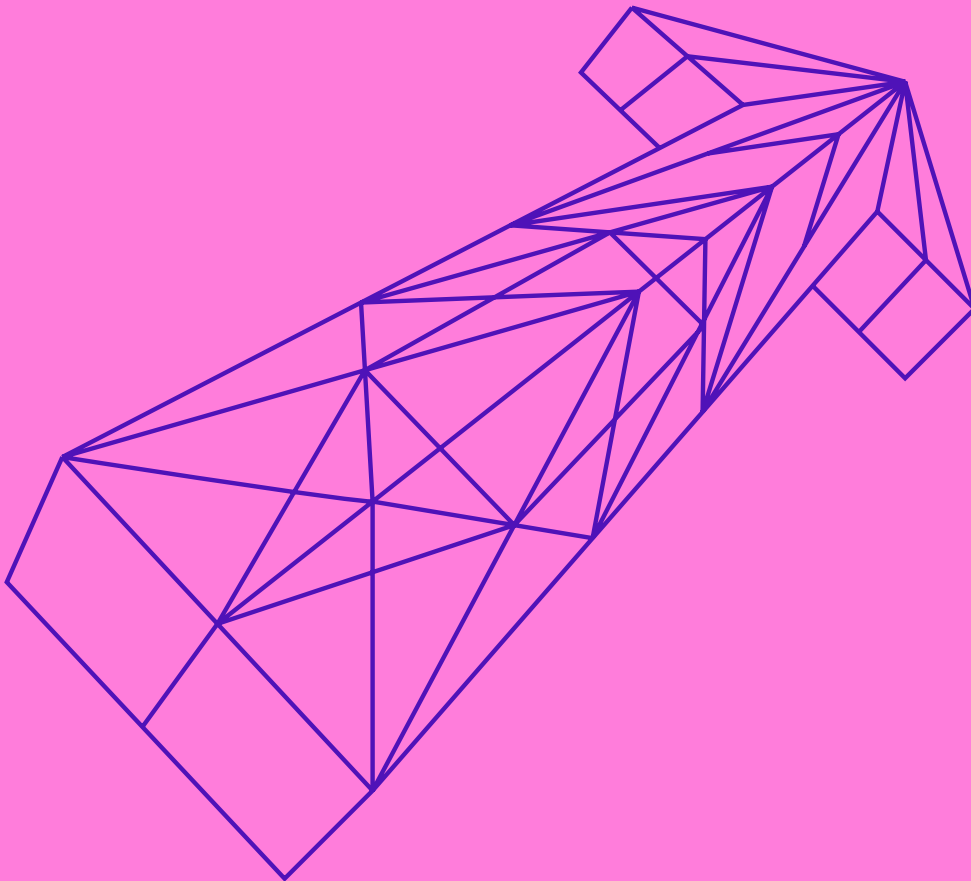
Grasping the concept of governance

According to the Council of Europe, internet governance refers to "the development and application by governments, the private sector, and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programmes that shape the evolution and use of the Internet"[92]. With regard to online content, the Content Policy & Society Lab (CPSL) at Stanford University identifies four levels of governance:

▶ **content regulation**, i.e. the set of rules adopted by a regulator or legislator, which serves as a framework for content moderation;

▶ **content policy,** i.e. the rules that represent a company's societal vision regarding acceptable content on its platform(s) (found in the Terms & Conditions or community rules of an online service, for example);

▶ **content governance**, i.e. a system of rules that regulate the process of creating and implementing content policies, as well as the distribution of powers among the entities responsible for each task;

▶ **content moderation**, which can be carried out in different ways (algorithmic, manual, upstream or downstream of content publication) and can take a variety of forms (deletion, labelling or reducing the visibility of content)[93].

If we work on the assumption that tomorrow's internet will be more immersive, issues very similar to those currently occupying the public debate around its governance are likely to emerge. What should be the respective roles of governments, the private sector, and civil society in the governance of the Metaverse? What principles, standards, rules, decision-making procedures, and shared programmes should be put in place to make it a safe and beneficial environment for as many people as possible?

To think ahead on these issues, we first need to look at what already exists. Given the similarities between the issues facing the web today and those likely to emerge with the advent of the Metaverse, could and should today's governance models be replicated in the Metaverse and tomorrow's internet? Are current regulatory frameworks adapted to the Metaverse, or do certain characteristics specific to the Metaverse require them to be updated? Will the role and scope of the various stakeholders involved in internet governance change?

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92. Council of Europe, "Internet Governance": Internet Governance - Freedom of Expression (coe.int)

93. Content Policy and Society Lab (CPSL), Standford University, "Content Governance in the Metaverse", August 2002, 16 pp., p. 5.

A metaverse-proof legal framework...

As outlined in the report of the intergovernmental mission on metaverses, they bring together "all the digital world's usual ethical issues: network neutrality, protection of personal data, digital identity, online harassment, addiction, isolation, and also exclusion"[94]. At the start of 2022, the European Commission took up the subject of metaverses and virtual worlds, in particular to analyse if there was a need to regulate their development and, if so, the potential role of regulators in doing so. In line with this, the President of the European Commission, Ursula von der Leyen, has announced the launch of an initiative on virtual worlds in 2023, as part of the "A Europe fit for the digital age"[95] programme.

Questions are being raised as to whether the existing legal framework is sufficient to protect users from certain practices that could be detrimental to them in metaverses, to protect their rights in these spaces, and to guarantee an "open, secure, trustworthy, fair, and inclusive digital environment"[96] as called for by the European executive. If European legislative initiatives and the national regulations that complement them exist, are they sufficient? Do they need to be amended? Should they be supplemented by other legislation? What role should self-regulation play in the Metaverse? Should we turn to more innovative forms of regulation?

AN ALREADY WELL-DEVELOPED FRAMEWORK, INVOLVING VARIOUS PLAYERS AT DIFFERENT LEVELS

At a time when neither the uses that are emerging or likely to be adopted, nor the business models that underpin them, are yet clearly defined, calls are being made for the Metaverse to be regulated. Meanwhile, the authors of the report on the exploratory mission on metaverses recommend planning ahead for suitable regulatory frameworks, considering that "[t]he principles and provisions of French or European texts such as the GDPR, the DSA, or the DMA can guide metaverses but will not be sufficient and must be specified and adapted"[97]. Is this approach overhasty? If not, what pitfalls need to be addressed?

A relatively well-developed legal framework already governs a large proportion of online interaction and social interaction at both national and European level. In the EU, the General Data Protection Regulation (GDPR) regulates the collection and processing of personal data, the European Digital Services Act (DSA) aims to regulate the activities of online platforms, and the Digital Markets Act (DMA) sets out obligations for the largest online platforms and search engines. As mentioned by the Centre on Regulation in Europe (CERRE), other initiatives, such as the Artificial Intelligence Act (AI Act), the digital identity framework, and the Data Act, will very soon complete the European array of provisions ap-

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94. Basdevant A., François C., Ronfard R., *op. cit.* , p. 81.

95. This work culminated in the presentation, on 11 July 2023, of a strategy to "place the EU at the forefront of Web 4.0 and virtual worlds". See: European Commission, "Towards the next technological transition: Commission presents EU strategy to lead on Web 4.0 and virtual worlds", press release, 11 July 2023: <u>EU strategy to lead on Web 4.0 and virtual worlds (europa.eu)</u>

96. *Ibid.*

97. Basdevant A., François C., Ronfard R., *op. cit.*, p. 90.

plicable to metaverses[98]. Various national texts, such as the Criminal Code and the French Data Protection Act, complete the framework adopted specifically at a European level to regulate the digital space.

Fundamental rights

Furthermore, higher standards apply to everyone, both online and offline, and form the basis of democracies: fundamental rights. In fact, they constitute the highest standards that apply to metaverses. At supranational level, several texts are dedicated to fundamental rights likely to be impacted by their mass adoption, including:

▶ the 1948 Universal Declaration of Human Rights;

▶ the European Convention for the Protection of Human Rights and Fundamental Freedoms, enforced by the European Court of Human Rights, which is based in Strasbourg;

▶ the Charter of Fundamental Rights of the European Union, which has been enforceable by the Member States since 2009: any citizen can refer to it if their rights are not respected.

"With regard to case law, in particular that of the Court of Justice of the European Union, for example the Schrems I and II decisions, we invariably come back to the Charter of Fundamental Rights of the European Union. The fundamental right to privacy appears more than 40 times in the Schrems II decision. What we need is an interpretation of fundamental rights transposed to the Metaverse."

Yaniv Benhamou,
Associate Professor, University of Geneva

Non-binding instruments

The legal framework that applies to the Metaverse, which is made up of international, regional, and national texts, is supplemented by instruments that are not legally binding. At European level, these include the Code of Practice on disinformation and the Code of Conduct to combat illegal hate speech online, to which online service providers adhere on a voluntary basis, and which are monitored and reported on by the European Commission. At the same time,

some private players are developing their own codes of conduct, such as Meta with its "Code of conduct on virtual experiences". Additionally, some non-governmental organisations (NGOs), such as Respect Zone in France, have created their own charter for a trusted Metaverse, which metaverse operators or owners can sign up to.

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98. CERRE (2023), "Defining virtual worlds: main features and regulatory challenges", p. 23: https://cerre.eu/wp-content/uploads/2023/07/CERRE-Virtual-Worlds-Issue-Paper-0723.pdf

Protection against criminal offences and harmful behaviour

The potential development of metaverses raises concerns about protection against criminal offences and harmful behaviour. While the fight against these practices is already proving extremely complex in today's online environment, how can we protect underage children, combat online hate, apology for terrorism, cyber-bullying, information disorders, misleading advertising, and even misleading interfaces (dark patterns) in the Metaverse?

In today's democracies, legal frameworks exist to protect individuals from criminal offences and harmful behaviour, both in the physical world and online. The answer to the question "Can a metaverse owner decide to allow practices in their virtual world that are against the law in the physical world?", which was asked on the third day of the *Metaverse Dialogues*, is no, in theory. The EU Charter of Fundamental Rights and the French Penal Code, for example, apply to the Metaverse (as they do to the internet in general). In France, cyberbullying is considered an offence, in the same way as moral or sexual harassment, and is punishable under article 222-33-2-2 of the French Penal Code.

king platforms, to clearly define these offences and therefore to counter them. How can harassment be defined in an immersive virtual space? Can rape take place in the Metaverse? Should a distinction be made between private and public spaces? How can the perpetrators of criminal offences and harmful behaviour be held accountable? How can such behaviour be proven, and victims compensated?

As observed by one of the participants on the third day of the Metaverse Dialogues organised by Renaissance Numérique in Brussels, there are major gaps in our legal systems, starting with the lack of definitions. For example, it is still difficult to establish a legal definition of what is illegal online. At European level, for example, there is no harmonised definition of "hate speech". Prior to 15 March 2017, and the coming into force of the Counter-Terrorism Directive, even terrorism did not have a common definition across Member States. Nor is there a harmonised Penal Code in Europe – each Member State had its own. What constitutes illegal content or behaviour therefore varies from country to country. In Denmark and Germany, for example, Holocaust denial is not punishable, whereas it is in France. So how can we identify and combat illegal behaviour in the Metaverse? Illegal according to whom? Illegal where?

"There are two layers. On the one hand, you have the law, which applies to everyone, including in the Metaverse. We need to find a way of applying it to virtual spaces. And if the current framework proves too weak, we need to create new ones. On the other hand, there are the rules set by the various owners of virtual worlds and accepted by users, which apply in certain private spaces, particularly if they are gaming spaces, role-playing spaces, etc."

Régis Chatellier,
"Innovation and Foresight" Manager,
CNIL(French Data Protection Authority) Innovation Laboratory (LINC)

Despite this framework, it can be difficult, in the age of the Metaverse and social networ-

On a separate note, the criminalisation of virtual rape has been under discussion for over thirty years and is well documented[99]. In France, under Article 222-23 of the Penal Code, "[a]ny act of sexual penetration, whatever its nature, committed against another person by violence, coercion, threat, or surprise is rape". For rape to be considered a criminal offence, there must be physical contact. In other words, in France, rape is not currently recognised as such in cyberspace, insofar as it is deemed that there is no physical penetration. Could the development of metaverses change this by increasing immersion to the point where a person physically feels the effects of someone else's behaviour towards their avatar or immersed body?

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[99]. On this subject, see for example: Horne C. (2023), Regulating Rape within the Virtual World, 10 *Lincoln Mem'l U. L.* Rev.: https://digitalcommons.lmunet.edu/lmulrev/vol10/iss2/8

Can rape take place in the Metaverse?

The first case of virtual rape dates back to 1993 in the Lambda-MOO virtual world. A user took control over other avatars through the use of a programme, and forced them to perform sexual acts. At the time, the game was played using a text interface. The players witnessed the scene, which caused them psychological distress. As criminal law could not punish this act, measures were taken within the game. In 2021, a woman also reported being raped in Horizon Worlds. Although these cases are not isolated, they were not legally classified as rape.

What about sexual assault in the Metaverse? In France, article 222-22 of the Penal Code defines sexual assault as "any sexual violation committed with violence, coercion, threats, or surprise or, in the cases provided for by law, committed on a minor by an adult". This definition is not as strict as that of rape. The definition of rape has often been broadened to include a wider range of acts such as oral sex. This raises the question of whether the definition of sexual assault should be expanded and whether this offence should be transposed to the virtual world, as has been the case for other offences. For example, online harassment is now prosecuted like any other offence. However, as in the case of rape, there are issues of materiality and physical contact.

In ruling no. 21-82.283 of 18 May 2022, the French Criminal Chamber of the Court of Cassation examined whether caming can be included in the definition of prostitution and therefore be used to justify procuring offences. Caming involves people performing sexual acts in front of a camera, transmitted live by an audiovisual medium to customers who request their services and use remote payment to pay them. Prostitution involves physical contact. Thus, in the absence of physical contact with the customer himself, the Court did not consider this to be prostitution. As a result, there is still legal uncertainty surrounding these issues, which run counter to the principle of strict interpretation of criminal law. Nevertheless, given the immersive aspect of the Metaverse, there is no doubt that the acts committed there have a psychological impact. What's more, the issue may be less clear-cut in some countries, particularly those that have a less strict definition of rape (because it does not require physical contact, for example).

The DSA, which came into force on 25 August 2023 and establishes harmonised rules for online service providers, does not address the problem of the lack of a definition. Article 3(h) defines "illegal content" as "any information that, in itself or in relation to an activity, including the sale of products or the provision of services, is not in compliance with Union law or the law of any Member State which is in compliance with Union law, irrespective of the precise subject matter or nature of that law." The DSA therefore refers to Union law, which is incomplete, and to the law of the Member States, which is not harmonised.

Defining and countering harmful content or behaviour is just as complex, if not more so. What is harmful is not necessarily illegal, which can leave room for different interpretations.

Protecting personal data and privacy

To maximise immersion, immersive devices, particularly virtual/augmented/mixed reality headsets, are multiplying the number of sensors and systems used to analyse people's behaviour (gestures, postures, etc.), expressions (particularly facial and eye expressions) and emotions. This makes it possible to detect the degree of dilation in an iris, an object on which the gaze is focused, or a sign of hesitation in speech. As well as the commercial issues involved, this raises questions about the processing of biometric data, behavioural data, and emotional data.

Personal data is any information relating to an identified or identifiable natural person. Like many current laws aimed at regulating the digital space, the GDPR applies to the Metaverse. As this regulation abides by the principle of tech-

nological neutrality, it applies to any technology, and any processing of personal data taking place via the Metaverse will have to comply with its rules. Two other European regulations, the Data Governance Act and the Data Act, establish horizontal rules for data sharing, and give users control over the data generated by their connected devices.

Additionally, there are special categories of personal data, known as "sensitive" data, including biometric data. This data is subject to a stricter legal regime than other data. Depending on the business models that emerge, the development of metaverses could lead to the collection and processing of biometric data, i.e. data whose processing is strictly regulated within the EU. In accordance with Article 9 of the GDPR, the processing of such data is not permitted, except:

▶ where the data subject has given their explicit consent;

▶ where processing is necessary to protect vital interests;

▶ where processing is necessary for important public interest reasons;

▶ or where processing is necessary for scientific research purposes.

However, while the processing of biometric data is strictly regulated by law, several studies, including one conducted by Renaissance Numérique on facial recognition technologies[100], have shown that this framework is not strictly applied. Rather than a lack of a common definition, we are dealing here with a failure to apply the law.

What's more, many data processing operations are based on user consent. As Étienne Drouard, partner at Hogan Lovells, explained on

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100. Renaissance Numérique (2020), "Facial recognition: Embodying European values", 103 pp.: https://www.renaissancenumerique.org/wp-content/uploads/2022/06/renaissancenumerique_report_facialrecognition.pdf

the third day of the *Metaverse Dialogues*, "consent means knowing what you are consenting to, why, from whom, for what purpose, and for how long". As stated in Article 4(11) of the GDPR, consent must be "freely given, specific, informed, and unambiguous". However, the expert adds, "when giving consent, individuals are not necessarily sufficiently aware of what is useful or necessary for them at the time they wish to communicate, or ten years later, when their behaviour can be traced". For the lawyer, it would therefore appear necessary to rethink the hierarchy of people's rights: entrusting everyone with the responsibility of controlling their private life online, without knowing whether they have the necessary skills, or awareness and knowledge of the possible consequences, in the short and medium term, of poor management of their own data, could be detrimental to them. Every person must have the right to protection, even if they do not see the need for it themselves. It is thus important that regulators produce guidelines so that companies can incorporate default protections into their products and services, which do not simply depend on a person's momentary will[101].

Emotional data, which makes it possible to infer our emotions, emotional state, or state of mind, does not necessarily make it possible to identify a person on an individual basis. So, does this data qualify as personal data, and is it therefore covered by the GDPR? Emotional data is essentially interpreted and deduced by capturing personal data. In the real world, emotional data can be interpreted by capturing an individual's image or writings. In metaverses, it is an avatar's behaviour and speech that could be used to collect emotional data. Consequently, if this data can be linked to an individual, it is personal data. However, this qualification has its limits. Taken individually and totally detached from personal data, emotional data could completely escape this classification.

Furthermore, although emotional data is personal data, it is important to bear in mind that certain emotional data could be assimilated to mental health data. For example, detecting that someone is depressed would be emotional data, but it would also be considered as health data. A constant mood change could also be assimilated to mental health data. This is an important boundary to draw since health data is considered to be sensitive data and is subject to specific, stricter rules under the GDPR.

Finally, in accordance with Article 7 of the Charter of Fundamental Rights of the European Union, "everyone has the right to respect for his or her private and family life, home and communications"[102]. The right to privacy is a fundamental right, which therefore is applicable online as it is in the physical world. On the internet in particular, it is largely governed at European level by the Directive of 12 July 2002 on the protection of privacy in the electronic communications sector. In order to update this directive, the European Commission published the proposed ePrivacy Regulation in 2017. At the time of this report's publication, it has still not been finalised. According to one participant on the third day of the Metaverse Dialogues, the main reason why the 2022 revision of the ePrivacy Directive has not yet been completed is that the Member States cannot agree on an adequate level of protection. As a result, there is no governance mechanism for online privacy protection at European level.

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101. Renaissance Numérique, "The Metaverse Dialogues | Étienne Drouard", video: https://youtu.be/EYSVmxRGpaE?-si=hS1vSWqSd5ZngNaQ

102. Charter of Fundamental Rights of the European Union (2000/C 364/01): https://www.europarl.europa.eu/charter/pdf/text_en.pdf

Intellectual and industrial property

Avatars, virtual objects and, more generally, productions in the Metaverse raise the question of ownership. Is it possible, for example, to take a handbag design from a major luxury brand and turn it into a virtual object worn by an avatar? If so, under what conditions? Should a distinction be made between commercial and other uses? Or should this possibility be reserved for the brands themselves? These questions are likely to arise for a whole range of everyday objects, from clothing and accessories to means of transport, personal and urban furniture, works of art and so on. These concerns have increased tenfold since the mass adoption of generative artificial intelligence solutions by the wider public. Capable of reproducing human cognitive capacity in a comprehensive and versatile way, generative AI, coupled with the Metaverse, heightens concerns about plagiarism, counterfeiting, and copyright infringement.

If virtual worlds are envisaged as spaces that leave plenty of room for creation (of content, "worlds", avatars, objects, etc.), the protection of intellectual property could potentially constitute a major challenge. However, the European legal framework applicable to the Metaverse in terms of intellectual and industrial property appears relatively comprehensive. The 2016 Directive on the protection of business secrets, the EU Trademark Regulation, which came into force in 2017, and the Directive on copyright in the digital market, adopted in 2019, all apply to virtual worlds.

According to Alain Strowel, a lawyer at the Brussels Bar specialising in copyright law, this legal framework is well suited to the Metaverse. However, as with the protection of biometric data, the real difficulty lies in implementing existing rules. While substantive law is broadly appropriate, enforcement and dispute resolution systems are not.

"We need to embrace a new approach that takes technological worlds into greater account – their speed, and their ubiquity – and focus on implementing alternative mechanisms for enforcing the law in these new worlds."

Alain Strowel,
Lawyer of the Brussels Bar, copyright law specialist

He also points out that, while some authorities exist to protect personal data, there is no independent authority at European level or in the Member States to enforce intellectual property rights. Legal action can be taken in a court of law, but the traditional judicial procedure is unsuitable (particularly because of the courts' slowness and lack of specialization). Besides, intellectual property offices are not empowered to punish behaviour that violates these standards.

...but which is hampered by its inconsistencies and implementation complexities

There is a relative consensus among *Metaverse Dialogues* participants that there is no need for a specific piece of legislation to govern metaverses. Instead, the urgent task is to ensure the articulation, coherence, and effective application of the existing legal framework applicable to virtual worlds.

LEGAL INCONSISTENCIES

Over the past twenty-five years, numerous legislative initiatives have been launched at European level to regulate digital uses. Various regulatory layers have been implemented, mainly on a sectoral basis: competition law, privacy protection, consumer law, copyright, e-commerce legislation, audiovisual media legislation, legislation on technical intermediaries, and so on. However, the laws adopted more recently establish rules that are horizontal rather than sectoral (for example, the GDPR, the Data Governance Act and the Data Act), which sometimes contradict each other, or are at least not clearly articulated.

"Are we well equipped? Having an arsenal is not enough to have an army. Today, there are many different legal weapons, which sit side by side, one on top of the other, each with its own regulator, its own culture, local instead of European levels of regulation. But to be effective, you need an army, i.e. skills that complement each other and pull in the same direction under the impetus of identified leadership, with perhaps different means, but in any case, with the will to collaborate in pursuit of a higher goal. Are we well equipped? I think we're over-armed with ammunition and artillery that don't work together, in other words, texts that weren't conceived together, but side by side. This arsenal is operated by regulators who move between indifference and coopetition, without being able to identify a greater common denominator, because none of them has the objective of arbitrating their respective priorities or relinquishing their own prerogatives. "

Étienne Drouard,
Partner, Hogan Lovells LLP

This legal incoherence, and the lack of prioritization between the various existing rules, has led to a certain inefficiency in the legal framework applicable to the Metaverse.

A FRAMEWORK THAT'S HARD TO APPLY

In terms of regulation, a second notable development has been added to the horizontality of recent legislation: the appearance of the

terms "by design", "by default" and "risk-based". Implementing privacy by design, or carrying out risk-based impact assessments, requires considerable financial and human resources. On this point, the many legal experts that took part in the *Metaverse Dialogues* are unanimous: very small businesses (VSEs) and small or medium-sized enterprises (SMEs), which nevertheless make up the vast majority of European economic players, are not in a position to comply with texts like the GDPR. Only the largest companies can, and with considerable difficulty. Adopting a risk-based regulation (like the AI Act) therefore means accepting that only the largest players will be able to comply; which is a certain vision of legal efficiency.

As one participant at the third day of the *Metaverse Dialogues* pointed out, "a specific product may be subject to around 250 infringements in Europe, depending on the number of regulators dealing with the same issue in each country, until European proceedings are brought before the Court of Justice of the European Union (CJEU) and a solution eventually found. No company can survive this situation. No one, in terms of efficiency, will make the effort to comply with the rules of the Polish market, then the French market, then the Spanish market, and so on. Not even the big players. But what's very positive is that the problem is visible, so we can target it."

In order to promote the applicability of laws and innovation, is it therefore better to provide different rules depending on the size of the business players? This is precisely the logic behind the DSA, which imposes special obligations on very large online platforms, and the DMA, which does the same for "gatekeepers". Time will tell whether this approach proves more effective.

From an enforceability point of view, another central issue, briefly mentioned in relation to intellectual property, is the incompatibility of traditional legal systems for dealing with litigations that may emerge on the internet, and therefore in metaverses. Billions of messages, photos, and videos are posted every day on social media platforms. For efficiency reasons, and in particular because of the need to act quickly, it is not feasible to have a judge on hand to deal with every case, every instance of cyber-bullying, every dissemination of illegal content online. In order to overcome this difficulty, online platforms have gradually been entrusted by governments and legislators with the responsibility of deciding on such matters, a task previously assigned to judges. For several years now, we have been witnessing the privatisation of justice: it is the moderation teams (and the artificial intelligence algorithms that assist them) that are in charge of deciding what is legal or illegal, harmful or not, on their platforms. As justice is one of the regalian functions of the State (along with currency, defence, and police powers), this shift is questionable[103].

Furthermore, the practical implementation of the major principles put forward in the various legislative initiatives of recent years seems to be problematic.

The promulgation of consensual legal texts cannot do without their applicability and enforcement. Thus, the priority for legislators and the next European Commission should be legal consistency and applicability. In this respect, the possible emergence of the Metaverse would be a perfect laboratory.

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103. This subject is at the heart of Renaissance Numérique's concerns. The think tank recently organised an event on "Judges' role in the digital space", in partnership with the Internet Society (ISOC) France and the "Internet Governance and Regulation" research group, CIS - CNRS: https://www.renaissancenumerique.org/evenements/la-place-du-juge-dans-lespace-numerique/. See also: «Régulation du numérique : il faut vite repartir du bon pied», *Libération, 2* June 2023: https://www.liberation.fr/idees-et-debats/tribunes/regulation-du-numerique-il-faut-vite-repartir-du-bon-pied-20230602_JPLAS5CE5ZBU3CZWCCUGRISJ2Y/

New challenges that deserve particular attention

Although the Metaverse is already largely governed by a multitude of existing laws and non-binding mechanisms, some of the virtual worlds' characteristics could change things.

THREE-DIMENSIONAL PHYSICAL INTERACTIONS

As with certain video games and other virtual worlds, the Metaverse raises the question of how to moderate increasingly realistic online behaviour, particularly that which results from capturing the behaviour of the user "behind" the avatar. However, as CERRE notes in a recent report on virtual worlds, "[the] current legal framework tackles illegal and harmful content online (through the DSA, for example). The notion of content refers to products and services, as well as hate speech or fake news. It is not clear, however, whether people's (in mixed reality contexts) or avatars' behaviours would fit this notion and therefore be moderated"[104].

With the development of automatic or semi-automatic software agents (or "bots") and artificial intelligence (AI), another issue is emerging. Should we be differentiating, in metaverses, between relationships between humans, relationships between a human and an AI, and relationships between several AIs? Is harmful behaviour directed at an AI more tolerable than when directed at a real human personified by an avatar? How can we tell the difference between the two? Should there be a technical way of knowing, visually, whether we are talking to another human or to an AI system? In this respect, the current discussions around generative AI could be enlightening. Several solutions are already being considered, such as requiring AI-generated content to be watermarked.

REAL-TIME SOCIAL INTERACTIONS

Understanding and regulating interactions in metaverses is made all the more complex by the fact that they take place in real-time. Thanks to artificial intelligence algorithms, it is possible to spot illicit or prejudicial texts, images or videos in the seconds following their publication (or even preceding it, in some cases), but the task can be more complex when it comes to live gestures or words.

Video games and virtual worlds provide further evidence of this. Systems for regulating behaviour exist simply because they allow or disallow certain gestures, postures, and behaviours. Second Life is a good example of this, because while the technical architecture of the virtual world, i.e. its code, may or may not allow certain behaviours, these are then moderated according to the spaces explored by the avatar. In other words, the owners or tenants of the different regions or spaces in Second Life's virtual world have the possibility of influencing the rights they grant to a user, whether this relates to the production of objects or to behaviour. For example, while it is possible to fly in certain zones (which is authorised in the basic functions of the world,

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104. CERRE, *op. cit.*, p. 23.

in its code), other spaces prohibit this functionality and force avatars to walk. In other cases, an avatar can pass "through" other avatars' bodies, even if this is not possible elsewhere. Certain avatar animations, or behaviours, will thus mark out areas reserved for an adult audience.

The moderation of behaviour in metaverses will probably involve three aspects: the application of the law, standards and conventions, and technical solutions. On this last point, we can, for example, imagine a movement detection system that identifies an illicit or prejudicial movement (whether in accordance with the law or the rules of the space in question) and ensures that it is not reproduced in the immersive environment, even though the user has performed it.

pants at the third day of the *Metaverse Dialogues*, there may be a strong social demand for the possibility of "storing" behaviour in order to be able to prove, if necessary, that it took place. But what data should be stored? Where should it be stored? Under what conditions? For how long? Finally, how can we avoid falling into a state of permanent surveillance?

This is a complex debate, which has arisen in relation to traffic and location data held by telecommunications operators, giving rise to numerous appeals and court rulings. In a ruling issued on 20 September 2022, the Court of Justice of the European Union pointed out that the unconditional general and indiscriminate retention of connection data is prohibited within the

"I have the feeling that we have gone from "netiquette" and rules relating to online behaviour, which were used in the early days of the internet, to moderation and deletion of content in the Web 2.0 era, and that in the era of the Metaverse, we have to go back to rules relating to behaviour".

Nicolas Vanbremeersch,
President, Renaissance Numérique

From the user experience point of view, the "real-time" nature of 3D interactions revives the problems associated with reporting illicit or prejudicial behaviour that can occur in video games. Insofar as interactions take place in real-time, how can we prove a posteriori that these behaviours did in fact take place, in order to hold the perpetrators responsible and obtain compensation? This raises issues relating to what is known in law as the "burden of proof", and to the data that could be stored by metaverse operators and the length of time for which this data is kept. According to some of the partici-

EU[105]. By analogy, it is possible to deduce that for reasons of privacy, data protection (in particular the concept of minimisation highlighted in the GDPR) and the usability of evidence, permanent monitoring and storage of user data is neither possible nor desirable. In France, a decree issued in 2022 by the Prime Minister authorises the storage of certain connection data on national security grounds, but limits its storage period to one year. A new decree, published on 10 October 2023, extends this storage period for a further year.

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105. Court of Justice of the European Union, Judgement of 20 September 2022: https://curia.europa.eu/juris/document/document.jsf?text=&docid=265882&pageIndex=0&doclang=EN&mode=req&dir=&occ=first&part=1&cid=887334

It is highly likely that a similar debate will emerge regarding the data stored by virtual world operators or by device suppliers (helmets, glasses, lenses) enabling access to them. It therefore seems crucial to place these issues at the heart of the public debate, all the more so as they potentially involve particularly sensitive data, such as biometric, mental, behavioural, and emotional data.

The "real-time" aspect of interactions in metaverses raises complex and non-trivial operational issues that will have to be addressed not only by the teams of metaverse owners responsible for ensuring their "Trust & Safety"* policy, but also by regulators and political decision-makers who may have to ask themselves these questions. It is therefore vital that they start thinking about these issues as soon as possible.

SOME POSSIBLE SOLUTIONS TO MEET THESE NEW CHALLENGES

Various solutions already exist to address the issues raised by metaverses. Firstly, a number of them can be put in place at a technical level to ensure user security "by design".

▶ In its report on virtual worlds, CERRE suggests, for example, integrating the detection of certain harmful behaviours directly into the avatars' source code, so that its actions can be stopped[106].

▶ On its side, Meta has implemented several security measures in Horizon Worlds to protect its users. By default, a "personal boundary" prevents avatars whose users are not "friends" from getting closer than a metre, making contact impossible. This feature can also be activated for all avatars, or deactivated. If necessary, users can activate

a "safe zone" around their avatar to isolate themselves. In this case, no avatar can touch them, talk to them, or interact with them. This mode can also be used to report, block, or mute other users. To make reporting easier, the last few minutes of avatar interaction are systematically recorded by Meta and shared with the teams responsible for analysing them. These recordings are constantly erased so that only the last few minutes of interaction remain. To put a stop to verbal aggression, the "grable voice" function can be used to make derogatory comments from another avatar unintelligible. In a similar vein, Orange has deployed "safe zones" on video game platforms such as Fortnite and Roblox.

▶ In the video game sector, Xbox has made it possible for players to record any inappropriate verbal exchanges in order to report them to the moderation teams. In addition to sounds, players can report any content in the form of text, images, or video. On the Xbox console, users can also set the level of language they will tolerate in messages sent to them by other users. There are four levels: "friendly", "medium", "adult" and "unfiltered". These filters are for messages from people who are not on the user's "friends" list.

Other ways of moderating content or behaviour can be considered.

▶ In the League of Legends video game, for example, a user's account can be temporarily suspended in the event of inappropriate behaviour. The user can then obtain information on the reasons for this suspension, access advice on how to avoid being suspended in the future, or how to avoid being suspended permanently. The game's publisher, Riot Games, also emphasises the need

106. CERRE, *op. cit.*, p. 24.

for players to take responsibility for their own behaviour.

▶ Still drawing on the experience of video games, American researchers have devised an alternative system to what they describe as punitive justice (based essentially on the moderation and deletion of content, and account suspensions). To help victims deal with the situation, encourage offenders to repair the damage they have caused, and enable the community to deal with the damage collectively, they put forward the idea of restorative justice[107].

▶ The community approach to dealing with disputes is consistent with the idea of involving users more in content moderation and, more broadly, in the regulation of online spaces – an approach that Renaissance Numérique has been supporting for several years[108]. In some cases, the community can be part of the solution. This is what happens on certain online forums, such as Reddit, or on Wikipedia, where moderation is carried out by the community. Moderators play a key role in sharing best practices and helping to educate other users. The idea, for example, is to prevent a user whose account has been suspended from returning to the platform by creating another account without changing their behaviour. Very similar issues will most certainly emerge in the metaverses.

Video games, social networks, and online forums have been facing a number of issues for years, and these are often mentioned as potential issues in the Metaverse. Consequently, it is important not to wipe the slate clean, but to build on what already exists, take into account lessons learned and, of course, the scientific literature on these many subjects. This would avoid falling into the trap of imagining the infinite possibilities of the Metaverse, which often tend to be more rooted in science fiction than in the actual reality of our immersive online interactions.

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107. Xiao, S. *et al.*, "Addressing Interpersonal Harm in Online Gaming Communities: The Opportunities and Challenges for a Restorative Justice Approach", *ACM Transactions on Computer-Human Interaction*, Volume 30, n° 6, article n°83, pp. 1-36: https://doi.org/10.1145/3603625

108. On this subject, see: Renaissance Numérique (2020), "Moderating our (dis)content: renewing the regulatory approach", 57 pp.: https://www.renaissancenumerique.org/wp-content/uploads/2022/06/renaissancenumerique_note_contentmoderation.pdf and Renaissance Numérique (2020), "Digital platforms: For a real-time and collaborative regulation, 9 pp.: https://www.renaissancenumerique.org/wp-content/uploads/2022/06/renaissancenumerique_note_digitalplatforms.pdf

The Metaverse: the perfect laboratory for better internet governance

Although it is particularly comprehensive, the legal framework applicable to the uses likely to develop in the Metaverse lacks coherence and is poorly enforced. Perhaps the advent of metaverses is an opportunity to rethink internet governance?

regulation, and is embodied in the AI Act. Both approaches have shown their limitations in terms of effectiveness. However, a third path is possible, and the development of metaverses provides a perfect laboratory in which to implement it.

"When a disruptive innovation or new technology emerges, its regulation consists of a mixture of industry self-regulation, market conditions, and state governance. But if we want to avoid laying down cumbersome and highly prescriptive regulations a posteriori, and move towards a more agile governance environment, we need to adopt a more holistic perspective on the regulation of new technologies and ask ourselves the following question: "What ethical standards can be incorporated into the technological layer (protocols, virtual identity systems, etc.) right from the design stage? This would probably avoid many 'pendulum-swing type regulations' at a later stage".

Paul Fehlinger,
Director of Policy, Governance, Innovation, and Impact,
Project Liberty's Institute

Until recently in Europe, emerging technologies were regulated in a rather reactive way: a new technology is rapidly and massively adopted without its full implications being understood (for example, social networking or e-commerce platforms), and it ends up having major societal consequences, so legislators draw up laws to regulate it after the event. This is known as "*ex post*" regulation. European authorities have also been trying to pre-empt the potential side-effects of new technologies on society for several years now, and are seeking to regulate their development a priori. This is known as "ex ante"

AN OPPORTUNITY TO INTRODUCE STANDARDISATION AND "COMPLIANCE BY DESIGN".

In addition to security and interoperability standards, standardisation could make it possible to incorporate a certain number of ethical and even legal principles directly into the technology, i.e. by design (at the infrastructure layer and protocol level, for example). Renaissance Numérique has been advocating this idea for several years now, and initially put it forward in its "Facial Recognition: Embodying European

Values"[109] report in 2020. As far as metaverses are concerned, we could envisage, in addition to technical standards (relating to interoperability and security, for example), standards such as compliance with the European Union's Charter of Fundamental Rights, the GDPR, or any other relevant legislation. However, such a paradigm shift is not easy to achieve. It requires the technical operationalisation of legal concepts, but also the need to make non-compliance with standards detrimental to metaverse operators. The operationalisation of certain concepts and auditability must therefore be considered.

Auditability is the *raison d'être* of any standardisation system. If the standards are not auditable, there is no way of checking that they are being complied with. Establishing these standards must therefore make it possible to draw up a certification reference system[110] that includes the list of requirements to be audited, clearly translating the norms established by consensus through a standardisation body. Once the reference system has been established, i.e. once the legal principles and technical aspects have been translated into practical requirements, inspection bodies can audit a system with a view to certifying it.

In this respect, the example of the Transparency & Consent Framework (TCF) is worth exploring. In just three months, the industry has put in place a standard applicable to the online advertising ecosystem, enabling the management of billions of people's identities every day. For the time being, however, most metaverse standardisation initiatives seem to focus on technical standards. Of the ten working groups set up by the Metaverse Standards Forum, which brings together most of the players in the eco-system, nine focus on technical interoperability issues. The last, however, is dedicated to issues of privacy, cybersecurity, and identity. For its part, the French Association for Standardisation (Afnor) commissioned a standardisation committee on the Metaverse. This also focuses primarily on interoperability issues.

POLICY PROTOTYPING, EXPERIMENTS, AND SANDBOXES

Policy prototyping is another way of changing the way we govern the internet and new technologies. "Policy Prototyping is the art of testing and experimenting with policy ideas to ultimately provide evidence-based input that can improve existing governance frameworks and/or inform lawmaking processes"[111]. However, these processes are extremely costly and require infrastructure and a degree of both technical and legal expertise. In practice, these processes are still under-explored by regulators, legislators, and public players in general, who lack resources.

However, some initiatives have seen the light of day, such as in Finland in the field of minimum social benefits, or more recently as part of the international Open Loop project, on specific subjects linked to emerging technologies. Bringing together regulators, institutions, elected representatives, SMEs, academics, civil society, and major companies, Open Loop aims to facilitate the operationalisation of the economic players' responsibilities. In June 2023, this programme published the results of an analysis on the applicability of certain measures in the AI Act. Renaissance Numérique encourages the development of such experimental mul-

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109. Renaissance Numérique (2020), "Facial recognition: Embodying European values".

110. A "technical document defining the characteristics that an industrial product or service must have, and the procedures for checking conformity with these characteristics". See: Ministère de l'Économie, des Finances et de l'Industrie (2004): «La certification en 7 questions des produits industriels et des services», p. 4.: https://evaluation.cstb.fr/doc/certification/certification-en-7-questions.pdf

111. Open Loop, "What is Policy Prototyping?": https://openloop.org/lets-experiment/

ti-stakeholder processes, in order to analyse the relevance of the existing legal framework regarding the Metaverse, and to put forward recommendations relating to the technical operationalisation of concepts such as respect for privacy, protection of personal data, or the fight against cyberbullying, in immersive worlds. In this sense, policy prototyping could be one way of addressing the lack of applicability of the existing legal framework that is currently being developed.

Regulatory sandboxes are a way of experimenting with regulations while facilitating innovation in the digital sector. Supervised by the regulatory authorities, they enable "[economic] players to test their innovative technology or service without necessarily having to comply with the entire regulatory framework that would normally apply", for a set period of time and within a restricted framework[112]. In France, for example, the CNIL (the data protectionauthority) recently launched a sandbox dedicated to projects using artificial intelligence for the benefit of public services. In addition to the relative flexibility they allow for experimentation, sandboxes also give regulators the opportunity to build up their skills through discussions with key stakeholders on subjects that are often complex and where legal expertise alone is not enough.

However, like policy prototyping programmes, setting up regulatory sandboxes requires significant financial and human resources. For the time being, most European regulators seem to lack the financial and human resources to deploy them.

REDESIGNED GOVERNANCE?

Ultimately, this more agile approach to regulation should enable more effective governance of tomorrow's internet to emerge, whether or not it evolves in the form of the Metaverse.

A collective approach

The key concept here, which is apparent in standardisation initiatives, policy prototyping and sandbox experimentation, is the multi-stakeholder aspect. Rather than top-down regulation that is often inconsistent and difficult to apply, the idea is to bring together metaverse operators, terminal suppliers, users, the relevant regulatory authorities, legislators, the world of research and civil society, in order to arrive at a holistic and structured approach to Metaverse governance. This is what Renaissance Numérique proposes, on its scale, for all of its work, and specifically for the Metaverse with the *Metaverse Dialogues*. For his part, Thierry Breton, European Commissioner for the Internal Market, is calling for the launch, "similarly to the European Bauhaus", of "a creative and interdisciplinary movement, aiming to develop standards, increase interoperability, maximising impact with the help of IT experts, regulatory experts citizens' organisations and youth"[113]. With this in mind, between February and April 2023 the European Commission convened a "European citizens' panel on virtual worlds". Bringing together 140 citizens from the 27 Member States, the panel published 23 recommendations on the values and actions needed to create attractive and equitable European virtual worlds. These recommendations are intended to feed into the Commission's work on virtual worlds and tomorrow's internet.

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112. Arcep, «Expérimenter et innover grâce aux réseaux mobiles. Bac à sable réglementaire», 11 July 2023: https://www.arcep.fr/professionnels/experimenter-et-innover-grace-aux-reseaux-mobiles/bac-a-sable-reglementaire.html

113. European Commission, "Europe's plan to thrive in the metaverse I Blog of Commissioner Thierry Breton", 14 September 2022: https://ec.europa.eu/commission/presscorner/detail/en/STATEMENT_22_5525

An agile approach

The second key concept, which lies at the heart of the "third path" outlined here, is agility. Without wiping the slate clean of existing restrictive legal frameworks, which are necessary, the challenge is to simultaneously establish multi-stakeholder mechanisms that are as agile as possible, with feedback loops to adapt to technologies as they evolve. This aspect is all the more important with regard to the Metaverse, as the underlying technologies are not yet fully mature, and the uses to which they will be put, and therefore the business models that will be linked to them, remain largely undefined.

A holistic approach

It is also highly likely that the responsibilities of the various players involved in the governance of the Metaverse will evolve. Nowadays, in the Web 2.0 era, we are faced with highly centralised systems. It is technically the online services providers, also known as "intermediaries", via their moderation and "Trust & Safety" policies, and via their Terms & Conditions, who decide, within the limits set by the law, what is acceptable or not on their platforms. However, the Metaverse is not destined to become a space controlled solely by a few dominant players. On the contrary, a multitude of metaverses and hence owners of immersive spaces should be able to emerge. In Horizon Worlds, for example, a third-party company could create its own space, in which it sets its own rules. As is the case in immersive worlds that have been in use for several decades now, such as Second Life, there would be several layers of responsibilities and rules: a technical layer, covering what the source code allows or does not allow in terms of actions; a layer managed by the operator of the metaverse; a layer managed by the owner of the specific world in that metaverse; and above all that, the law[114].

The ambition of a multi-stakeholder, agile, holistic approach should be to move towards a more effective allocation of responsibilities across various layers, so that they can be implemented more effectively. Renaissance Numérique encourages the next European Commission to embrace this approach and to facilitate the establishment of agile, multi-stakeholder governance mechanisms to organise the rights and duties of all stakeholders in tomorrow's internet.

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114. Lucas J.-F. (2013), *op. cit.*

The Metaverse in the era of "global boiling"

In July 2023, the Secretary General of the United Nations, Antonio Guterres, delivered a speech in which he reiterated the urgent need for global action on emissions, climate adaptation, and funding the fight against climate change. He warned that "the era of global warming has ended" and that "the era of global boiling has arrived"[115].

In 2022, the digital sector, which can be defined as all the infrastructure, equipment, data, and uses that are made of it, accounted for "3 to 4% of greenhouse gas (GHG) emissions worldwide and 2.5% of [France's] carbon footprint (including the manufacturing and use phases). Furthermore, according to the report by the [French] Senate's information mission on the environmental footprint of digital technology, the latter's carbon footprint could increase significantly if nothing is done to reduce it (+60% by 2040, i.e. 6.7% of the national carbon footprint)"[116].

Over and above these estimates, which are debatable given the complexity of their production and the fact that they are approximations due to data gaps and different calculation models used by the various players, it is important to bear in mind that digital technology has an environmental impact throughout its life cycle, particularly during the production of digital equipment and devices (high water consumption, rare metal extraction, etc.).

However, as with any technology, a systemic approach to its impact is needed to understand what it can "consume" on the one hand and "save" on the other, in terms of resources. For example, equipping a water network with low-energy consumption pressure sensors to detect leaks seems like a "responsible" use of digital technology, when we know that the leakage rate, i.e. the ratio between the volume of water introduced into the distribution network and the volume of water consumed, was around 20% in 2019 in France (21% in the UK, 27% in Belgium and 38% in Italy for the same year)[117]. To what extent can the Metaverse itself be considered responsible or offer responsible usage?

This question needs to be seriously asked at a time when the Metaverse promises are based on ever more realistic three-dimensional modelling and even more powerful synchronicity of experience, requiring the development of considerable infrastructure, ever more materials to build new equipment and ever more data; the development of metaverses that use blockchain would undoubtedly be even worse, given that this technology consumes so much electricity. However, as with the European Parliament, one of the arguments most often put forward in support of this kind of development,

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115. ONU, "Hottest July ever signals 'era of global boiling has arrived' says UN chief", 27 July 2023: https://news.un.org/en/story/2023/07/1139162

116. ADEME, ARCEP (2022), «Évaluation de l'impact environnemental du numérique en France et analyse prospective. État des lieux et pistes d'action»: https://librairie.ademe.fr/consommer-autrement/5226-evaluation-de-l-impact-environnemental-du-numerique-en-france-et-analyse-prospective.html

117. Plat B., Lambry A., Donadieu de Lavit P., de la Touane D. (2019), «Les services publics d'eau et d'assainissement en France. Données économiques, sociales & environnementales», Rapport de la BIPE et de la Fédération des entreprises de l'eau (FP2E), p. 80: https://www.fp2e.org/etudes-et-rapports/

is its promoters' unique conviction that "virtual worlds can make a positive contribution to the fight against climate change and for environmental sustainability, for example by facilitating remote working, thereby reducing commuting and associated carbon emissions"[118]. As Alain Berthoz points out in the report of the French exploratory mission on metaverses, this argument illustrates the risk of "a form of denial of reality in the face of climate challenges"[119]. Indeed, while remote working undoubtedly requires more powerful digital tools, it probably does not require the development of immersive virtual worlds for the vast majority of professional uses, many of which boil down to videoconferences during which more and more people can be seen turning off their cameras. Furthermore, a simple look at the history of science and technology and the reality of the rebound effect (or Jevons' paradox) is enough to illustrate that the energy benefits expected from the development of a technology, due to a significant amplification of behaviour, are rarely achieved. For example, "in the transport sector, the opening of a new road often results in an increase in traffic, never a reduction. One can also fear that metaverse travel will be added to road and air travel without significantly reducing them"[120].

Consequently, there is now an urgent need for collective (and individual) reflection on the actual and possible uses of the Metaverse in terms of the direct and indirect effects they may have on environmental impact, whether positive or negative.

118. European Parliament (2023), "Draft Report. Virtual worlds – opportunities, risks and policy implications for the single market (2022/2198(INI))", Committee on the Internal Market and Consumer Protection, 4 August 2023, p. 6: https://www.europarl.europa.eu/doceo/document/IMCO-PR-751902_EN.pdf
119. Basdevant A., François C., Ronfard R. (2022), *op. cit.*, p. 82.
120. *Ibid.*, p. 83.

The Shift Project has its say

For The Shift Project, the study of virtual worlds is based on a dual carbon constraint: mitigating climate change and freeing ourselves from fossil fuel dependency. For the digital sector today, this requirement is reflected and quantified in the Science-based Target Initiative (SBTi), which aims to reduce the sector's greenhouse gas emissions by 45% between 2020 and 2030. In view of these factors, virtual worlds are a pivotal issue that needs to be approached methodically.

Let's start with the visible part of the iceberg: the piling up of user terminals, at a time when limiting terminals and encouraging the extension of their lifespans is essential. VR headsets and AR glasses are used alongside a computer, console, or smartphone, and their manufacturing carbon footprint varies from 15 kgCO2eq for a small case into which a smartphone is inserted[121], to 30 kgCO2eq or 100 kgCO2eq for a current best-selling headset. And depending on the screen technology[122], perhaps double that for a headset with computer-like performance (in terms of screen size and technology, CPU/GPU).

Then there's the hidden end of the iceberg: virtual worlds put a strain on the entire digital infrastructure at a time when we need to reduce data volume growth so that energy efficiency gains result in lower energy consumption. For example, the persistence feature of virtual worlds can only be achieved at the cost of additional calculations and storage.

Clearly, the fulfilment of the virtual worlds promise will exert major pressure on the network infrastructure in terms of capacity and functionality. Demand for bandwidth has increased: VR streaming would require 17 Mbps or even 170 Mbps in HD, whereas HD streaming requires 3 Mbps[123], not to mention the additional demand for upload bandwidth[124]. Similarly, the synchronicity promised for metaverses requires low latency and reliability requirements that are four times more resource-intensive than the transmission of a traditional video and requires the addition of computing capacity that is close to users ("at the edge")[125].

For the kind of virtual world promised by Meta, all these environmental costs have to be added up. For other applications, a distinction

121. Anders A. (2017), "Life Cycle Assessment of a Virtual Reality Device", *Challenges*, 8, 15: https://doi.org/10.3390/challe8020015
122. Cas d'Étude Pour un Immersif Responsable (CEPIR) (2023), «Impacts environnementaux de la XR», intermediary deliberable webinar: https://www.cepir.info/webinaire-juin-2023
123. CISCO Annual Internet Report (2018-2023), 2020.
124. Ericsson Mobility Report, June 2023.
125. *Ibid.*

needs to be made between functionalities: a purely immersive application does not necessarily require a persistent virtual world and its associated environmental costs, and vice versa. Another example is that a real-time application will place significant constraints on the chosen network architecture, but perhaps less so on the terminals. This screening exercise must be carried out systematically in order to determine which applications are relevant to the design and development of the digital system.

Although we can applaud the fact that the calculation of indirect effects is becoming better understood, we must admit that the methodologies used are very heterogeneous and generally inadequate: the perimeters are often partial, and emissions added are more often forgotten than emissions avoided. Above all, the question of alternatives and the construction of counterfactual paths in decarbonising worlds are ignored, even though they are essential.

Lastly, although the Metaverse hype seems to have died down, it has not been without environmental impact: the "Meta" signal has enabled various players in the sector to position their offerings and adjust their innovation strategy in relation to this use case. The European Commission has not escaped this process unscathed, placing virtual worlds at the centre of discussions on the networks of the future[126].

What we need to do now, in the light of physical constraints, is articulate the relevant possibilities of virtual worlds with our business models and regulatory frameworks in order to design an efficient and resilient digital system.

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126. European Commission (2023), *Ibid*.

Continuing the
Metaverse Dialogue

Through its *Metaverse Dialogues*, Renaissance Numérique enabled a high-level exchange between international experts in immersive technologies, worlds, realities, and experiences. Meeting over three separate one-day working sessions between December 2022 and June 2023, these experts from a variety of backgrounds and fields (sociology, economics, law, political science, psychology, technology, etc.) shared their knowledge and compared their views on the uses, imaginaries, business models, and ethical, legal, regulatory, and governance issues surrounding the Metaverse. This iterative, collaborative approach has helped to reduce some of the vagueness surrounding the Metaverse. It has also led to the formulation of six key recommendations, addressed to political decision-makers, in particular the next European Commission, and to anyone interested in or involved in the construction of metaverses.

However, the dialogue deserves to be continued.

Firstly, because the Metaverse creates tension between the different types of development possible, each encapsulating models that are sometimes opposed in the technologies, values, and principles that underpin or govern them. In this way, it highlights societal choices that go beyond those of our digitised interactions, and highlights our dissatisfaction with those we make on a daily basis. But what voice does civil society really have in these discussions and stances? If charters and declarations of good intentions represent its interests, what levers can we put in place to develop (or not) one or more metaverses that reflect society's choices?

Secondly, the question of the territoriality of the law applicable in the Metaverse is likely to prove thorny. While the law is inevitably territorial, one of the Metaverse's promises is, inversely, to be able to engage in digital experiences that are territorially undefined and synchronised with an infinite number of people. If this promise follows Marshall McLuhan's vision of the global village, a diversity of cultures will probably coexist in the Metaverse, since this is already the case in our online interactions. Will the reconciliation of different meanings, understandings and applications of rights, conventions, and standards call for a territorialisation of the Metaverse? Should we also, as MEPs Axel Voss and Ibán García del Blanco suggest, examine the idea of a special legal status for avatars?

Ultimately, we need to understand the Metaverse as a concept that allows us to anticipate possible immersive uses, which leads us to anticipate certain regulations, but which also updates and questions a large number of concepts that often pre-existed the uses, and therefore the adoption, of any technology. Consequently, over and above the discussions about the possible uses of the Metaverse, which occupy a (probably overly) significant place in the debates between experts and in the media, we need to take a closer look at the technological and societal imaginaries that are

reflected in the various representations of the Metaverse, or that these representations bring to light.

It is only by understanding, sharing, and discussing them that we will collectively find the way to build, whether responsibly or not, our future digital interactions.

Glossary

API - Application Programming Interface

"An API is a software interface that allows one piece of software or service to be 'connected' to another piece of software or service in order to exchange data and functionality. APIs offer many possibilities, such as data portability, setting up e-mail advertising campaigns, affiliation programmes, integrating functionalities from one site into another or open data. They can be free or paid for"[127].

Augmented reality (AR)

Technology enabling 2D or 3D digital elements to be added to perceived reality using digital devices (smartphones, tablets, headsets, smart glasses, etc.).

Biometric data

"Personal data resulting from specific technical processing relating to the physical, physiological, or behavioural characteristics of a natural person, which allow or confirm the unique identification of that natural person, such as facial images or dactyloscopic data [fingerprints]"[128].

Blockchain

"Blockchain is a technology for storing and transmitting information that is transparent, secure, and operates without a central control body. It is a database that contains the history of all exchanges between its users since its creation. It is secure and distributed: it is shared by its various users, without intermediaries, so that everyone can check the chain's validity. There are public blockchains, open to all, and private blockchains, where access and use are limited to a certain number of players. A public blockchain can therefore be likened to a public, anonymous, unforgeable accounting ledger. As the mathematician Jean-Paul Delahaye writes, we need to imagine 'a very large notebook, which everyone can read freely and without payment, on which everyone can write, but which is impossible to erase and indestructible'"[129].

BtoB or B2B (Business to Business)

Refers to commercial relationships in which one company carries out a commercial transaction with another. BtoB is sometimes referred to as "trade market ".

BtoC or B2C (Business to Consumer)

Refers to commercial relationships between companies and consumers (or individuals).

CAVE (Cave Automatic Virtual Environment)

A CAVE is an "automatic virtual environment", which is usually closed. It is similar to a "cave". Generally, "screen walls" surround one or more users who are placed at the centre of the CAVE structure. To enhance perceptual immersion, people wear equipment such as 3D helmets and glasses, or suits and gloves to capture movements[130].

Early adopters

Understood here as a specific community of users who, as well as being pioneers in the adoption of a technology or the purchase of a device, are generally at ease with technical objects

127. CNIL, «Interface de programmation d'application (API)»: https://www.cnil.fr/fr/definition/interface-de-programmation-dapplication-api#:~:text=Une%20API%20

128. Article 3 §13 of Directive (EU) 2016/680 of 27 April 2016, Article 4 §14 of Regulation (EU) 2016/679 of 27 April 2016 and Article 3 §18 of Regulation (EU) 2018/1725 of 23 October 2018.

129. CNIL, «Blockchain»: https://www.cnil.fr/fr/definition/blockchain#:~:text=La%20blockchain%20est%20une%20technologie,sans%20organe%20central%20de%20contr%C3%B4le

130. Lucas J.-F. (2013), *op. cit.*, p. 18.

and sometimes act as relays in the mass adoption of uses.

Emotions recognition system

An AI system for recognising or deducing people's or groups' emotions, thoughts, states of mind, or intentions based on their biometric data and biometrics-based data[131].

Extended reality (XR)

Extended reality can be used to describe all the expressions "virtual, augmented, and mixed reality". In this report, this expression is sometimes confused with mixed reality (MR), or even augmented reality (AR).

Gamification

"Gamification consists of incorporating codes and mechanisms associated with the world of video games to sectors for which they were not intended"[132].

Non-Fungible Token (NFT)

A digital token, fungible or not, is a unique digital asset (an avatar, the avatar's head or even an avatar's hair), which is issued and exchangeable on a blockchain network. Tokenisation works as a flexible legal mechanism through which people can define the digital and physical properties of programmed rights. Non-fungible digital tokens can be used for a variety of purposes: membership (closed communities can provide memberships in the form of NFTs to reflect the scarcity of seats in a closed club), loyalty (equivalent to accumulating points), ticketing (a ticket in the form of an NFT guarantees its uniqueness and authenticity), identification of digital or physical goods (NFTs can be attached to physical items to ensure their traceability and transparency), voting, etc.

Marketplace

A marketplace is a unique online sales model. It is a market operated by a technological infrastructure, that offers a varied range of products and services, and is made up of third-party sellers (Amazon, *Leboncoin* (A well-known French digital platform for classified adverts, akin to Craigslist or Gumtree), BlaBlaCar, Meetic, Tinder, etc.).

Mixed reality (MR)

A set of devices and technologies from the physical and digital world that encompass the real environment, augmented reality (AR), augmented virtuality (AV), and the virtual environment. In this report, this expression is sometimes confused with augmented reality (AR) or extended reality (XR).

Smart contract

A smart contract is an intelligent computer protocol capable of automatically verifying and executing predefined operations or instructions (negotiation, execution, termination, etc.). They are based on blockchain technologies to guarantee their integrity and inviolability.

Software as a Service (SaaS)

"Software as a Service, also known as SaaS, is a cloud-based service where, instead of downloading software that your desktop PC or business network can run and update, you access an application via a web browser. The software application can be office automation or unified

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131. Artificial Intelligence Act, article 3(1)34).

132. Beedeez, «Gamification : tout ce que vous devez savoir», 10 May 2022: https://www.beedeez.com/fr/blog/tout-ce-que-vous-devez-savoir-sur-la-gamification

communications software from a wide range of other available business applications"[133].

Trust & Safety

"In the context of content moderation, Trust & Safety is a set of principles (usually developed, applied, and updated by the Trust & Safety team) aimed at regulating the behaviour of users of an online platform and preventing them from publishing content that would breach the platform's guidelines"[134].

Virtual reality (VR)

See the "Virtual reality" section of the report, pages 26-27.

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133. Oracle,"What is SaaS (Software as a Service)? ":https://www.oracle.com/applications/what-is-saas/#:~:text=Software%20as%20a%20service%20(SaaS,as%2Dyou%2Dgo%20basis

134. WebHelp, «Trust & Safety : pourquoi est-ce essentiel et comment le mettre en œuvre correctement?»: https://webhelp.com/fr/news/trust-and-safety-pourquoi-est-ce-important-et-comment-le-mettre-en-oeuvre-correctement

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About Us

The think tank of the digital civil society

R enaissance Numérique is an independent, non-partisan think tank focusing on society's digital transformation. It sheds light on the changes that this transformation is bringing about, and strives to give everyone the keys to mastering it.

Renaissance Numérique is a non-profit association under the French law of 1901, which is not affiliated to any party, company, or organisation. The think tank was born in 2007, from its co-founders' desire to shed light on the public debate about digital issues (notably by publishing a first white paper on the digital divide), so that we can all be free and informed players and citizens in a digital society.

Digital transformation is bringing profound changes to our social, economic, and political interactions and structures. In order to grasp and understand its complexity, which is itself ambiguous and ever-changing, Renaissance Numérique brings together members with a wide range of expertise (political, economic, legal, communications, technical, sociological, etc.) and organisations (independent experts, consultancies, law firms, non-governmental organisations, colleges and universities, institutions, businesses, etc.).

This diversity of players and points of view makes Renaissance Numérique a place for debate, a space for confronting ideas in a constructive way, which is unique in the landscape of think tanks and digital players in France and Europe.
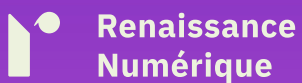
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Renaissance Numérique is an independent, non-partisan think tank focusing on the digital transformation of society. It sheds light on the changes that this transformation is bringing about, and strives to give everyone the keys to mastering it.

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