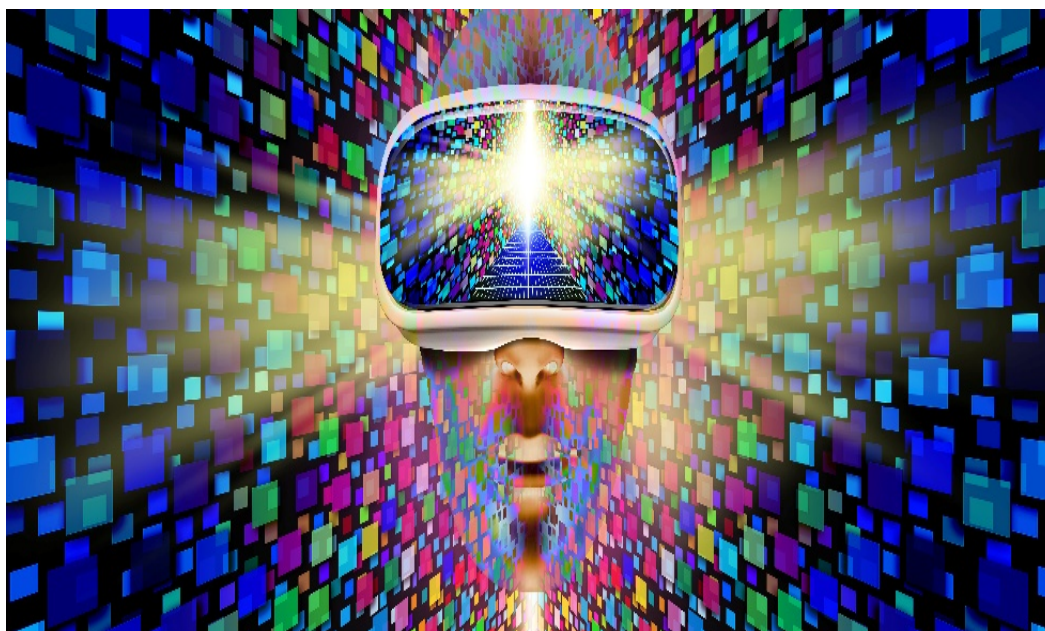


Metaverse



Metaverse

Abstract

This study was prepared by the European Parliament's Policy Department for Citizens' Rights and Constitutional Affairs at the request of the JURI Committee.

Commercial, industrial and military applications of metaverse bring both opportunities as well as significant concerns for everyday life, health, work, and security.

Legislative initiatives promoting fundamental principles of law, legislative and judicial oversight, applied comprehensively across a broad range of policies, are necessary to make sure that metaverse will play a positive role.

This document was requested by the European Parliament's Committee on Legal Affairs.

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Manuscript completed in June 2023

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LIST OF ABBREVIATIONS

3D	Three-Dimensional
5G	5th Generation Mobile Network
AI	Artificial Intelligence
AIDA	Special Committee on Artificial Intelligence in a Digital Age
AI HLEG	High-Level Expert Group on Artificial Intelligence
AV	Augmented Reality
CBDC	U.S. Central Bank Digital Currency
CCPA	California Consumer Privacy Act
CCTV	Closed-Circuit Television
CFR	Common Frame of Reference
CJEU	Court of Justice of the European Union
CoA	European Court of Auditors
ColoPA	Colorado Privacy Act
COPPA	Children’s Online Privacy Protection Act
CPRA	California Privacy Rights Act
CRD	Consumer Rights Directive
DG ITEC	European Parliament’s Directorate-General for Innovation and Technological Support
DPRC	Data Protection Review Court
DToC	Digital Twin of a Customer
DToP	Digital Twin of a Person
DTSA	Defend Trade Secrets Act
ECB	European Central Bank
ECPA	Electronic Communications Privacy Act

EDPS	European Data Protection Supervisor
EEG	Electroencephalogram
EO	Executive Order
EU	European Union
EUI	European University Institute
EUIPO	European Union Intellectual Property Office
EUTM	European Union Trade Mark
FATF	Financial Action Task Force
FISA	Foreign Intelligence Surveillance Act
FRAND	Fair, Reasonable, and Nondiscriminatory
FTC	Federal Trade Commission
FTX	Futures Exchange
GDPR	General Data Protection Regulation
GPT	Generative Pre-trained Transformers
GDP	Gross Domestic Product
GVA	Gross Value Added
ICANN	Internet Corporation for Assigned Names and Numbers
ICT	Information and Communication Technologies
IEEE	Institute of Electrical and Electronics Engineers
IFSC	International Financial Services Centre
INNOVIT	Innovation Unit
IPR	Intellectual Property Right
IRS	U.S. Internal Revenue Service
JURI	Committee on Legal Affairs

LED	Data Protection Law Enforcement Directive
NASA	The National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NFT	Non-Fungible Token
OECD	Organisation for Economic Co-operation and Development
PECL	Principles of European Contract Law
PEGA	Committee of Inquiry to investigate the use of Pegasus and equivalent surveillance spyware
SCA	Stored Communications Act
SEC	Securities Exchange Commission
SEP	Standard Essential Patent
SME	Small and Medium-Sized Enterprise
SLAM	Simultaneous Localization and Mapping
TAC	Traffic Acquisition Costs
TRIPS	Trade-Related Aspects of Intellectual Property Rights
UAV	Unmanned aerial vehicle
UCPD	Unfair Commercial Practices Directive
UCTD	Unfair Contract Terms Directive
UI	User Interface
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPC	United Patent Court
UPCA	UPC Agreement
U.S.	United States
USD	U.S. Dollar

USPTO	United States Patent and Trademark Office
VASP	Virtual Asset Service Provider
VARA	Virtual Assets and Related Activities Regulations
VAT	Value Added Tax
VCDPA	Virginia Consumer Data Protection Act
VFX	Visual Effects
VR	Virtual Reality
vRAN	Virtualized Radio Access Networks
WIPO	World Intellectual Property Organization
WTO	World Trade Organisation
XR	Extended Reality

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1. UNLIMITED WORLD OF METAVERSE

1.1. Definition of metaverse

According to Oxford English dictionary the term metaverse is etymologically composed of two components: **meta** (Greek prefix *μετα* meaning post, after or beyond - denoting change, transformation, permutation, or substitution) and **universe**.¹

The concept of a metaverse refers to the migration of various parts of the human experience **from the physical world to an increasingly immersive virtual world**. The metaverse refers to an idea likely to be embodied in numerous virtual worlds, where technology has the opportunity to bring content to those worlds in ways never before imagined and, with it, legal issues and challenges never before contemplated.²

There are numerous definitions of metaverse available in the literature:

Consulting company Gartner defines metaverse as *"a **collective virtual shared space**, created by the convergence of virtually enhanced physical and digital reality. [...] A metaverse is not device-independent, nor owned by a single vendor. It is an independent virtual economy, enabled by digital currencies and non-fungible tokens (NFTs). As a combinatorial innovation, metaverses require multiple technologies and trends to function. Contributing trends include virtual reality (VR), augmented reality (AR), flexible work styles, head-mounted displays (HMDs), an AR cloud, the Internet of Things (IoT), 5G, artificial intelligence (AI) and spatial computing."*³

Stylianios Mystakidis, Greek academic, defines metaverse as *"[...] the **post-reality universe, a perpetual and persistent multiuser environment merging physical reality with digital virtuality**. It is based on the convergence of technologies that enable multisensory interactions with virtual environments, digital objects and people such as virtual reality (VR) and augmented reality (AR). Hence, the Metaverse is an interconnected web of social, networked immersive environments in persistent multiuser platforms. It enables seamless embodied user communication in real-time and dynamic interactions with digital artifacts. Its first iteration was a web of virtual worlds where avatars were able to teleport among them. The contemporary iteration of the Metaverse features social, immersive VR platforms compatible with massive multiplayer online video games, open game worlds and AR collaborative spaces."*⁴

Venture capitalist Matthew Ball attempts to define the metaverse as an **interoperable network of 3D worlds with a massive scale that's rendered in real time**. These virtual worlds can be "experienced synchronously and persistently" by an unlimited number of users who have an "individual sense of presence". He notes that the metaverse —a network of interconnected and interoperable experiences— is often misdescribed as virtual reality and argues that VR is only a small part of the metaverse. The former is used to access or experience the latter.^{5,6}

¹ [https://www.oed.com/view/Entry/271922?redirectedFrom=metaverse&";](https://www.oed.com/view/Entry/271922?redirectedFrom=metaverse&) similarly in Mark Zuckerberg's Founder's letter, 2021, <https://about.fb.com/news/2021/10/founders-letter/>

² Ara Tom.K. et al., Exploring the metaverse: What laws will apply?, 2022, <https://www.dlapiper.com/en/us/insights/publications/2022/06/exploring-the-metaverse-ipt-news-june-2022/>

³ <https://www.gartner.com/en/articles/what-is-a-metaverse>

⁴ Mystakidis, S., Metaverse, <https://www.mdpi.com/2673-8392/2/1/31>

⁵ <https://influencermarketinghub.com/state-of-the-metaverse/>

⁶ Matthew Ball, The Metaverse Primer, June 29, 2021, <https://www.matthewball.vc/the-metaverse-primer>

Jon Radoff, author of the Building the Metaverse blog, points that the most-common definitions of the 'metaverse' are: "1) an **embodied virtual-reality experience**; 2) a **Web3 framework for economic interoperability**; 3) a **creative platform for experiences** (e.g., Roblox). Some current versions [of metaverse] may be a hybrid of these. ... all of these 'product-centric' definitions fail to look at the underlying culture and social change. The fundamental shift is toward thinking of virtual property and virtual identity as 'real' and/or important. One can trace the origin of the metaverse back to Dungeons & Dragons before it was digitized and look at it as an imaginary, creative space of social interaction and storytelling. Everything since then is simply technologies that have digitized, dematerialized and democratized access to this category of experience."⁷

Mike Elgan from Computerworld, points that "[t]he metaverse isn't a set of technologies; it's **a vision about future human culture**. It's about what product companies and the public might do with a set of technologies - mainly live and work in virtual spaces and play in virtual worlds."⁸

For the purposes of this study we propose a definition according to which **metaverse is a digital simulation of a multidimensional space**. The metaverse can be provided by **public or private actors** for single users or as a networking platform. It can **mirror reality, create a simulation of an entirely new space and actors (bots), or mix both**. There can be one, interoperable metaverse or a myriad of four-walled metaverses (alike today's social media).

Metaverse can be used for **commerce (commercial metaverse)**, **industry (industrial metaverse)**, **military (military metaverse)** or **public services (e-government metaverse)** purposes.

It is currently based on visual, auditive and, in some cases, tactile perception of the simulation, although in future, with scientific progress, the scope of the perception could be expanded.

Figure 1: Layers of spatial Web 3.0

Spatial interaction layer

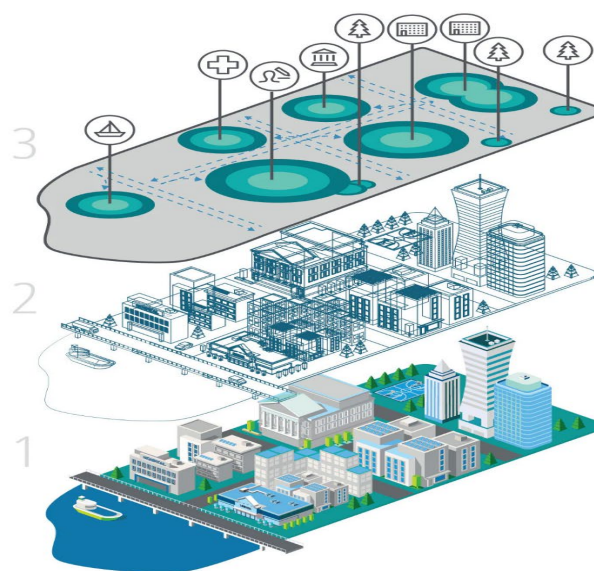
Through next-generation interfaces (e.g., smart glasses or voice), we will be able to interact with contextual, real-time information that has been called up by intuitive and sensory triggers such as geolocation, computer vision, and voice, gesture, or biometric commands. In effect, this merges the digital and physical layers for the user.

Digital information layer

Through sensorization and digital mapping of the physical world, we will eventually create a digital twin of every object in every place. Today, this type of digital information is primarily accessed via screens and dashboards. In the future, it will be retrieved primarily via the spatial interaction layer.

Physical layer

The world as we currently know and experience it through the five senses.



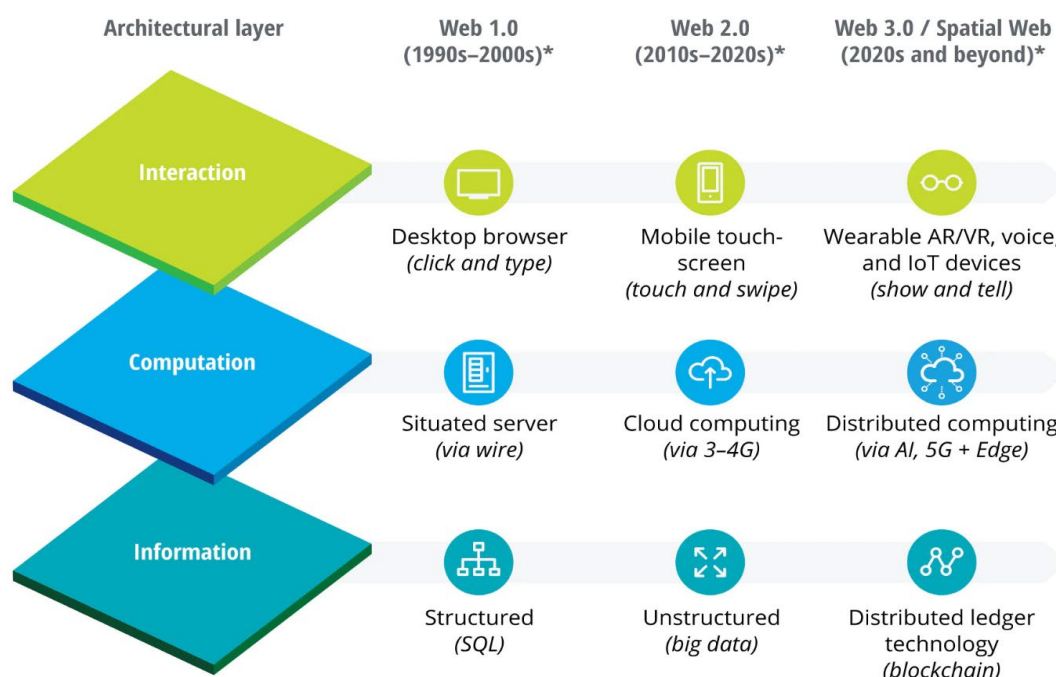
Source: Deloitte analysis.

⁷ <https://www.pewresearch.org/internet/2022/06/30/the-metaverse-in-2040/>

⁸ Elgan M., 'Digital twin' tech is twice as great as the metaverse, Computerworld, 28/2/2023.

As illustrated, metaverse can closely follow and simulate reality (digitized reality, mirror world, digital twin) or be entirely decoupled from the physical layer and populated with AI, with any mix between the two possible, in a singular or multiplied versions.

Figure 2: Architectural layer of Web 1.0, Web 2.0 and Web 3.0.⁹



*Note: Date ranges are approximate and meant for directional purposes only.

Source: Deloitte analysis adapted from Gabriel René and Dan Mapes, *The Spatial Web: How Web 3.0 Will Connect Humans, Machines, and AI to Transform the World* (Amazon, 2019).

Metaverse is considered to be an evolution of the internet from Web1 - the worldwide web, Web2 - the rise of social media, into Web3. In Web3 individuals are actively involved in the creation of virtual worlds.

Metaverse, as a computer-generated simulation, can be collectively perceived and interacted with. It therefore can create an illusion of a collective reality, reinforced by a collective, real-time participation in it. It is subjective how strong this illusion could be for each individual. The brain often fails to differentiate between virtual experiences and real ones. The patterns of neurons that fire when one watches a three-dimensional digital re-creation of an object are very similar to those that fire in its actual presence.¹⁰

Companies investing in metaverse certainly try hard to convince their users that they offer “real estate”, “real money”, “real art objects”, etc. For most part, under the current technological progress it is merely an aspiration. It can be also considered misleading and manipulative.

One of metaverse services points that “[o]ur ultimate vision is **to build an entirely new world** for the next level of communication, e-commerce, entertainment and **a place to live**. We are building the

⁹ <https://www2.deloitte.com/us/en/insights/topics/digital-transformation/web-3-0-technologies-in-business.html>

¹⁰ Blascovich, J.; Bailenson, J. *Infinite Reality: Avatars, Eternal Life, New Worlds, and the Dawn of the Virtual Revolution*; Harper Collins: New York, NY, USA, 2011.

platform for citizens **to build on** [...] where everyone can **buy land, build or import objects**, use avatars and scripts, easily monetize their experiences and immerse themselves into a completely alternative reality.”¹¹

These statements are trying to project stability by using such words as **world, land, objects, reality, place to live**. Yet, what is being developed and sold is **a digital simulation, an information technology service depending on providers’ IP address, servers and ICT services**.

In the future, general collective perception of metaverse as a reality may be reinforced if accorded with human natural perception in terms of high definition and multidimensionality of provided content and if its interface becomes more natural. This will, however, require a massive increase in computation powers and energy consumption.¹²

Computer scientist Gordon E. Moore and futurologist Ray Kurzweil point that an analysis of history shows that computing power (Moore) and technological progress (Kurzweil) follow a pattern of exponential growth and will progressively transform all natural resources into computing tasks. The latter indicates that:

*An analysis of the history of technology shows that technological change is exponential, contrary to the common-sense “intuitive linear” view. So we won’t experience 100 years of progress in the 21st century — it will be more like 20,000 years of progress (at today’s rate). The “returns,” such as chip speed and cost-effectiveness, also increase exponentially. There’s even exponential growth in the rate of exponential growth. **Within a few decades, machine intelligence will surpass human intelligence**, leading to The Singularity — **technological change so rapid and profound it represents a rupture in the fabric of human history**.*¹³

And further:

*The state of computation in the early 2030s will not represent the Singularity, however, because it does not yet correspond to a profound expansion of our intelligence. By the mid-2040s, ... one thousand dollars’ worth of computing will be equal to 10^{26} cps, so the intelligence created per year (at a total cost of about $\$10^{12}$) will be about one billion times more powerful than all human intelligence today.*¹⁴

While humanity progresses rapidly in the first area, the problem of the interface between computing devices and human brain, as well as of understanding human brain in general, is still in its nascent stage. Christof Koch, Chief Scientist and President of the Allen Institute for Brain Science, indicates on the issue how far we are from understanding our own brains, that “[w]e don’t even understand the brain of a worm”.¹⁵ The lab roundworm houses **302 neurons and 7,000 connections** between those neurons in its microscopic body. Yet, researchers still do not fully understand how these connections work synergistically to give rise to the worm’s behaviors.

¹¹ <https://vr-society.io/home/>

¹² Zhu L, The Metaverse: Concepts and Issues for Congress, Congressional Research Service, 2022, <https://crsreports.congress.gov/product/pdf/R/R47224>

¹³ https://link.springer.com/chapter/10.1007/978-3-662-05642-4_16

¹⁴ Kurzweil R., The Singularity is Near, Penguin Books, 2005, p. 135-136.

¹⁵ https://alleninstitute.org/news/5-unsolved-mysteries-about-the-brain/?qclid=CjwKCAjwpayjBhAnEiwA-7ena-E52rEqYpiGHpyJ6TYs19UGo8EEs9urWpXUS6AvyZe5jHTAVRvzFBoCDqkQAvD_BwE

Human brain has approximately **86 billion neurons, woven together by an estimated 100 trillion connections**, or synapses. It's a daunting task to understand the details of how those cells work, let alone how they come together to make up our sensory systems, our behavior, our consciousness.¹⁶

Ray Kurzweil was more optimistic while forecasting that by 2029 "we'll have reverse-engineered and modeled and simulated all the regions of the brain. And that will provide us the software/algorithmic methods to simulate all of the human brain's capabilities including our emotional intelligence. And computers at that time will be far more powerful than the human brain."¹⁷¹⁸

When this is resolved, humanity may eventually transgress through the window of its own imagination into a metaverse of its own creation.

1.2. Alternate reality in analogue and digital age

Virtual-world building is an **essential part of the human experience**. The strive for an alternate reality starts with prehistoric cave paintings and oral storytelling capturing tribe tales used to build virtual, mythological worlds to communicate both real and allegoric events, as well as valuable lessons learned to the next generations.¹⁹

Theatres, religions, handwritten manuscripts and book reproductions through typography, photography, cinematography, mass media, e.g., radio and television, allowed the construction of virtual realities on ever bigger scales.²⁰

The Link Trainer was the first analog precursor to VR, a mechanical flight simulator, used in the late 1920s to train military airplane pilots. Morton Heilig's Sensorama machine was a public, stand-alone arcade machine that provided immersive, multimodal theatrical experiences in the 1960s, including a vibrating seat, sounds, an odor transmitter and wind fans. In 1968, the first experimental, mechanical AR heads-up-display was developed by Ivan Sutherland.²¹

At the beginnings of networked computing, during the late 1970s, the first, text-based, generation of social VR systems was introduced. Inspired by the role-playing board game Dungeons & Dragons and Tolkien's masterful fantasy works Hobbit and Lord of the Rings, Multi-User Dungeons (MUDs), role-playing games in fantasy settings allowed players to chose avatars from different classes to develop skills or powers, explore or complete quests. In 1984 appeared literary precursor to the metaverse, William Gibson's science fiction novel Neuromancer describing a VR cyberspace called Matrix. In 1989, Habitat was the first virtual world platform with a 2D graphical interface.²²

¹⁶ Idem.

¹⁷ <https://bigthink.com/guest-thinkers/ray-kurzweil-the-six-epochs-of-technology-evolution/>. Further, Kurzweil predicts that by the early 2030s the amount of non-biological computation will exceed the "capacity of all living biological human intelligence". Finally the exponential growth in computing capacity will lead to the singularity. Kurzweil spells out the date very clearly: "I set the date for the Singularity—representing a profound and disruptive transformation in human capability—as 2045".

¹⁸ On the latest progress on brain scanning technology see: <https://www.nature.com/articles/d41586-023-01616-7>

¹⁹ Mystakidis S., Metaverse, <https://www.mdpi.com/2673-8392/2/1/31>

²⁰ Mystakidis S., Metaverse, <https://www.mdpi.com/2673-8392/2/1/31>

²¹ Ivan E. Sutherland, "The Ultimate Display," Proceedings of IFIP Congress, vol. 65, no. 2 (1965), pp. 506-508, at <http://papers.cumincad.org/data/works/att/c58e.content.pdf>. See: Tomasz Mazuryk and Michael Gervautz, Virtual Reality: History, Applications, Technology and Future, Institute of Computer Graphics, Vienna University of Technology, Austria, Technology Report TR-186-2-96-06, 1996, at <https://www.cg.tuwien.ac.at/research/publications/1996/mazuryk-1996-VRH/TR-186-2-96-06Paper.pdf>

²² Mystakidis, S., Metaverse, <https://www.mdpi.com/2673-8392/2/1/31>

The term metaverse first appeared in Neal Stevenson's science fiction novel *Snow Crash* published in 1992²³. It represented a parallel virtual reality universe created from computer graphics, which users from around the world can access and connect through goggles and earphones.

The second wave of social VR systems followed in the 1990s and 2000s where platforms such as *Traveler*, *Croquet*, [ActiveWorlds](#), *There*, *Blue Mars*, [Second Life](#), [World of Warcraft](#) and [Open Simulator](#) used client-server architecture and integrated a graphical user interface and multimedia communication. [Second Life](#) and the massive multiplayer online fantasy gaming platform [World of Warcraft](#) released in 2004 by [Blizzard Entertainment](#) are still operating today.²⁴

A modern literary reincarnation of the metaverse is the *OASIS*, the 2011 science fiction novel *Ready Player One* by Ernest Cline. *OASIS* is a massive multiuser online VR game that evolved into the predominant online destination for work, education and entertainment. *OASIS* offers all of the worlds' books freely and openly accessible to citizens. Teachers take students for virtual field trips to ancient civilizations, foreign countries, and elite museums.

A third generation of social VR environments offering sensory immersion include [VRChat](#), [AltSpaceVR](#), [EngageVR](#), [RecRoom](#), [Virbela](#), [Sansar](#), [High Fidelity](#), [Sinespace](#), [Somnium Space](#), [Mozilla Hubs](#), [Decentraland](#), [Spatial](#) and [Meta's Horizon Worlds](#).²⁵

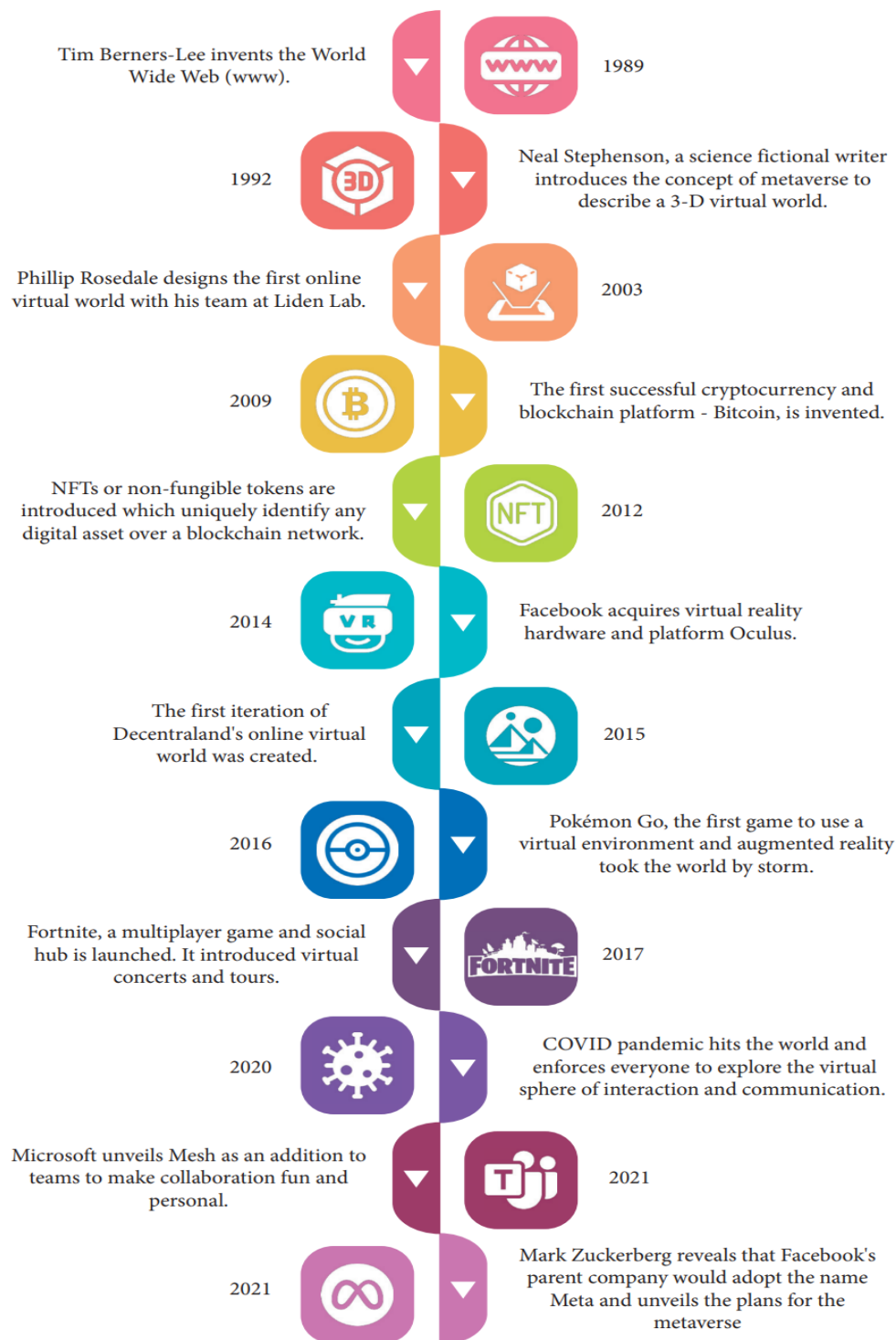
The launch of [Horizon Worlds](#) in 2021 by Meta Platforms and the vision of how the metaverse could potentially shape many aspects of how we work and socialise, has attracted a lot of attention to the metaverse but also engendered an increasing level of questioning and debate from academics and practitioners on the numerous societal implications for many people worldwide.

²³ <https://www.worldcat.org/title/snow-crash/oclc/25026617>

²⁴ Mystakidis, S., Metaverse, <https://www.mdpi.com/2673-8392/2/1/31>

²⁵ Mystakidis, S., Metaverse, <https://www.mdpi.com/2673-8392/2/1/31>

Figure 3: Chronology of metaverse



Source: A Comprehensive Study on Metaverse and Its Impacts on Humans²⁶

²⁶ Bale A.S. et al., A Comprehensive Study on Metaverse and Its Impacts on Humans, Advances in Human-Computer Interaction Volume 2022, A, <https://downloads.hindawi.com/journals/ahci/2022/3247060.pdf>

The new metaverse concept as outlined by Mark Zuckerberg, describes an integrated immersive ecosystem where the barriers between the virtual and real worlds are seamless to users, allowing the use of avatars and holograms to work, interact and socialise via simulated shared experiences.²⁷

*This ecosystem will allow to teleport instantly as a hologram to be at the office without a commute, at a concert with friends, or in your parents' living room to catch up. It will effect physical things. Your **TV, your perfect work setup with multiple monitors, your board games** and more — instead of physical things assembled in factories, they'll be **holograms designed by creators around the world**.*²⁸

On a futuristic vision from 2005:

*Initially VR will have certain benefits in terms of enabling communications with others in engaging ways over long distance and featuring a great variety of environments from which to choose. Although the environments will not be completely convincing at first, by the late 2020s they will be indistinguishable from real reality and will involve all of the senses, as well as neurological correlations of our emotions. As we enter the 2030s there won't be clear distinction between human and machine, between real and virtual reality, or between work and play.*²⁹

1.3. Technology of metaverse

In its 2022 report Gartner, a consulting firm specialised in technology, indicated that **metaverse technologies are nascent** and as a combinatorial innovation, metaverses require multiple technologies and trends to function.

Contributing technologies and trends necessary for metaverse include **virtual reality** (VR), **augmented reality** (AR), **flexible work styles**, **head-mounted displays** (HMDs), an **AR cloud**, the **Internet of Things** (IoT), **5G**, **artificial intelligence** (AI) and **spatial computing**.³⁰

In a world where a countless number of physical objects and structures will be connected by sensors (IoT), augmented reality can serve as a visualisation medium that will make the sensor data situational, bridged to the real-world surroundings. **Augmented reality** not only has the potential to serve as an interface for traditional e-commerce³¹, but can also contribute to dematerialisation of consumption by providing a bridge to digital content in virtual shopping (e.g. through QR codes or object recognition). **Virtual reality** can reproduce existing urban landscapes, architecture and a variety of content digitalised in virtual reality. Examples of such large-scale project are: Japanese Earth Simulator, EU-funded Living Earth Platform³² or commercial Google Earth³³. Accessibility of information and content is crucial for a rich experience when using such services, and in turn content can be efficiently dispatched through such platforms.

²⁷ Dwivedi Y.K., Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. International Journal of Information Management, Vol. 66, October 2022, <https://www.sciencedirect.com/science/article/pii/S0268401222000767#bib216>

²⁸ Mark Zuckerberg, Founder's letter, 2021, <https://about.fb.com/news/2021/10/founders-letter/>

²⁹ Kurzweil R., The Singularity is Near, Penguin Books, 2006, p. 341-342.

³⁰ See: <https://www.gartner.com/en/articles/what-is-a-metaverse>

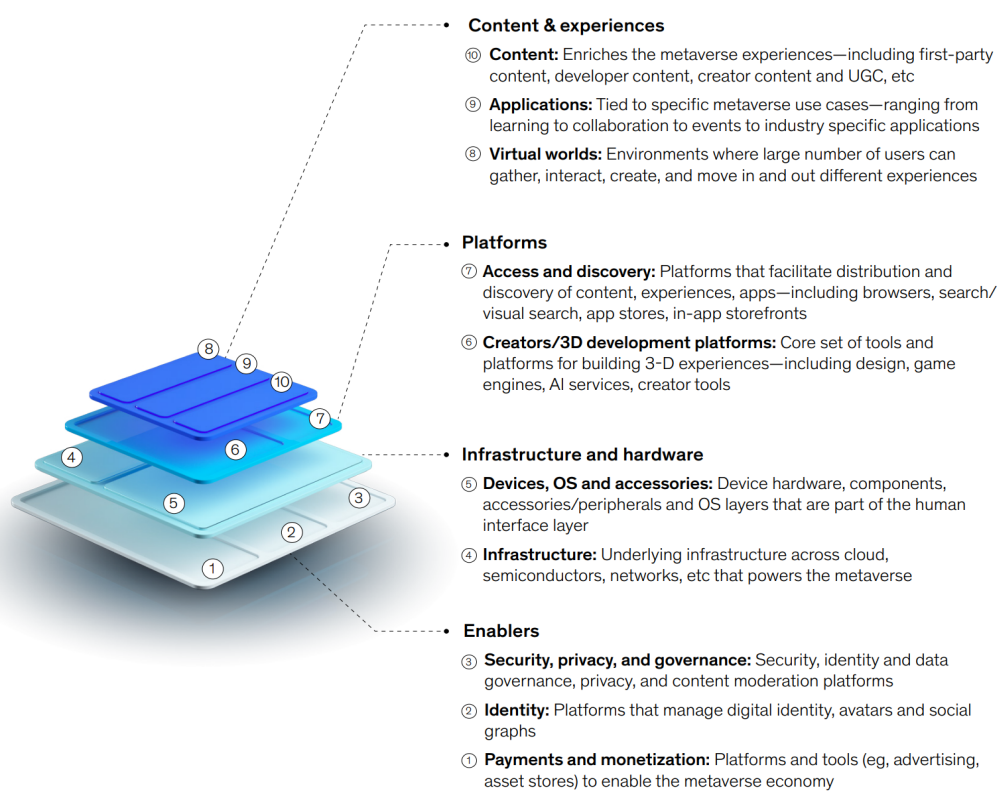
³¹ See: <http://www.theglobeandmail.com/report-on-business/virtual-shopping-gets-real-at-toronto-subway-station/article4097553/>

³² EU project aimed at a simulation, visualisation and participation platform to support the decision-making of policy-makers, business people and citizens – See: <http://www.futurict.eu/>

³³ See: <http://www.google.com/earth/explore/products/desktop.html>

[McKinsey report on metaverse](#) identifies ten layers of metaverse:

Figure 4: Technological layers of metaverseSource



Source: McKinsey

Metaverse services feature three key characteristics that differentiate them from two-dimensional (2D) online applications: (1) an **immersive**, three dimensional (3D) user experience; (2) real-time, **persistent network access**; and (3) **interoperability** across networked platforms.³⁴

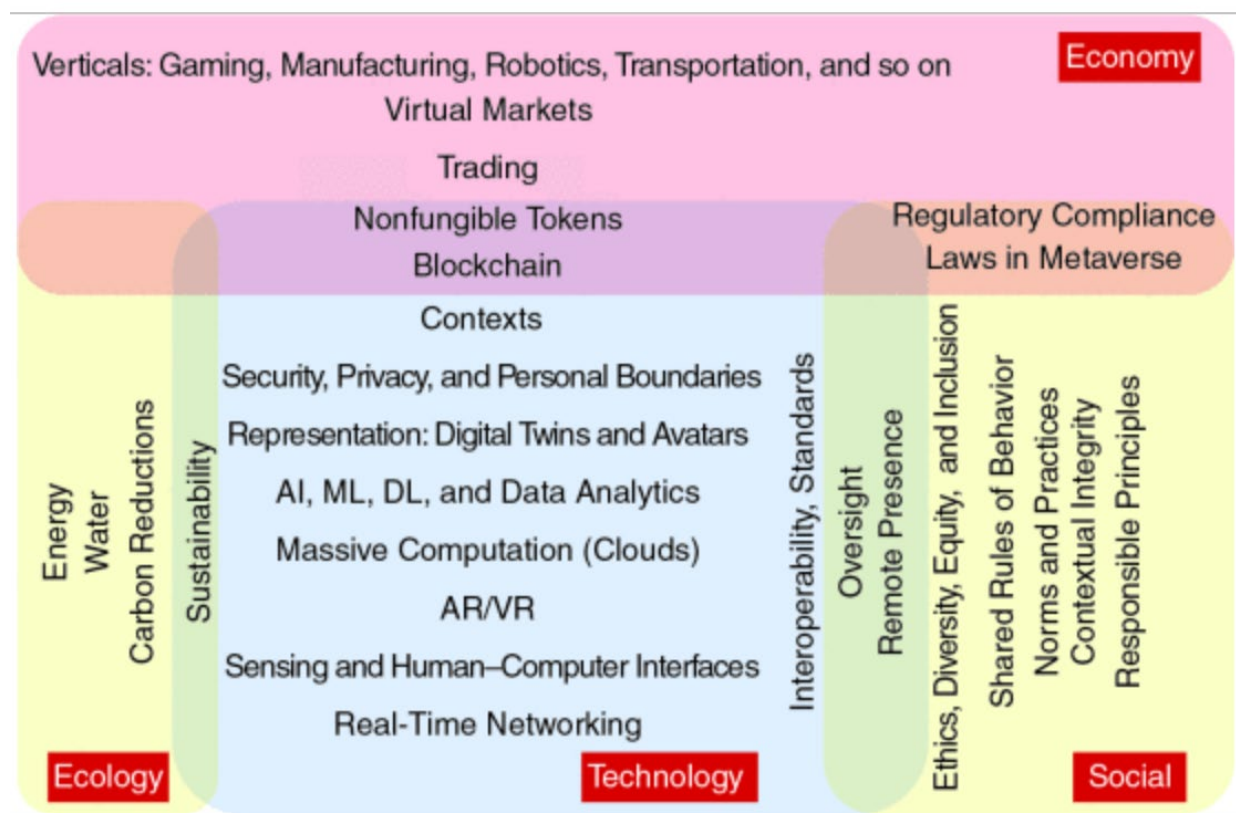
The immersive experience provides users with an enhanced feeling of presence and immersion within a virtual 3D world. Achieving persistence requires computing and data architectures capable of hosting always-on, interconnected virtual spaces as well as high-bandwidth, low-latency, wireless networks to support user devices and access. A virtual environment will generate an immense number of textured, high definition 3D objects, as well as their positions, motions, sounds, surroundings, and simulated interactions with other objects and users. This will require **massive amounts of data to be created and transmitted**, in particular during real-time events (e.g., a live online concert) involving a large number of geographically dispersed participants generating dynamic input (e.g., text and voice comments), actions (e.g., interacting with others), and reactions. Such **metaverse would require “a 1,000-times increase in computational efficiency** from today’s state of the art.”³⁵

³⁴ Zhu L, The Metaverse: Concepts and Issues for Congress, Congressional Research Service, 2022, <https://crsreports.congress.gov/product/pdf/R/R47224>

³⁵ Idem.

Achieving a believable virtual world requires a confluence of new technologies and real-time, low-latency networking that can enable many participants to experience seamless interaction. Necessary advances include sense and brain interfaces, which will further enhance immersion into the virtual world. These are the basis for augmented reality (AR) and virtual reality (VR) achieved through advanced devices connected into a cloud computing back end. The geographic distribution of massive computation enabled by cloud computing is needed to facilitate low-latency.³⁶

Figure 5: The informal metaverse architecture



Source: Virtual Worlds (Metaverse): From Skepticism, to Fear, to Immersive Opportunities³⁷

Automating the virtual behaviours of both living things and moving/evolving objects requires **automation and intelligence achieved using artificial intelligence (AI) and data analytics**. Each object in the virtual world should also have equal or similar security, privacy, and even personal or object boundaries that protect its real-world counterpart.³⁸

³⁶ Faraboschi P., Frachtenberg E., Laplante P., Milojicic D. and Saracco R., "Virtual Worlds (Metaverse): From Skepticism, to Fear, to Immersive Opportunities," in *Computer*, vol. 55, no. 10, pp. 100-106, Oct. 2022, doi: 10.1109/MC.2022.3192702, <https://ieeexplore.ieee.org/abstract/document/9903884/citations?tabFilter=papers#citations>

³⁷ Idem.

³⁸ Idem.

The metaverse development in terms of **interoperability** is uncertain.³⁹ The myriad of devices, platforms, applications, and services that may contribute to it are developed by a heterogeneous set of global actors with different business models, objectives and priorities.⁴⁰ This can lead to "a multiverse of metaverses," each with different focus, business model, and form and currently developed by leading platform players in the sectors including online games, digital commerce, virtual collaboration, and entertainment.⁴¹

Instead, interoperability would allow users to move between virtual spaces and access different platforms and services using the same devices and digital assets. This was envisaged by Mark Zuckerberg in his Founder's letter.⁴² Running multiple interoperable metaverse deployments will require standards and oversight.⁴³

³⁹ Shankland S., "The Metaverse Will Be a Multi-Platform Mess," CNET, March 26, 2022, at <https://www.cnet.com/tech/computing/features/here-comes-the-multi-metaverse-mess/>.

⁴⁰ Zhu L, The Metaverse: Concepts and Issues for Congress, Congressional Research Service, 2022, <https://crsreports.congress.gov/product/pdf/R/R47224>; See: Paul Daugherty, Marc Carrel-Billiard, and Michael Blitz, Meet Me in the Metaverse, Accenture, The Technology Vision 2022 Report, p. 7, 2022, at <https://www.accenture.com/acnmedia/Thought-Leadership-Assets/PDF-5/Accenture-Meet-Me-in-the-Metaverse-Full-Report.pdf>

⁴¹ Gurau M., "A Multiverse of Metaverses," Forbes, March 22, 2022, at <https://www.forbes.com/sites/forbestechcouncil/2022/03/22/a-multiverse-of-metaverses/>

⁴² "The metaverse will not be created by one company. It will be built by creators and developers making new experiences and digital items that are interoperable and unlock a massively larger creative economy than the one constrained by today's platforms and their policies."; See: Zuckerberg M., Founder's Letter, 2021, <https://about.fb.com/news/2021/10/founders-letter/>

⁴³ Faraboschi P., Frachtenberg E., Laplante P., Milojicic D. and Saracco R., "Virtual Worlds (Metaverse): From Skepticism, to Fear, to Immersive Opportunities," in Computer, vol. 55, no. 10, pp. 100-106, Oct. 2022, doi: 10.1109/MC.2022.3192702, <https://ieeexplore.ieee.org/abstract/document/9903884/citations?tabFilter=papers#citations>

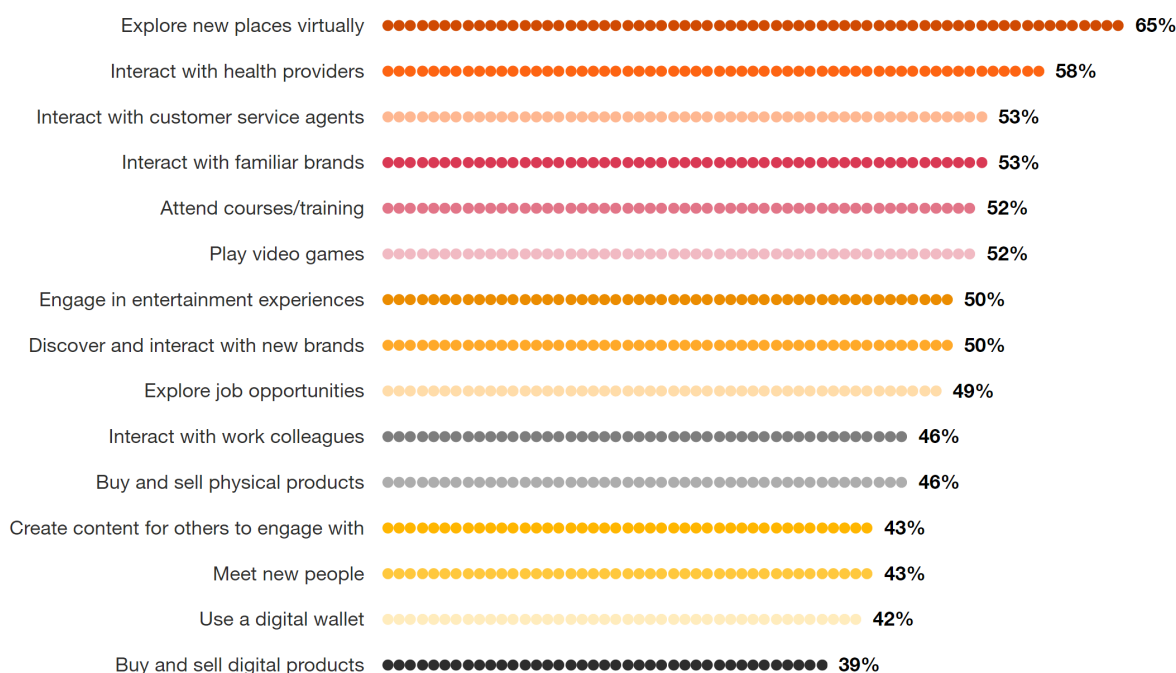
2. OPPORTUNITIES OF THE METAVERSE: DIGITISATION OF EVERYTHING

The strength of the trend towards metaverse is due principally to the **convenience of services available and a reality-like sensation of the computer-generated simulation in the metaverse.**

A survey carried out by PwC in 2022 indicated the following advantages expected by consumers from metaverse:

Figure 6: The informal metaverse architecture

What consumers want



Source: PwC 2022 US Business and Consumer Metaverse Survey, July 2022.⁴⁴

With a focus on a longer term perspective, the Pew Research Center and Elon University's Imagining the Internet Center, have asked hundreds of technology experts to share their insights on the topic with 2040 as the time horizon.⁴⁵ These answers reproduced below vividly illustrate opportunities of metaverse, with 54% of these experts of an opinion that they expect by 2040 the metaverse will be a much-more-refined and truly fully-immersive, well-functioning aspect of daily life for a half billion or more people globally:

⁴⁴ <https://www.pwc.com/us/en/tech-effect/emerging-tech/metaverse-survey.html>

⁴⁵ <https://www.pewresearch.org/internet/2022/06/30/the-metaverse-in-2040/>

- XR pioneer Avi Bar-Zeev, a co-creator of [Google Earth](#) and [HoloLens](#), wrote: “VR fundamentally **strips away the most common constraints of reality: location and travel, physics, even sometimes time**, where hours can often seem like minutes, and we can travel to the historical past or imagined futures.”
- Elizabeth Hyman, CEO for the [XR Association](#), indicated that: “Virtual, augmented and mixed reality are **the gateway to phenomenal applications in medicine, education, manufacturing, retail, workforce training and more, and it is the gateway to deeply social and immersive interactions** – the metaverse. Each day we’re taking strides to make the technology better and ensure that the opportunities are limitless – because they are. The XR industry is focused on responsible innovation and it has built a strong repository of resources that lay the foundation for the industry’s continued growth. While widespread adoption does take time and challenges will no doubt arise, we believe **XR technology will become the next major computing platform. [...] Uses of XR include warehousing and inventory management, product engineering and design, immersive job training and upskilling and virtual health care patient monitoring. Particularly in the health care setting, we’re seeing XR use with children.**”
- Daniel D. Bryant, Wales-based VR educator, co-founder of Educators in VR and a leader in the [Virtual World Society](#), pointed that: “**By 2040 the internet that you now access on a screen will be a place you can enter, visit and explore.** Currently we are looking in through windows (literally), but we are soon going to be starting to climb through the windows and into the internet. The word website implies a location. Currently this is mostly in 2D. What if these sites are in 3D and you can get in and interact directly, rather than with a keyboard and a mouse? Think how creative people already get with creating and monetizing content on the 2D internet. Now add a third dimension to this and you have just created what Charlie Fink has referred to as **the ‘largest wealth-and-value-creation experience humankind has ever witnessed.’** I can’t imagine the momentum heading anywhere else. When young people can truly get their heads and hands into the ‘metaverse,’ just stand back and watch in wonder. And that is even before AI [artificial intelligence] gets into the mix. **AI will soon be able to generate virtual worlds and useful and very convincing AI bots to populate it.** It’s a wild ride already. Better get strapped in.”
- Louis Rosenberg, is CEO of [Unanimous AI](#) pointed that the virtual metaverse will increase in popularity but will always be restricted to short-duration applications – mostly for gaming, socializing, shopping and entertainment, and it will have powerful business and education uses as well. The augmented metaverse, on the other hand, will replace mobile phones as our primary gateway to digital content. The transition from mobile phones to AR hardware will begin the middle of the 2020s and will be complete by 2035, possibly sooner. It will fundamentally change society, altering our world into a merged reality of real and virtual. People will use AR eyewear from the moment they wake up to the moment they go to sleep, much like they keep mobile phones with them today. Blockchain will be used to assign ownership of virtual objects within the metaverse.

Harvard Business Review indicated that the metaverse is set to reshape the world of work in at least four major ways: **new immersive forms of team collaboration; the emergence of new digital, AI-enabled colleagues; the acceleration of learning and skills acquisition through virtualization and**

gamified technologies; and the eventual rise of a metaverse economy with completely new enterprises and work roles.⁴⁶

2.1. Augmented and immersive access to information.

The Internet has led to a profound **transformation in our ability to access information and content.**⁴⁷ At the heart of this transformation are: digital convergence and a growing Internet network allowing for **immediate, universal and interactive access to digital content** regardless of geographical and physical barriers. In addition, the developments of metaverse allow to access content in a way that creates a sensation of reality and real-time, pervasive networking with others.

On-line access to content has brought access to worldwide databases with information, that in the past was reserved for few, required a lifetime to be gained, and necessitated long journeys and prolonged stays abroad. Today, it is immediately accessible, increasingly mobile and ubiquitous, while the main cost of it is the cost of attention and time spent consulting the content.

'Shifting from ink on paper to digital text suddenly allows us to make perfect copies of our work. Shifting from isolated computers to a globe-spanning network of connected computers suddenly allows us to share perfect copies of our work with a worldwide audience at essentially no cost. About thirty years ago this kind of [...] global sharing became something new under the sun. Before that, it would have sounded like a quixotic dream'⁴⁸.

The exponential expansion of information is particularly dynamic in areas where it is coupled with social media and crowdsourcing, thereby allowing users to share information or create content based on their experience or creativity. The trend in user-generated content is having a major impact on the value chain of the media and content industry⁴⁹. The scale of such input ranges from trivial home-made videos to networks reporting in real time on product safety concerns or human rights violations (e.g. TripAdvisor, FoodSwitch or Ushahidi).

Efficiency in online content distribution is achieved through: 1) **low cost** of dispatching, sharing and receiving information (versus physical transportation requiring significant resources and energy), including low environmental costs due to substitution of transportation by virtual mobility and dematerialisation of consumption; and 2) facilitated, immediate and **ubiquitous access to information** (versus access postponed in time).

The success of ubiquitous models is based on the fact that **markets are fundamentally determined by people's willingness to exchange goods and services.** This willingness is **driven by innovation** and **secured by freedom of contract, legal certainty and the rule of law:** continuously closing scarcity gaps through **improving knowledge about resources is its key feature.**⁵⁰

⁴⁶ <https://hbr.org/2022/04/how-the-metaverse-could-change-work>

⁴⁷ Access to information is one of the basic concepts in economics, law and scientific discovery.

⁴⁸ Suber P., Open Access, MIT Press, 2012, p. 1, http://www.amazon.com/Open-Access-Press-Essential-Knowledge/dp/0262517639/ref=sr_1_22?s=books&ie=UTF8&qid=1348216012&sr=1_22&keywords=access+to+information#reader_0262517639.

⁴⁹ McKenzie, P., Burckell, J., Trosow, S., Wong, L., Whippley, C. & McNally, M. (2012): *User-generated online content 1: overview, current state and context*. First Monday, Volume 17, Number 6 – 4 June 2012, <http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/3912/3266>.

⁵⁰ Maciejewski M. et al., Streaming and online access to content and services, Policy Department, European Parliament, 2014, [https://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/492435/IPOL-IMCO_ET\(2014\)492435_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/492435/IPOL-IMCO_ET(2014)492435_EN.pdf)

These benefits are most evident in the case of disabled and vulnerable citizens, citizens in rural areas and SMEs; in particular, in cross-border transactions.

Significant energy efficiency gains may be achieved in the area of transportation and dematerialisation of consumption⁵¹. In particular, energy efficiency may be achieved through the substitution of transport by "virtual mobility". The concept of dematerialisation on the one hand is related to the idea that not goods but information is travelling; on the other hand it is related to a concrete substitution of material goods by ICT products. Such virtual goods often refer to the dematerialisation potential of ICT for information goods. E-government can have a significant impact on reducing GHG emissions through the dematerialisation of public service delivery: "For example, many paper-based services can be moved into the digital environment and situations where face-to-face interaction has been previously required (e.g. to prove identity) can be done virtually. There are also major energy efficiency gains to be achieved in the governmental supply chain"⁵².

Virtual mobility and consumption leads to **increasing convergence between reality and digital information** through augmented reality⁵³, virtual reality and immersive technologies (digital deeply interacting with senses). In particular, augmented reality will require instant access to massive information in order to assure instant interaction between reality, sensors, search engines and digitally stored information.

Internet technology is converging with renewable energies merging to create a powerful new infrastructure.⁵⁴

However, as discussed in 2019 European Commission study, *the process of digitalisation requires an enormous amount of hardware covering final ICT goods, data centres, networks as well as accompanying infrastructures (e.g. cooling, uninterrupted power supply, etc.). All of these physical products demand energy and resources throughout their life cycles. [...] A holistic approach is needed to properly understand the impacts and get robust results: that is, not only the use phase should be looked at, but also manufacturing and end-of-life phases; not only IT equipment should be focussed on, but also on the required infrastructures; not only the carbon footprint should be measured, but also other impacts; not only direct but also indirect and systemic effects need to be acknowledged*.⁵⁵

The cost of information is the basic concept of economics and the main factor of transaction costs. Reduction of information costs - and thus transaction costs - through facilitated, immediate and ubiquitous access improves the outcomes of transactions and leads to efficiency. Such outcomes are improved not only in individual economic activity (improved information on business and employment opportunities, research and expert networks, facilitated administrative and financial compliance, etc.), but also in the area of quality of life (including access to cultural heritage,

⁵¹ Schippl J., Weinberger N., *Assessing the potential of ICT to increase energy efficiency and fight climate change – key technologies and prospects*, Study for Science and Technology Options Assessment, European Parliament 2008, p. 25-26.

⁵² Idem, p. 26.

⁵³ Osborne Ch., *Will augmented reality technology be the next big trend?*, <http://www.zdnet.com/will-augmented-reality-technology-be-the-next-big-trend-7000019439/>

⁵⁴ See: European Parliament's *Declaration on Energy and the Economy*, and Rifkin Jeremy, *The Third Industrial Revolution*, Palgrave Macmillan, 2011, p. 1.

⁵⁵ Liu R. et al. *Impacts of the digital transformation on the environment and sustainability*, 2019, p. 90, https://wayback.archive-it.org/12090/20230313090442/https://ec.europa.eu/environment/enveco/resource_efficiency/pdf/studies/issue_paper_digital_transformation_20191220_final.pdf

participation in distant cultural events, site-seeing, and e-tourism, enhanced product information and online dispute settlement, e-health services and improved information on the environmental consequences of nutrition habits reducing the environmental impact per capita⁵⁶).

In legal doctrine, access to information is expressed by such fundamental principles as the principles of equality, principle of transparency, promulgation of legal acts and access to documents, as well as by the right of access to culture and cultural heritage, access to education and other quality of life concerns.

These economic and legal principles **converge and serve the same overriding purpose of facilitation in exchange of knowledge.**

Annual benefits of selected legal instruments adopted or proposed during the 8th Legislature of the European Parliament (2014-2019)(billions of 2018 euro), **aimed to develop services offering online access to information and content for Europeans, exceed EUR 176 billions annually.**⁵⁷

At the same time there was relatively **slow uptake of public services of online access to information and services for citizens and businesses.**⁵⁸ Even the **European Union had significant and costly delays in introducing such services for Europeans despite expert studies and workshops indicating at a need for such services and European Parliament's active involvement.**⁵⁹ **Examples of such delays include, the Digital Single Gateway⁶⁰, digitisation of customs services⁶¹ and modernisation and simplification of VAT⁶².**

Whilst the legislative process is underway, the EU does not capture these annual benefits (this is known as the 'cost of slow Europe'). Assuming benefits from the digital economy of €315bn per year and an average delay in the EU legislative process of 10 months, researchers estimated **the cost of slow Europe for the digital economy from the EU legislative process at €262bn.**⁶³

Additionally, there are also costs associated with transposition delays for EU directives. The average transposition delay between 2018 and 2019 was 11.5 months. The share of directives among all legislative processes within IT, telecommunications and data processing between 2016 and 2020 was

⁵⁶ Mogensen L., Hermansen John E., Halberg N., Dalgaard R., *Life Cycle Assessment across the Food Supply Chain*, in Cheryl J. Baldwin (ed.), *Sustainability in the Food Industry*, Wiley-Blackwell 2009, p. 142, <http://orgprints.org/15610/1/15610.pdf>.

⁵⁷ Scott J.S., Contribution to Growth: The European Digital Single Market Delivering economic benefits for citizens and businesses, Policy Department, European Parliament, 2019, [https://www.europarl.europa.eu/RegData/etudes/STUD/2019/631044/IPOL_STU\(2019\)631044_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2019/631044/IPOL_STU(2019)631044_EN.pdf)

⁵⁸ Jones S. et al. Better regulation in the EU: Improving quality and reducing delays, Policy Department, European Parliament, 2022, [https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/734712/IPOL_BRI\(2022\)734712_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/734712/IPOL_BRI(2022)734712_EN.pdf)

⁵⁹ Van Veenstra A.F. et al., Ubiquitous Developments of the Digital Single Market, Policy Department, European Parliament, 2013

⁶⁰ Duke Ch. et al, A European Single Point of Contact, Policy Department, European Parliament, 2013, [https://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/507453/IPOL-IMCO_ET\(2013\)507453_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/507453/IPOL-IMCO_ET(2013)507453_EN.pdf)

⁶¹ Lejeune I. et al., Implementation of modernized customs code, Policy Department, European Parliament, 2012, [https://www.europarl.europa.eu/RegData/etudes/etudes/join/2012/475094/IPOL-IMCO_ET\(2012\)475094_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/etudes/join/2012/475094/IPOL-IMCO_ET(2012)475094_EN.pdf)

⁶² Næss-Schmidt H. S. et al., Simplifying and Modernising VAT in the Digital Single Market for e-Commerce, Policy Department, European Parliament, 2012, [https://www.europarl.europa.eu/RegData/etudes/etudes/join/2012/492432/IPOL-IMCO_ET\(2012\)492432_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/etudes/join/2012/492432/IPOL-IMCO_ET(2012)492432_EN.pdf)

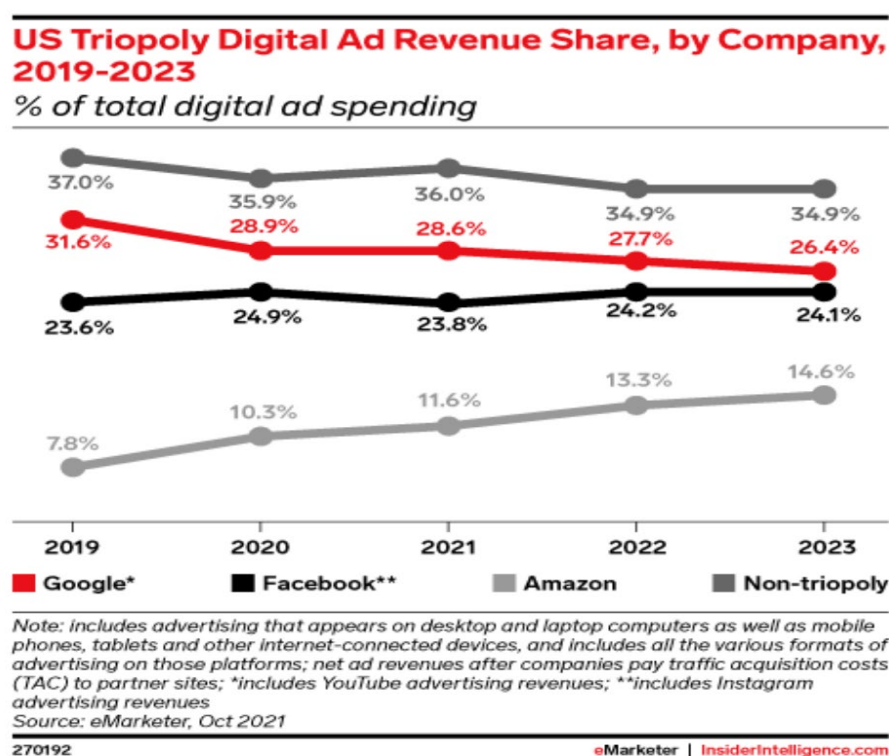
⁶³ Jones S. et a., Better regulation in the EU: Improving quality and reducing delays, Policy Department, European Parliament, 2022, [https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/734712/IPOL_BRI\(2022\)734712_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/734712/IPOL_BRI(2022)734712_EN.pdf)

19%. Applying the same estimate of €315bn per year as cost of delay, researchers estimated **a cost of transposition delay at €57bn.**⁶⁴

Summing the cost of slow Europe for the digital economy (€262bn) and the cost of transposition delay (€57bn), the **total the cost of delay for the digital economy is €319bn.**⁶⁵

Digital technologies improve as well **access of businesses, and in particular platforms, to information about consumers.** A demand for this access and its scope is driven by various reasons. Initially, and most commonly, the demand for access to information and data of citizens/consumers was driven by **marketing and advertising.** Market segmentation, a key element of both marketing and advertising, requires advanced and detailed information about consumers. The raise of Internet, cloud computing and connectivity created a perfect mix for targeted and mass collection of data and advertising based on it, including political advertising. This capacity allowed Google, Meta and Amazon to capture advertising market.⁶⁶

Figure 7: Digital Ad Revenue Share



Source: eMarketer⁶⁷

On a global market, Alibaba and Bytedance (TikTok) are important new players competing with Google, Meta, Amazon triopoly.

⁶⁴ Idem.

⁶⁵ Idem.

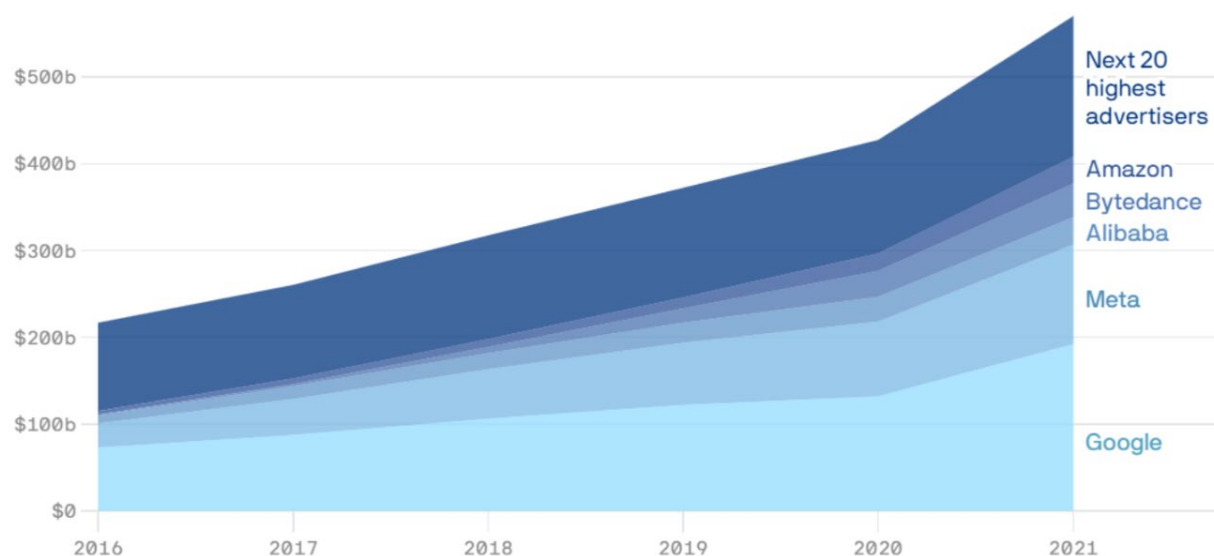
⁶⁶ <https://digiday.com/marketing/the-rundown-google-meta-and-amazon-are-on-track-to-absorb-more-than-50-of-all-ad-money-in-2022/>

⁶⁷ <https://www.insiderintelligence.com/content/google-facebook-amazon-account-over-70-of-us-digital-ad-spending>

Figure 8: Global advertisers

Top 25 global advertisers by revenue

Annually; 2016 to 2021



Data: GroupM; Chart: Simran Parwani/Axios

With the **raise of AI and metaverse**, the reasons to collect and process any sort of information and data, not just personal data, including those generated by consumers and citizens, expended to building **digital automation services**, such as **AI, virtual twins of places, work environments and persons, digital humans, AI enabled assistants and co-workers**.

The world as we know it is changing, and due to AI, everyday objects are getting smarter and interactions are shifting from only physical to virtual and hybrid:

- **Multimodal UI** and **digital humans** (AI avatars) are transforming human-machine interaction, as well as enabling a new era of intelligent software.
- **Digital twin** adoption is expanding to help improve business decisions and outcomes via the visualization and support of smart robotic fleets, complex manufacturing operations and smart cities or even individual objects, like a car or a digital human.
- Adjacent technologies such as **IoT platforms** and location services are supporting the development of contextualized and real-time digital twins due to the benefits of monitoring assets and products.
- The future collective **3D smart shared space** will materialize in the metaverse that manifests from the combinatorial fusion of multiple technologies. A **metaverse experience will enable the convergence of the physical and digital worlds** in a persistent, contextualized and device-independent way, thus redefining the immersive experiences capacity for transport, transform and transact.⁶⁸

⁶⁸ <https://emtemp.gcom.cloud/ngw/globalassets/en/doc/documents/767259-emerging-tech-impact-radar-2023-excerpt.pdf>

2.2. Economic impact of metaverse: is metaverse a megatrend?

In its 2022 report entitled "What Is a Metaverse? And Should You Be Buying In?" Gartner, a consulting firm specialised in technology, indicated that *"a metaverse today comprises multiple emerging technologies — and **organizations should be careful when investing in a specific metaverse** as it is too early to determine which investments are viable for business in the long term"*.⁶⁹

Despite this early stage of metaverse development, Gartner points that *"[e]merging metaverse technologies may be nascent, but they offer **strategic opportunities** — with potential benefits that aren't limited to virtual worlds. Metaverse will transform the physical world, as well as transport or extend physical activities to a virtual world."*⁷⁰

Gartner points at four elements of metaverse that indicate at its strategic importance: 1) **Web3**, which is a new stack of technologies for the development of decentralized web applications that enable users to control their own identity and data; 2) **spatial computing**, which can be defined as a three-tiered technology stack through which users experience the intersection of the physical and digital worlds; 3) **digital twin of a person (DToP)** not only mirrors a unique individual, but is also a near-real-time synchronized multipresence, with the ability to be present in multiple places at the same time in both digital and physical spaces; 4) **digital twin of a customer (DToC)**, a subset of DToP, a dynamic virtual representation of a customer that simulates and learns to emulate and anticipate behavior. Customers can be individuals, personas, groups of people or machines.⁷¹

Emerging Tech Impact Radar highlights the technologies and trends that have the most potential to disrupt a broad cross-section of markets. It indicates that **metaverse has high disruptive potential that will realize in the range of 6-8 years**. However, important elements of metaverse such as **digital ethics, digital twins, blockchain, generative AI, tokenization, digital humans** will start to have significant impact much earlier (1 to 3 years and 3 to 6 years in the case of generative AI, tokenization and digital human).⁷²

The Tech Impact Radar recommends **tracking metaverse, along with digital humans technology**, to be prepared to make early investments in these longer range technologies so as to be ready to utilize them when they come to maturity.⁷³

⁶⁹ See: <https://www.gartner.com/en/articles/what-is-a-metaverse>

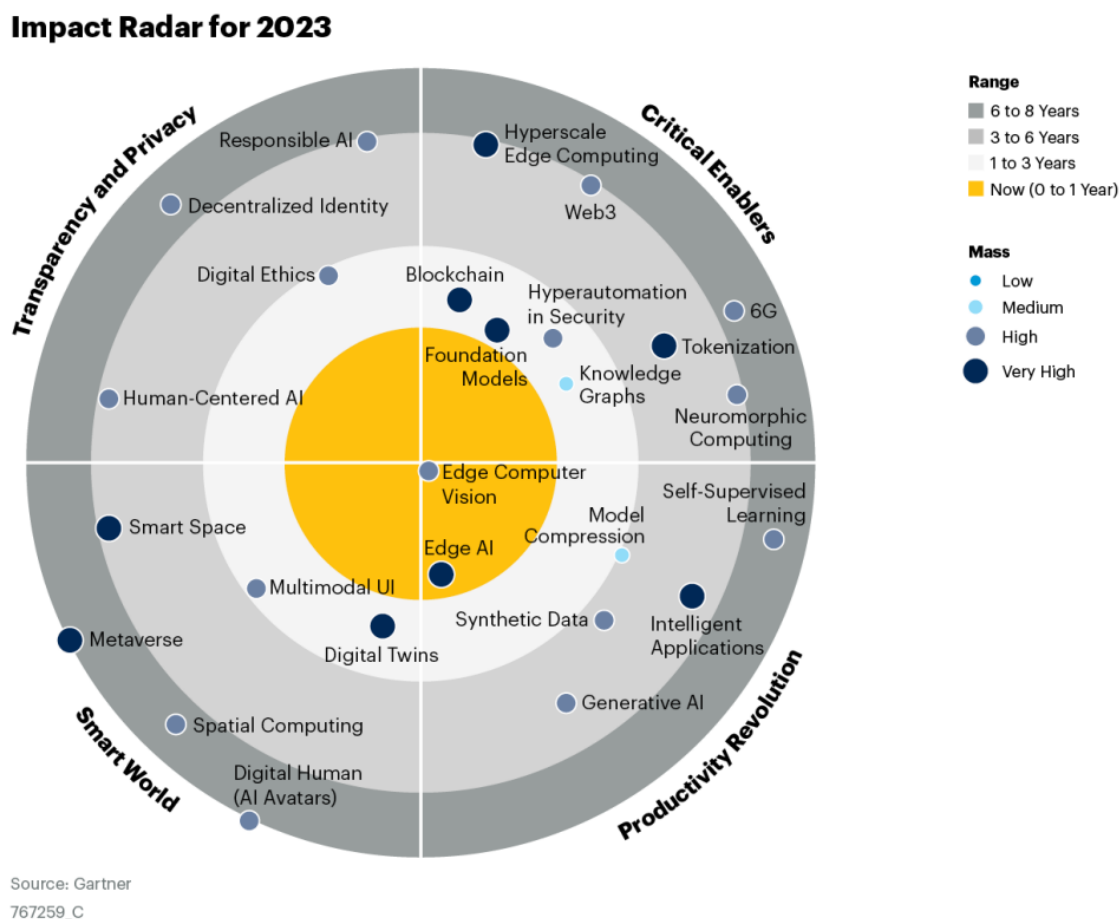
⁷⁰ See: <https://www.gartner.com/en/articles/what-is-a-metaverse>

⁷¹ See: <https://www.gartner.com/en/articles/what-is-a-metaverse>

⁷² <https://emtemp.gcom.cloud/ngw/globalassets/en/doc/documents/767259-emerging-tech-impact-radar-2023-excerpt.pdf>

⁷³ Idem.

Figure 9: Impact radar for 2023



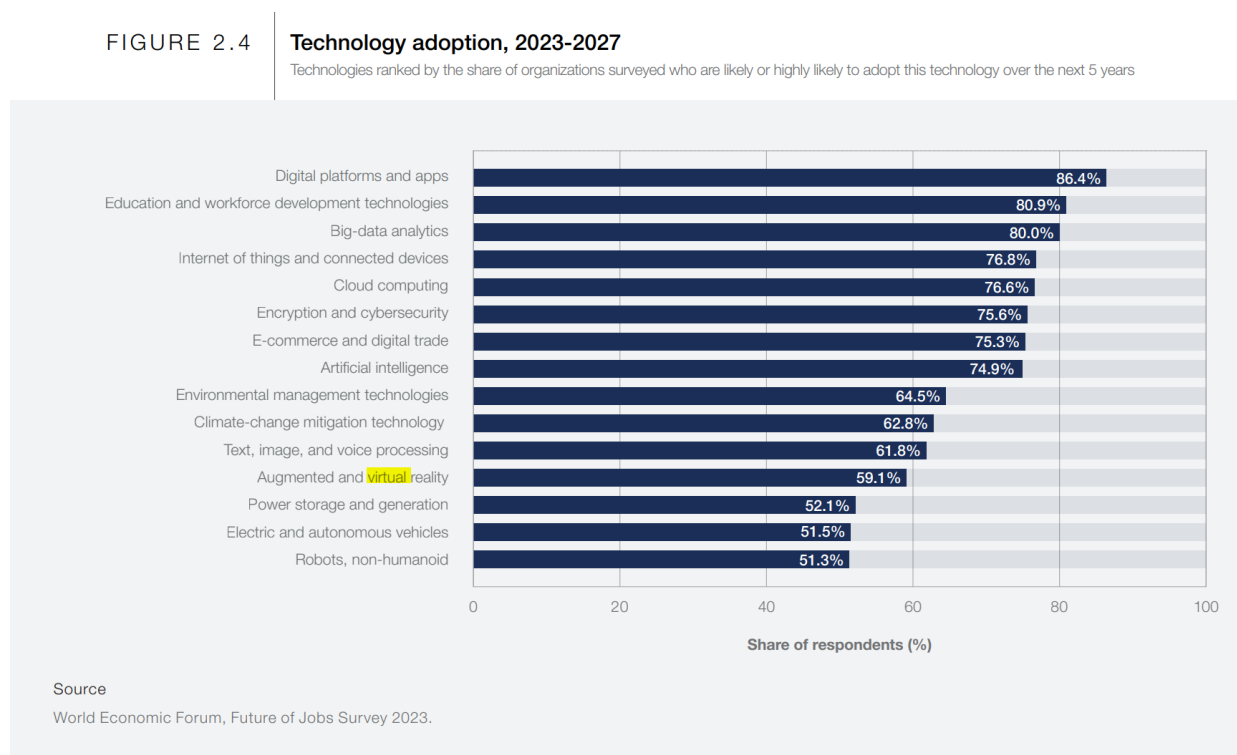
Gartner

Estimates of the economic impact of the metaverse vary widely.

According to the [World Economic Forum Future of Jobs report](https://www3.weforum.org/docs/WEF_Future_of_Jobs_2023.pdf?_gl=1*4ehgiz*_up*MQ_&qclid=CjwKCAjwgqejBhBAEiwAuWHioANeSqVXwf4ouMAigKK4rSKSFWMb8pAj9eHsfh4zePO8N4WoCR-fJR0C7MwQAvD_BwE), 59% of its responders indicated at augmented reality and virtual reality as technologies they will adopt in the next 5 years, with likely heavy adoption by organizations in electronics (80%); research, design and business management services (77%); and energy technology and utilities (75%) industries, compared to mining and metals (46%); accommodation, food and leisure services (42%); and agriculture, forestry and fishing (30%) industries.⁷⁴

⁷⁴ Future of Jobs, World Economic Forum, 2023, p. 26, https://www3.weforum.org/docs/WEF_Future_of_Jobs_2023.pdf?_gl=1*4ehgiz*_up*MQ_&qclid=CjwKCAjwgqejBhBAEiwAuWHioANeSqVXwf4ouMAigKK4rSKSFWMb8pAj9eHsfh4zePO8N4WoCR-fJR0C7MwQAvD_BwE

Figure 10: Technology adoption 2023-2027

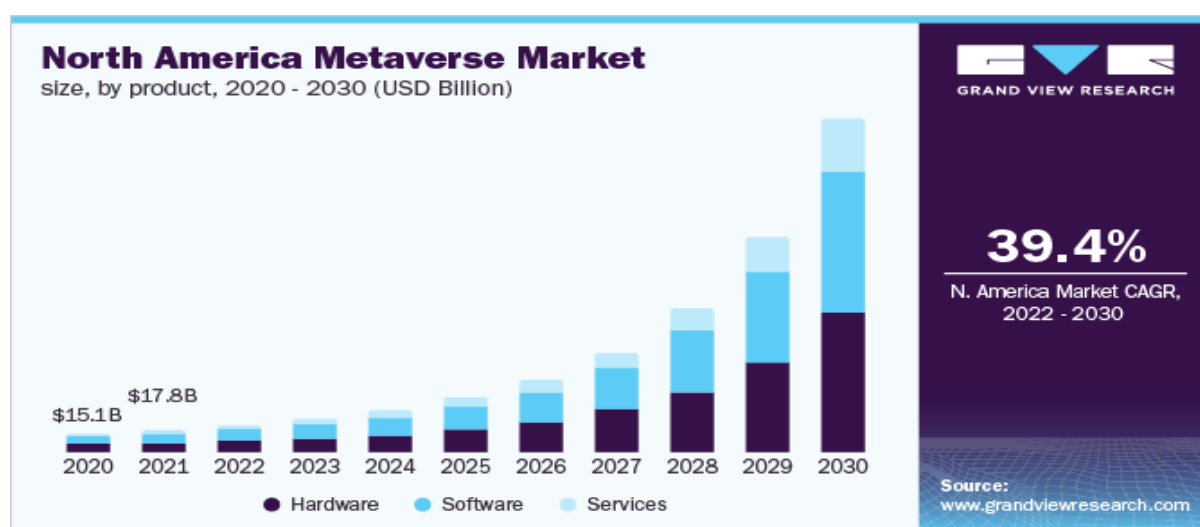


The market cap of metaverse companies was calculated around **USD14.8 trillion** as of October 2021.⁷⁵

It is estimated that the global metaverse market size was at **USD 38.85 billion in 2021**. One of the forecasts expects it to expand at a compound annual growth rate (CAGR) of 39.4% from 2022 to 2030 and estimates the global revenue forecast in 2030 at **USD 678.8 billion**.

⁷⁵ Kasiyanto S., The Legal Conundrums of the Metaverse, Journal of Central Banking Law and Institutions, Vol. 1 No. 2, 2022, pp. 299 - 322, <https://jcli-bi.org/index.php/jcli/article/view/25/15>

Figure 11: North America Metaverse Market



According to [Ecorys study](#), in Europe (including non-EU countries), the VR/AR industry market size was estimated at **EUR 9.6 billion in 2021**, with a 26 % growth from the previous year, and its market value is expected to increase between **EUR 35 billion and EUR 65 billion by 2025**.⁷⁶

Major factors expected to drive the revenue growth include a growing focus on integrating digital and physical worlds using the Internet, increasing momentum and popularity of [mixed reality](#) (MR), [augmented reality](#) (AR), and [virtual reality](#) (VR), and the outbreak of COVID-19, as well as the situation's subsequent developments and outcomes.⁷⁷

Another forecast concluded that the metaverse has the potential to contribute 2.8% to global gross domestic product (GDP) in the 10th year after the start of its adoption. If adoption began in 2022, for example, the metaverse could contribute **\$3 trillion to global GDP in 2031**.⁷⁸

Actually, some economists estimate the gross value added to the U.S. economy alone from hybrid workplaces at more than US\$2 trillion. The findings reveal that flexible working could allow the US population to add more than **\$2.36 trillion** in GVA (economic output) annually. The significant economic impact is mostly driven by individuals who are currently economically inactive and would be wanting to join the labour force if they were given the opportunity to work remotely. There are also potential savings in commuting costs for employees through flexible working. The yearly total cost

⁷⁶ <https://xreuropepotential.com/assets/pdf/ecorys-xr-2021-report.pdf>

⁷⁷ Metaverse Market Size, Share & Trends Analysis Report By Product, By Platform, By Technology (Blockchain, Virtual Reality (VR) & Augmented Reality (AR), Mixed Reality (MR)), By Offering, By Application, By End Use, By Region, And Segment Forecasts, 2022 - 2030, <https://www.grandviewresearch.com/industry-analysis/metaverse-market-report>.

⁷⁸ Christensen L. et al., The potential global economic impact of the metaverse, <https://www.analysisgroup.com/globalassets/insights/publishing/2022-the-potential-global-economic-impact-of-the-metaverse.pdf>

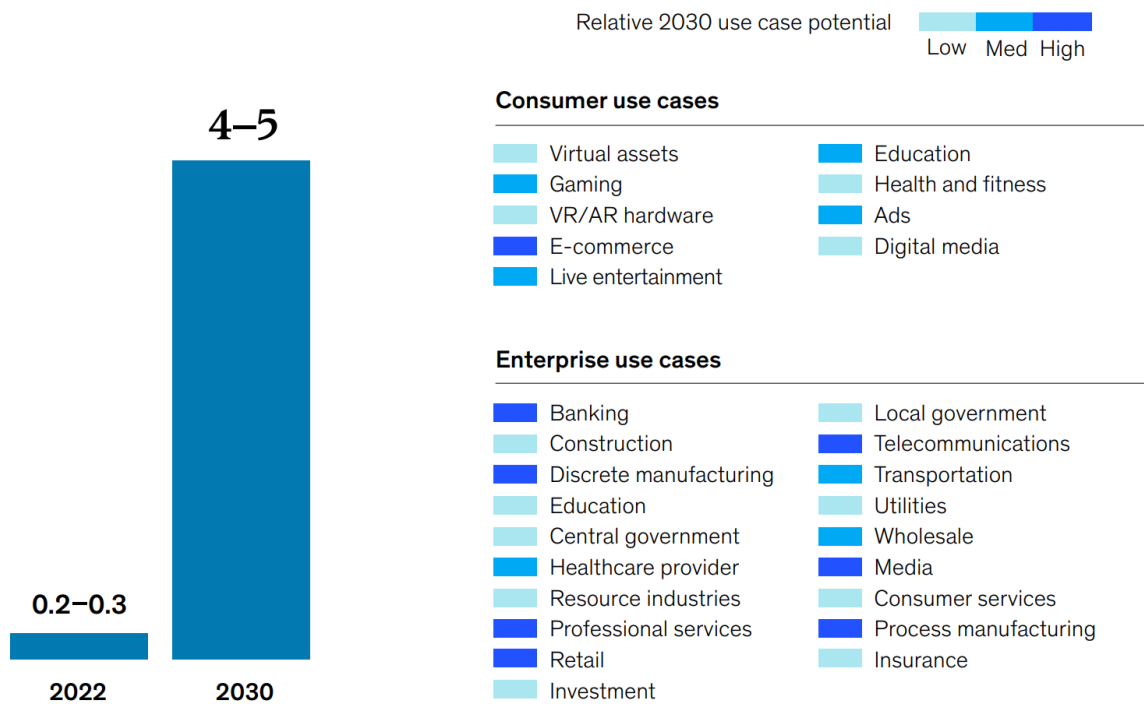
saving from reduced commuting, including the commuter value of time is estimated at **\$107.6 billion**.⁷⁹

McKinsey’s forecast in 2022 value creation in the metaverse. The study estimates that the metaverse may generate up to **\$5 trillion by 2030**.⁸⁰

Figure 12: Metaverse impact potential by 2030

By 2030 the metaverse could generate \$4 trillion to \$5 trillion across consumer and enterprise use cases.

Metaverse impact potential by 2030, \$ trillion



Source: McKinsey analysis; For a detailed explanation of the methodology behind our sizing forecast, please refer to Appendix B

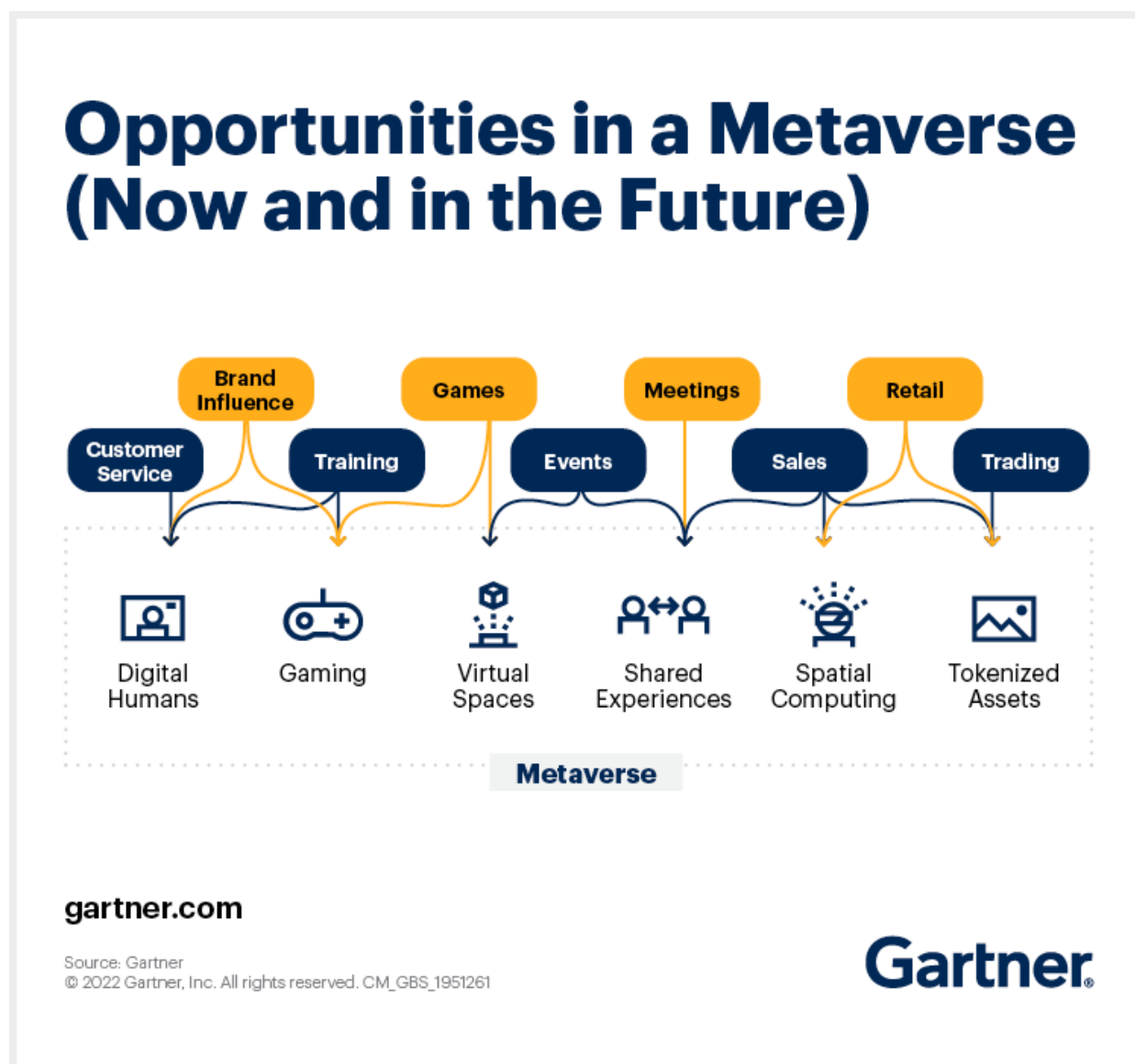
This forecast assumes that by 2030, **more than 50 percent of live events could be held in the metaverse**. More than 80 percent of commerce could be impacted by something consumers do there, from discovering brands to visiting a virtual store. Most learning and development could happen in a metaverse environment, as could most virtual or hybrid collaboration. Asset-heavy enterprises such as manufacturers and telecommunications companies may have virtually all assets and processes

⁷⁹ Report for Citrix on the potential economic impacts of a flexible working culture, 2019, https://www.citrix.com/content/dam/citrix/en_us/documents/white-paper/economic-impacts-flexible-working-us-2019.pdf.

⁸⁰ https://www.mckinsey.com/~/_media/mckinsey/business%20functions/marketing%20and%20sales/our%20insights/value%20creation%20in%20the%20metaverse/Value-creation-in-the-metaverse.pdf

represented in a digital mirror, and the same applies to the simulation of physical products and spaces to aid their design.⁸¹

Figure 13: Opportunities in metaverse



In the area of commercial use, McKinsey points at five core categories of consumer use of metaverse: 1) **gaming** - driving force of the development of the metaverse, 2) **socializing** through such platforms as Decentraland, the Sandbox, and Second Life, 3) **fitness**, 4) **commerce**, including [Sotheby's](#) proprietary marketplace for curated NFT, virtual-only fashion company Fabricant,⁶⁰ as well as start-ups promoting an immersive retail experience, including [Obsess](#) and [AnamXR](#), as the metaverse can be a channel for selling real and virtual products at scale, and emerging technology enables thousands of people to simultaneously interact may help, 5) **remote learning** connecting groups individuals in

⁸¹ Idem.

virtual classrooms; and three categories for enterprise solutions: 1) **enhanced remote collaboration**: a move from 2-D screens to an immersive 3-D space as online meetings in the metaverse will further enable remote work and potentially diminish the need for co-locating, 2) **reimagined learning and development**, where simulations of real-life settings and situations will allow for a far more captivating learning process, opening possibilities both in onboarding new colleagues and developing current personnel, which is increasingly important for organizations competing for talent on a global scale, 3) **digital twins**, with innovations such as [BMW](#)'s effort to build a digital factory twin on [Nvidia Omniverse](#), which is expected to drive efficiency improvements across its supply chain. By building virtual replicas of physical settings and objects that generate data in real-time, far richer analyses can be generated than previously to enable improved decision-making

The leading companies providing [metaverse solutions](#) include:

- **Microsoft** is an American multinational technology corporation headquartered in Redmond, Washington, United States with revenue of 168 billion USD (2021) best known for its software products. Through its [Mesh platform](#) it allows the creation of customized, animated versions of users to join meetings using the new Mesh avatars for Microsoft Teams or HoloLens and a shared virtual space, in which users can meet and interact. In January 2022, Microsoft acquired the video game development company [Activision Blizzard](#).
- **Meta** formerly Facebook, Inc., and The Facebook, Inc., is an American multinational technology conglomerate based in Menlo Park, California, owning Facebook, Instagram, and WhatsApp, among other products and services with revenue of 85.96 billion USD (2020). It attracted worldwide attention to metaverse after its major rebrand in November 2021. To date, Meta has invested a total of \$10bn in metaverse acquisition and development (for both hardware and software), in particular [Meta Horizon](#), [Meta Horizon Workrooms](#) and [Meta Quest](#), although recent reports indicate that the metaverse is causing important financial losses on the part of Meta as the user uptake is not as great as forecasted. Bloomberg reported that Mark Zuckerberg's pivot into the metaverse has cost him USD 70 billion wipe-out of his personal wealth in the real world.⁸²
- **Alphabet** is investing extensively in the advancement of the metaverse, particularly in the realms of VR and AR teams, and the development of a shared virtual reality space.
- **Decentraland** is a decentralised, 3D VR platform, which allows users to experience, create and monetise on content and applications. It stands as one of the world's leading virtual destinations for digital assets. In this virtual world, users can buy and sell land, avatar wearables, estates and more.
- **Nvidia** is one of the world's leading producers of graphics processing unit (GPU). It is pioneering developments in GPUs for consoles, laptops and PCs. Nvidia stands as one of the metaverse's biggest investors. In response to the demand for industry-standard solutions that can run 5G, AI applications and immersive graphics workloads on the same server — including for computer vision and the metaverse, NVIDIA is developing a new AI-on-5G solution that combines 5G vRAN, edge AI and digital twin workloads on an all-in-one, hyperconverged and GPU-accelerated system.
- **Shopify** - e-commerce and online shopping is a sector that's set to be completely transformed by the metaverse. Virtual shopping is an avenue that is becoming increasingly sought-after in

⁸² <https://www.bloomberg.com/news/articles/2022-09-19/mark-zuckerberg-s-net-worth-is-down-71-billion-putting-focus-on-meta-s-woes?sref=YfHlo0rL#xj4y7vzkg&leadSource=verify%20wall>

the metaverse. Shopify is specifically focusing on the realm of AR shopping capabilities and, as such, it is making heavy investments in this sphere.

- **Unity Technologies** is a global game engine company. Through the platform, developers can use the Unity Engine to develop metaverse experiences. In November 2021, Unity acquired for \$1.6bn the digital VFX company Weta Digital. Through this acquisition, and Weta's focus on VFX tools, Unity accelerates its development of real-time 3D technologies, and their deployment in the metaverse.
- **Epic Games** - a company which is also renowned for being the creator of the popular game engine Unreal Engine - is investing heavily into new metaverse gaming projects, and the advancement of **Fortnite**, to match new metaverse capabilities.
- **Roblox** a global online gaming platform, which also pioneers the development of metaverse gaming experiences. Through Roblox, users can create and share their own games and experiences, programming games themselves, and playing games that have been developed by other users.
- **Somnium space** - defines itself as an open, social, virtual reality world; a world with its own economy and its own currency; a VR world with its own marketplace, games, social experiences and land ownership⁸³; it offers as well a Live Forever mode, an automatic recording mode on consumers' "own property" for future AI analysis to bring your avatar to life. As reported by Analytics Insight the 'Live Forever' option *"allows to become eternal and communicate with your loved ones even after they die"*. The metaverse company is providing *"the opportunity to live forever in its virtual environment even after physical death"*. Anyone who wants to live forever must submit Somnium Space with comprehensive personal information. Somnium Space's CEO and founder, Artur Sychov, stated the following *"If I die—and I have this data collected—people can come or my kids can come in, and they can have a dialogue with my avatar, with my actions, with my voice. [...] You will meet the individual. And you might not realize that it's AI for the first 10 minutes of speaking with that individual. That is the intention."* The goal is for your eternal avatar to move, talk, and act exactly like you.⁸⁴

While the outbreak of Covid-19 and the launch of Horizon Worlds in 2021 by Meta Platforms singlehandedly elevated interest to metaverse into the mainstream, the climate around metaverse significantly cooled down after reporting **Meta's significant financial losses**⁸⁵, **important lay-offs** of entire metaverse's divisions and an **investment turn towards AI**⁸⁶, although the latter is a contributive technology for metaverse since it may assist in generating virtual worlds and AI bots to populate it.

⁸³ Its economy paper states that *"Our ultimate vision is to build an entirely new world for the next level of communication, e-commerce, entertainment and a place to live. We are building the platform for citizens to build on. Somnium Space is an Open, Social and Persistent Virtual Reality World, empowered by blockchain technology where everyone can buy land, build or import objects, use avatars and scripts, easily monetize their experiences and immerse themselves into a completely alternative reality."*
<https://somniumspace.com/files/Somnium%20Space%20Economy%20Paper.pdf>

⁸⁴ <https://www.analyticsinsight.net/the-tale-of-metaverse-immortality-how-do-people-live-after-dying/>

⁸⁵ <https://www.bloomberg.com/news/articles/2022-09-19/mark-zuckerberg-s-net-worth-is-down-71-billion-putting-focus-on-meta-s-woes?sref=YfHlo0rL#xj4y7vzkg>

⁸⁶ <https://www.businessinsider.com/meta-layoffs-ceo-mark-zuckerberg-moves-away-from-metaverse-ai-2023-3?r=US&IR=T>

On 1 June 2023, Mark Zuckerberg announced in a [video on Instagram a new Quest 3](#) headset with “high-res color mixed reality”.⁸⁷

On 5 June 2023, Apple unveiled their [Vision Pro](#) headset based on augmented and virtual reality, also referred to as the first spatial computer. It has built in an advanced 4K video capacity and lenses elaborated in cooperation with Zeiss.

2.3. Social benefits of metaverse

Studies prepared for the European Parliament were indicating since over a decade at important **potential of ubiquitous information and communication technologies for e-government**. Ubiquitous services can provide users with **real-time access to desired information, from anywhere and at any time, significantly lowering transaction costs**. Areas identified by experts as deserving particular attention regarding EU level coordination included: **identification (e-ID), authentication, and authorisation schemes; the European Interoperability Framework (EIF) and related activities; e-health, e-VAT; and e-customs**.⁸⁸

Global examples of best practice can be found in South Korea, Japan, the US, and Canada.⁸⁹ **South Korea's** u-strategy aims to create a ‘top level’ u-infrastructure also offering services for mobile devices. **Japan's** ubiquitous policies aim to use ICTs to cope with societal challenges, such as health care issues due to a rapidly aging society, environmental issues and energy shortage, and public safety. Central to **the U.S.** strategy is focus on transparency, participation, and collaboration. **Canada's** Federating Identity Management is seen as one central element towards achieving a citizen-centred service model.⁹⁰

Metaverse, in particular, can improve the **public's accessibility to and engagement** with legislators and government agencies. It can serve as a platform for **collaboration and information sharing to increase efficiencies and cooperation**.⁹¹

In terms of public metaverse the most notorious examples of using metaverse are the following:

- South Korea's capital, **Seoul**, announced a five-year “Metaverse Seoul Basic Plan” that will begin by creating a [virtual Seoul City Hall](#), plaza, and civil-service center.
- A complete [digital 3D replication](#) of Estonia.
- **Dubai's** [Virtual Assets Regulatory Authority](#) earlier this year established Metaverse HQ on [the Sandbox](#), making it the first regulator in the emerging digital space.
- [Tuvalu announced](#) a plan to become the first digitised nation in the metaverse.

⁸⁷ <https://www.cnn.com/2023/06/01/meta-quest-3-unveiled-ahead-of-apples-planned-vr-headset-debut.html>

⁸⁸ Van Veenstra A.F., Ubiquitous Developments of the Digital Single Market, Policy Departments, European Parliament, 2013, [https://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/507481/IPOL-IMCO_ET\(2013\)507481_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/507481/IPOL-IMCO_ET(2013)507481_EN.pdf)

⁸⁹ On the current progress and ranking of e-government see: UN E-Government Survey 2022, <https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2022>

⁹⁰ Van Veenstra A.F., Ubiquitous Developments of the Digital Single Market, Policy Departments, European Parliament, 2013, [https://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/507481/IPOL-IMCO_ET\(2013\)507481_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/507481/IPOL-IMCO_ET(2013)507481_EN.pdf)

⁹¹ <https://www2.deloitte.com/ca/en/pages/technology-media-and-telecommunications/articles/metaverse-considerations-government-public-service.html>

- At a session of the 90th [Interpol](#) General Assembly in New Delhi, the global police organization unveiled the first ever [Metaverse specifically designed for law enforcement](#) worldwide. However, there is a number of concerns regarding operations of Interpol, in particular the oversight of its system of red notices and sharing of citizen's personal data.⁹²
- **Europol** released a [report on policing in the metaverse](#) and a [video](#) explaining it's engagement in metaverse.

Governments across the world (e.g. Maldives, Sweden, Estonia, Serbia, Kazakhstan) established virtual embassies. Many governments have embarked on simulations of voting, interactive learning and even conferences, all in virtual mode.

A virtual polling station was set up in Alameda County, California state of the U.S. to explain voting procedures.⁹³ [MuniGov 2.0](#) is a coalition of federal, state, local, municipal and international governments focused on exploring the use and principles of Web 2.0, as well as Web3, in an effort to improve citizen services and communication via technology. Additional examples include the U.S. contractors for the Agriculture Department's Forest Service who are using AI and digital twin technologies to simulate wildfires in a metaverse to better understand their dynamics and how they can slow or stop their spread. U.S. Air Force leaders at Tyndall Air Force Base in Florida have created a digital twin of the entire base to help plan rebuilding projects following the 2018 destruction of Hurricane Michael. Using a new virtual portal to access Tyndall's digital twin, planners can conduct "what if" scenarios and locate and design new flight line facilities that will support new squadrons of F-35 Lightning II strike fighters due to arrive in 2023.

E-government developments need to be accompanied by a general reflection on **better law-making** to make sure that there is an **efficient regulation** in the first place and that metaverse e-government services are developed to accompany such better law-making. **Facilitating and eliminating costs of compliance** increases **aggregate welfare** ultimately through increased economy-wide productivity and innovation. Missing e-government and a lack of coordination of e-government solutions at the European level, which leads to **market fragmentation**, is a **key barrier to Single Market integration** across sectors and a substantial cost factor⁹⁴ while non-transparent and overly complicated public and private measures can have **devastating effects for individual citizen and the entire economy**.⁹⁵ Myriads of taxes, fees and administrative requirements accompanied by criminalizing provisions and administrations that confront citizens⁹⁶ instead of assisting them, take away resources from innovation.

⁹² See: Wandall R.H., Ensuring the rights of EU citizens against politically motivated Red Notices, Policy Department, European Parliament, 2022, [https://www.europarl.europa.eu/RegData/etudes/STUD/2022/708135/IPOL_STU\(2022\)708135_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2022/708135/IPOL_STU(2022)708135_EN.pdf)

⁹³ Gayatri P., Metaverse – The Start of a New Era of Government Services, National Informatics Centre, 2023, <https://www.nic.in/blogs/the-metaverse-the-start-of-a-new-era-of-government-services/>

⁹⁴ Godel M.I., Reducing Costs and Barriers for Businesses in the Single Market, Policy Department, European Parliament, 2016, [https://www.europarl.europa.eu/RegData/etudes/STUD/2016/578966/IPOL_STU\(2016\)578966_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2016/578966/IPOL_STU(2016)578966_EN.pdf)

⁹⁵ Muller P. et al., Consumer Protection Aspects of Financial Services, Policy Department, European Parliament, 2014, [https://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/507463/IPOL-IMCO_ET\(2014\)507463_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/507463/IPOL-IMCO_ET(2014)507463_EN.pdf)

⁹⁶ <https://www.oecd.org/tax/use-of-digital-technologies-set-to-increase-tax-compliance.htm>

Complexity of current compliance systems is unsustainable. It is true for the U.S.⁹⁷ as much as for the EU.⁹⁸ While ICT and metaverse can provide assistance in compliance and in informing citizens about regulatory requirements, such assistance will result in wasteful energy consumption, if performed on cluttered regulation. This energy waste would be a reflection of wasteful character of the entire process.⁹⁹ Such regulation should be subject to **better law-making and better regulation requirements**. E.g. taxing average income with aim to finance budgets could be considered wasteful and replaced by monetary policy. **Compliance can be automated through ICT and metaverse**, while administration should ascertain such automation, its proper functioning and perform advisory functions towards citizens. We stress that **extending rights - not barriers and sanctions - for citizens correlates with economic growth**.¹⁰⁰

Metaverse and healthcare

Metaverse is applied in telemedicine, virtual medicine, remote care and monitoring, data-driven medicine and other fields. The use of limited equipment resources to provide highly mobile, digital, real-time, and remote medical services for patient diagnosis, first aid, and nursing care, improves medical efficiency, and informatization of the medical industry.

The main advantages of metaverse in healthcare and patient care can be placed in the following categories: virtual reality's growing role in medical training, digital therapeutic applications of metaverse, augmented reality in surgical procedures, radiology, medical wearables in metaverse, mental health.¹⁰¹

Metaverse technology, if accompanied by real innovation to meet people's perceptions and expectations, will revolutionize the performance of health care. Institutions must however understand how to create this technology safely for the patient and meet the human aspects. In addition, the potential of the metaverse in education can create a revolution in students' medical training and public health.¹⁰²

According to futurist Bernard Marr, the metaverse has the potential to impact healthcare through the convergence of three current major technological trends: (a) telepresence, (b) digital twinning, and (c) blockchain.¹⁰³

Telemedicine consultations, particularly through VR, mean that patients are no longer limited to being treated by particular clinicians due to their physical location. In the case of the metaverse, the digital twin - a virtual model, or simulation, of any object, process, or system, generated using real-world data,

⁹⁷ McBride W., Testimony: The Costs and Complexity of the Federal Tax Code Demand Reform, <https://taxfoundation.org/federal-tax-complexity-costs-reform/#conclusion> prepared for Senate Budget Committee hearing on April 18, 2023, titled, "A Rigged System: The Cost of Tax Dodging by the Wealthy and Big Corporations."

⁹⁸ <https://www.aatcomment.org.uk/accountancy-resources/brexit/the-true-economic-cost-of-cross-border-tax-complexity-revealed/>

⁹⁹ Brady D., 6.5 Billion Hours, \$260 Billion: What Tax Complexity Costs Americans, 2023, <https://www.ntu.org/foundation/detail/65-billion-hours-260-billion-what-tax-complexity-costs-for-americans>

¹⁰⁰ [https://www.europarl.europa.eu/RegData/etudes/ATAG/2019/638392/IPOL_ATAG\(2019\)638392_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/ATAG/2019/638392/IPOL_ATAG(2019)638392_EN.pdf)

¹⁰¹ Gravand A. et al., Metaverse phenomenon and its impact on health: A scoping review, Informatics in Medicine Unlocked, Volume 32, 2022, <https://www.sciencedirect.com/science/article/pii/S235291482200171X>

¹⁰² Idem.

¹⁰³ Marr B. (2022) The amazing possibilities of healthcare in the metaverse. Forbes <https://www.forbes.com/sites/bernardmarr/2022/02/23/the-amazing-possibilities-of-healthcare-in-the-metaverse/?sh=793e17159e5c> (accessed Apr. 18, 2023)

for the purpose of learning more about its real-world counterpart - could be of the patient. Finally, distributed and encrypted databases allow data to be stored and transferred securely in a way that no one except the data owner can tamper with. They are considered to be an important part of the metaverse concept since they allow for a decentralized record of digital "ownership".¹⁰⁴

However, although VR has been hailed as the future of mental health management, the fact remains that studies have shown a lack of significant improvement over conventional, evidence-based approaches. Current studies exploring the benefits of VR-based therapy suffer from low quality of evidence, a limited number of randomised controlled trials, the lack of follow-up analysis or control groups, and the presence of heterogeneity and publication bias.¹⁰⁵

An extended list of metaverse deployments in the health sector is presented in a 2022 study commissioned by the European Commission and prepared by Ecorys [Extended reality Opportunities, success stories and challenges \(health, education\)](#).

Education and metaverse

According to Meta website, metaverse technologies have the potential to transform school lessons, bring teachers and students together remotely in shared spaces, enhance vocational training, and create new opportunities for lifelong learning.¹⁰⁶ The website points that at Japan's N and S high schools, the largest online high schools in the country, more than 6,000 students learn in VR using Meta Quest 2 headsets. Their teachers report that this enhances the learning experience and enables students to nurture social skills even when they are physically far away. Metaverse also opens up opportunities for students to learn from people they don't have access to locally. Students in the most remote corner of Alaska could tour NASA, the Louvre in Paris, or the Grand Egyptian Museum in Cairo. A personal tutor could run a session with a student in a completely different city without either having to leave their house.¹⁰⁷ Metaverse can assist blended learning, virtual experiment learning, language learning, competence-based education, and inclusive education.¹⁰⁸

According to Brookings Institute playful learning may help children to develop skill in the area of collaboration, communication, content, critical thinking, creative innovation and confidence.¹⁰⁹

Governments play a role in laying the groundwork through curriculum development, digital literacy schemes, and by supporting and convening educators to help steer this technology to have the biggest impact.

An extended list of metaverse deployments in the education sector is presented in a 2022 study commissioned by the European Commission and prepared by Ecorys [Extended reality Opportunities, success stories and challenges \(health, education\)](#).

¹⁰⁴ Idem.

¹⁰⁵ Dellazizzo L, Potvin S, Luigi M, et al. Evidence on virtual reality-based therapies for psychiatric disorders: meta-review of meta-analyses. J Med Internet Res 2020;22:e20889.doi:10.2196/20889 pmid: <http://www.ncbi.nlm.nih.gov/pubmed/32812889>

¹⁰⁶ <https://about.fb.com/news/2023/04/how-the-metaverse-can-transform-education/>

¹⁰⁷ Idem.

¹⁰⁸ Xinli Z. et al., The metaverse in education: Definition, framework, features, potential applications, challenges, and future research topics, Frontiers in Psychology, Vol. 3, Year 2022, <https://www.frontiersin.org/articles/10.3389/fpsyg.2022.1016300/full>

¹⁰⁹ <https://www.brookings.edu/research/a-whole-new-world-education-meets-the-metaverse/>

Art in metaverse

The metaverse can be used for various purposes, including organizing art exhibitions, auctions and being a platform for art creation.¹¹⁰

On importance of metaverse for the future of art, [Dhiren Dasu](#) stated that “[t]he metaverse is the proverbial perfect storm of experiential technology poised at the juncture of art, entertainment, social media and crypto currency. It has the potential to revolutionise the art world. Storage, location, display, transparency, authenticity and accessibility are the stumbling blocks to experiencing or owning fine art. The metaverse provides a platform for creators, commentators, critics, galleries and collectors to transcend all of these issues.” while Tina Vaz pointed that “with its focus on experiences and its potential to address the structural barriers and inequities of physical life, the metaverse has the potential to be radically transformative for art and the art world.”¹¹¹

Exhibits are increasingly presented in digital form, allowing museum exhibitions to be extended to more regions. At the same time, a combination of virtual and real exhibits is being used to display precious collections that cannot be touched up close, enabling a variety of interaction methods for people and collections.

Among museum offering virtually their exhibits are:

- [Vatican Museums](#), Rome,
- [Guggenheim](#), Bilbao,
- [Rijksmuseum](#), Amsterdam,
- [Musée d’Orsay](#), Paris
- [Natural History Museum](#), London,
- [National Gallery](#), London
- [National Museum of Modern and Contemporary Art](#), South Korea
- [Shanghai Natural History Museum](#), China
- [MASP](#), São Paulo, Brazil
- [J Paul Getty Museum](#), Los Angeles,

There are also purely virtual art exhibitions such as [Substrata](#) hosted by Epoch Gallery (a virtual art gallery) and the Los Angeles Museum of Art (LAMO), that let artists to create their own environment where one can buy and sell digital art, play games, and explore any other immersive experience, or [Unit Gallery](#) which has its own metaverse through its platform institut.co on Arium.

Auction houses and galleries also ventured into the metaverse to exhibit and sell artworks. Sotheby's, for instance, created a [permanent space](#) in Decentraland¹¹², where [KÖNIG GALERIE](#) has its own [gallery](#) and [NFT](#) auction.

¹¹⁰ Praeble M., The raise of immersive art exhibitions, 2022, <https://insights.masterworks.com/art/museums/the-rise-of-immersive-art-exhibitions/>

¹¹¹ What is the metaverse and why does it matter to the art world? Experts weigh in and predict its future impact, 2022, <https://www.theartnewspaper.com/2022/01/28/what-is-the-metaverse-and-why-does-it-matter-to-the-art-world-experts-weigh-in-and-predict-its-future-impact>

¹¹² <https://www.sothebys.com/en/articles/next-stop-the-metaverse>

3. CHALLENGES OF THE METAVERSE: HOW TO GET CYBERSICK, HARRASED, SURVEILLED, COPIED AND ROBBED, ALL AT THE SAME TIME

3.1. An overview of challenges

The immersive, persistent, and real-time environment and large-scale virtual platforms of the metaverse reproduce and magnify the issues already surrounding the online platforms, services, and applications, such as content moderation, privacy, competition, and the digital divide.¹¹³

The founding Members of the Congressional Caucus on Virtual, Augmented, and Mixed Reality Technologies¹¹⁴ have asserted that “[a]s these technologies develop, questions will inevitably rise in privacy, intellectual property, and other areas.”¹¹⁵ In fact, metaverse could become a real minefield for regulators.¹¹⁶

In its 2022 survey PwC indicated the following immediate concerns of businesses and citizens regarding the metaverse:

Figure 14: Concerns of consumers and businesses

What business leaders worry about...		What consumers worry about...
Cybersecurity	1st	Privacy concerns
Privacy risks	2nd	Risk of being hacked
Technology constraints	3rd	Cost of tech to participate
Regulatory uncertainty	4th	Lack of protection / regulation
Intellectual property concerns	5th	Unclear benefit

¹¹³ Zhu L, The Metaverse: Concepts and Issues for Congress, Congressional Research Service, 2022, <https://crsreports.congress.gov/product/pdf/R/R47224>

¹¹⁴ In May 2017, Representatives Suzan DelBene, Yvette Clarke, Bill Flores, Darrell Issa, and Ted Lieu formed the Congressional Caucus on Virtual, Augmented, and Mixed Reality Technologies for the 115th Congress, also known as the “Reality Caucus.” to promote the advancing technologies of virtual reality, augmented reality, and mixed reality to Members of Congress and their staff.

¹¹⁵ Zhu L, The Metaverse: Concepts and Issues for Congress, Congressional Research Service, 2022, <https://crsreports.congress.gov/product/pdf/R/R47224>

¹¹⁶ Harry Robertson, “Wall Street Is Pumped About the Metaverse. But Critics Say It’s Massively Overhyped and Will Be a Regulatory Minefield.” Business Insider, December 25, 2021, at <https://markets.businessinsider.com/news/stocks/metaverse-outlook-overhyped-regulations-facebook-meta-virtual-worlds-genz-2021-12>

Source: PwC 2022 US Business and Consumer Metaverse Survey, July 2022.¹¹⁷

Pew Research Center and Elon University's Imagining the Internet Center's survey on the topic of the metaverse with 2040 as the time horizon resulted in the following examples of concern from the experts:

- Justin Reich, associate professor of digital media at MIT and director of the Teaching Systems Lab, pointed that: *"The term metaverse was coined to describe a corporate, dystopian hellscape where a completely financialized world is stripped of any culture and value. Advocates of the metaverse are currently trying to bring that vision into reality in the hopes of creating **new digital surfaces that can be covered in new advertising and made as addictive as possible**. As the physical world encounters saturation of existing advertising surfaces and data collection, augmented reality is **the new frontier of surveillance capitalism**. If it does come to fruition, it will be as terrible as social media is today. Questions that I've not seen journalists ask of Mark Zuckerberg or other folks at Meta: 'How many hours a day are you currently spending in the metaverse?' 'How many hours a day do you encourage your children to spend in the metaverse?' My hunch is that the typical Meta employee spends very little time in the metaverse, because it's terrible. And they don't want their children there, because it's terrible."*
- According to Davi Ottenheimer, vice president for trust and digital ethics at Inrupt, *"We should declare metaverse to only be a success if it augments the human in a decentralized human-centric model of data ownership. It is currently in danger of being co-opted into **overly centralized platforms and constraints, a regression to slavery models in the guise of a proprietary 'digital twin' to be abused by giant companies looking to operate selfishly and above the law and deny social good**.[...]"*
- Keram Malicki-Sanchez, a prominent expert and activist who runs conferences about VR, AR and XR and is founding president of the Constant Change Media Group, indicated that: *"There is no way to put the genie back in the bottle of immersive technologies. **There is no future without 3D realities** as part of it. **Will it be called the 'metaverse'? God, I hope not if that means the MAANG companies – Meta (formerly Facebook) Amazon, Apple, Netflix and Google – appropriate and commandeer it to funnel us into a homogeneous, highly trackable somatosensory collection of walled gardens**. An alternative path for these technologies is that they will be built using **open-source solutions**, improved and expanded holistically, organically by a **global community who will create an estuary for systems that allow people to seamlessly transition between 3D worlds where they can embody whatever they want and share whatever experiences they choose**. These are also media that can communicate new perspectives and afford us new angles of insight via dimensional contexts. They can provide scaffolding to test our analytical reasoning and processes to potentially escape our **cognitive biases**, develop greater plasticity, or even test new forms of embodiment. We must always take account of how these new media can and will be **manipulated** and **weaponized** and consider **the rights of our future selves as we become subsumed in data**. In addition, there are important **digital divides** to consider here. These cannot be worlds accessible only to the privileged. VR needs to be built so that anyone should feel they have the tools and access available to them."*¹¹⁸

¹¹⁷ <https://www.pwc.com/us/en/tech-effect/emerging-tech/metaverse-survey.html>

¹¹⁸ <https://www.pewresearch.org/internet/2022/06/30/the-metaverse-in-2040/>

3.2. Metaverse related health concerns in adults and minors

The key health concern caused by the metaverse is motion sickness, known as well as **cybersickness**, which is well known in research since at least thirty years and is vastly discussed as an ongoing problem.¹¹⁹

In traditional 360-degree VR experiences, translational movement in the real world is not reflected in the virtual world, and therefore self-motion information is not confirmed by matching visual and vestibular cues, which may trigger symptoms of cybersickness.

Studies have shown that more than half of first-time headset users experience the phenomenon within 10 minutes of being exposed to VR.¹²⁰

The cybersickness associated with XR exposure often includes **nausea, disorientation, oculomotor disturbances, drowsiness** (so called sopite syndrome), and **other discomforts**.¹²¹

Cybersickness can linger long after XR exposure and **compromise postural stability, hand-eye coordination, visual functioning, and general well-being**. These after effects generally result from the individual's sensorimotor adaptation to the immersive experience, which is a natural and automatic response to an intersensorily imperfect virtual experience and is elicited (and often resolved) by the plasticity of the human nervous system, which recalibrates continuously to new inputs. It is speculated that the problem is less severe in AR, as compared to VR, but that assumption has yet to be fully validated.¹²²

Another research points that **up to 80% of VR users experience debilitating symptoms of discomfort, disorientation, nausea, eyestrain, headaches and sweating**. It clarifies that cybersickness includes severe and frequent disorientation symptoms (dizziness, vertigo, and difficulty in focusing), followed by nausea symptoms (stomach awareness, increased salivation, and nausea itself), and in third place oculomotor symptoms (eyestrain, headache, and blurred vision).¹²³

Research is analyzing **dominant factors that determine cybersickness incidence and its severity**, such as camera movement, including rotation, translation, navigating speed, and acceleration,¹²⁴ as well as **ways of limiting cybersickness**, e.g. by restricting dynamic field-of-view.¹²⁵

¹¹⁹ McCauley, M. E., & Sharkey, T. J. (1992). Cybersickness: Perception of self-motion in virtual environments. *Presence: Teleoperators and Virtual Environments*, 1(3), 311–318, <https://doi.org/10.1162/pres.1992.1.3.311>

¹²⁰ <https://neurosciencenews.com/cybersickness-vr-21243/>

¹²¹ Kay Stanney, Ben D. Lawson, Bas Rokers, Mark Dennison, Cali Fidopiastis, Thomas Stoffregen, Séamas Weech & Jacqueline M. Fulvio (2020) Identifying Causes of and Solutions for Cybersickness in Immersive Technology: Reformulation of a Research and Development Agenda, *International Journal of Human–Computer Interaction*, Volume 36, 2020 - Issue 19, 1783–1803, <https://www.tandfonline.com/doi/full/10.1080/10447318.2020.1828535>

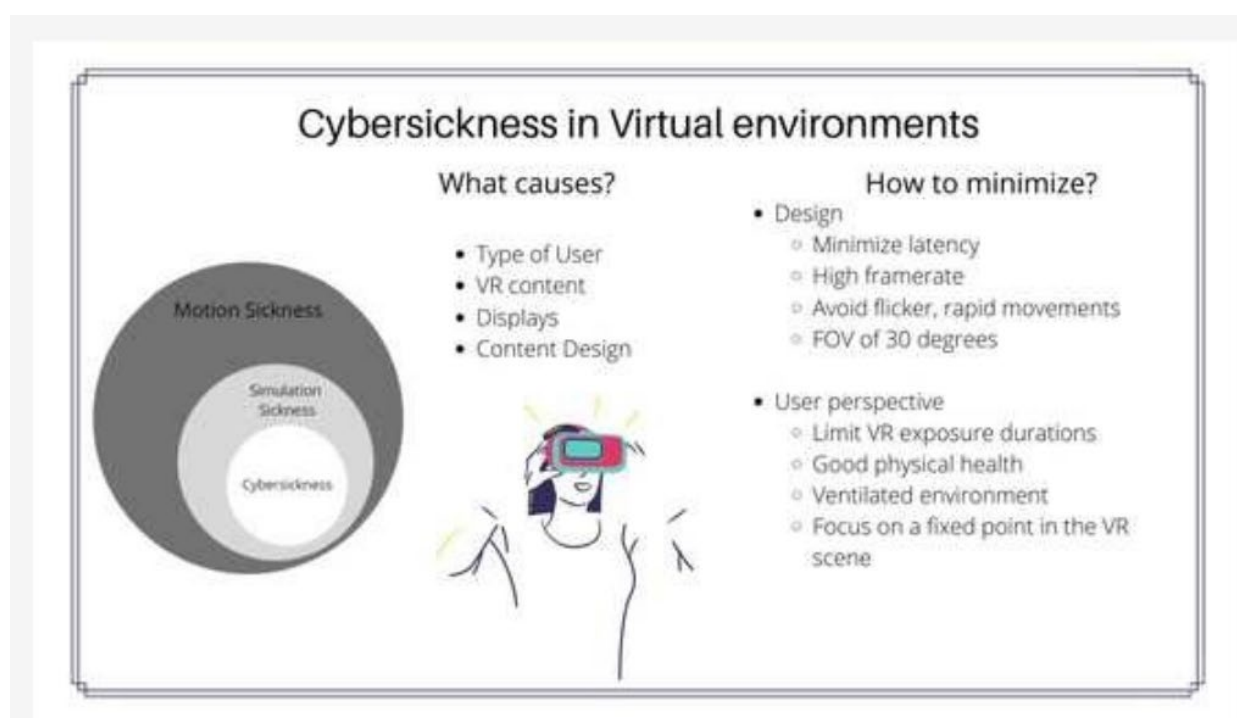
¹²² Idem.

¹²³ Arshad I. et al., Reducing Cybersickness in 360-Degree Virtual Reality, *Multisensory Research* 35 (2022) 203–219,

¹²⁴ Heeseok O. et al., Cybersickness and Its Severity Arising from Virtual Reality Content: A Comprehensive Study, *Sensors* 2022, 22(4), 1314; <https://doi.org/10.3390/s22041314>

¹²⁵ Teixeira, J., Palmisano, S. Effects of dynamic field-of-view restriction on cybersickness and presence in HMD-based virtual reality, *Virtual Reality* 25, 433–445 (2021), <https://doi.org/10.1007/s10055-020-00466-2>

Figure 15: Cybersickness



Source: A Systematic Survey on Cybersickness in Virtual Environments¹²⁶

Human ability for sensorimotor adaptation to the immersive experience, which is elicited by the plasticity of the human nervous system, is **particularly problematic in the case of minors**. Human nervous system in its stages of formation is particularly affected by the use of the metaverse which will trigger the individual's sensorimotor adaptation in ways that would not occur in natural environment.¹²⁷ Headsets should not be used by children younger than 13 years, and for those older should be used with caution and for a limited time.

Since the metaverse is relatively new, there are not yet any long-term studies on its impact on childrens' health and development but there are important and alarming indications of persisting issues that call for an ethical and regulatory framework concerning minors:

- **Age verifications.** Age verification remains extremely unreliable and often inaccurate on digital platforms.
- **Physiological dangers.** VR sets can sometimes cause children to become nauseous or experience eye strain with potentially lasting effects. These immersive devices can also make children unaware of their real physical surroundings, sometimes resulting in injuries.
- **Psychological risks.** Some emerging studies indicate that a positive correlation may exist between VR technologies underlying the metaverse and psychological implications such as addiction, aggression, and dissociation from reality.

¹²⁶ Chandra A.N.R. et al., A Systematic Survey on Cybersickness in Virtual Environments, Computers 2022, 11(4), 51; <https://doi.org/10.3390/computers11040051>

¹²⁷ <https://www.techdetoxbox.com/weapons-of-digital-manipulation/vr-and-your-brain-is-metaverse-the-end-of-humanity/>

- **Memory risks.** Some researchers believe that the metaverse could lead to the creation of false memories in children.
- **False information and manipulation.** One highly popular technology in the metaverse is called deepfake, a type of technology that uses deep learning to replace what someone looks like with a different face in media or video. This technology may be used to manipulate or persuade people (including children).¹²⁸

As noted by WHO spending more time online connected to the metaverse with gadgets may reduce levels of physical activity and give advertisers many more ways to promote unhealthy products such as junk food, tobacco or alcohol.¹²⁹

3.3. Inappropriate conduct and content

Metaverse is affected by such problems as **cyberbullying, sexual harassment, catfishing and hate speech**. The harm reported is potentially even more insidious and impactful than in multiplayer games, on social apps, in other related Web 2.0 environments, since the realism that accompanies VR experiences readily translates to fear experienced emotionally, psychologically, and physiologically when individuals are targeted or threatened.¹³⁰

Research prepared by Centre for Counting Digital Hate concluded that minors are being routinely harassed and exposed to adult content on Meta's flagship virtual reality social network, Horizon Worlds. Researchers logged into Horizon Worlds 100 times, recording footage from each visit. Horizon Worlds is the flagship social app in Meta's family of 'metaverse' VR products, and is currently supposed to be limited to users aged 18 and up. Analysis of recording showed that minors already routinely use the platform, with minors present in 66 of the 100 recordings collected. Within these recordings researchers identified 19 incidents of abuse directed at minors by adults, including sexually explicit insults and racial, misogynistic and homophobic harassment. Minors were also spotted in multiple 'Mature Worlds' where Meta permits sexually explicit content, legal drugs and gambling. Mature Worlds must be marked as 18+ but there are no further safety measures and they are easily accessible from the main menu or in-world 'portals'.¹³¹

Numerous other metaverse services are affected by this problem while there are no public, large-scale analyses of abuse in VR, AR, or immersive gaming and reliance is on individual reports.¹³²

The legal limits of conduct in a metaverse and who will police them constitutes an important legal aspect. A beta tester of Facebook's VR platform Horizon World recently made allegations that she had been virtually groped in a virtual Horizon World meeting space called the Plaza.¹³³ Facebook has thus far responded by noting that users can block each other, but it did not address the potential legal

¹²⁸ <https://www.security.org/digital-safety/parents-metaverse-guide/>; Reed N. et al., Kids and the Metaverse: What Parents, Policymakers, and Companies Need to Know, <https://www.common sense media.org/sites/default/files/featured-content/files/metaverse-white-paper.pdf>

¹²⁹ <https://www.who.int/europe/news/item/05-01-2022-healthy-metaverse-how-can-we-promote-health-online>

¹³⁰ Hinduja S., The Metaverse: Opportunities, Risks, and Harms, Cyberbullying Research Centre, <https://cyberbullying.org/metaverse>

¹³¹ https://counterhate.com/wp-content/uploads/2023/03/Horizon-Worlds-Exposed_CCDH_0323.pdf

¹³² Reed N. et al., Kids and the Metaverse: What Parents, Policymakers, and Companies Need to Know, <https://www.common sense media.org/sites/default/files/featured-content/files/metaverse-white-paper.pdf>

¹³³ <https://www.technologyreview.com/2021/12/16/1042516/the-metaverse-has-a-groping-problem/>

consequences of such actions, which may require novel application of laws designed to address misconduct in the physical world.

On this front, many metaverse projects have terms of service that purport to govern user conduct contractually, allowing remedies for violation such as banning from the platform and confiscation of in-world assets. For example, the virtual worlds Fortnite and Roblox both require users to accept terms of service before entering the game. These terms typically address an array of conduct, from restriction of various behaviours to measures taken to achieve platform security to methods for dispute resolution.

The general rules on tort liability (non-contractual injuries, including emotional distress, and property damage) and contract law apply to the metaverse, although as indicated earlier they may make an awkward fit to specificities of metaverse, and courts will need to look into novel issues of application to new technology.

A [NGO Truth in Advertising](#) filed a [complaint](#) with the FTC over alleged deceptive advertising practices by the Roblox. The complaint alleges that Roblox fails to make a clear distinction between entertainment content and advertising content for reasonable consumers, especially children. The platform allows users to create "advergaming" combining advertisements with gaming experiences. However, the complaint alleges that it is almost impossible to distinguish between (sponsored) games created by advertisers and games created by individual users (without promotional content), and that the sponsored nature of virtual events is not always clear.

In February 2022, three Members of Congress wrote a letter to Lina Khan, Chair of the Federal Trade Commission, regarding "the potential threats to children who use VR products and platforms." In the letter, they urged the FTC to use its authority under the [Children's Online Privacy Protection Act of 1998](#) (COPPA; Title XIII of P.L. 105-277) and the [Federal Trade Commission Act of 1914](#), as amended, to protect children in the metaverse. Among the concerns identified by the Members are "VR companies' plans to present commercial advertisements in the metaverse," which "could lead to harmful marketing practices that may be inherently manipulative of children." The Members stated that under the laws the FTC "has a statutory obligation to ensure that powerful technology platforms treat young people fairly, comply with the platforms' own public statements [e.g., privacy policies], and protect children's privacy."

Metaverse, along with video games, accommodates **unprecedented levels of violence**. Games involve killing opponents with the use of various weapons, including axes, knives, machine guns and grenades. Such games are extremely graphically explicit.

The American Academy of Pediatrics published a [policy statement Virtual Violence](#) in July 2016 advising pediatricians, parents, industry and policy makers regarding current video game research and recommendations. Regarding research findings, Virtual Violence policy states: "[s]ummarizing the results of > 400 studies including violent media of all types, researchers found there was a significant association between exposure to media violence and aggressive behavior, aggressive thoughts, angry feelings, and physiologic arousal."¹³⁴

Despite unprecedented violence multiple games carry PEGI rating that allows their use for 12 years old children. PEGI 12 indication should be used on *video games that show **violence of a slightly more graphic nature** towards fantasy characters or non-realistic violence towards human-like characters would fall in this age category. **Sexual innuendo or sexual posturing can be present**, while any **bad language***

¹³⁴ <https://www.tagcounseling.com/ten-reasons-why-children-under-the-age-of-12-should-not-play-violent-video-games/>

in this category must be mild. It is questionable if such activities are recommendable for children. However, there are metaverse games available with PEGI 12 indication where young players of 12 years old can engage in earning points by capturing different zones and by getting eliminations (killings) mastering different weapon loadouts. In practice, they walk around a limited area shooting opponents, including by deployment of machine guns from short distance.¹³⁵ Yet, violent video games, which enable kids to enact violence, may increase the risk of aggression for some children in the near future and the risk of aggressive behavior later in life.¹³⁶ In the long term, players are more likely to be desensitized to media violence, which correlates with decreased empathy in the real world.¹³⁷

Research is now documenting **game transfer phenomena**, where gamers retain visual imagery and violent behaviors endemic in the game and transfer these to real life. A study of adult gamers showed 71% visualized video game imagery with eyes closed after gaming; 31% visualized imagery with eyes open. This raises the question of what children experience following video game immersion. Younger children are more impressionable.¹³⁸

Another risk relating to VR is **disassociation**. VR disassociation relates to coming out of VR and no longer feeling connected to your body, and/or perceiving the physical world as not real, which can induce anxiety or panic attacks.¹³⁹

3.4. Personal data protection and privacy concerns

As pointed by Sartor, two or three decades ago, when the Internet was still in its beginning, the mainstream assumption was that information and communication technologies would deliver a new economic environment, making for new exiting opportunities for both businesses and citizens: disintermediation, unlimited access to information, larger and open markets, the opportunity for global interactions.¹⁴⁰

The main focus of the debate was on the conflict between, on the one hand, the legal and socio-economical restrictions to the free-flow of information (such as censorship and copyright) and, on the other hand, the need to enable the free growth of the new online ecology.¹⁴¹

Raise of non-transparent mass- and targeted surveillance

This model was followed by an emergence of a set of powerful, **monopolistic or oligopolistic, intermediaries**, in multiple domains, from access to the internet infrastructure, to search engines, to platforms for sharing online content, to e-commerce, to cloud services, to online payments. With regard to the online provision of information services —search engines, online repositories, social

¹³⁵ E.g. in *Deserted: Domination* by Epic Labs and available on [Fortnite site](#).

¹³⁶ Prescott, A. T., Sargent, J. D., and Hull, J. G. (2018). Metaanalysis of the relationship between violent video game play and physical aggression over time. *Proc. Natl. Acad. Sci. U.S.A.* 115, 9882–9888. <https://doi.org/10.1073/pnas.1611617114>

¹³⁷ Carnagey, N. L., Anderson, C. A., & Bushman, B. J. (2007). The effect of video game violence on physiological desensitization to real-life violence. *Journal of Experimental Social Psychology*, 43(3), 489–496. <https://doi.org/10.1016/j.jesp.2006.05.003>

¹³⁸ <https://www.tagcounseling.com/ten-reasons-why-children-under-the-age-of-12-should-not-play-violent-video-games/>

¹³⁹ The Institution of Engineering and Technology, *Safeguarding the metaverse*, 2022, <https://www.theiet.org/media/9836/safeguarding-the-metaverse.pdf>

¹⁴⁰ Sartor G., *New aspects and challenges in consumer protection - Digital services and artificial intelligence*, European Parliament, 2020, [https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU\(2020\)648790](https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU(2020)648790)

¹⁴¹ Ibidem.

networks —the business model has emerged according to which **services are offered for free to final users**, but they are backed by **advertising revenues**. Thus, such key services for the information society are offered on **two sided markets**: providers have two different classes of clients — advertisers, and users — and have to take both into account.¹⁴²

While this business model was undoubtedly successful on the entrepreneurial side, leading to the emergence of some of the richest companies of today's economy, such as Facebook and Google, its record from a liberal-egalitarian perspective is questionable, as this business model contributes to **pervasive surveillance and influence over citizens**.¹⁴³

At this point exponential increase of **computing power, ubiquitous hyper connectivity and artificial intelligence** rapidly advanced providing technologies through which to exploit the wealth of information so as to better target individuals: big data and AI have converged, providing a new infrastructure for addressing and managing individuals.

The **statistical machine-learning** approach has become dominant in AI. This approach uses big data sets to automatically build models that track correlations, and then uses such models to make predictions for new cases. It has meant that records of past behaviour could be used to grasp correlation between data (purchases, sites visited, likes on social networks) and possible responses to ads and other related messages).

Every click or message, can be recorded in order to use it subsequent discover possible correlation that may be useful in influencing individuals through the most effective adds. **Psychographic techniques** can be deployed to extract the personality types and psychological attitudes of individuals. **Emotion detections techniques** are also increasingly available: these enable the monitoring of facial expression and record voices to infer emotional states and reactions of individuals and use this knowledge in transactions.

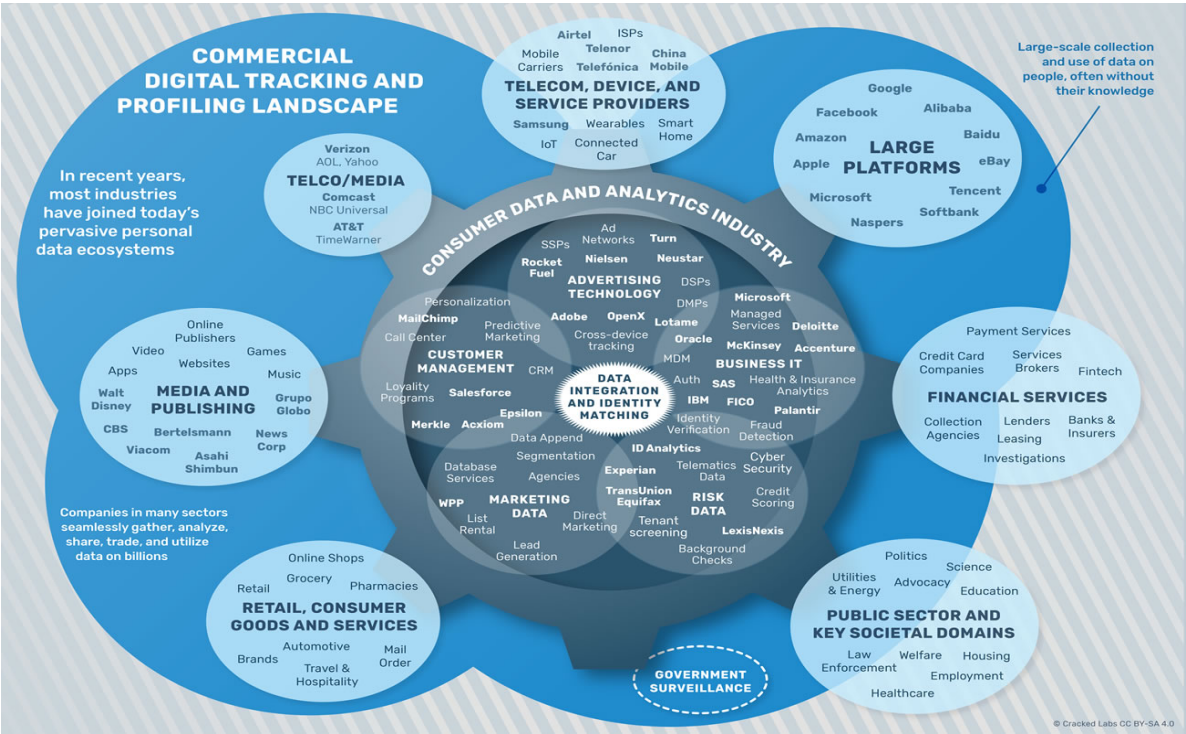
In the contexts of computer-powered smart homes, cars, and cities, AI is embedded into physical objects (e.g. house appliances, cars, roads, etc.). Interconnected sensing devices increase the amount and the specificity of data collected and enable ubiquitous commercial interactions with individuals.

¹⁴² Ibidem.

¹⁴³ Ibidem.

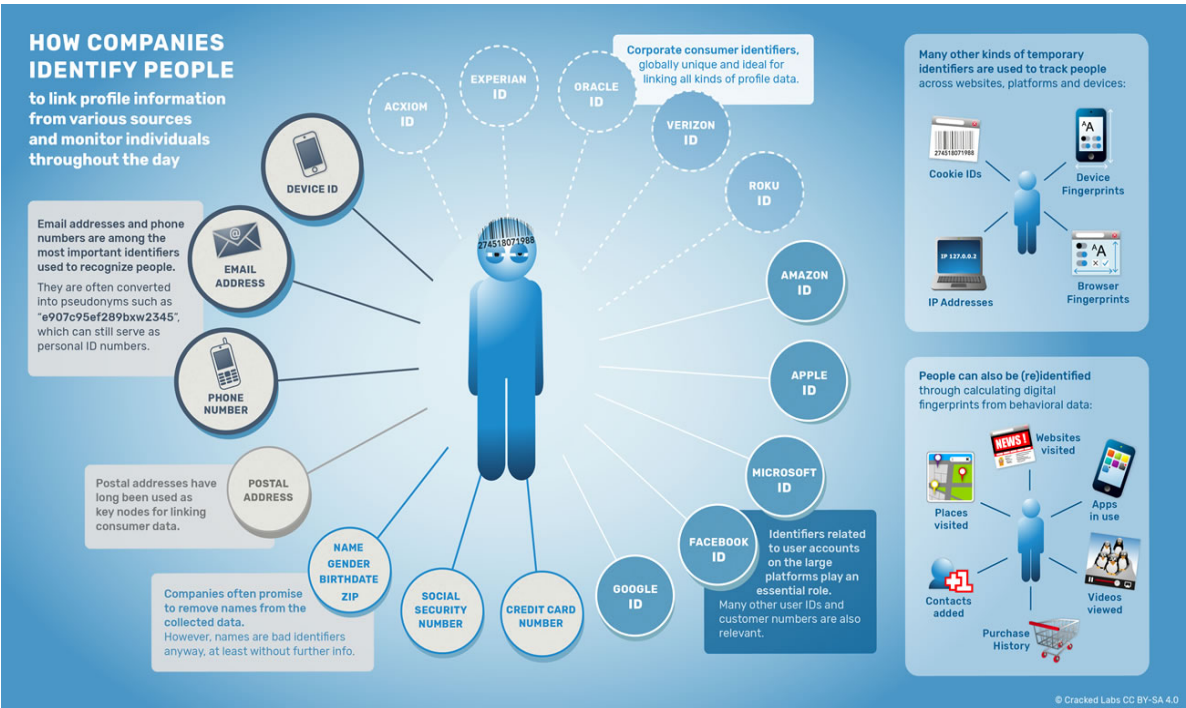
Below figure presents complexity of tracking and profiling industry:

Figure 16: Commercial digital tracking and profiling



The following figure shows how companies identify individuals:

Figure 17: How companies identify people

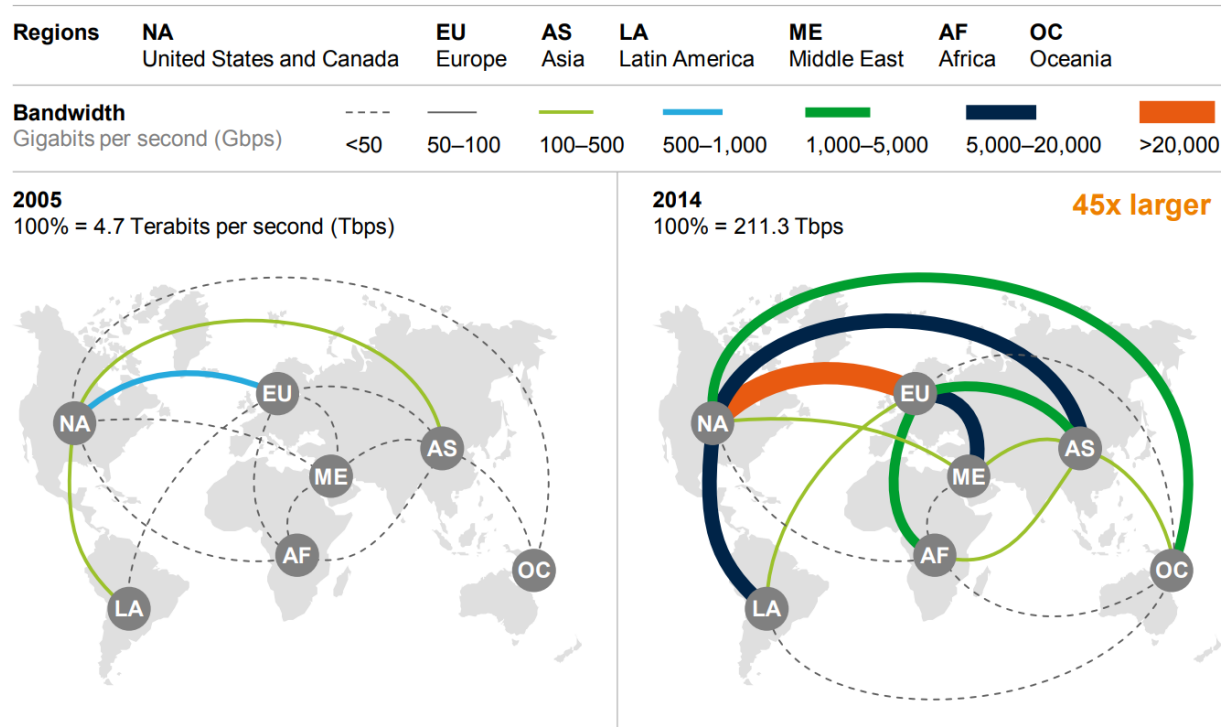


A 2016 report by the McKinsey Global Institute¹⁴⁴ indicates that the volume of data transfers grew between 2005 and 2014 about 45 times, with the data **transfers between the EU, the US** and Canada constituting the biggest part of this growth.

Figure 18: Cross-border data flows

Cross-border data flows are surging and connecting more countries

Used cross-border bandwidth



NOTE: Lines represent interregional bandwidth (e.g., between Europe and North America) but exclude intraregional cross-border bandwidth (e.g., connecting European nations with one another).

SOURCE: TeleGeography, Global Internet Geography; McKinsey Global Institute analysis

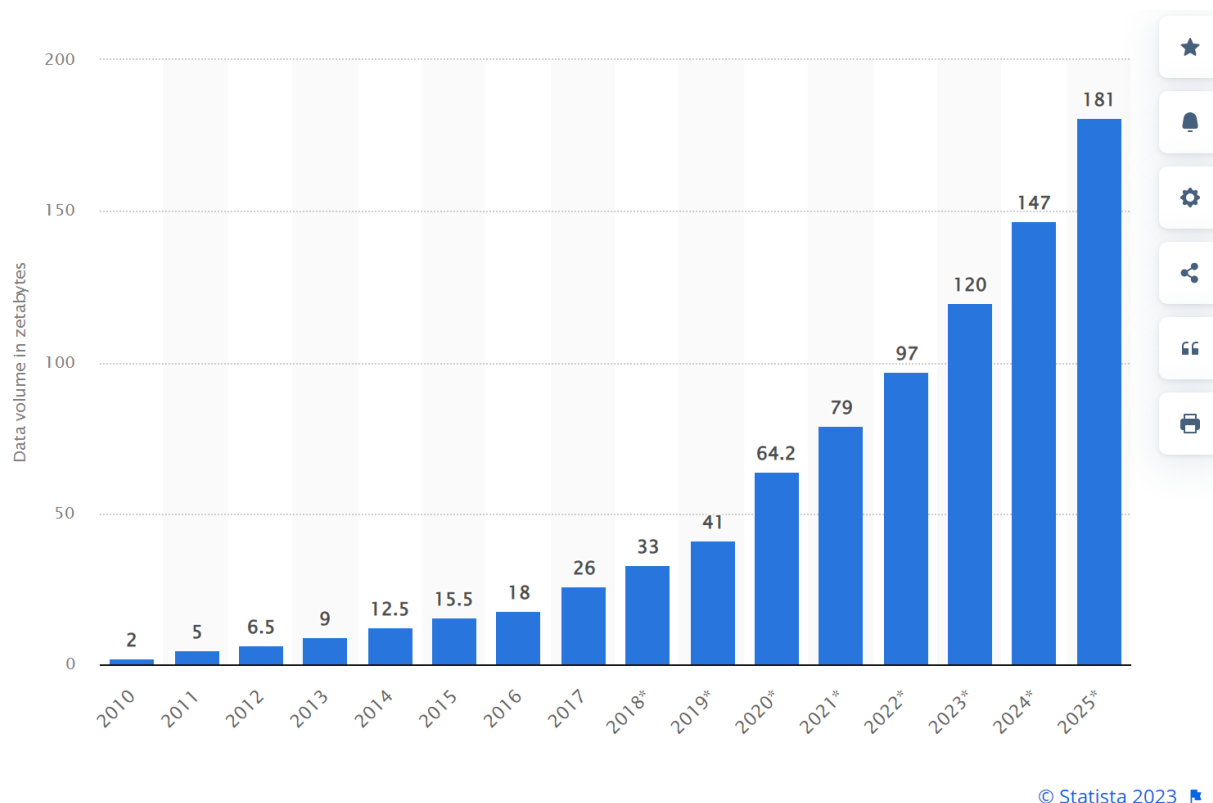
Statista website forecasts that the global volume of data transfers **will grow further to 181 zettabytes in 2025**.¹⁴⁵ While traditional trade flows in goods (including commodities, finished goods, and intermediate inputs) flattened, rapidly growing trade in data is the new hallmark of international trade in general.¹⁴⁶

¹⁴⁴ McKinsey Global Institute, Digital Globalization: The New Era of global Flows, 2016, available at: <https://www.mckinsey.com/~media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/digital%20globalization%20the%20new%20era%20of%20global%20flows/mgi-digital-globalization-full-report.pdf>

¹⁴⁵ <https://www.statista.com/statistics/871513/worldwide-data-created/>

¹⁴⁶ McKinsey Global Institute, Digital Globalization: The New Era of global Flows, 2016, available at: <https://www.mckinsey.com/~media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/digital%20globalization%20the%20new%20era%20of%20global%20flows/mgi-digital-globalization-full-report.pdf>

Figure 19: Volume of data/information created, captured, copied, and consumed worldwide from 2010 to 2020, with forecasts from 2021 to 2025(in zettabytes)



Massive collection of personal data became over the last two decades a foundation of advertising-driven economic models. **The U.S. dominates the online advertising landscape** due to the large spending on online advertising, its world-wide platforms leaders in the advertising intermediation (such as Google, Facebook, and Amazon), and the large investments on advertising technologies (e.g., big data, AI, virtual and augmented reality).

A **complex online advertising ecosystem** has emerged that besides **marketers** and **targeted individuals** involves further actors: **publishers and different advertising intermediaries, such as advertising networks, advertising exchanges, supply-side and demand-side platforms, and data management companies (platforms, brokers, data analytics, and market research companies)**. Personal data can be sold for its further use, in particular to data management platforms and data brokers or data analytics and market research companies. Data managing companies collect, aggregate, study, and analyse online user data in order to facilitate the matching between ads and users. To this end, they build user profiles that include preferences, desires, and needs.¹⁴⁷

Further issues concern the **transfer of techniques for targeted advertising from the commercial to the political arena**, where citizens may be fed messages that are more likely to **push them towards**

¹⁴⁷ Sartor G. et al., Regulating targeted and behavioural advertising in digital services, European Parliament. Policy Department C, 2021, [https://www.europarl.europa.eu/RegData/etudes/STUD/2021/694680/IPOL_STU\(2021\)694680_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2021/694680/IPOL_STU(2021)694680_EN.pdf)

desired political attitudes and voting choices, in such a way as to take advantage of their ignorance and biases.¹⁴⁸

Failing legal framework in the U.S.

Transfers of personal data from the EU to the U.S. have been carried out for an extensive period of time (at least since 2000) largely without respecting European standards for data protection, resulting in irreversible harm to EU citizens and companies.

On 6 October 2015, the CJEU had **declared invalid** the European Commission's July 2000 decision on the legal adequacy of the **EU-US Safe Harbour Framework** (Schrems I) while on 16 July 2020 the Court of Justice of the European Union (CJEU) **invalidated** the European Commission Decision 2016/1250 on the adequacy of the protection provided by the **EU-US "Privacy Shield" agreement**, on the basis of concerns that the US government surveillance powers are not limited as required by EU law, and that EU persons do not have effective means of redress.¹⁴⁹

Despite a **lack of any major reforms of data protection regime in the U.S.** that would aim to improve the protection of Europeans, the **European Commission reached another agreement with the U.S.** and presented a proposal for yet another EU-US Data Privacy Framework. Upon LIBE Committee's motion, on 11 May 2023, European Parliament adopted a **resolution on the adequacy of the protection afforded by the EU-US Data Privacy Framework** (2023/2501(RSP)) concluding that the EU-US Data Privacy Framework fails to create essential equivalence in the level of protection and calling on the Commission to continue negotiations with its U.S. counterparts but to refrain from adopting the adequacy finding until all the recommendations made in the EP resolution and the EDPB opinion are fully implemented. Among the most serious concerns of the European Parliament was the fact that the Data Protection Review Court ('DPRC') does not meet the standards of independence and impartiality set Article 47 of the Charter.¹⁵⁰ **It remains to be seen if the European Commission will take this resolution seriously.**

Numerous platforms (Google, Facebook, Microsoft, LinkedIn, Amazon, PayPal, eBay, Twitter and TikTok) located their operations in small European Member States, such as Ireland, **effectively clogging application of European data protection rules.**

A recent study indicates the **Irish Data Protection Commission is the bottleneck of GDPR enforcement against Big Tech across the EU.** Almost all (98%) major GDPR cases referred to Ireland

¹⁴⁸ Pedreschi D., Milou I., Artificial Intelligence (AI): new developments and innovations applied to e-commerce, Policy Department, European Parliament, 2020, [https://www.europarl.europa.eu/RegData/etudes/IDAN/2020/648791/IPOL_IDA\(2020\)648791_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/IDAN/2020/648791/IPOL_IDA(2020)648791_EN.pdf)

¹⁴⁹ The judgment currently allows to continue transatlantic data transfers by upholding the validity of standard contractual clauses to allow data transfers under the General Data Protection Regulation (GDPR), but requires data controllers to assess the level of data protection in the recipient's country and to adopt "supplementary measures" if needed.

¹⁵⁰ For the following reasons: 1) the Data Protection Review Court ("DPRC") will be classified and not made public or available to the complainant; 2) the DPRC is part of the executive branch and not the judiciary; 3) a complainant will be represented by a 'special advocate' designated by the DPRC, for whom there is no requirement of independence; 4) the redress process provided by the EO is based on secrecy and does not set up an obligation to notify the complainant that their personal data has been processed, thereby undermining their right to access or rectify their data; 5) the proposed redress process does not provide for an avenue for appeal in a federal court and therefore, among other things, does not provide any possibility for the complainant to claim damages.

remained unresolved.¹⁵¹ Yet, Ireland has the central role in protecting the data rights of 452 million people across Europe against the misuse of their data by big tech.¹⁵²

Despite effort of Irish authorities to improve its data protection institutions, doubts remain if this relatively small jurisdiction can manage to ascertain its central role in protecting the data rights of millions of Europeans.

One of the explanations why the U.S. became an equivalent of tax heaven in the area of data protection, is that it has no single comprehensive federal data protection law, even with regard to its own citizens.

In the absence of a federal framework, states such as [California](#), [Colorado](#), [Utah](#), and [Virginia](#), [Iowa](#) and [Connecticut](#) adopted data protection legislation with some degree of comprehensiveness. Building upon the California Consumer Privacy Act (CCPA) and the California Privacy Rights Act (CPRA), as of 2023 Virginia and Colorado impose new obligations on businesses and provide residents with new rights regarding the collection and processing of their personal data. The Virginia Consumer Data Protection Act (VCDPA) and the Colorado Privacy Act (ColoPA) largely track the requirements under the CCPA and CPRA. Unlike the CCPA and CPRA, neither the VDCPA nor the ColoPA provide consumers with a private right of action. Instead, each state's attorney general or district attorneys remain exclusively in charge of enforcement and can impose civil penalties. It is expected that the trend away from the inclusion of a private right of action will continue, as legislation in many federal states where a privacy law initially had strong support, failed in part due to disagreements amongst lawmakers on issues of enforcement (e.g., Florida and Washington). Connecticut introduced [Connecticut Personal Data Privacy and Online Monitoring Act](#) that will be effective as of July 1st, 2023 and Iowa introduced [Iowa Consumer Data Protection Act](#) that will come to effect on January 1st, 2025.

Some states are in the process of crafting new data protection legislation. A detailed overview of the **patchwork state of play** with a granular comparative analysis in table form of key provisions incorporated in the laws or proposed legislation is provided [here](#) and another interactive map [here](#).

Figure 20: US State Privacy Tracker 2023

¹⁵¹ <https://www.iccl.ie/digital-data/2021-gdpr-report/>

¹⁵² <https://www.irishtimes.com/opinion/we-must-reform-our-data-protection-commission-1.4690041>



The lack of a federal-level data protection legislation has not only spurred state-level legislative activity but has also encouraged other developments. These include growing support for greater oversight and enforcement of the Federal Trade Commission (FTC). In October 2021, the FTC [adopted](#) a new Gramm-Leach-Bliley Act Safeguards Rule that entered into force on 10 January 2022 and imposes more stringent data security requirements on regulated financial institutions. Moreover, there is an increased focus on the protection of children's personal data. For more details, please see [here](#).

PE 751.222

At the same time the U.S. have significantly developed State mass- and targeted surveillance services as well as a series of exceptions that allow to specifically target non-U.S. citizens:

- The Constitution's Fourth Amendment¹⁵⁴ providing a right "of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures." In [United States v. Verdugo-Urquidez](#), the Court held that the Fourth Amendment **does not apply to extraterritorial actions by law enforcement, at least where the defendant is a citizen and resident of a foreign country** with "no voluntary attachment to the United States" and the place searched was located abroad.
- the Electronic Communications Privacy Act (ECPA), which generally prohibits government wiretapping except where the government has obtained a court order supported by probable cause and authorizing such surveillance against the target. Although passed at the infancy of the Internet, the Stored Communications Act (SCA), which is part of ECPA, has been interpreted over the years to cover the content of emails, private Facebook messages, YouTube videos, and so-called metadata, or non-content information.
- Foreign Intelligence Surveillance Act (FISA) which under Section 702, allows the government to **compel electronic communications service providers for a period of up to one year to assist in targeting non-US persons** reasonably believed to be located outside the United States.
- **Executive Order 12333** (issued in 1981) which addresses all US foreign intelligence surveillance activities, including those which may fall outside of FISA's statutory scheme, such as **activities conducted overseas targeting non-US persons**. The Order delegates to the Attorney General the power to approve the use of any technique for intelligence purposes within the United States or against a US person abroad. If a warrant would be required for law enforcement purposes, the executive order requires the Attorney General to determine in each case there is probable cause to believe that the technique is directed against a foreign power or an agent of a foreign power. The authority delegated by Executive Order 12333 must be exercised in accordance with FISA, but also extends to activities beyond FISA's reach.
- **Executive Order 14086 on Enhancing Safeguards for United States Signals Intelligence Activities** ("EO") partially addressing issues brought up by the CJEU in its Schrems II judgment but failing on numerous aspects.

Legal framework in the EU - worrying limitations

Protection of personal data and respect for private life are European fundamental rights. The right to the protection of personal data is established in art. 16 of the [Treaty on the Functioning of the European Union](#) while art. 7 of the [EU Charter of Fundamental Rights](#) establishes the right to respect for private and family life, home and communications, and art. 8 guarantees that everyone has the right to the protection of personal data concerning him or her. Such data must be processed fairly for specified purposes and on the basis of the consent of the person concerned or some other legitimate basis laid down by law. Everyone has the right of access to data which has been collected concerning him or her, and the right to have it rectified. Compliance with these rules shall be subject to control by an independent authority.

The European Parliament has always insisted on the need to strike a balance between enhancing security and safeguarding human rights, including data protection and privacy. The main EU legislative

¹⁵⁴ <https://www.whitehouse.gov/about-the-white-house/our-government/the-constitution/>

instruments comprise of the [General Data Protection Regulation](#) (GDPR), [Data Protection Law Enforcement Directive](#) (LED) and the [Directive on Privacy and Electronic Communications](#).

The General Data Protection Regulation became a world standard, contributes EUR 51.6 billion annually to GDP in the European Union.

However, recent research carried out for the European Parliament, indicates that exceptions provided in the GDPR create significant and highly contentious loopholes, which **undermine effectiveness of data protection system** and by consequence **democracy and individual freedoms**.¹⁵⁵

The Law Enforcement Directive (Directive (EU) 2016/680) which aims to ensure that the personal data of victims, witnesses, and suspects of crime are duly protected, does not perform fully its role as evidenced in an [evaluation study](#) commissioned by the European Parliament¹⁵⁶, allowing for **measures undermining democracy and individual freedoms in the EU**.

With such issues the EU and the U.S. enter the era of Web 3.0 and will face, respectively, European Parliament’s elections and presidential elections.

3.5. Metaverse as power shifting technology: digital twins, doppelgangers, industrial and military metaverse

The new challenges in metaverse result from total traceability and increasing capacity of VR devices to generate a **much broader range of data** that reveals **user’s movements, physical state, emotions, abilities, and desires**. Headsets and their peripherals could enable the capture of a **wide range of user data**, including **neural activity**, such as **EEG for brain-computer interfaces**.¹⁵⁷

Table 1: Examples of User Data Captured by XR Devices

Table 1. Examples of User Data Captured by XR Devices	
Data Type	Detailed Data
Movements and physical actions	Optical and inertial tracking of head/body/limb movements, electromyography neuromotor input (e.g., by haptic gloves), sensing of facial expressions, auditory sensing of speech and non-speech activity, etc.
Neural activity	EEG for brain-computer interfaces
Context	Location tracking, Simultaneous Localization and Mapping (SLAM), and machine-learning-driven analysis of optical data
Physiology	Eye/gaze tracking, heart rate variability sensing, and other biometrics

Source: Mark McGill, *Extended Reality (XR) and the Erosion of Anonymity and Privacy*, IEEE, The IEEE Global Initiative on Ethics of Extended Reality (XR) Report, November 2021, p. 7, at <https://standards.ieee.org/wp-content/uploads/import/governance/iccom/extended-reality-anonymity-privacy.pdf>.

¹⁵⁵ Sartor G. et al, The impact of Pegasus on fundamental rights and democratic processes, Policy Department, European Parliament, 2022, [https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU\(2022\)740514](https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU(2022)740514).
¹⁵⁶ Vogiatzoglou, P. et al., *Assessment of the implementation of the Law Enforcement Directive*, European Parliament, Directorate-General for Internal Policies of the Union, Policy Department for Citizens’ Rights and Constitutional Affairs, 7 December 2022.
¹⁵⁷ McGill, Extended reality (XR) and the erosion of anonymity and privacy, <https://standards.ieee.org/wp-content/uploads/import/governance/iccom/extended-reality-anonymity-privacy.pdf>

Importantly, with the **raise of AI and metaverse**, the capabilities and reasons to collect and process information and data, including those generated by consumers and citizens, go beyond collection of personal data for the purposes of marketing and advertising.

The new prevailing reason for collection of data is building **digital automation services for hybrid and digital spaces**. Such automation and robotisation is an essential part of **AI, as well as of metaverse**.

A capacity to digitize all aspects of surrounding universe, including **human activities, knowledge and content, buildings, entire cities and physical spaces including real-time movement that occurs on them**, transforms everything into **information and data which can be collected, processed and re-presented by AI**. A fusion of emerging technologies is occurring, through interactions between information-rich and contextually expanded physical-virtual hybrid experiences.

Data/content which exists in the form of knowledge, literature, articles, e-mails, paintings, photos, videos, music, etc. or any form of human behaviour or expression, can be broken down into smaller data units, processed, blended through an automated algorithm, and re-presented **without any referencing to its sources, data from which it originates, including personal data or intellectual protection rights applicable to it**.

Advancements in artificial intelligence (AI) tools, technologies and applications are rapidly progressing the utility and automation potential of AI. **Critical enabling technologies**, such as foundation models and neuromorphic computing, are allowing for previously unattainable technological advancement. In turn, these enablers are fostering new business and monetization opportunities.¹⁵⁸ **This is accompanied by an exponential growth in corporate and personal data collection.**

In addition, a number of contractual arrangements facilitate washing the data out of intellectual property rights or allowing to take over intellectual property rights of their subjects, on the basis that their publication occurred on a particular platform or that creation/invention occurred in the frame of an employment/service contract, e.g.:

- legal arrangements, depriving users of intellectual property rights or forcing them to give away non-numerated licences, with respect to content placed on digital platforms' services and servers, and/or transferring such rights to the platforms,
- buy-out contracts through which platforms overtake creators' intellectual property rights,
- legal arrangements depriving employees, inventors or creators, of intellectual property rights, with respect to content created in the course of their employment or service, and/or transferring such rights to the employer (work for hire).

Such collection of data and its automation may allow to: 1) exploit entire groups of society by copying their features, knowledge and depriving them of possibilities to develop, 2) concentrate wealth in a small number of individuals and avoid redistributive function of taxation, while the [tax burden, constituting an important percentage of GDP](#), is carried mainly by the rest of the society through [social contributions, pensions, payroll tax and VAT](#).

¹⁵⁸ <https://emtemp.gcom.cloud/ngw/globalassets/en/doc/documents/767259-emerging-tech-impact-radar-2023-excerpt.pdf>

According to [World Economic Forum report](#), organizations estimate in 2023 that **34% of all business-related tasks are already performed by machines, with the remaining 66% performed by humans**. The report indicates that respondents' expectations for future automation are that **42% of business tasks will be automated by 2027**. Task automation in 2027 is expected to vary from 35% of reasoning and decision-making to 65% of information and data processing.¹⁵⁹

The report indicates that while expectations of the displacement of physical and manual work by machines has decreased, reasoning, communicating and coordinating – all traits with a comparative advantage for humans – are expected to be more automatable in the future. **Artificial intelligence, a key driver of potential algorithmic displacement, is expected to be adopted by nearly 75% of surveyed companies** and is expected to lead to high churn – with 50% of organizations expecting it to create job growth and 25% expecting it to create job losses.¹⁶⁰

The largest losses are expected in administrative roles and in traditional security, factory and commerce roles. Organizations surveyed for the report predict **26 million fewer jobs by 2027** in record-keeping and administrative roles, including cashiers and ticket clerks; data entry, accounting, bookkeeping and payroll clerks; and administrative and executive secretaries, driven mainly by digitalization and automation.¹⁶¹

The report indicates that **training workers to utilize AI and big data ranks third among company skills-training priorities in the next five years** and will be prioritized by 42% of surveyed companies.¹⁶²

Initially **automation and robotisation were built on sensory inputs** (e.g. visual, tactile, etc.) obtained directly by AI devices and used in physical spaces. Such solutions are applied e.g. for [vehicle safety features](#) and could play an important role e.g. in reducing the amount of traffic accidents.¹⁶³

However, increasingly there is a trend, enabled by AI and [industrial metaverse](#), in **building virtual twins of places, work environments and persons, as well as creating digital humans, AI enabled assistants and co-workers**. This involves creating digital copies of spaces, human features such as physical characteristics and behaviours, know-how, knowledge, written and spoken contributions, monitoring actual movement, including those that could, or should, be covered by intellectual property rights, data protection or respect for personal integrity and goodwill.

Metaverse and AI become **tools of management and centralisation of resources**, including physical resources located in various jurisdictions. Such a centralising role was played by multinational companies trading goods on a global level. This centralising role is already evident in the case of social media in the area of advertising, as discussed in the previous section or transportation apps in the area of sharing economy.

¹⁵⁹ World Economic Forum, Future of Jobs Report 2023, https://www3.weforum.org/docs/WEF_Future_of_Jobs_2023.pdf?_gl=1*1gghvgp*_up*MQ..&gclid=CjwKCAjwgqejBhBAEiwAuWHioANeSqVXwf4ouMAigKK4rSKSFWMB8pAj9eHsfh4zePO8N4WoCR-fJR0C7MwQAvD_BwE

¹⁶⁰ Idem, p. 6.

¹⁶¹ Idem, p. 6.

¹⁶² Idem, p. 7.

¹⁶³ Audera M. et al., Workshop on "Type-approval requirements for motor vehicles as regards their general safety and protection of vehicle occupants and vulnerable road users", Policy Department, European Parliament, 2019, [https://www.europarl.europa.eu/RegData/etudes/STUD/2019/642351/IPOL_STU\(2019\)642351_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2019/642351/IPOL_STU(2019)642351_EN.pdf)

However, in the case of metaverse and AI, this role goes further than under any previous business model and has broader and deeper impacts. It involves **processing and appropriating elements of the physical world into metaverse services**. For this reason, it requires a close regulatory scrutiny and prompt legislative action.

James Barrat book *Our Final Invention* describes how the cyber ecosystem could be used for cyber attacks e.g. performed by business players. It indicates that *[c]yber experts play war games that feature cyberattacks, creating disaster scenarios that seek to teach and to provoke solutions. They've had names like "Cyberwars" and "Cyber Shockwave"*. He argues that financial fraud competes with the most expensive terrorist attacks.¹⁶⁴ Global turndown since the Great Depression cost about \$10 trillion globally¹⁶⁵ and \$4trillion in the U.S, Enron scandal cost \$71 billion and Bernie Madoff fraud cost \$64.8 billion.¹⁶⁶

Metaverse is a **dual use technology**, a terms used to describe technologies with both peaceful and military applications.¹⁶⁷ Just like AI can be used for operating autonomous weapons, metaverse can be used to create digital twins of spaces and persons considered adversary. This is referred to as **military metaverse**.¹⁶⁸ It can allow real time monitoring of such spaces and persons with the use of satellites and Internet of Things, including their mobile devices, running different scenarios, training and deployment of arms.¹⁶⁹ Similar utility of metaverse can be found by **special services and police**.¹⁷⁰ This may lead to even more far reaching surveillance concerns, impacting democracy and individual rights, than those triggered by the use of [Pegasus spyware](#).

Metaverse technology can serve as a tool to build [Single Synthetic Environments](#) (SSE), *an integrated common operational picture, which will deliver [...] global situational awareness. ... Building a **synthetic replication of an operating environment**, whether for homeland defense and security or for alliance level deterrence and intervention across a wider area of responsibility, will enable single service, joint and combined forces to perform better, train more realistically and efficiently, and underpin wider transformation such as the evolution of **manned, unmanned and autonomous forces**.*¹⁷¹

The NATO and think tanks such as the Atlantic Council, have repeatedly called for virtual environments or "synthetic environments", for military deployment.¹⁷² Such complete [single synthetic environment has been created e.g. for Estonia](#).

¹⁶⁴ Barrat J., *Our Final Invention*. Artificial Intelligence and the End of the Human Era, Thomas Dunne Books, 2013. p.263.

¹⁶⁵ Muller P. et al., *Consumer Protection Aspects of Financial Services*, Policy Department, European Parliament, 2014, [https://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/507463/IPOL-IMCO_ET\(2014\)507463_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/507463/IPOL-IMCO_ET(2014)507463_EN.pdf)

¹⁶⁶ Barrat J., *Our Final Invention*. Artificial Intelligence and the End of the Human Era, Thomas Dunne Books, 2013. p.263.

¹⁶⁷ Barrat J., *Our Final Invention*. Artificial Intelligence and the End of the Human Era, Thomas Dunne Books, 2013. p.155.

¹⁶⁸ <https://capsulesight.com/metaverse/15-examples-of-the-use-of-metaverse-in-military/>

¹⁶⁹ <https://nationalinterest.org/blog/techland-when-great-power-competition-meets-digital-world/how-metaverse-will-revolutionize>

¹⁷⁰ Vanorio F., *Metaverse: Implications for Security and Intelligence*, 2022, <https://www.natofoundation.org/wp-content/uploads/2022/02/NDCF-Paper-Vanorio-110222.pdf>

¹⁷¹ <https://www.cae.com/defense-security/what-we-do/training-systems/single-synthetic-environment-in-support-of-military-activities/>

¹⁷² <https://articles.jsime.org/3/1/A-Gamefied-Synthetic-Environment-for-Evaluation-of-Counter-Disinformation-Solutions>



Source: Hadean

Virtual reality environments were already in use to control remotely guided systems such as the U.S. Air Force's Armed Predator UAV.¹⁷³

Metaverse technology may be used in operating **swarming**, a combination of many systems, for example drones, unmanned boats, or tanks into a swarm whose units act independently but in a coordinated manner. Swarms make new tactics such as flying minefields, waves of attacks, or 'kill webs' possible. The EU's Horizon 2020 funding also supports swarm research, namely "Roborder": autonomous border surveillance system with unmanned mobile robots including aerial, water surface, underwater and ground vehicles, capable of functioning both as standalone and in swarms.

Metaverse could be also deployed along AI enabled automation of nuclear defence, or AI-enabled autonomous systems carrying **nuclear weapons**.¹⁷⁴

¹⁷³ Kurzweil R., *Singularity is Near*, Penguin Books 2006, p. 335.

¹⁷⁴ Adam Lowther, Curtis McGiffin, "America Needs a 'Dead Hand'", War on the Rocks, 16 August 2019, <https://warontherocks.com/2019/08/a-america-needs-a-dead-hand/>



Source: Antier¹⁷⁵

In the light of these developments, military, security services and police need to be subject to full legislative and judicial oversight, with consideration of a ban on applications of metaverse in conjunction with any lethal weapons or spyware.

3.6. Tax avoidance

Numerous platforms (**Google, Facebook, Microsoft, LinkedIn, Amazon, PayPal, eBay, Twitter and TikTok**) located their operations in small European Member States that offer **tax advantages**, such as Ireland.

Ireland is home to **16 of the top 20 global tech companies**, the top 3 enterprise software providers with 37,000+ people employed in the industry.¹⁷⁶ Dublin is Europe's leading hub of innovative games companies with **Big Fish, EA, Havok, DemonWare, PopCap, Zynga, Riot Games and Jolt**. The sector accounts for more than **€50 billion of exports from Ireland per annum**.¹⁷⁷ Social video platform TikTok announced that it will open its long-planned European data centre in Ireland early next year, in an investment believed to be worth about **€600 million**. The video-sharing service is investing more than initially expected, due to the increased capacity of the centre. It will initially have a capacity of 30 megawatts, ramping to 60 megawatts by the end of 2023. TikTok has signed contracts with a third-party data provider and construction on the site is under way on the Dublin data centre.¹⁷⁸ TikTok in

¹⁷⁵ <https://www.antiersolutions.com/why-the-military-needs-a-metaverse/>

¹⁷⁶ <https://www.idaireland.com/explore-your-sector/business-sectors/technology>

¹⁷⁷ <https://www.enterprise-ireland.com/en/Start-a-Business-in-Ireland/Startups-from-Outside-Ireland/Key-Sectors-and-Companies-in-Ireland/ICT-sector-profile.html>

¹⁷⁸ <https://www.irishtimes.com/business/technology/tik-tok-to-open-600m-european-data-centre-in-ireland-1.4846481>

general stepped its regulatory compliance efforts as it was hauled into its [first-ever major congressional hearing](#) over platform safety.

Irish economic success benefited from **European integration, educational revolution and demographic change**. However, [research](#) indicates as well that **low taxation played an important role in promoting economic activity**. In fact, Ireland has been criticised for the way in which its tax system has been used by multinationals to set up **aggressive tax planning structures and exploit mismatches and gaps in the international tax framework**.¹⁷⁹ In 2015, Ireland facilitated **€100 billion in tax avoidance** – more than all of the Caribbean Islands put together. A year earlier, the Financial Stability Board found that Ireland had the **fourth largest shadow banking system on the planet**, with \$2.2 trillion housed in the IFSC outside the regulatory control of the Central Bank.¹⁸⁰

A web of global corporate links and financial transfers, enabled by OECD modelled taxation treaties, allows companies and individuals to shift their profits away from Europe by using artificial schemes based on **intellectual property licencing, know-how and consulting fees**.

Importantly, the U.S. does not share the same concern with the EU. Unlike EU Member States, the U.S. does not rely on OECD model taxation treaties. The United States is one of two countries in the world that taxes its resident and non-resident citizens on worldwide income, in the same manner and with the same rates. The U.S. Supreme Court upheld the constitutionality of imposition of such a tax in the case of [Cook v. Tait](#).

The judgement states:

The contention was rejected that a citizen's property without the limits of the United States derives no benefit from the United States. The contention, it was said, came from the confusion of thought in "mistaking the scope and extent of the sovereign power of the United States as a nation and its relations to its citizens and their relation to it." And that power, in its scope and extent, it was decided, is based on the presumption that government, by its very nature, benefits the citizen and his property wherever found, and that opposition to it holds on to citizenship while it

"belittles and destroys its advantages and blessings by denying the possession by government of an essential power required to make citizenship completely beneficial."

*In other words, the principle was declared that **the government, by its very nature, benefits the citizen and his property wherever found, and therefore has the power to make the benefit complete**. Or, to express it another way, the basis of the power to tax was not and cannot be made dependent upon the situs of the property in all cases, it being in or out of the United States, nor was not and cannot be made dependent upon the domicile of the citizen, that being in or out of the United States, but upon his relation as citizen to the United States and the relation of the latter to him as citizen. The consequence of the relations is that the native citizen who is taxed may have domicile, and the property from which his income is derived may have situs, in a foreign country, and the tax be legal, the government having power to impose the tax.*

The 2017 Tax Cuts and Jobs Act introduced important modifications in tax treatment of resident U.S. corporations.¹⁸¹ However, U.S. corporations often have seats in tax havens states such as Delaware. Delaware is home to nearly 68% of the Fortune 500 companies, including Google and Amazon. This state does not collect any local and state sales tax and the companies based there are not subject to

¹⁷⁹ [https://www.europarl.europa.eu/RegData/etudes/ATAG/2022/733532/EPRS_ATAG\(2022\)733532_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/ATAG/2022/733532/EPRS_ATAG(2022)733532_EN.pdf)

¹⁸⁰ <https://www.irishexaminer.com/opinion/commentanalysis/arid-40761102.html>

¹⁸¹ <https://www.taxpolicycenter.org/briefing-book/how-does-current-system-international-taxation-work>

any income tax on their intangible assets. Legally this tax haven can be used by holding companies that charge their subsidiaries **trademark** charges – thus moving their income (in accounting terms reducing their income tax base by expenses) to the company set up in Delaware where it is not subject to state taxes.

[The U.S. Internal Revenue Service \(IRS\)](#) has issued guidance clarifying that cryptocurrencies constitute property, the profit from which is taxable. NFTs are understood to receive similar treatment. Indeed, the IRS has already issued myriad subpoenas to cryptocurrency exchanges seeking information that could lead to the identification and collection of income taxes, and it would not be surprising to see taxation authorities targeting metaverse projects in similar fashion.

Whether NFT and other metaverse asset sales are subject to state sales tax presents another open issue. While many states have guidance on sales tax as applied to digital assets, to date no state has issued guidance specifically on whether sales tax applies to NFTs.

The role of metaverse as a tool of **management and centralization of resources** needs to be looked at in junction with **tax avoidance and profit shifting**. It involves a massive shift of wealth and resources away from **individuals** whose data, integrity and intellectual property rights are affected and **States**, which allow massive profits to move away and concentrate, without, redistribute taxation. European Commission's [proposal](#) to introduce a 3 % tax on big platforms¹⁸² was not a sufficient solution to the problem, to which the Commission itself contributed over the last twenty years. A digital levy¹⁸³ of a similar "magnitude" will not resolve it either.

There is a need for taxation tools aimed at **preventing monopolization, keeping benefits originating in Europe in the EU and ascertaining their just distribution**. Such taxation could e.g. finance measures aimed at providing income ensuring active social inclusion.¹⁸⁴

There is also a need for precise tracing of the use of data and intellectual property rights as well as for ethical rules of a new social contract to ascertain fair redistribution of wealth created by AI automation in metaverse.

3.7. Cryptocurrencies

Cryptocurrencies are **digital or virtual currencies attached to that software that largely function outside most existing financial infrastructures**.

Olivier Morelle, finance expert for ECB described them in a [letter](#) to Financial Times as "*scams to attract suckers [which] should be made **illegal and banned from any financial systems***", admitting that "*stable*

¹⁸² Although measures proposed by the Commission in 2018 failed, as of January 2023, Austria, France, Hungary, Italy, Poland, Portugal, Spain, Turkey, and the UK have implemented a digital services tax; while Belgium, the Czech Republic, and Slovakia have published proposals to enact one and Latvia, Norway, and Slovenia have either officially announced or shown intentions to implement such a tax. Rates of such taxes range from 1.5 percent in Poland to 7.5 percent in both Hungary and Turkey (See: <https://taxfoundation.org/digital-tax-europe-2020/> and Vázquez J.M., Digital Services Taxes in the European Union: What Can We Expect?, Kluwer International Tax Blog, 2023, <https://kluwertaxblog.com/2023/02/14/digital-services-taxes-in-the-european-union-what-can-we-expect/>)

¹⁸³ https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12836-A-fair-competitive-digital-economy-digital-levy_en

¹⁸⁴ <https://ec.europa.eu/social/main.jsp?langId=en&catId=89&furtherNews=yes&newsId=10417#navItem-relatedDocuments>

coins', which are cryptos attached to some collaterals, [...] should comply with the same rules as those of a security and should therefore follow the same regulatory and reporting framework while being subject to regular external audits".

Significant scale of crypto exchange markets has attracted attention of a number of world economies as a potential tool to go past the Covid-19 economic slow-down. This contributed to a *laissez-faire* approach towards cryptocurrencies despite obvious concerns that they do not constitute a legal means of payment.

Cryptocurrencies are currently tormented by a **massive crisis**.¹⁸⁵ There is a long list of negative events triggered by cryptocurrencies that built up into this crisis:

- In the 12 months since bitcoin topped out at over \$68,000, the two largest digital currencies have lost three-quarters of their value, collapsing alongside the riskiest tech stocks. The industry, once valued at roughly \$3 trillion, now sits at around \$900 billion.¹⁸⁶
- In November 2022 cryptocurrency exchange FTX went bust after its rival Binance pulled out of a deal to buy it. FTX sank from a \$32 billion valuation all the way to bankruptcy as liquidity dried up and customers demanded withdrawals.¹⁸⁷
- Three Arrows Capital did not repay loans of more than \$660 million to cryptocurrency firm Voyager Digital, which filed for Chapter 11 bankruptcy protection July 5, 2022.¹⁸⁸
- Singapore-based crypto hedge fund Three Arrows Capital lost more than \$3 billion in 2021 and 2022, becoming the first major crypto company to go bankrupt this year on July 3, 2022.¹⁸⁹
- In June 2022, Celsius Network, a major US cryptocurrency lending company, froze withdrawals and transfers, citing "extreme" conditions. Celsius Network, which managed \$12 billion in assets in June, also filed for bankruptcy July 13, 2022.
- Also in June 2022, Binance, one of the world's largest cryptocurrency exchanges, paused bitcoin withdrawals, with chief executive Changpeng Zhao blaming a "stuck transaction" that was causing a backlog.
- Between May 9 and May 13, the "algorithmic stablecoin" Terra and its "sister coin" Luna lost something like \$40–45 billion of their market capitalization, and Terra broke its peg to the U.S. dollar. Luna's price dropped to zero.¹⁹⁰
- Early in 2022, it was reported that Russia might ban cryptocurrency operations. But then, after the invasion of Ukraine, there were calls for crypto exchanges to ban Russian transactions.
- In May 2021, Tesla boss Elon Musk said that the electric car maker would no longer be accepting digital payments over concerns about the impact of cryptocurrency "mining" – the computing power required to create the likes of bitcoin – on the environment.
- In June 2021, banks and payment institutions in China were told to stop enabling crypto transactions, and the Chinese government banned the mining of the currencies. Then in

¹⁸⁵ Jackson T., The Crypto Crisis, 2022, https://www.dissentmagazine.org/online_articles/the-crypto-crisis

¹⁸⁶ <https://www.cnn.com/2022/11/11/crypto-peaked-in-nov-2021-investors-lost-more-than-2-trillion-since.html>

¹⁸⁷ <https://www.cnn.com/2022/11/11/crypto-peaked-in-nov-2021-investors-lost-more-than-2-trillion-since.html>

¹⁸⁸ <https://www.aa.com.tr/en/economy/bitcoin-digital-currencies-crash-in-2022-crypto-winter-amid-crises-turmoil-bankruptcies/2776010>

¹⁸⁹ ¹⁸⁹ Idem.

¹⁹⁰ Jackson T., The Crypto Crisis, 2022, https://www.dissentmagazine.org/online_articles/the-crypto-crisis

September 2021, all crypto transactions were declared illegal, in effect meaning that the likes of bitcoin were banned.

- Also in June 2021, then US president Donald Trump described bitcoin as a “scam” competing against the dollar to be “the currency of the world”.
- FBI agents have seized millions of dollars in bitcoin from criminals down the years.
- In August 2021, UK regulator the Financial Conduct Authority in effect blacklisted Binance, one of the largest crypto exchanges. Big banks such as HSBC and Santander followed suit by blocking customers from making payments to Binance.
- In the same month, the International Monetary Fund issued a warning on countries using cryptocurrencies as legal tender, saying its widespread use would threaten “macroeconomic stability” and could harm financial integrity.
- Crypto heist: last August, a hacker stole \$600m in a cyber attack targeting the crypto platform Poly Network, only to return more than half of it four days later saying they did it “for fun” and to “expose the vulnerability” in the system before others did.¹⁹¹

According to Federal Trade Commission [report](#) prepared on the basis of complaints directed to it, 46,000 people have lost more than \$1billion to crypto scams since the start of 2021.

The [SEC](#) has taken the stand that cryptocurrencies are not a legal means of payment in the U.S. The SEC charged numerous companies involved in cryptocurrency exchange.

This crisis is accompanied by problems such as **money laundering, lack of transparency, tax avoidance, financing of terrorism and criminal activities** as well as ongoing questions **if private actors have the right to issue money**, which is reserved for State monetary authorities.¹⁹²

3.8. Gambling and lottery laws

Gambling and lottery laws, which typically regulate certain activities concerning games of chance with prize awards, are also implicated in metaverse projects that feature chance-based opportunities to win prizes. For example, some metaverse games feature “loot boxes,” virtual unopened treasure chests that users can discover or purchase and open to receive a randomized selection of various virtual assets. The regulation of loot boxes as a form of gambling has triggered scrutiny in several jurisdictions.

European Parliament has published an [independent study on lootboxes](#) in a more general gaming context. The study indicates that:

[w]hile various interviewed experts and some authorities agree that not all loot boxes carry risks, some loot boxes are surrounded by problematic game designs which could have adverse psychological and financial consequences. Some game designs resemble addictive designs of conditioning, known, for example, from slot machines. Opaque offer and pricing techniques could cause unwanted or uncontrolled spending. However, such designs are not limited to loot boxes but found in games more broadly and some are well-known from other consumer markets.

¹⁹¹ <https://www.thetimes.co.uk/money-mentor/article/is-bitcoin-crash-coming/>

¹⁹² https://unctad.org/system/files/official-document/presspb2022d10_en.pdf

*Even though many games with loot boxes are not specifically targeted at children, they still play and pay. Research on the effects of loot boxes on children's behaviour in online games is even more limited than the research on adults. Drawing from general research on developmental psychology, it appears however that children could potentially be more vulnerable to problematic game designs. This is because children have a reduced ability to exert self-control and more difficulties in understanding valuation and probabilities in games.*¹⁹³

¹⁹³ Cerulli-Harms A., Loot boxes in online games and their effect on consumers, in particular young consumers, Policy Department, European Parliament, 2020, [https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652727/IPOL_STU\(2020\)652727_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652727/IPOL_STU(2020)652727_EN.pdf)

4. ETHICAL ASPECTS OF METAVERSE

Ethics is a set of principles: a theory or system of values. It is also understood as the principles of conduct governing an individual or a group (eg. professional ethics). Considering the novelty of issues raised by metaverse, as well as those raised by artificial intelligence and information technology in general, a reflection of ethical concerns is essential.

Information technology ethics is the study of the ethical issues arising out of the use and development of electronic technologies. Its goal is to identify and formulate answers to questions about the basis of individual responsibilities and actions, as well as the underpinnings of public policy.¹⁹⁴

Information technology ethics raises new and unique problems triggered by social, political, and conceptual change introduced by information technology, including some of the basic organizing concepts of moral and political philosophy such as property, privacy, the distribution of power, basic liberties and responsibility.¹⁹⁵

Among the general questions of ethics is the fundamental question, **who makes the rules or how broad and inclusive should be a discussion on ethical values?** Should ethical values be formulated be the **executive branch or by the legislative branch?** In the latter case, how legitimacy and accountability of democratic discussion on ethical questions can be reinforced by **independent expertise and academia?** Is legislator under obligation to provide for optimal legislation? Specific questions may include: **who should benefit** from additional value generated by technology? Should technology allow for accumulation of benefits from common efforts or a shift of benefits from those entitled to them? Can innovative technological design **circumvent or disrespect existing principles of law, human rights and specific regulations** relying on its novelty or it could contribute to **reforming the society making more space for innovation?** What are the **moral responsibilities of computer professionals** when designing new technologies? What **economic and social goals** are served by technology? What sort of **content and values** are propagated by the technology and what should be the age of its users? Should the use of technology be limited if it can be deployed along **nuclear arms** or otherwise along **lethal weapons**? Can military be **excluded from legislative and judicial oversight** when using technologies to operate lethal weapons? Who is to blame when **computer software failure causes harm**? Is **computer hacking** immoral? Should technology be used as **warfare or spyware**? Should a highly lucrative new technology use as a basis cheap labor performing data labelling tasks in low wage countries? Questions related to public policy include: what constitutes just policy with respect to **freedom of speech, association, and the exercise of other civil liberties** over computer networks? What determines the extent and limits of **property rights**? What policies adequately protect a right to **privacy, intellectual property, personal integrity and goodwill in metaverse?**

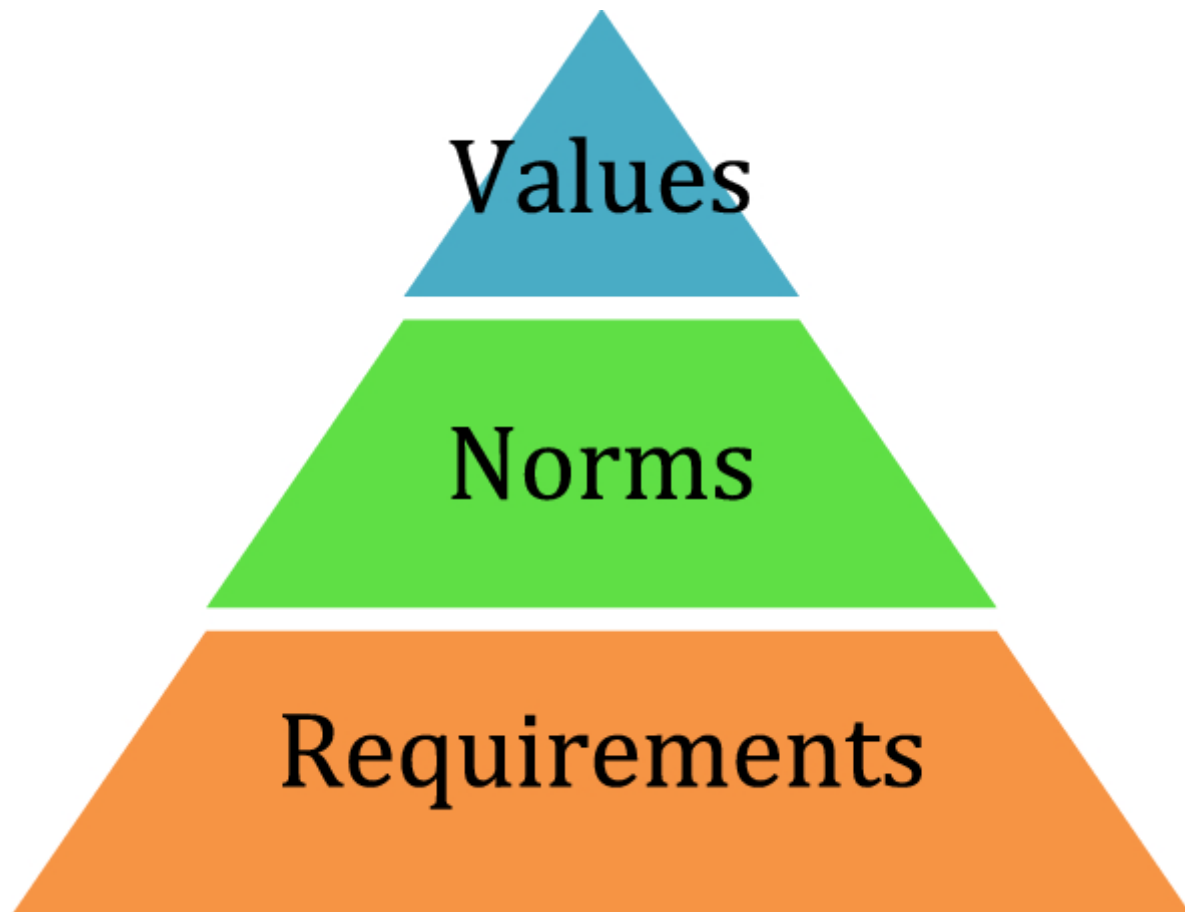
¹⁹⁴ Nissenbaum, Helen. Information technology and ethics, 1998, doi:10.4324/9780415249126-L121-1. Routledge Encyclopedia of Philosophy, Taylor and Francis, <https://www.rep.routledge.com/articles/thematic/information-technology-and-ethics/v-1>.

¹⁹⁵ Ibidem.

Values are important in the development of technological artefacts. Different conceptualizations of these abstract values lead to different design-requirements.¹⁹⁶

The idea that values can be designed for and inform designs has been elaborated from the early 1990s onwards in what is referred to as value sensitive design. Design for values was heavily influenced by value sensitive design, but originated in the field of ethics of technology and has a strong pragmatic focus on making ethics work in a world of technology. It aims to help designers to put social and moral values at the heart of the design of new technologies.

Figure 21: Design for values and norms



Source: Veluwenkamp, H. et al., Design for values and conceptual engineering¹⁹⁷

4.1. Ethical values common to information and communication technologies

In 2012, the [European Group on Ethics in Science and New Technologies](#) (an advisory body to the European Commission founded in 1991, grouping a number of [academics](#) specialized in ethics and bioethics) issued an opinion on [Ethics of information and communication technologies](#).

¹⁹⁶ Veluwenkamp, H., van den Hoven, J. Design for values and conceptual engineering. *Ethics Inf Technol* 25, 2 (2023). <https://doi.org/10.1007/s10676-022-09675-6>

¹⁹⁷ Ibidem.

The opinion listed international bodies involved in **Internet governance**:

- the United Nations Internet Governance Forum,
- UNESCO: Code of Conduct for the Information Society,
- OECD,
- Council of Europe,
- Internet Corporation for Assigned Names and Numbers (ICANN).

The opinion indicated that the ethical framework of information and communication technologies is **based on art. 2¹⁹⁸ and 3¹⁹⁹ of the Treaty on European Union**.

In promoting the framework of values the group emphasized especially the following **principles**:

- **human dignity,**
- **respect of freedom,**
- **respect for democracy, citizenship and participation,**
- **respect for privacy,**
- **respect of autonomy and informed consent** (which secures, inter alia, the right to inform and consent to the use of data or actions that are based on the data-processing),
- **justice** (which secures, inter alia, the equal access to ICT, and a fair sharing of its benefits,
- **solidarity** (e.g. inclusion of everyone who wishes to participate in ICT).

The opinion indicated at fundamental importance of the **right to access ICT, the right to privacy and protection of data** (including transparency as a fundamental condition for enabling individuals to exercise control over data and explicit consent given by an appropriate method, with special attention for children and vulnerable adults.

The opinion formulated recommendations concerning:

- **individual identity** (with special safeguards for children and adolescents, recommendations to foster responsibility and psychological impact of ICT usage),
- **digital divide** (concerning access to e-government, e-health, e-businesses and e-services,
- **work-life balance,**

¹⁹⁸ Article 2: The Union is founded on the values of respect for human dignity, freedom, democracy, equality, the rule of law and respect for human rights, including the rights of persons belonging to minorities. These values are common to the Member States in a society in which pluralism, non-discrimination, tolerance, justice, solidarity and equality between women and men prevail.

¹⁹⁹ Article 3: 1. The Union's aim is to promote peace, its values and the well-being of its peoples. (...)

3. The Union shall establish an internal market. It shall work for the sustainable development of Europe based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment. It shall promote scientific and technological advance. It shall combat social exclusion and discrimination, and shall promote social justice and protection, equality between women and men, solidarity between generations and protection of the rights of the child. It shall promote economic, social and territorial cohesion, and solidarity among Member States. It shall respect its rich cultural and linguistic diversity, and shall ensure that Europe's cultural heritage is safeguarded and enhanced. (...)

5. In its relations with the wider world, the Union shall uphold and promote its values and interests and contribute to the protection of its citizens. (...).

- **political participation,**
- **balance between commercial and non-commercial use of ICT,**
- **corporate social responsibility,**
- **cross-correlation data mining** (which must require an explicit information),
- **environment and raw materials** (indicating that impact of ICT on environment may be both positive and negative).

The opinion summarizes ethical values reflecting European fundamental principles illustrating advantages of such an approach, among others, by the attention it contributes to social and environmental sustainability. It is an opinion of an expert group remaining within a traditional scope of EU competence.

4.2. Ethical principles for AI as a guidance for metaverse

European Parliament's work on ethical principles for artificial intelligence provides for an **important guidance** on how ethical principles for metaverse can be elaborated, both for reasons of similarity of problematics and the role that AI plays in building and managing metaverse.

Following a major breakthrough in AI image-recognition in 2012, corporate and government interest in the field exploded, attracting important contributions from ethicists and activists who published research into the dangers of training AIs on biased data sets, revealing that AI is effectively "automating inequality," as well as perpetuating racial biases in law enforcement. Many tech corporations established supposedly **independent ethics boards**. However, the reliability of this form of governance has since been called into question following high-profile ousters of internal researchers who raised concerns about the **ethical and social implications of certain AI models**.²⁰⁰

On 16 February 2017, the European Parliament adopted a Resolution on civil law rules on robotics (2015/2013 (INL) on the basis of the work of the Working Group on Robotics and Artificial Intelligence set up in 2014 by the Committee on Legal Affairs and the report of the Group's Chair Mady DELVAUX, calling for a reflection on ethical questions. The European Parliament indicated that "[...] *the existing Union legal framework should be updated and complemented, where appropriate, by **guiding ethical principles** in line with the complexity of robotics and its many social, medical and bioethical implications; is of the view that **a clear, strict and efficient guiding ethical framework for the development, design, production, use and modification of robots** is needed to complement the legal recommendations of the report and the existing national and Union acquis; proposes, in the annex to the resolution, a framework in the form of **a charter consisting of a code of conduct for robotics engineers, of a code for research ethics committees when reviewing robotics protocols and of model licences for designers and users**".* Further, the European Parliament pointed "*that the guiding ethical framework should be based on the **principles of beneficence, non-maleficence, autonomy and justice, on the principles and values enshrined in Article 2 of the Treaty on European Union and in the Charter of Fundamental Rights, such as human dignity, equality, justice and equity, non-discrimination, informed consent, private and family life and data protection, as well as on other underlying principles and values of the Union***"

²⁰⁰ Entsminger J et al., Who Will Establish Metaverse Ethics?, Project Syndicate, 17/8/2022.

*law, such as non-stigmatisation, transparency, autonomy, individual responsibility and social responsibility, and on existing ethical practices and codes”.*²⁰¹

On 27 February 2017, the European Parliament held a [roundtable on Strategy for Artificial Intelligence in Europe](#) organised in the framework of scientific cooperation between European Parliament and European University Institute, involving MEP **Róza THUN** (Chair of the Digital Single Market Working Group of the Committee for the Internal Market and Consumer Protection), MEP **Mady DELVAUX** (Chair of the Working Group on Robotics and Artificial Intelligence set up by the Committee on Legal Affairs), Mr **Riccardo RIBERA D'ALCALA**, Director-General of DG IPOL, European Parliament, Ms **Catelijne MULLER** (European Economic and Social Committee), and Dr **Cecile HUET**, the Deputy Head of Robotics and Artificial Intelligence Unit in DG CNECT. Members and officials discussed with **EUI experts** a need to carefully shape AI in order to prevent misuse, including dissemination of fake news, where machine learning is used in election campaigns to engage voters under excuse of informing them on key political issues with many implications, including those ethical. Experts participating in a follow up [EP-EUI roundtable proposed setting up an Artificial Intelligence Observatory](#) in the European University Institute under the auspices of European Parliament, with the initial aim of developing tools to address issues of citizen's protection and prevention of technological influence over the election process.

In its Communication of 25 April 2018 and 7 December 2018, the European Commission set out its vision for artificial intelligence (AI), which supports “ethical, secure and cutting-edge AI made in Europe”.

[In September 2018, European Parliament adopted a resolution calling for an international ban on autonomous weapons](#) This resolution followed failure in the United Nations to reach a consensus on a ban caused by the opposition of some States.

These technological developments cause challenges to the conduct of war. One fundamental issue is the question of **compatibility of new weapons technology with the fundamental principles and rules of international humanitarian law**. These include the principles of distinction and proportionality. The latter prohibits attacks that “are expected to cause incidental loss to civilian life or damage to civilian objects which is excessive in relation to the concrete and direct military advantage anticipated” ([article 51\(5\)\(b\) Additional Protocol I to the Geneva Conventions \(AP1\)](#)). Both principles on one level require the sufficient development of AI, for example in image analysis and classification. On another level, however, both principles contain qualitative elements that require a highly contextualized exercise of judgement. For this reason, an important point of contention is the extent of maintenance of ‘**meaningful human control**’ over the launch of a particular attack. At a more fundamental level, however, and this is crucial in any future legislative effort, is the question of whether law, and specifically the law of war, can be reduced to algorithm.

Adjacent to the principles of distinction and proportionality is the obligation to “**take all feasible precautions** in the choice of means and methods of attack with a view to avoiding, and in any event to minimizing, incidental loss or civilian life, injury to civilians and damage to civilian objects”(art. [57\(2\)\(a\)\(ii\) 1977 AP1](#)). Weapons systems with increasing degrees of autonomy, to the extent that they

²⁰¹ In the light of research carried out for European Parliament, in the same period of time, numerous governments of Member States of the European Union were equipping their special services and police, with the most intrusive spyware designed to provide surveillance of every aspect of private life of its victims, in contradiction with principles of the EU law. See research prepared for PEGA Committee.

relegate human input to an earlier phase of the decision-making and targeting process, shift the point in time where the necessary precautions need to be taken. Furthermore, by potentially requiring a high level of technological expertise, they pose challenges to the individual commander's capacity to take the necessary precautions, risking the hollowing out of the legal obligation.

On 8 April 2019, European Commission published [The Ethics Guidelines for Trustworthy Artificial Intelligence \(AI\)](#) a document prepared by the [High-Level Expert Group on Artificial Intelligence \(HLEG\)](#), set up by the European Commission in June 2018.

The Guidelines put forward a set of 7 key requirements that AI systems:

- **Human agency and oversight:** AI systems should empower human beings, allowing them to make informed decisions and fostering their fundamental rights. At the same time, proper oversight mechanisms need to be ensured, which can be achieved through human-in-the-loop, human-on-the-loop, and human-in-command approaches
- **Technical Robustness and safety:** AI systems need to be resilient and secure. They need to be safe, ensuring a fall back plan in case something goes wrong, as well as being accurate, reliable and reproducible. That is the only way to ensure that also unintentional harm can be minimized and prevented.
- **Privacy and data governance:** besides ensuring full respect for privacy and data protection, adequate data governance mechanisms must also be ensured, taking into account the quality and integrity of the data, and ensuring legitimised access to data.
- **Transparency:** the data, system and AI business models should be transparent. Traceability mechanisms can help achieving this. Moreover, AI systems and their decisions should be explained in a manner adapted to the stakeholder concerned. Humans need to be aware that they are interacting with an AI system, and must be informed of the system's capabilities and limitations.
- **Diversity, non-discrimination and fairness:** Unfair bias must be avoided, as it could have multiple negative implications, from the marginalization of vulnerable groups, to the exacerbation of prejudice and discrimination. Fostering diversity, AI systems should be accessible to all, regardless of any disability, and involve relevant stakeholders throughout their entire life circle.
- **Societal and environmental well-being:** AI systems should benefit all human beings, including future generations. It must hence be ensured that they are sustainable and environmentally friendly. Moreover, they should take into account the environment, including other living beings, and their social and societal impact should be carefully considered.
- **Accountability:** Mechanisms should be put in place to ensure responsibility and accountability for AI systems and their outcomes. Auditability, which enables the assessment of algorithms, data and design processes plays a key role therein, especially in critical applications. Moreover, adequate an accessible redress should be ensured.

In October 2020, European Parliament adopted a [framework of ethical aspects of artificial intelligence, robotics and related technologies](#) (2020/2012(INL)).

The resolution, based on MEP Iban Garcia' del Blanco's Report, highlights the need for a **human-centric and a human-created AI approach** and the necessity of developing, deploying and monitoring an **ethical AI approach**, respectful of the current European regulation and international human rights law. A **not discriminatory use of A.I.** tools is requested to guarantee **full respect of fundamental rights**. The text also provides guidance on the respect of **privacy**, especially where biometric recognition systems are concerned. In this respect, EP underlines that **good governance** should be

ensured, particularly in situations where consumers might be the target of algorithmic systems. Moreover, the EP emphasizes that some additional areas, such as **security and defense, transport, employment, workers' rights, digital skills, education, culture and the national supervisory authorities**, should be the object of particular and sectoral focus. Finally, the text highlights the need for both **European coordination and international cooperation**, and underlines the possibility of establishing an **European certification of ethical compliance**.

This resolution was accompanied by resolutions on [a civil liability regime for artificial intelligence \(2020/2014\(INL\)\)](#)²⁰² and on [intellectual property rights for the development of artificial intelligence technologies \(2020/2015\(INI\)\)](#).²⁰³ Later in 2021, European Parliament adopted also resolutions on [A.I. : questions of interpretation and application of international law in so far as the EU is affected in the areas of civil and military uses and of state authority outside the scope of criminal justice \(2020/2013\(INI\)\)](#) and one on [A.I. in education, culture and the audio-visual sector \(2020/2017\(INI\)\)](#).

In September 2020 an interdisciplinary **Special Committee on Artificial Intelligence in a Digital Age (AIDA)** started its work. Its mandate was exploring the impact of AI on the EU economy and its different sectors, analysing the AI approach of third countries, and charting the road ahead. The committee held a number of [hearings](#) and [workshops](#) to feed into the report. Its deliberations were informed by [independent expertise](#) provided by European Parliament's Policy Departments and European academia. As conclusion of its work AIDA adopted its final [Report on artificial intelligence in a digital age](#) (Rapporteur **Axel VOSS**) which was voted in the plenary of May 2022

The adopted text warns that the EU is late in the global race for tech leadership. As a result, there is a risk that standards will be developed elsewhere in the future, often by non-democratic actors, while the **EU needs to act as a global standard-setter in AI**. The report identified policy options that could develop AI's potential in health, the environment and climate change, to help combat pandemics and global hunger, as well as enhancing people's quality of life through personalized medicine. The EU should not always regulate AI as a technology; instead, the level of regulatory intervention should be proportionate to the type of risk associated with using an AI system in a particular way. The text also stresses that AI technologies could pose **crucial ethical and legal questions**. It highlights the

²⁰² In this resolution (based on Axel Voss Report) the EP affirms that there is no need for a complete revision of the liability regimes currently in place among EU Member States. Nevertheless, in highlighting the "complexity, connectivity, opacity and vulnerability, the capacity of being modified through updates, the capacity for self-learning and the potential autonomy of AI-systems, as well as the multitude of actors involved", the EP reiterates that civil liability is one of its main challenges. However, due to the complex, intractable and impecunious nature of the third-party, additional guidelines are still needed. Thus, the resolution focuses on civil liability claims against the operator of the AI-system: it affirms that the operator's liability is justified by the fact that they are responsible for the risk associated with the AI system as the operator might be, in many cases, the first point of contact for the victim. The resolution also highlights the fact that various liability rules should be applied and be based on a risk-based approach. The text highlights also the fundamental role of insurance companies.

²⁰³ The resolution, based on Stephane Sejourne's report, focuses on the intellectual property rights in the development of AI technologies, calling for a high level of IPRs protection and legal certainty in the context of the AI, which will encourage investment in new technologies in the EU. The EP underlines the main legal challenges raised by AI technologies in terms of copyright and intellectual property rights. The adopted text points out "the difference between AI-assisted human creations and AI-generated creations, with the latter creating new regulatory challenges for IPR protection, such as questions of ownership, inventorship and appropriate remuneration, as well as issues related to potential market concentration; further considers that IPRs for the development of AI technologies should be distinguished from IPRs potentially granted for creations generated by AI" it also considers that " where AI is used only as a tool to assist an author in the process of creation, the current IP framework remains applicable",

challenge of reaching a consensus within the global community on minimum standards for the responsible use of AI, and concerns about military research and technological developments into **lethal autonomous weapon systems**.

Report underlines that certain AI technologies enable the **automation of information processing to an unprecedented scale**. This paves the way for **mass surveillance and other unlawful interference and poses a threat to fundamental rights**, in particular the rights to privacy and data protection. Authoritarian regimes apply artificial intelligence systems to control, mass surveillance and classify their citizens or restrict freedom of movement. In addition, dominant technology platforms use them to get more information about a person. Evidently, this profiling poses **risks for democratic systems and for the protection of fundamental rights**.

The same **issues apply to metaverse as identified in the section on challenges**.

On 19 February 2020, the Commission published the White Paper on AI - A European approach to excellence and trust and on April 21, 2021 published a [proposal](#) of Artificial Intelligence Act aimed to implement the objective for the development of an ecosystem of trust by proposing a legal framework for trustworthy AI.

The proposal includes rules for the development, placement on the market and use of AI systems in the Union following a proportionate risk-based approach with four levels of risks:

- Unacceptable risk AI. Harmful uses of AI that contravene EU values (such as social scoring by governments) will be banned because of the unacceptable risk they create;
- High-risk AI. A number of AI systems that are creating adverse impact on people's safety or their fundamental rights are considered to be high-risk. In order to ensure trust and consistent high level of protection of safety and fundamental rights, a range of mandatory requirements would apply to all high-risks systems;
- Limited risk AI. Some AI systems will be subject to a limited set of obligations (e.g. transparency);
- Minimal risk AI. All other AI systems can be developed and used in the EU without additional legal obligations than existing legislation.

Certain particularly harmful AI practices are prohibited as contravening Union values, while specific restrictions and safeguards are proposed in relation to certain uses of remote biometric identification systems for the purpose of law enforcement.²⁰⁴ The proposal lays down a risk methodology to define "high-risk" AI systems that pose significant risks to the health and safety or fundamental rights of persons. Those AI systems will have to comply with a set of horizontal mandatory requirements for trustworthy AI and follow conformity assessment procedures before those systems can be placed on the Union market.

Internal Market Committee (MEP Brando BENIFEI) and the **Civil Liberties Committee (MEP Dragoș TUDORACHE)** prepared a joint report on 22 May 2023 and adopted a draft negotiating mandate on the first ever rules for Artificial Intelligence, that was endorsed by EP plenary on 14 June 2023.

²⁰⁴ Wendehorst Ch. et al., Biometric Recognition and Behavioural Detection Assessing the ethical aspects of biometric recognition and behavioural detection techniques with a focus on their current and future use in public spaces, Policy Department, European Parliament, 2021, [https://www.europarl.europa.eu/RegData/etudes/STUD/2021/696968/IPOL_STU\(2021\)696968_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2021/696968/IPOL_STU(2021)696968_EN.pdf)

MEPs substantially amended the list proposed by the European Commission to include bans on intrusive and discriminatory uses of AI systems such as:

- “Real-time” remote biometric identification systems in publicly accessible spaces;
- “Post” remote biometric identification systems, with the only exception of law enforcement for the prosecution of serious crimes and only after judicial authorization;
- Biometric categorisation systems using sensitive characteristics (e.g. gender, race, ethnicity, citizenship status, religion, political orientation);
- Predictive policing systems (based on profiling, location or past criminal behaviour);
- Emotion recognition systems in law enforcement, border management, workplace, and educational institutions; and
- Indiscriminate scraping of biometric data from social media or CCTV footage to create facial recognition databases (violating human rights and right to privacy).

MEPs included obligations for providers of foundation models who would have to guarantee **robust protection of fundamental rights, health and safety and the environment, democracy and rule of law**. They would need to assess and mitigate risks, comply with design, information and environmental requirements and register in the EU database.

Generative foundation models, like GPT, would have to comply with additional transparency requirements, like **disclosing that the content was generated by AI, designing the model to prevent it from generating illegal content and document and make publicly available a sufficiently detailed summary of the use of training data protected under copyright law**.

There is a number of additional concerns regarding **know-how, ways of conducting business, knowledge, written and spoken contributions, even ways of expressions, movements, emotional reactions, habits**, etc. that can be digitized into data but not treated as personal data and not covered by intellectual property, that would deserve protection against copying and algorithmically reproducing for profit into metaverse by means of AI.

An additional concern with regard to metaverse is **if metaverse would be considered as a publicly accessible space**.

In his opinion of June 2021 on the draft Regulation on the Artificial Intelligence Act, the European Data Protection Supervisor stated that the classification of an AI system as high-risk does not necessarily mean that it is lawful per se. According to the EDPS, remote biometric identification of individuals in publicly accessible spaces poses a high-risk of intrusion into individuals’ private live. Therefore, it called for **a general ban on any use of AI for an automated recognition of human features in publicly accessible spaces** (such as of **faces** but also of **gait, fingerprints, DNA, voice, keystrokes and other biometric or behavioural signals**) in any context. Furthermore, the EDPS considered that the use of AI to infer **emotions** of a natural person should be prohibited.

4.3. Integrity in metaverse

In her study on Biometric recognition and behavioural detection, Prof. Dr Wendehorst argued that:

*Capturing biometric identifiers means transforming unique physical features of a human being into digital data, leading to a ‘**datafication**’ of humans. Since the features that uniquely identify a person are part of a person's body, their collection and use interfere with a human’s personal autonomy and dignity. Once a*

biometric template has been created and stored in a reference database anyone in possession of that template is able to identify and trace the relevant person anywhere on the globe, creating a severe risk for that person of being tracked and put under surveillance. The template may be used for identifying the person for an indefinite range of purposes and in different situations. What makes possession of biometrical templates so powerful and potentially so risky from a fundamental rights perspective is the fact that individuals will, during their lifetime, not be able to change their biometric features. **Being traceable by way of biometric data is thus irreversible, and traceability close to inescapable.** Other personal data, such as social security number or address (so-called 'indexical data'), is not inextricably tied to the physical features of a human but is only contingently linked to a person.²⁰⁵

It is argued that creating biometric templates digitalises the unique characteristics of person, which leads to **a loss of control over how a person's bodily features are used by others.** The transformation of biometric identifiers into digital data objectifies the human body and gives others the possibility to use unique bodily characteristics for their own purposes, even if these purposes are in contradiction to the data subject's interests. The use of objectified characteristics of humans for identification purposes by others is viewed as a contradiction to Kant's fundamental principle that people are to be treated as ends in themselves, never merely as a mean.²⁰⁶

Considering that a biometric template digitalises the human body and represents bodily features, it has even been argued that the collection of biometric identifiers not only interferes with a person's private life and right to data protection but also with the integrity of a person's body.

Datafication of humans is an element that plays a **role in construction of metaverse**, in the process of creation of photographic avatars, digital humans based on identifiers collected from existing persons, digital twins of persons but also of buildings where such digital buildings would observe internal traffic of persons.

Datafication is a matter of concern every time physical subjects or objects will be processed by AI into fully digitized environment of metaverse, with or without a reference to data protection, intellectual property, integrity, etc.

In military and special services context the datafiction of humans can be used as **weapon or a tool of surveillance** that is withheld entirely or partially from the democratic and the rule of law oversight. As discussed in the chapter on challenges, the **military metaverse**²⁰⁷ can allow real time monitoring of physical spaces and persons, running different scenarios and deployment of arms.²⁰⁸ Similar utility of metaverse can be found by **special services and police**²⁰⁹ leading to surveillance concerns surpassing the use of [Pegasus spyware](#), with particular threats in the area of [deep fakes](#).

²⁰⁵ Anton Alterman, 'A Piece of Yourself: Ethical Issues in Biometric Identification' (2003) 5 Ethics and Information Technology 139, 144.

²⁰⁶ Anton Alterman, 'A Piece of Yourself: Ethical Issues in Biometric Identification' (2003) 5 Ethics and Information Technology 139, 145.

²⁰⁷ <https://capsulesight.com/metaverse/15-examples-of-the-use-of-metaverse-in-military/>

²⁰⁸ <https://nationalinterest.org/blog/techland-when-great-power-competition-meets-digital-world/how-metaverse-will-revolutionize>

²⁰⁹ Vanorio F., Metaverse: Implications for Security and Intelligence, 2022, <https://www.natofoundation.org/wp-content/uploads/2022/02/NDCF-Paper-Vanorio-110222.pdf>

4.4. Comprehensiveness of ethical values and fundamental principles of law in metaverse

The work of Committee of Inquiry to investigate the use of Pegasus and equivalent surveillance spyware (PEGA Committee) illustrates how governments of EU Member States, the Council and the Commission, consider that some policy areas are withheld from European legislative oversight and not bound by EU fundamental rights to the detriment of individual rights and democracy in the EU.²¹⁰

European Parliament highlighted in its recommendations *the undeniable importance of the protection of privacy, the right to dignity, private and family life, freedom of expression and information, freedom of assembly and association, and the right to a fair trial, in particular in an increasingly digital world where more and more of our activities take place online.*

European Parliament took *the firm position that breaches of these fundamental rights and freedoms are key in terms of respect for the common legal principles set out in the Treaties and in other sources, and notes that democracy itself is at stake, as the use of spyware on politicians, civil society and journalists has a chilling effect and severely affects the right to peaceful assembly, freedom of expression and public participation.*

While of essential importance in the light of the upcoming European elections, the deliberations of PEGA Committee were a testing ground in the light of challenges that may be posed by metaverse in the area of activities of military, special services and police.

Similarly, on 11 May 2023, European Parliament adopted a resolution on the adequacy of the protection afforded by the EU-US Data Privacy Framework (2023/2501(RSP)) concluding that the EU-US Data Privacy Framework fails to create essential equivalence in the level of protection. In the background of this decision were two judgments of the CJEU, of 6 October 2015 and 16 July 2020, in which the CJEU had invalidated, respectively, the European Commission's July 2000 decision on the legal adequacy of the EU-US Safe Harbour Framework (Schrems I) and the European Commission Decision 2016/1250 on the adequacy of the protection provided by the EU-US "Privacy Shield" agreement (Schrems II), on the basis of concerns that the U.S. government surveillance powers are not limited as required by EU law. By means of these two decisions, European Commission gave the U.S. big tech for two decades rapidly increasing access to data of Europeans.

The position of the European Parliament and of the CJEU proves that it considers that European **ethical values and fundamental rights need to be protected across a broad spectrum of policies and play an important role also in the area affected by national and public security.** They are an ethical and legal fundament of the entire European project.

Metaverse, as well as AI, is **not just another product for consumers.** It is also a tool of economic dominance and can be used as a [weapon](#) or [spyware](#). European ethical values and fundamental principles of law need to regulate metaverse in these areas, if the EU wants to effectively protect individual rights of its citizens and its democracy.

²¹⁰ European Parliament recommendation of 15 June 2023 to the Council and the Commission following the investigation of alleged contraventions and maladministration in the application of Union law in relation to the use of Pegasus and equivalent surveillance spyware, https://www.europarl.europa.eu/doceo/document/TA-9-2023-0244_EN.html

As a new platform for governance, metaverse can be built on the principles of 1) *universal fundamental rights, not exceptions*, 2) *innovation, not exploitation*, 2) *cooperation, not confrontation*.

4.5. Methodology of smart regulation model, independent expertise and an obligation to provide for optimal legislation

A set of prioritised ethical principles for metaverse can be identified on the basis European principles as derived from the Treaties and the general principles of EU law, in the light of discussions on potential treaty changes and rebalancing of ethical principles towards social and environmental sustainability.

While ICT start-ups and platforms pretend to operate outside the legal framework, that legal framework fully applies to them. Principles of law reflecting more general, ethical considerations may be in this case more effective than specialised, fragmented provisions, which need to be continuously adjusted and create an impression of a continuous legislative and regulatory crisis. Of course, start-ups and platforms may shop for a jurisdiction, which offers relaxed standards, however, as discussed in the section on civil and commercial law, this problem can be solved if jurisdiction and applicable law follows users rather than producers. The problem can also be solved by a reform of e-government and focusing public services on assisting citizens and businesses rather than sanctioning them; to help them in compliance rather than impose fines or even criminalise them in case of non-compliance.

Such a system offers a higher degree of stability but requires additional work, including work on codification, which comprehensively covers an entire field of law, rather than producing selective instruments addressing a specific, current problem.

Research indicates at an important correlation between policies improving rights of citizens and businesses²¹¹ and a potential of such policies to contribute to growth.²¹²

There has been an important research done for the European Parliament on smart regulation based on performance indicators.²¹³ It is related to a more general question if legislators are obliged to provide optimal legislation. [Interinstitutional Agreement between the European Parliament, the Council of the European Union and the European Commission on Better Law-Making](#) provides for an engagement towards better law-making which is seen by the European Commission as a voluntary commitment from which it can depart in case of difficulties, urgency or, altogether, in the area of quantifications of ex-post evaluation. Instead, in a representative democracy based on the rule of law, the answer to this questions should be positive. Legitimacy and accountability require the legislation to be prepared by elected representatives but also on the basis of an independent scientific evidence and through thorough assessment.

²¹¹ De Streel A. et al. Contributing to Growth: European Digital Single - Market Delivering improved rights for citizens and businesses, Policy Department, European Parliament, 2019, [https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU\(2019\)638395](https://www.europarl.europa.eu/thinktank/en/document/IPOL_STU(2019)638395)

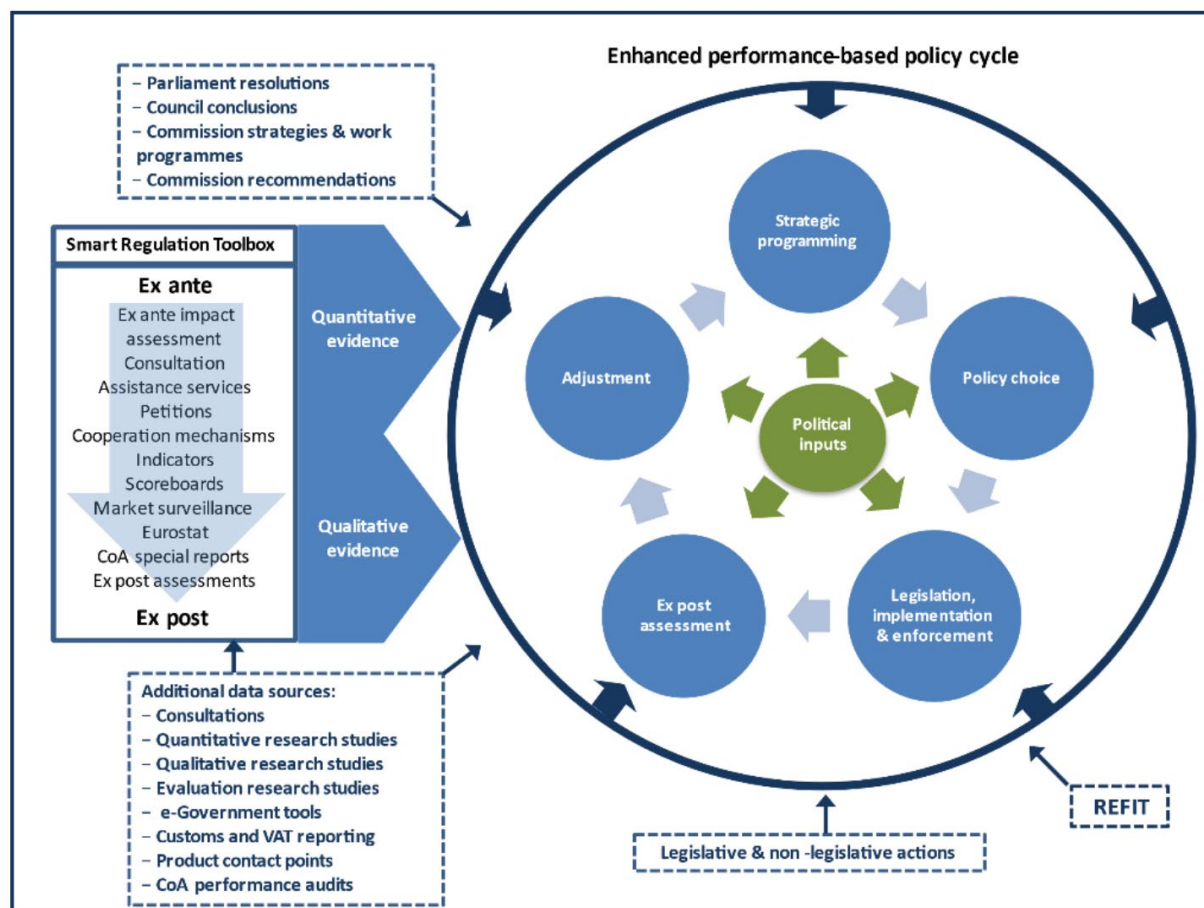
²¹² Maciejewski M., Delivering economic benefits for citizens and businesses, Policy Department, European Parliament, 2019, [https://www.europarl.europa.eu/RegData/etudes/ATAG/2019/638392/IPOL_ATAG\(2019\)638392_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/ATAG/2019/638392/IPOL_ATAG(2019)638392_EN.pdf)

²¹³ Muller P. et al., Performance-Based Full Policy Cycle for the Digital Single Market, Policy Department, European Parliament, 2013, [https://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/507457/IPOL-IMCO_ET\(2013\)507457_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/507457/IPOL-IMCO_ET(2013)507457_EN.pdf)

The concept of smart regulation is based on the principles of law and a circular collection of qualitative and quantified information generated ex ante and ex post from all available sources for an ongoing, real-time, policy assessment. enhanced by technology.²¹⁴

It is illustrated with the below figure on performance based policy-cycle.

Figure 22: Performance based policy cycle



Source: Jones S. et al., [Better regulation in the EU: Improving quality and reducing delays](#), Policy Department, European Parliament, 2022.²¹⁵

There is a number of entry points where ethical considerations can be formulated and introduced into the system. They are mainly on the top of the figure and European Parliament's resolutions are of particular importance provided that European Commission gives them a scrupulous follow up. There is also a number of points where their effects can be evaluated. Important weakness of current better regulation process is due to particular ineffectiveness of ex-post evaluation exercise.²¹⁶

²¹⁴ Muller P., Smart Single Market Regulation, Policy Department, European Parliament, 2015, [https://www.europarl.europa.eu/RegData/etudes/STUD/2015/563442/IPOL_STUD\(2015\)563442_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2015/563442/IPOL_STUD(2015)563442_EN.pdf)

²¹⁵ [https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/734712/IPOL_BRI\(2022\)734712_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/734712/IPOL_BRI(2022)734712_EN.pdf)

²¹⁶ Jones S., Identifying Optimal Policy Making and Legislation, Policy Department, European Parliament, 2019, [https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/638399/IPOL_BRI\(2019\)638399_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/638399/IPOL_BRI(2019)638399_EN.pdf)

An important role in this process is played by academia and independent expertise, in particular through quantitative, qualitative and policy evaluation research studies.²¹⁷

The European Parliament's practice of referring to independent expertise - engaged through Policy Departments in order to inform democratic discussion and reinforce accountability - can be seen as a model solution. The European Parliament's work is based on strong parliamentary committees, organised by policy area, which are responsible for the legislative and scrutiny work. Research support for the committees has to be independent and geared to the highest level of knowledge, if it is to make a difference and add value. Policy departments provide expertise that is scientific, non-partisan, independent and without stakeholder bias. The role of independent expertise and academia in the legislative process has been illustrated in the section 4.2 describing how independent expertise contributed to MEPs reflection on ethical values.

4.6. Designing metaverse in the EU

In 2019, European Commission published a [proposal for a regulation of the European Parliament and of the Council on markets in crypto-assets and amending Directive \(EU\) 2019/1937](#). Following, European Parliament's legislative resolution of 20 April 2023 and the adoption by Council on 16 May 2023, the [regulation](#) has been published on 6 June 2023 and will apply since the end of 2024 introducing digital assets that may depend on cryptography and exist on a distributed ledger, into the European legal system.

In May 2020, the [European Blockchain Observatory and Forum](#) was initiated as a pilot project of the European Parliament with aim to accelerate blockchain innovation and the development of the blockchain ecosystem within the EU and help cement Europe's position as a global leader in this transformative new technology. On 3 December 2020 the European Commission published a communication "[Europe's Media in the Digital Decade: An Action Plan to Support Recovery and Transformation](#)", which in the aftermath of an economic turndown due to measures aimed to contain Covid-19, listed measures to boost, among others virtual reality experience by fostering a [European Virtual and Augmented Reality \(VR/AR\) industrial coalition](#) (action 5)²¹⁸ and a Creative Innovations Lab

²¹⁷ Maciejewski M. et al., EP-EUI Roundtable - Role of the European Parliament in promoting the use of independent expertise in the legislative process, Policy Department, European Parliament, 2018, [https://www.europarl.europa.eu/RegData/etudes/STUD/2018/626085/IPOL_STU\(2018\)626085_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2018/626085/IPOL_STU(2018)626085_EN.pdf)

²¹⁸ "Immersive technologies and high-quality content allow creating new applications and use cases as well as new ways of engaging with audiences. Immersive technologies create more appealing and immersive experiences in different domains such as media, entertainment, culture, healthcare, design, architecture, manufacturing, education, tourism, fashion, training or retail shopping. By 2030, Virtual Reality (VR) and Augmented Reality (AR) have the potential to add about 1,3 trillion euros to the global economy, up from 39 billion euros in 2019. While most of the big players are currently in Asia and the US, Europe also has great potential to become market leader in this technology. EU research funds have supported more than 450 projects dedicated to VR and AR, for a total of over 1 billion euros since the 1990s. Europe has a distinct competitive advantage when it comes to content thanks to its large cultural diversity: leading cultural players such as the ARTE, the Venice Film Festival, and the Centre National du Cinema are actively exploring and supporting the potential of VR. Europe also has highly skilled workers capable of 3D modelling and creating computer-generated (CG) content for the gaming industry and VR animation. Building on Europe's creativity and strong research base, VR/AR content, technical solution and applications have the potential to trigger innovations in other industrial sectors, such as manufacturing industries, by improving product development and processes. Besides, they play an important role in driving the transformation of the tourism sector and helping creative industries such as fashion or architecture, to develop new business models, make production more efficient by reducing waste, and enhance costumers' experience. However, the European VR/AR sector suffers from fragmentation across sectors, players, and applications. The Commission therefore proposes to launch a VR/AR Coalition to stimulate cooperation and cross-fertilisation across sectors and ensure European leadership in this crucial, growing market. The VR/AR Coalition would provide a platform for synergies, by fostering joint actions and commitments. The Coalition will be based on a broad, cross-sectorial approach involving industries, technology providers and creatives. The Coalition would reflect this diversity of skills and consist of prominent players of

(action 8).²¹⁹ The VR/AR Industrial Coalition brings together stakeholders from key metaverse technologies. It aims to inform policymaking, encourage investment, facilitate dialogue with stakeholders and identify key challenges and opportunities for the European VR/AR sector. It does so by taking a broad cross-sectoral approach involving industries, technology providers and creatives. The coalition has several components: • workshops with stakeholders ([the first workshop on challenges and opportunities](#); [second workshop on optimal deployment by 2026](#); [third workshop on EU VR/AR competitiveness & unique value proposition](#); [fourth workshop on media sector, including gaming sector and metahumans](#); [fifth workshop on industry-policy initiatives and support to the European VR/AR ecosystem](#) (November 2021 to February 2022) • the [strategic paper with a market assessment of the European VR/AR ecosystem](#) prepared by Ecorys, which previously prepared a similar [study on metaverse](#) for XR Association; • a [roadmap](#).

In its communication of 9 March 2021 entitled '[2030 Digital Compass: the European way for the Digital Decade](#)' (the 'Digital Compass Communication') the Commission laid out its vision for 2030 to empower citizens and businesses through digital transformation, pointing specifically at "Government as a Platform", as a new way of building digital public services, that will provide a holistic and easy access to public services with a seamless interplay of advanced capabilities, such as data processing, AI and virtual reality. and providing a plan that will likely influence the initiative on virtual worlds and the development of the metaverse in Europe.

In her [the State of the Union](#) of 14 February 2022, Ursula van der Leyen announced the development among key new initiatives for 2023 - within the framework of [A Europe fit for the digital age](#) - of an **initiative on virtual worlds, such as metaverse**. based on respect for digital rights and EU laws and values. The aim is open, interoperable and innovative virtual worlds that can be used safely and with confidence by the public and businesses. Informed by input from a 'citizens' panel', this initiative, announced for summer 2023, would describe this vision, address opportunities and societal challenges, and announce upcoming implementation measures.

On 9 March 2022, the Council of the European Union published a [study on Metaverse - Virtual World, Real Challenges](#), calling for Europe to benefit fully from new opportunities created by metaverse.

On 30 May 2022, the European Parliament and of the Council adopted [regulation \(EU\) 2022/858 on a pilot regime for market infrastructures based on distributed ledger technology](#) laying down requirements in relation to **distribute ledger technology market infrastructures and their**

the various sectors, ranging from content production and distribution, to the availability of technology, as well as innovation and business development. It would include members representing national or regional VR/AR associations, various industry representatives that could benefit from the wider use of VR/AR technologies for content creation and use. The Coalition would present, by end 2021, a strategic paper setting out a) the extent to which VR/AR are deployed in the media sector; b) objectives for optimum deployment of VR/AR in the media sector to be reached by 2026; c) concrete commitments on how the industry will contribute to meet these objectives. A VR Media Lab will also be launched to support creative cooperation on projects for new ways of storytelling and interacting, through virtual and augmented reality. It will enable joint work and mutual learning between people representing a range of professional groups (journalists, filmmakers, game designers, programmers, researchers). The funded projects will focus on content for entertainment, culture and news, as well as virtual reality applications in other industries, such as tourism, and fields such as education."

²¹⁹ "Start-ups and scale-ups will have the possibility to participate in the Creative Innovation Labs, a new initiative under the cross-sectorial strand of Creative Europe. This will bring together media and other creative sectors (e.g., music, publishing) and experiment with data, virtual and augmented reality and other technologies to develop new content, new business models, new skills, to promote diversity inclusion, and sustainability and to boost audience engagement. It is important to note that innovative media start-ups and SMEs will also be able to apply for Horizon Europe support under the European Innovation Council and the European Institute of Innovation and Technology."

operators in respect of: (a) granting and withdrawing specific permissions to operate DLT market infrastructures in accordance with this Regulation; (b) granting, modifying and withdrawing exemptions related to specific permissions; (c) mandating, modifying and withdrawing the conditions attached to exemptions and in respect of mandating, modifying and withdrawing compensatory or corrective measures; (d) operating DLT market infrastructures; (e) supervising DLT market infrastructures; and (f) cooperation between operators of DLT market infrastructures, competent authorities and the European Supervisory Authority (European Securities and Markets Authority) established by Regulation (EU) No 1095/2010 (ESMA).

In a follow up to the 2030 Digital Compass communication, the European Parliament and the Council issued on 14 December 2022 a [decision establishing the Digital Decade Policy Programme 2030](#), which sets up general objectives of digital policy until 2030, including:

“(a) promoting a human-centred, fundamental-rights-based, inclusive, transparent and open digital environment where secure and interoperable digital technologies and services observe and enhance Union principles, rights and values and are accessible to all, everywhere in the Union;

(b) reinforcing Member States’ collective resilience and bridging the digital divide, achieving gender and geographic balance by promoting continuous opportunities for all individuals, developing basic and advanced digital skills and competencies, including through vocational and professional training, and lifelong learning, and fostering the development of high-performing digital capacities within horizontal education and training systems;

(c) ensuring the Union’s digital sovereignty in an open manner, in particular by secure and accessible digital and data infrastructures capable of efficiently storing, transmitting and processing vast volumes of data that enable other technological developments, supporting the competitiveness and sustainability of the Union’s industry and economy, in particular of SMEs, and the resilience of the Union’s value chains, as well as fostering the start-up ecosystem and the smooth functioning of the European digital innovation hubs;

(d) promoting the deployment and the use of digital capabilities with a view to reducing the geographical digital divide and granting access to digital technologies and data on open, accessible and fair terms, in order to achieve a high level of digital intensity and innovation in Union enterprises, in particular start-ups and SMEs;

(e) developing a comprehensive and sustainable ecosystem of interoperable digital infrastructures, where high performance, edge, cloud, quantum computing, artificial intelligence, data management and network connectivity work in convergence, to promote their uptake by businesses in the Union, and to create opportunities for growth and jobs through research, development and innovation, and ensuring that the Union has a competitive, secure and sustainable data cloud infrastructure in place, with high security and privacy standards and complying with the Union data protection rules;

(f) promoting a Union digital regulatory environment to support the ability of Union undertakings, especially that of SMEs, to compete fairly along global value chains;

(g) ensuring that online participation in democratic life is possible for everyone, and that public services, health and care services are also accessible in a trusted and secure online environment for everyone, in particular for disadvantaged groups including persons with disabilities, and in rural and remote areas, offering inclusive, efficient, interoperable and personalised services and tools with high security and privacy standards;

(h) ensuring that digital infrastructure and technologies, including their supply chains, become more sustainable, resilient, and energy- and resource-efficient, with a view to minimising their negative

environmental and social impact, and contributing to a sustainable circular and climate-neutral economy and society in line with the European Green Deal, including by promoting research and innovation which contribute to that end and by developing methodologies for measuring the energy and resource efficiency of the digital space;

(i) facilitating fair and non-discriminatory conditions for users during the digital transformation throughout the Union by strengthening the synergies between private and public investments and the use of Union and national funds, and by developing predictable regulatory and supportive approaches that also involve the regional and local levels;

(j) ensuring that all policies and programmes which are relevant to achieving the digital targets set out in Article 4 are taken into account in a coordinated and coherent way to fully contribute to the European green and digital transition, while avoiding overlaps and minimising administrative burdens;

(k) improving resilience to cyberattacks, contributing to increasing risk-awareness and the knowledge of cybersecurity processes, and increasing the efforts of public and private organisations to achieve at least basic levels of cybersecurity."

coupled with **digital targets**, subject to revision by 30 June 2026, **data collection** and **annual reporting on the progress** with the first report scheduled for 9 January 2024.

On 14 September 2022, Thierry Breton issued a [statement on People, technologies & infrastructure – Europe's plan to thrive in the metaverse](#), indicating that the European way to foster the **virtual worlds** is threefold: 1) people: a metaverse centered on Europe's values and rule, 2) shaping the metaverse by mastering technologies, and 3) a resilient connectivity infrastructure.

On 23 January 2023, the European Parliament, the Council and the Commission proclaimed a joint [Declaration on Digital Rights and Principles for the Digital Decade](#).

On 14 February 2023, the European Commission launched a [regulatory sandbox for blockchain](#).

On 24 February 2023, the European Commission published a [study on Extended reality: opportunities, success stories and challenges in health and education](#).

According to Commission's website the study describes the state-of-the art and provide an assessment of the strengths and weaknesses of the existing research results linked to the use of XR in health and education. It also identifies research fields where relevant data is still missing. The study investigates how XR can help in the daily life of vulnerable groups, such as children and persons with disabilities, as well as the challenges that they face when using these technologies.

Moreover, the study includes success stories on how XR benefits the education and health sectors at European level, as well as success stories in the engineering, manufacturing and logistics domains. Finally, it makes a market study of XR applications available in Europe, highlighting their societal and economic impact and identifying barriers for larger deployment or take-up.

The study provides recommendations both in terms of policy intervention, potential research and innovation areas at EU level, aiming at fully exploiting the opportunities and benefits that XR technologies can offer to individuals and European businesses, in particular those active in the health and education sectors, and to the society at large.

European Commission called the **Citizens Panel on Virtual Worlds** consisting of 150 EU citizens who discussed pitfalls as well as opportunities during [three-weekend sessions](#) between February and April 2023 and concluded their work with [23 recommendations](#).

[Public consultation](#) was held by the European Commission from 5 April 2023 till 3 May 2023.

On 24 April 2023, European Parliament's JURI Committee organized a [hearing on Regulatory Challenges of the Metaverse](#).

On 26 April 2023, European Economic and Social Committee adopted an [opinion on Initiative on virtual worlds, such as the metaverse](#).

Among other considerations, the EESC indicated that:

- at the societal level, a variety of stakeholders will need to define a road map toward an **ethical**, safe, and inclusive metaverse experience. Guidelines may also be necessary around issues including security, **ethics** and regulatory compliance, physical health and safety, sustainability, and equity and fairness. The requirements for data protection and the implementation of the European General Data Protection Regulation in the metaverse also pose a special challenge. The extent to which existing requirements are still sufficient must be examined (3.3.3); and
- it is crucial to consider new sharing and licensing mechanisms that will enable the creation and distribution of content and services while also ensuring the **protection of intellectual and industrial property** and the privacy and security of users. The design of the metaverse must respect **trademarks, copyrights and other licences and forms of intellectual and industrial property** (3.7).

In May 2023, European Parliament's Policy Department A issued a [study on Remaining regulatory challenges in digital finance and crypto-assets after MiCA](#) to reflect concerns triggered by massive collapse of crypto-currencies and crypto-exchanges.

European Commission's **initiative on virtual worlds** will be announced on 11 July 2023.

It will be closely followed by European Parliament's JURI Committee report on policy implications of the development of virtual worlds - civil, company, commercial and intellectual property law issues (2023/2062 (INI)).

European Commission also plans to adopt a [legislative proposal on a digital euro](#) for the EU.

4.7. Designing metaverse in various jurisdictions

Designing metaverse in China

Crypto mining and trading were prohibited in China in 2021 to prevent environmental damage, fraud and money laundering.²²⁰

In China, metaverse platforms are centralized and governed by the tech giants such as Alibaba, Tencent, Baidu, ByteDance. On December 27 2021, Baidu launched the first domestically produced metaverse, [XiRang](#), also known as Land of Hope. Accessible as an application on computers, smartphones, and wearable devices, the virtual world invites Baidu users to login and create an avatar to explore the environment and engage with other users. Featuring a fusion of historical Chinese and futuristic design elements, the Möbius band-shaped space includes the sci-fi-themed Three Body Museum, an ancient Shaolin Temple, and the Creator City region, which has already played host to

²²⁰ <https://digital-business-lab.com/2023/02/the-rise-of-metaverse-marketing-in-china/>

Baidu's Create 2021 symposium. In line with the Chinese government's ban of cryptocurrencies, XiRang does not support digital assets or digital transactions.²²¹

The Guangzhou Huangpu District and Guangzhou Development Zone jointly released [Measures for Promoting the Innovation and Development of the Metaverse](#), the first policy of its kind in the Guangdong-Hong Kong-Macao Greater Bay Area. Some of the highlights include: a) promoting innovation agglomeration and encouraging enterprises to form clusters and become "highly specialized"; b) supporting technological leadership, where institutions and businesses should work hand in hand to solve technical bottlenecks; c) strengthening the protection of intellectual property rights; d) Increasing talent acquisition; and e) establishing a "Metaverse Industrial Fund" to attract social capital.

The China Metaverse Technology and Application Innovation Platform to advance metaverse research and development was inaugurated on May 22, 2023 in Nanjing, the capital city of China's eastern Jiangsu province. It is State-backed and led by the Nanjing University of Information Science and Technology (NUIST). It consists of founding members representing diverse academic institutions and metaverse-related companies throughout mainland China.

The platform aims to bring together the resources of academic institutions and enterprises in China, strengthening research endeavors in metaverse-related fields.

Nanjing and other Chinese cities are competing to take a prominent position in the country's metaverse development. In February 2023, the city revealed its metaverse strategy, aiming to create a thriving industry with annual revenues surpassing 135 billion yuan (\$19.13 billion) by the close of 2025. The city of Shanghai is actively pursuing its metaverse aspirations, predicting its metaverse industry will reach annual revenue of 350 billion yuan (\$49.6 billion) by 2025.²²²

Designing metaverse in South Korea

South Korea's government announced in early in January a US\$170 million fund to invest in the virtual reality idea and its digital technologies. The fund is aimed to set the stage for the country to be in the top five nations in metaverse developments by 2026, with South Korean President Yoon Suk-yeol saying the technology is a national priority.²²³

South Korea's National Data Policy Committee announced on Sept. 23, 2022, that it would develop regulatory amendments specific to the metaverse. The Committee is chaired by South Korean Prime Minister Han Duck-soo and co-administered by the Ministers of Science and ICT and the Minister of Interior and Safety. The announcement focused on the metaverse as a technology that could "lead the success of national competitiveness." The Committee found specifically that the South Korean framework that exists for videogaming was insufficient to deal with metaverse issues.²²⁴

On 20 January 2023, the Ministry of Science and ICT (MSIT, Minister: Lim Hyesook) announced a [pan-government strategy on metaverse](#) as part of Digital New Deal 2.0 initiative. This strategy will help

²²¹ <https://jingculturecrypto.com/baidu-xirang-metaverse/>

²²² <https://cointelegraph.com/news/chinese-city-launches-govt-backed-metaverse-platform>

²²³ <https://forkast.news/metaverse-south-korea-current-clunky-technology/#:~:text=South%20Korea%27s%20government%20set%20the,idea%20and%20its%20digital%20technologies>

²²⁴ <https://www.hklaw.com/en/insights/publications/2022/09/eu-south-korea-japan-announce-metaverse-regulation-plans>

South Korea to better respond to disruptive innovation and emerging new technologies, and be prepared for the future.

This metaverse strategy focuses on four main objectives. First is to **reinvigorate the metaverse platform ecosystem, and foster an environment for the metaverse platforms to grow**. Second is to **nurture experts and talent** in the metaverse field, and providing people with opportunities to access metaverse without regional restrictions, and to participate in a variety of metaverse events. Third is to **nurture leading companies** specialized on metaverse. To this end, metaverse infrastructure, like metaverse demonstration facilities, and diverse types of funds, will be provided. Final objective is to **create an exemplary metaverse world**. This includes setting **ethical principles for metaverse** to prevent unethical and illegal conducts while protecting digital assets and copyrights. The government will also strive to address digital divide among people by providing metaverse education to the digitally marginalized people.

Minister Lim Hyesook indicated that “*metaverse is an uncharted digital continent with indefinite potential. Anyone can realize their dreams. In particular, metaverse will become a place where the youth can take up more challenges, grow and leap forward a greater world. The Ministry will ensure to implement the diverse support strategies faithfully, so that South Korean can become a leading global metaverse country.*”

Designing metaverse in the U.S.

In May 2017, Representatives Suzan DelBene, Yvette Clarke, Bill Flores, Darrell Issa, and Ted Lieu formed the [Congressional Caucus on Virtual, Augmented, and Mixed Reality Technologies](#) for the 115th Congress, also known as the “Reality Caucus.” The purpose of the caucus was to promote the advancing technologies of virtual reality, augmented reality, and mixed reality to Members of Congress and their staff.²²⁵ Congressman Darrell Issa (CA-50), along with Rep Suzan DelBene (WA-01), Rep Ted Lieu (CA-33), and Rep Yvette D Clarke (NY-09), submitted a [resolution](#) 117th Congress (2021-2022) aimed at declaring November 2022 as National XR Month.

On February 18th, 2022, the [Oversight and Safety Act of 2022](#) was introduced before the Congress (sponsor: [Representative Lori Trahan](#)) with aim to give FTC competences to issue regulations regarding content moderation on covered platforms including those providing AR and VR services while [Kids Internet Design and Safety Act \(KIDS Act\)](#), introduced on September 24th 2020 (sponsor: [Representative Kathy Castor](#)), aims to empower the FTC to issue regulations regarding content moderation on covered platforms including those providing AR and VR services.²²⁶

After initial laissez-faire approach, the [SEC](#) is struggling with the appropriate application of securities laws to cryptocurrencies and tokens. A SEC commissioner recently stated that securities laws might apply to certain NFT projects, particularly NFT projects that offer fractionalization or entitle the holder to a revenue stream. In addition to securities laws, the issuance, trading, exchange, lending and other activities concerning in-world currencies may trigger certain regulatory regimes – for example, those concerning banking, money transmission and other financial activities.

On 9 March 2022, Joe Biden has signed an [executive order](#) with aims to:

- **Protect U.S. Consumers, Investors, and Businesses** by directing the Department of the Treasury and other agency partners to assess and develop policy recommendations to address

²²⁵ <https://delbene.house.gov/news/documentsingle.aspx?DocumentID=1953>

²²⁶ Other, more general proposed bills before the 117th Congress related to content moderation, include, for example, the [Digital Platform Commission Act of 2022](#) (S. 4201) and the [21st Century FREE Speech Act](#) (H.R. 7613).

the implications of the growing digital asset sector and changes in financial markets for consumers, investors, businesses, and equitable economic growth. The Order also encourages regulators to ensure sufficient oversight and safeguard against any systemic financial risks posed by digital assets.

- **Protect U.S. and Global Financial Stability and Mitigate Systemic Risk** by encouraging the Financial Stability Oversight Council to identify and mitigate economy-wide (i.e., systemic) financial risks posed by digital assets and to develop appropriate policy recommendations to address any regulatory gaps.
- **Mitigate the Illicit Finance and National Security Risks Posed by the Illicit Use of Digital Assets** by directing an unprecedented focus of coordinated action across all relevant U.S. Government agencies to mitigate these risks. It also directs agencies to work with our allies and partners to ensure international frameworks, capabilities, and partnerships are aligned and responsive to risks.
- **Promote U.S. Leadership in Technology and Economic Competitiveness to Reinforce U.S. Leadership in the Global Financial System** by directing the Department of Commerce to work across the U.S. Government in establishing a framework to drive U.S. competitiveness and leadership in, and leveraging of digital asset technologies. This framework will serve as a foundation for agencies and integrate this as a priority into their policy, research and development, and operational approaches to digital assets.
- **Promote Equitable Access to Safe and Affordable Financial Services** by affirming the critical need for safe, affordable, and accessible financial services as a U.S. national interest that must inform our approach to digital asset innovation, including disparate impact risk. Such safe access is especially important for communities that have long had insufficient access to financial services. The Secretary of the Treasury, working with all relevant agencies, will produce a report on the future of money and payment systems, to include implications for economic growth, financial growth and inclusion, national security, and the extent to which technological innovation may influence that future.
- **Support Technological Advances and Ensure Responsible Development and Use of Digital Assets** by directing the U.S. Government to take concrete steps to study and support technological advances in the responsible development, design, and implementation of digital asset systems while prioritizing privacy, security, combating illicit exploitation, and reducing negative climate impacts.
- **Explore a U.S. Central Bank Digital Currency (CBDC)** by placing urgency on research and development of a potential United States CBDC, should issuance be deemed in the national interest. The Order directs the U.S. Government to assess the technological infrastructure and capacity needs for a potential U.S. CBDC in a manner that protects Americans' interests. The Order also encourages the Federal Reserve to continue its research, development, and assessment efforts for a U.S. CBDC, including development of a plan for broader U.S. Government action in support of their work. This effort prioritizes U.S. participation in multi-country experimentation, and ensures U.S. leadership internationally to promote CBDC development that is consistent with U.S. priorities and democratic values. coordinate a regulatory plan for cryptocurrencies including ensuring "sufficient oversight and safeguard against any systemic financial risks posed by digital assets".²²⁷

²²⁷ <https://www.whitehouse.gov/briefing-room/statements-releases/2022/03/09/fact-sheet-president-biden-to-sign-executive-order-on-ensuring-responsible-innovation-in-digital-assets/>

In his 2022 speech, Gary Gensler stated “[w]hen a new technology comes along, our existing laws don’t just go away.”

In the 1930s, Congress painted with a broad brush the definition of a security. Our laws have been amended many times since then, Congress has painted with an even wider brush, and the Supreme Court has weighed in numerous time. They’ve all said, basically, to protect the public against fraud, to protect the public against scammers, people raising money from the public had to register and make basic disclosures with a cop on the beat: the SEC.

You might wonder: how might a crypto token be a security?

The **Supreme Court’s 1946 Howey Test**, which was about orange groves, says that an investment contract exists when there is the investment of money in a common enterprise with a reasonable expectation of profits to be derived from the efforts of others.”²²⁸

With regard to stablecoins he indicated:

“[Stablecoins] are not issued by a central government and are not legal tender.

Stablecoins, though, in offering features similar to and potentially competing with bank deposits and money market funds, raise three important sets of policy issues.

*First, stablecoins raise **public policy considerations around financial stability and monetary policy.** ...*

*Second, stablecoins raise issues on how they potentially can be used for **illicit activity**...*

*Third, stablecoins raise issues for **investor protection**. Stablecoins were first adopted and continue to be dominantly used on crypto trading and lending platforms. About 80 to 85 percent of trading and lending on these platforms involves stablecoins.”²²⁹*

In response to a crisis of bankruptcies and fraud schemes described in the chapter on challenges of this study, the Security and Exchange Commission increased its investigation effort resulting in numerous proceedings:

- On 30 September 2022, the Securities and Exchange Commission charged Arbitrade Ltd., a Bermudan company, and Cryptobontix Inc., a Canadian company, and their principals, Troy R. J. Hogg, James L. Goldberg, and Stephen L. Braverman, and a so-called international gold trader, Max W. Barber, for **perpetrating an alleged pump-and-dump scheme involving a crypto asset** called "Dignity" or "DIG."
- On 13 December, 2022, the Securities and Exchange Commission charged Samuel Bankman-Fried with **orchestrating a scheme to defraud equity investors** in FTX Trading Ltd. (FTX), the crypto trading platform of which he was the CEO and co-founder.
- On 12 January 2023, the Securities and Exchange Commission charged Genesis Global Capital, LLC and Gemini Trust Company, LLC for the **unregistered offer and sale of securities** to retail investors through the Gemini Earn crypto asset lending program. Through this unregistered offering, Genesis and Gemini raised billions of dollars’ worth of crypto assets from hundreds of thousands of investors.
- On 16 February, 2023, the Securities and Exchange Commission charged Singapore-based Terraform Labs PTE Ltd and Do Hyeong Kwon with **orchestrating a multi-billion dollar crypto asset securities fraud** involving an algorithmic stablecoin and other crypto asset securities.

²²⁸ <https://www.sec.gov/news/speech/gensler-remarks-crypto-markets-040422>

²²⁹ <https://www.sec.gov/news/speech/gensler-remarks-crypto-markets-040422>

- On 6 May 2023, the Securities and Exchange Commission charged Binance, BAM Trading Services Inc., BAM Management US Holdings Inc. , and Changpeng Zhao, with **unlawful engagement in unregistered offers and sales of crypto asset securities**.

[The U.S. Internal Revenue Service \(IRS\)](#) has issued [guidance](#) clarifying that **cryptocurrencies constitute property**, the profit from which is taxable. NFTs are understood to receive similar treatment. IRS clarified that digital assets (such as cryptocurrencies, stablecoins and NFTs) are **not a real currency** (also known as “fiat”) because they are not the coin and paper money of the United States or a foreign country and are not digitally issued by a government’s central bank. A digital asset that has an equivalent value in real currency, or acts as a substitute for real currency, has been referred to as **convertible virtual currency**. A cryptocurrency is an example of a convertible virtual currency that can be used as payment for goods and services, digitally traded between users, and exchanged for or into real currencies or digital assets. Indeed, the IRS has already issued myriad subpoenas to cryptocurrency exchanges seeking information that could lead to the identification and collection of income taxes, and it would not be surprising to see taxation authorities targeting metaverse projects in similar fashion.

While many states have guidance on sales tax as applied to digital assets, to date no state has issued guidance specifically on whether sales tax applies to NFTs.

On 11 May, 2023, Rep. Lisa Blunt Rochester [D-DE-At Large] introduced [Immersive Technology for the American Workforce Act of 2023](#) (H.R.3211) to carry out a competitive grant program to support community colleges and career and technical education centers in developing immersive technology education and training programs for workforce development.

While the U.S. AI start-ups are gaining billions of dollars in financing, the AI industry requires **cheap labor to label the mass data required to power AI**, which in turn is used by metaverse to create virtual worlds and populate them with AI avatars. That industry is built with hundreds of thousands of outsourced workforce, located in countries including Kenya, the Philippines and Venezuela, many of them paid less than \$1 an hour.²³⁰ They are also, increasingly, an ethical concern, with worries emerging about substandard working conditions and low pay. [The Fairwork Cloudwork Ratings report 2022](#) evaluated working conditions at 15 popular freelance and microwork platforms such as Fiverr, Upwork and Amazon Mechanical Turk concluding : 1) majority of online work platforms fail to provide fair working conditions for remote online workers, 2) nearly a third of online platform workers aren’t being paid for completed tasks, 3) on average, workers spent over 8 hours a week on unpaid tasks.²³¹ For increasing U.S. defense contracts, the industry needs to employ U.S. labelers.²³²

Metaverse in United Arab Emirates

On 5 June 2023, United Emirates issued [Virtual Assets and Related Activities Regulations](#), which formulate fundamental principles and primary policy goals for effective regulation of virtual assets in metaverse

The following **fundamental principles** were identified:

²³⁰ Cai K., Mobilizing A.I.’s Infantry, Forbes, 2023, Vol. 206. No. 2, p. 73.

²³¹ <https://fair.work/en/fw/publications/work-in-the-planetary-labour-market-fairwork-cloudwork-ratings-2022/>

²³² Cai K., Mobilizing A.I.’s Infantry, Forbes, 2023, Vol. 206. No. 2, p. 76.

1. **Market integrity and stability:** the market should be fair, orderly, transparent, and prevent fraud and other criminal activity. The market should be systemically safe with consideration given to prudential risks. The market can be volatile whilst still being considered to be fair and orderly. The regime should be fully FATF compliant.

2. **Consumer protection:** the regime seeks to prevent harms arising from misinformation, abuse and/or poor operational practices. Market participants are free to engage with risk, so long as they give "informed consent" about their investments and VASPs have provided them with all information necessary for such consent in accordance with all applicable laws and regulations.

3. **Technology neutrality and supportive of innovation:** the regime must not discriminate against technology, but instead against illicit or harmful activities. If an activity is not illicit, it should be possible and desirable to regulate it without banning it entirely. VARA does not regulate products or protocols as the starting point for achieving its policy goals (except in special cases). VARA does not decide which innovations are subjectively valuable or not.

4. **Regulatory resilience:** the regime must not become quickly outdated with loopholes given the fast-paced nature of the industry. The regime is principles-driven and VARA is mindful when it makes prescriptive carve-outs. 5. **Regulatory efficiency and proportionality:** enforce a regime that is not only effective [i.e. achieves the policy intent], but does so in the least burdensome way possible for both VARA and VASPs. Any burden imposed is justified relative to the potential harm that is being mitigated.

Underpinning these fundamental principles are VARA's two **primary policy goals**, which are to:

1. promote the Emirate and ultimately the UAE as a **safe and progressive jurisdiction** worthy of attracting meaningful Virtual Asset growth and innovation, in complement with all related UAE Government programmes, and
2. position VARA and the UAE as **globally trusted and respected in the realm of international law**, particularly with respect to FATF compliance, and by designing a system that lends itself to interoperability and passportability.

4.8. Metaverse ethical values on international fora

Important role in the exercise on metaverse ethical values should be played by international fora, which could contribute to values discussed beyond Europe. Due to global character of metaverse the discussion on its ethics should embrace a globally representative range of participants, which aim to reach a broad consensus rather than impose a standard of any particular jurisdiction.

Between international organisations and fora which are vocal on the issue of metaverse it is worth to mention the [Global Future Council on the Future of Metaverse, World Economic Forum](#) (building in metaverse the [Global Collaboration Village](#)), International Telecommunication Union (ITU), which organised a [Forum on "Creating a metaverse for all through international standards"](#), and the [Metaverse Standards Forum](#), a venue for cooperation between standards organizations and companies to foster the development of interoperability standards for an open and inclusive metaverse, and accelerate their development and deployment through pragmatic, action-based projects.

International Governance Forum organised on 20 November 2022 a meeting on [Joint efforts to build a responsible & sustainable Metaverse](#) and on 28 November 2022 organised a panel with participation of Council of Europe on [Regulatory challenges of addressing advanced technologies \(AI and metaverse\)](#). The UNESCO Institute for Information Technologies in Education organised on 23 February a webinar on ["Shaping the Future of Immersive Learning in a Metaverse and AI World"](#), as part of the

collaboration between UNESCO IITE and the Shanghai Open University (SOU). UNESCO organised as well on 5 May 2023 a webinar "[How Versed Are You in Metaverse?](#)"

In recent Hiroshima Leaders' Communiqué concluding an annual Summit on May 19-21, 2023, the Group of Seven (G7) countries made the following statements concerning metaverse:

*"In areas such as AI, immersive technologies such as the **metaverses** and quantum information science and technology and other emerging technologies, the governance of the digital economy should continue to be updated in line with our **shared democratic values**. These include **fairness, accountability, transparency, safety, protection from online harassment, hate and abuse and respect for privacy and human rights, fundamental freedoms and the protection of personal data**. We will work with technology companies and other relevant stakeholders to drive the **responsible innovation** and implementation of technologies, ensuring that **safety and security** is prioritized, and that platforms are tackling the threats of **child sexual exploitation and abuse** on their platforms, and upholding the **children's rights to safety and privacy online**. We continue to discuss ways to advance **technology for democracy** and to cooperate on new and emerging technologies and their social implementation, and look forward to an **inclusive, multi-stakeholder dialogue** on digital issues, including on Internet Governance, through relevant fora, including the OECD Global Forum on Technology."*

*"We recognize the potential of immersive technologies, and virtual worlds, such as **metaverses** to provide **innovative opportunities**, in all industrial and societal sectors, as well as to **promote sustainability**. For this purpose, **governance, public safety, and human rights** challenges should be addressed at the global level. We task our relevant Ministers to consider **collective approaches** in this area, including in terms of **interoperability, portability and standards**, with the support of the OECD. We express our interest in possible **joint cooperation in research and development on computing technologies**. We also task our relevant Ministers to consider ways to further **promote digital trade**."*

Enlarging discussion on ethical values for metaverse into **international fora** is a particular element of building **inclusiveness** into the work on foundations of metaverse.

There is an inherent value in subjecting the discussion on metaverse to **inclusive democratic standards** involving a **broad range of actors** and promoting **evidence-based and expertise-based approach**.²³³ Evidence-based reflection in this process is of **vital importance** for the European Parliament, which acts as a continental-scale co-legislator – jointly with the Council – adopting laws for millions of European citizens. Use of independent expertise should also constitute a model for other legislators, such as the Council of the European Union or the parliaments of the Member States. Entire policy making process from **forecasting, to choosing strategies, selecting objectives, assessing the best mix of policies, enacting legislation and evaluating its consequences** should be assessed with the use of independent expertise. The data used in this process need to be as complete as possible and regular fully quantified ex-post evaluations must cover entire policy fields and feed into new policy objectives, thus completing the policy cycle. **European strategies need to be subject to assessments** and should focus on delivering results valued by citizens.²³⁴

²³³ Maciejewski M. et al., EP-EUI Roundtable - Role of the European Parliament in promoting the use of independent expertise in the legislative process, Policy Department, European Parliament, 2018, [https://www.europarl.europa.eu/RegData/etudes/STUD/2018/626085/IPOL_STU\(2018\)626085_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2018/626085/IPOL_STU(2018)626085_EN.pdf)

²³⁴ Idem.

5. THE FALLACY OF REAL ESTATE IN METAVERSE - IS IT TIME FOR A VIRTUAL PROPERTY LAW?

5.1. Land in the U.S. and European law

In the light of the U.S. law,²³⁵ a land in the most general sense, comprehends any **ground, soil, or earth** whatsoever; as meadows, pastures, woods, moors, waters, marshes, furzes, and heath. Co. Litt 4a. The word "land" includes not only the soil, but everything attached to it, whether attached by the course of nature, as trees, herbage, and water, or by the hand of man, as buildings and fences. Mott v. Palmer, 1 N. Y. 572; Nessler v. Neher, 18 Neb. 649, 26 N. W. 471; Higgins Fuel Co. v. Snow, 113 Fed. 433, 51 C. C. A. 267; Lightfoot v. Grove, 5 Heisk. (Tenn.) 477; Johnson v. Richardson, 33 Miss. 464; Mitchell v. Warner, 5 Conn. 517; Myers v. League, 62 Fed. 659, 10 C. C. A. 571. 2 Bl. Comm. 16, 17.²³⁶

According to art. 659 of the Civil Code of the State of California, "land is the **material of the earth**, whatever may be the ingredients of which it is composed, whether **soil, rock, or other substance**, and includes free or occupied space for an indefinite distance upwards as well as downwards, subject to limitations upon the use of airspace imposed, and rights in the use of airspace granted, by law." ([Civ. Code Cal](#)). According to art. 663 every kind of property that is not real is personal.²³⁷

Therefore, computer simulation of land does not meet the prerequisites of the notion of land under the U.S. law, which has a clear reference to the surface of earth and its solid components.

In the European Union, there is a number of legal systems that coexist, including those based on the Code Napoleon (France, Belgium, Italy, Luxembourg, Portugal, Spain), the common law countries (Ireland, in many respects also Scotland), the Nordic countries (Denmark, Finland and Sweden), the Eastern European states (e.g. Hungary, Poland, Slovenia, the Czech republic, Slovakia), finally the German systems (Austria, Germany and Switzerland).²³⁸ The term „land“ is used under these systems in the extensive sense of immovable property, including both the parcel (a part of earth surface) and the buildings permanently affixed to the parcel.

Computer simulation of land does not meet the prerequisites of the notion of land under the EU Member States laws either.

5.2. Metaverse companies advertising their simulations of land as real estate

Even though, virtual parcels do not meet prerequisites to be treated as land neither under the U.S. law nor under the law of the EU Member States, they are still advertised by companies active in metaverse as land.

²³⁵ The U.S. has a complex common law system comprised of various levels of norms, among which the most prominent are federal and State norms, resulting from activities of legislators and judges.

²³⁶ <https://thelawdictionary.org/land/>

²³⁷ https://leginfo.ca.gov/faces/codes_displayText.xhtml?lawCode=CIV&division=2.&title=1.&part=1.&chapter=&article=

²³⁸ Schmid Ch. et al., Real Property Law and Procedure in the European Union, EUI, 2005, <https://www.eui.eu/Documents/DepartmentsCentres/Law/ResearchTeaching/ResearchThemes/EuropeanPrivateLaw/RealPropertyProject/GeneralReport.pdf>

Decentraland encourages to “buy and sell **LAND, Estates**, Avatar wearables and names in the Decentraland Marketplace”.²³⁹ A dedicated [part of the site](#) refers to **land, parcels and estate**.

Another services MyLand.Earth Metaverse™, built on the www.myland.earth web3 platform, is a digital twin with 1:1 ratio to the planet Earth. With the basic measurement of 10 meter x 10 meter per land lot, there are 5.1 trillion land lots available on MyLand.Earth, which is to create another virtual world that is a replica of the planet Earth. The service plans to move nearly all activities that can happen on the actual Earth to the digital Earth. The service refers to the 19th-century gold rush in San Francisco, California land value appreciated 30 times within 30 years. Again, during the past 30 years of the technology boom, Silicon Valley land appreciated more than 30 times. These elements may trigger anxiety and a sense of a quickly disappearing opportunity. The service explains its business case stating that “[s]elling and distributing **land** on MyLand.Earth Metaverse™ is only a transitional process for us, not a final stop. It’s a process to distribute **land parcels** to capable **land owners** based on their business acumen, capability, technical skill set, and passion. Metaverse **land** investors can have multiple ways to realize gains from **land investment**. Some may improve **land value** by building a project on it, some may want to trade and sell the **land** and some may just want to hold and wait for its value to increase over time. We are here to build the Metaverse so as to help **landowners** meet their investment goals at all levels. Since our Metaverse is based on planet Earth, **land owners** can benefit the most from our platform.”²⁴⁰

The Sand Box encourages to become a **LAND** owner and to get a piece of **LAND** from The Sandbox. A dedicated [OpenSea site](#) offers **regular and premium lands**. The Sandbox explains that its “Metaverse is made up of **LANDS**, that are parts of the world, owned by players to create and monetize experiences. There will only ever be 166,464 **LANDS** available, which can be used to host games, build multiplayer experiences, create housing, or offer social experiences to the community.”²⁴¹ The limited number may create a sense of anxiety among potential buyers.

Somnium Space economy paper has a subtitle “Buy **land**” and uses the term land 26 times.²⁴²

Axie Infinity has dedicates sections for land sale.²⁴³

Bloktopia service indicates that within Bloktopia the purchase of **real estate** is known as Reblok. Bloktopians will be able to purchase **real estate** following the BLOK token distribution event (TGE). The **real estate** will be a valuable commodity within Bloktopia allowing Bloktopians to speculate on the property and either resell for profit or lease for passive income opportunities.²⁴⁴

5.3. How does it actually work

In practice users only get a license from a platform provider to use such “property”. An example for this is the World of Warcraft where under its Term of Services all rights, title, and interest in and to the platform, without limitation, belongs to the platform provider. This includes users account, data,

²³⁹ <https://decentraland.org/>

²⁴⁰ https://myland.earth/images/MyLand_Whitepaper_II_Updated_08282022.pdf

²⁴¹ <https://www.sandbox.game/en/about/land/>

²⁴² <https://somniumspace.com/files/Somnium%20Space%20Economy%20Paper.pdf>

²⁴³ <https://app.axieinfinity.com/marketplace/?Listed=Land&TopSale=Land>

²⁴⁴ <https://bloktopia.com/>

computer codes, virtual goods such as currency and digital cards, all characters, and even characters' names.²⁴⁵

Non-fungible tokens (NFTs)²⁴⁶ - digital asset which are uniquely identifiable within the technological framework in which it exists – are central to how virtual land 'ownership' works. Virtual land transactions have been made possible by linking the right to control and modify virtual spaces in the metaverse to an NFT. When the NFT is bought and sold, the sequence of transactions is recorded using blockchain, or another type of DLT, and is therefore traceable.²⁴⁷

The user's rights in respect of its virtual land NFT are determined by contract law, in the form of the terms and conditions of the relevant platform. Certain terms and conditions may provide that the operator has no continuing obligation to operate the metaverse platform and may cease to operate it in its sole discretion without any liability. The terms may also give the operator the right to update the terms and conditions from time to time, putting users at risk that their rights to access and use their virtual land may at any time be unilaterally altered. In addition, the terms of service may give the operator the right to, at any time, suspend a user's access to the platform at its sole discretion, to the extent technically possible. If a platform were to exercise any of these rights, while the user would remain the owner of the underlying NFT linked to the virtual land, it would not be able to access or use that land (rendering the NFT effectively worthless).²⁴⁸

Transactions in virtual land in the metaverse, such as acquiring, letting out or mortgaging virtual land, are effected through smart contracts. A smart contract is an agreement written in computer code which runs on the blockchain and is programmed to execute automatically when certain pre-determined conditions have been met.²⁴⁹

5.4. Legal consequences

Using a term "land", which is clearly defined in law by a reference to its physical attributes, in order to advertise and sell a digital simulation service, may have a number of negative legal consequences starting from invalidity of contractual relations based on error, unfair and misleading advertisement, and escalating towards criminal responsibility for deception.

It is important to keep in mind the scale of the problem with approximately US\$2 billion worth of 'land' which has changed hands in 2022 with further growth forecasted by over US\$5 billion by 2026 in the metaverse²⁵⁰ as well a considerable volatility of prices. For instance, the average price of "lands" sold

²⁴⁵ Kasiyanto S. et al., The Legal Conundrums of the Metaverse, Journal of Central Banking Law and Institutions, Vol. 1 No. 2, 2022, pp. 299 - 322, <https://jcli-bi.org/index.php/jcli/article/view/25/15>

²⁴⁶ <https://www.cliffordchance.com/insights/resources/blogs/talking-tech/en/articles/2021/06/non-fungible-tokens-the-global-illegal-impact.html>

²⁴⁷ Pirmohamed R., The metaverse: When is real estate no longer real? 2022, <https://www.cliffordchance.com/briefings/2022/10/the-metaverse--when-is-real-estate-no-longer-real-.html>

²⁴⁸ Idem.

²⁴⁹ Idem.

²⁵⁰ Among drivers of this market is the fact that Companies are looking to acquire virtual office space in the metaverse, for employees to have meetings and exchange ideas. Meta and Microsoft both developing products to allow users to meet in three-dimensional virtual spaces. Sotheby's created a digital replica of its London headquarters in Decentraland in order to showcase digital art for sale. Samsung launched virtual retail space in Decentraland in which it offers a range of virtual experiences designed to enhance customer engagement.

Many acquisitions of virtual land are motivated either by short-term speculation or a long-term passive investment strategy. Despite a handful of high-profile metaverse launches there have arguably been relatively few transactions that

across Decentraland peaked at \$37,238 in February 2022. But as of Aug. 1, 2022 their costs had dropped to an average of \$5,163. Similarly, the Sandbox's average sale price dropped from circa \$35,500 in January to around \$2,800 in August.²⁵¹

Considering the scale of the problem, there should be a reaction of legislators to this issue in the U.S. and the EU.

5.5. Further considerations on NFTs

Blockchain is a software to record transactions and is useful for a broad range of applications such as intellectual property, data protection, smart contracts, etc. A blockchain is essentially a set of connected blocks of information on an online ledger. Each block contains a set of transactions that have been independently verified by each validator on a network. Every new block generated must be verified by each node before being confirmed, making it almost impossible to forge transaction histories. The contents of the online ledger must be agreed upon by a network of individual nodes, or computers that maintain the ledger.²⁵²

Every entry or block on the blockchain, which represents an “asset”, is called “token”. Tokens can be classified from different perspectives:

- Currency or payment tokens are cryptocurrencies such as Bitcoin or Ethereum etc. These tokens are intended to serve as alternative means of payment that are independent of financial institutions.
- Security, equity or investment tokens embody shares in companies and the associated rights of co-determination. Due to their proximity to securities, they may be subject to the provisions of securities law.
- Utility tokens have the function of providing access to products or services. They represent virtual vouchers for future products or services of a company, the establishment of which is financed with the help of token sales.²⁵³

From this perspective, NFTs would generally be classified as utility tokens, as their main purpose is to link them to a digital or real value. But under certain circumstances, e.g. if they confer a co-ownership share in a real asset, they might also be qualified as security, depending on their specific content.²⁵⁴

Another distinction that can be made is the distinction between fungible (“exchangeable”) and non-fungible (“non-exchangeable”) tokens. The best-known applications of fungible tokens are cryptocurrencies, like Bitcoin, Ether or Solana. Such tokens are exchangeable like coins or bills are in the real world, as one Bitcoin looks like another Bitcoin. As opposed to cryptocurrencies, Non-Fungible Tokens (hereafter called NFTs) correspond to or represent (parts of) goods that are unique due to their characteristics, such as (digital or physical) works of art – or real estate.²⁵⁵

in the short term have led to meaningful attempts to properly commercially develop, and create genuine commercial use cases for, the virtual land.

²⁵¹ Gola Y., Metaverse housing bubble bursting? Virtual land prices crash 85% amid waning interest, Cointelegraph, 2022, <https://cointelegraph.com/news/metaverse-housing-bubble-bursting-virtual-land-prices-crash-85-amid-waning-interest>

²⁵² <https://www.investopedia.com/terms/c/cryptocurrency.asp#toc-types-of-cryptocurrency>

²⁵³ Garbers von Boehm K. et al., [Intellectual Property Rights and Distributed Ledger Technology with a focus on art NFTs and tokenized art](#), Policy Department, European Parliament, 2022.

²⁵⁴ Ibidem.

²⁵⁵ Ibidem.

An NFT is a [smart contract with metadata](#) that uses a blockchain to create a unique, non-fungible digital “asset” which can be owned and traded. Technically the NFT consists of a number (the tokenID) and an alphanumeric code (the address code of the smart contract) and is linked in some way to a digital file or a physical asset.

According to German civil law, NFTs cannot be classified as property within the meaning of Section 90 of the German Civil Code (BGB) due to the lack of physicality of the purely digital tokens. Physical objects must be tangible and spatially definable. Therefore, ownership of NFTs within the strict meaning of Section 903 of the German Civil Code is not possible. The strict *numerus clausus* of property law normally also prohibits an analogous application to non-corporeal things. However, there is a discussion about an analogue application of Section 903 of the German Civil Code based on uniqueness of NFTs.

Whether the buyer of an NFT acquires any rights to use the work represented by the NFT depends on what was agreed upon. If nothing specific was agreed upon, the buyer of an NFT does not acquire any rights going beyond what is provided for in exceptions for private use based on Article 5 Nr. 2 b) Directive 2001/29/EC on harmonisation of certain aspects of copyright and related rights in the information society (InfoSoc Directive).²⁵⁶

²⁵⁶ Ibidem.

6. CIVIL AND COMMERCIAL LAW IN METAVERSE: LEGAL FRAGMENTATION, MISSING EUROPEAN CIVIL AND COMMERCIAL CODE

Metaverse projects are generally global, allowing for use and interaction by participants across the world, triggering application of conflict of norms statutes and requiring compliance with the laws and regulations in multiple jurisdictions.

The complexity of cross-border civil and commercial law relations and litigation that may be involved in metaverse encompasses issues of identifying competent courts, procedural and substantive law among different judicial systems of the Member States and possibly the U.S. legal system where main metaverse services are based. Rules on enforcement add additional complexity to this landscape.

The general rules on tort liability (non-contractual injuries, including emotional distress, and property damage) and contract law apply to the metaverse, although they may make a difficult fit to specificities of metaverse, and courts need to look into novel issues of application to new technology.

6.1. Civil and commercial law in the EU

In 1989, the European Parliament for the first time asked if a European code of private law was desirable and feasible.²⁵⁷ Such civil law rules would typically cover property law, the law of obligations, including the law of contracts (formation of contract, legal capacity, including legal capacity of minors and minimum age for legal acts, invalidity of contracts, termination, liability), unfair contractual provisions, delicts (torts) and restitution, liability rules, family law, the law of inheritance, as well as commercial law, company law, commercial contracts, etc.²⁵⁸ This resulted in the so-called [Lando-Principles](#) formed by the Commission on European Contract law, which created Principles of European Contract Law (PECL) (the first part of the PECL was published in 1995, followed by Part II in 1999 and the final Part III in 2003), the survey of the Tilburg-Group and the preliminary draft of the Pavia-Group on a European Civil Code.²⁵⁹

In 2004, however, the European Commission announced that it did not envisage proposing a European Civil Code. The Commission considered useful to write down common definitions, fundamental principles and model rules of European civil law in order to enhance the quality and consistency of the *acquis communautaire*. As a result, an academic [Draft Common Frame of Reference](#) was presented to the Commission in 2007 covering contracts and other juridical acts, obligations and corresponding rights, specific contracts, services, benevolent intervention in another's affairs, non-contractual liability arising out of a damage, unjustified enrichment.²⁶⁰ A Common Frame of Reference (CFR) is a non-binding text that contains definitions of legal terms (such as "contract"), fundamental principles (such

²⁵⁷ Resolution A2-157/89, OJ EC 1989, C 158/400.

²⁵⁸ Von Bar Ch, Study of the systems of private law in the EU with regard to discrimination and the creation of a European Civil Code, DG Research, European Parliament, 1999, [https://www.europarl.europa.eu/RegData/etudes/etudes/join/1999/168511/IPOL-JURI_ET\(1999\)168511_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/etudes/join/1999/168511/IPOL-JURI_ET(1999)168511_EN.pdf)

²⁵⁹ Schmid D., (Do) We Need a European Civil Code (?), Annual Survey of International & Comparative Law, Vol. 18 [2012], Iss. 1, Art. 11, <https://digitalcommons.law.ggu.edu/cgi/viewcontent.cgi?article=1163&context=annlsurvey>

²⁶⁰ J. M. Smits, The Draft Common Frame of Reference (DCFR) for a European Private Law: Fit for Purpose?, Maastricht Journal of European and Comparative Law 2008.2 (2008), at 145.

as “good faith”) and coherent model rules.²⁶¹ CFR aimed to serve as a “tool box” for European legislators when transposing directives, for the Commission when proposing new directives or reviewing the *acquis communautaire*, and for the European Court of Justice when interpreting the existing *acquis*.²⁶²

Obstacles invoked to this process included plurijural character of the European Union as well as differences between civil law and common law traditions.²⁶³

However, advancements of the Digital Single Market progressively pushed for harmonization in selected areas of civil law, resulting in a **highly specialized and fragmented in its scope, body of European civil law** mainly concerning European consumers.

Table 2: Consumer and marketing law

Enforcement of Consumer Protection Rules Directive (2019) ²		
Sales of Goods Directive (2019) ⁴	Misleading and Comparative Advertisement Directive (2006) ⁵	Representative Actions Directive (2020) ⁶
Contracts for the supply of digital content and services Directive (2019) ⁸	Unfair Commercial Practices Directive (UCPD) (2005) ⁹	Consumer Protection Cooperation (CPC) Regulation (2017) ¹⁰
Consumer Rights Directive (CRD) (2011) ¹¹	Price Indication Directive (1998) ¹²	Consumer Protection Cooperation (CPC) Network ¹³
Unfair Contract Terms Directive (UCTD) (1993) ¹⁴		
Proposal for a Directive on Distance Marketing of Financial Services (2022) ¹⁵	Proposal for a Directive on Empowering consumers for the green transition (2022) ¹⁶	
Proposal for a Revised Consumer Credit Directive (2021) ¹⁷		
Guidance on CRD (2021) ¹⁸	Guidance on UCPD (2021) ¹⁹	
Guidance on UCTD (2019) ²⁰	Guidance on Price indication Directive (2021) ²¹	

Source: EU Mapping: Overview of Internal Market and Consumer Protection related legislation²⁶⁴

²⁶¹ Communication from the Commission to the European Parliament and the Council, European Contract Law and the Revision of the *Acquis*: The Way Forward, at 8, COM (2004) 651 final (Oct. 11, 2004).

²⁶² European Commission Green Paper on Policy Options for Progress Towards a European Contract Law for Consumers and Businesses, at 7, COM (2010) 348 final (Jul. 1, 2010).

²⁶³ Legrand P., Against a European Civil Code, *The Modern Law Review* Vol. 60, No. 1 (Jan., 1997), pp. 44-63, <https://www.jstor.org/stable/1097290>

²⁶⁴ EU Mapping: Overview of Internal Market and Consumer Protection related legislation, Policy Department, European Parliament, 2023, [https://www.europarl.europa.eu/RegData/etudes/STUD/2023/740062/IPOL_STU\(2023\)740062_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2023/740062/IPOL_STU(2023)740062_EN.pdf)

Representative actions directive (Directive (EU) 2020/1828 of the European Parliament and of the Council of 25 November 2020 on representative actions for the protection of the collective interests of consumers and repealing Directive 2009/22/EC) applies to representative actions brought against infringements by traders of the provisions of Union law referred to in Annex I, including such provisions as transposed into national law, that harm or may harm the collective interests of consumers. Among listed legal acts are:

- Directive (EU) 2019/770 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the supply of digital content and digital services (OJ L 136, 22.5.2019, p. 1).
- Council Directive 93/13/EEC of 5 April 1993 on unfair terms in consumer contracts (OJ L 95, 21.4.1993, p. 29).
- Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market ('Directive on electronic commerce') (OJ L 178, 17.7.2000, p. 1): Articles 5-7, 10 and 11.
- Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications) (OJ L 201, 31.7.2002, p. 37): Articles 4-8 and 13.
- Directive 2005/29/EC of the European Parliament and of the Council of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market and amending Council Directive 84/450/EEC, Directives 97/7/EC, 98/27/EC and 2002/65/EC of the European Parliament and of the Council and Regulation (EC) No 2006/2004 of the European Parliament and of the Council ('Unfair Commercial Practices Directive') (OJ L 149, 11.6.2005, p. 22).
- Directive 2006/114/EC of the European Parliament and of the Council of 12 December 2006 concerning misleading and comparative advertising (OJ L 376, 27.12.2006, p. 21).
- Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights, amending Council Directive 93/13/EEC and Directive 1999/44/EC of the European Parliament and of the Council and repealing Council Directive 85/577/EEC and Directive 97/7/EC of the European Parliament and of the Council (OJ L 304, 22.11.2011, p. 64).
- Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) (OJ L 119, 4.5.2016, p. 1).
- Regulation (EU) 2017/1128 of the European Parliament and of the Council of 14 June 2017 on cross-border portability of online content services in the internal market (OJ L 168, 30.6.2017, p. 1).
- Directive (EU) 2019/771 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the sale of goods, amending Regulation (EU) 2017/2394 and Directive 2009/22/EC, and repealing Directive 1999/44/EC (OJ L 136, 22.5.2019, p. 28).

Member States shall adopt and publish, by 25 December 2022, the laws, regulations and administrative provisions necessary to comply with this Directive. They shall immediately inform the Commission thereof. They shall apply those measures from **25 June 2023**.

Sale of goods directive (Directive (EU) 2019/771 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the sale of goods, amending Regulation (EU) 2017/2394 and Directive 2009/22/EC, and repealing Directive 1999/44/EC) applies to **sales contracts between a consumer and a seller**. Sales contract means any contract under which the seller transfers or undertakes to transfer ownership of goods to a consumer, and the consumer pays or undertakes to pay the price thereof. Goods within the meaning of the directive are tangible movable items, including items that incorporate or are inter-connected with digital content or a digital service in such a way that the absence of that digital content or digital service would prevent the goods from performing their functions.

Therefore, provisions of the directive apply to physical manifestations of metaverse such as headsets.

The directive regulates the issue of **conformity, liability for lack of conformity, remedies, termination, commercial guarantees, right of redress and consumer information**.

Provisions of the directive are **mandatory**, that is unless otherwise provided for in this Directive, any contractual agreement which, to the detriment of the consumer, excludes the application of national measures transposing this Directive, derogates from them, or varies their effect, before the lack of conformity of the goods is brought to the seller's attention by the consumer, shall not be binding on the consumer.

Contracts for the supply of digital content and digital services directive (Directive (EU) 2019/770 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the supply of digital content and digital services) **applies to any contract where the trader supplies or undertakes to supply digital content or a digital service to the consumer** and the consumer pays or undertakes to pay a price (including by a transfer of personal data). There is an important number of exceptions from the scope of the directive.²⁶⁵ The Directive is without prejudice to Union and national law on copyright and related rights, including Directive 2001/29/EC of the European Parliament and of the Council. It does not affect the freedom of Member States to regulate aspects of general contract law, such as rules on the formation, validity, nullity or effects of contracts, including the consequences of the termination of a contract in so far as they are not regulated in this Directive, or the right to damages.

²⁶⁵ Art. 3 (5): This Directive shall not apply to contracts regarding:

- (a) the provision of services other than digital services, regardless of whether digital forms or means are used by the trader to produce the output of the service or to deliver or transmit it to the consumer;
- (b) electronic communications services as defined in point (4) of Article 2 of Directive (EU) 2018/1972, with the exception of number-independent interpersonal communications services as defined in point (7) of Article 2 of that Directive;
- (c) healthcare as defined in point (a) of Article 3 of Directive 2011/24/EU;
- (d) gambling services, namely, services that involve wagering a stake with pecuniary value in games of chance, including those with an element of skill, such as lotteries, casino games, poker games and betting transactions, by electronic means or any other technology for facilitating communication and at the individual request of a recipient of such services;
- (e) financial services as defined in point (b) of Article 2 of Directive 2002/65/EC;
- (f) software offered by the trader under a free and open-source licence, where the consumer does not pay a price and the personal data provided by the consumer are exclusively processed by the trader for the purpose of improving the security, compatibility or interoperability of that specific software;
- (g) the supply of digital content where the digital content is made available to the general public other than by signal transmission as a part of a performance or event, such as digital cinematographic projections;
- (h) digital content provided in accordance with Directive 2003/98/EC of the European Parliament and of the Council (21) by public sector bodies of the Member States.

The directive regulates the issues of **conformity, liability for lack of conformity, remedies, termination, commercial guarantees, right of redress.**

Importantly the provision of the directive are **mandatory**, that is unless otherwise provided for in this Directive, any contractual term which, to the detriment of the consumer, excludes the application of the national measures transposing this Directive, derogates from them or varies their effects before the failure to supply or the lack of conformity is brought to the trader's attention by the consumer, or before the modification of the digital content or digital service in accordance with Article 19 is brought to the consumer's attention by the trader, shall not be binding on the consumer.

Consumer rights directive (Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights, amending Council Directive 93/13/EEC and Directive 1999/44/EC of the European Parliament and of the Council and repealing Council Directive 85/577/EEC and Directive 97/7/EC of the European Parliament and of the Council Text with EEA relevance) applies, under the conditions and to the extent set out in its provisions, to any **contract (sales or service) concluded between a trader and a consumer where the consumer pays or undertakes to pay the price** (including by provision of personal data). The list of exemptions from the scope is particularly long for this directive.²⁶⁶ The directive contains provisions on:

- information requirements for contracts other than distance or off-premises contracts,
- information requirements for distance and off-premises contracts and right of withdrawal,

²⁶⁶ This Directive shall not apply to contracts:

- (a) for social services, including social housing, childcare and support of families and persons permanently or temporarily in need, including long-term care;
 - (b) for healthcare as defined in point (a) of Article 3 of Directive 2011/24/EU, whether or not they are provided via healthcare facilities;
 - (c) for gambling, which involves wagering a stake with pecuniary value in games of chance, including lotteries, casino games and betting transactions;
 - (d) for financial services;
 - (e) for the creation, acquisition or transfer of immovable property or of rights in immovable property;
 - (f) for the construction of new buildings, the substantial conversion of existing buildings and for rental of accommodation for residential purposes;
 - (g) on packages as defined in point 2 of Article 3 of Directive (EU) 2015/2302 of the European Parliament and of the Council (4).
- Article 6(7), Article 8(2) and (6) and Articles 19, 21 and 22 of this Directive shall apply mutatis mutandis to packages as defined in point 2 of Article 3 of Directive (EU) 2015/2302 in relation to travellers as defined in point 6 of Article 3 of that Directive;
- (h) which fall within the scope of Directive 2008/122/EC of the European Parliament and of the Council of 14 January 2009 on the protection of consumers in respect of certain aspects of timeshare, long-term holiday product, resale and exchange contracts (5);
 - (i) which, in accordance with the laws of Member States, are established by a public office-holder who has a statutory obligation to be independent and impartial and who must ensure, by providing comprehensive legal information, that the consumer only concludes the contract on the basis of careful legal consideration and with knowledge of its legal scope;
 - (j) for the supply of foodstuffs, beverages or other goods intended for current consumption in the household, and which are physically supplied by a trader on frequent and regular rounds to the consumer's home, residence or workplace;
 - (k) for passenger transport services, with the exception of Article 8(2) and Articles 19, 21 and 22;
 - (l) concluded by means of automatic vending machines or automated commercial premises;
 - (m) concluded with telecommunications operators through public payphones for their use or concluded for the use of one single connection by telephone, Internet or fax established by a consumer;
 - (n) for any goods sold by way of execution or otherwise by authority of law.

- specific information requirements for contracts concluded on online marketplaces,
- formal requirements for off-premises and distant contracts;
- modalities of the right of withdrawal,
- exceptions to the right of withdrawal where particularly the exception for contracts for the supply of digital content which is not supplied on a tangible medium may have importance for metaverse,²⁶⁷
- no obligations for consumers as a result of inertia selling.

The directive has imperative character, that is if the law applicable to the contract is the law of a Member State, consumers may not waive the rights conferred on them by the national measures transposing this Directive. Any contractual terms which directly or indirectly waive or restrict the rights resulting from this directive shall not be binding on the consumer.

Unfair commercial practices directive (Directive 2005/29/EC of the European Parliament and of the Council of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market and amending Council Directive 84/450/EEC, Directives 97/7/EC, 98/27/EC and 2002/65/EC of the European Parliament and of the Council and Regulation (EC) No 2006/2004 of the European Parliament and of the Council ('Unfair Commercial Practices Directive') applies to **unfair business-to-consumer commercial practices**, as laid down in Article 5, before, during and after a commercial transaction in relation to a product, defined as any good or service including immovable property, digital service and digital content, as well as rights and obligations.

²⁶⁷ (a) service contracts after the service has been fully performed but, if the contract places the consumer under an obligation to pay, only if the performance has begun with the consumer's prior express consent and acknowledgement that he will lose his right of withdrawal once the contract has been fully performed by the trader;

(b) the supply of goods or services for which the price is dependent on fluctuations in the financial market which cannot be controlled by the trader and which may occur within the withdrawal period;

(c) the supply of goods made to the consumer's specifications or clearly personalised;

(d) the supply of goods which are liable to deteriorate or expire rapidly;

(e) the supply of sealed goods which are not suitable for return due to health protection or hygiene reasons and were unsealed after delivery;

(f) the supply of goods which are, after delivery, according to their nature, inseparably mixed with other items;

(g) the supply of alcoholic beverages, the price of which has been agreed upon at the time of the conclusion of the sales contract, the delivery of which can only take place after 30 days and the actual value of which is dependent on fluctuations in the market which cannot be controlled by the trader;

(h) contracts where the consumer has specifically requested a visit from the trader for the purpose of carrying out urgent repairs or maintenance. If, on the occasion of such visit, the trader provides services in addition to those specifically requested by the consumer or goods other than replacement parts necessarily used in carrying out the maintenance or in making the repairs, the right of withdrawal shall apply to those additional services or goods;

(i) the supply of sealed audio or sealed video recordings or sealed computer software which were unsealed after delivery;

(j) the supply of a newspaper, periodical or magazine with the exception of subscription contracts for the supply of such publications;

(k) contracts concluded at a public auction;

(l) the provision of accommodation other than for residential purpose, transport of goods, car rental services, catering or services related to leisure activities if the contract provides for a specific date or period of performance;

(m) **contracts for the supply of digital content which is not supplied on a tangible medium** if the performance has begun and, if the contract places the consumer under an obligation to pay, where:

(i) the consumer has provided prior express consent to begin the performance during the right of withdrawal period;

(ii) the consumer has provided acknowledgement that he thereby loses his right of withdrawal; and

(iii) the trader has provided confirmation in accordance with Article 7(2) or Article 8(7).

The directive specifically indicates that it is without prejudice to the rules determining the jurisdiction of the courts.²⁶⁸

The directive indicates that a commercial practice shall be regarded as misleading if it contains **false information** and is therefore **untruthful** or in any way, including overall presentation, **deceives or is likely to deceive the average consumer**, even if the information is factually correct, in relation to one or more of the following elements, and in either case causes or is likely to cause him to take a transactional decision that he would not have taken otherwise:

- (a) the existence or **nature of the product**;
- (b) the **main characteristics of the product**, such as its availability, benefits, risks, execution, composition, accessories, after-sale customer assistance and complaint handling, method and date of manufacture or provision, delivery, fitness for purpose, usage, quantity, specification, geographical or commercial origin or the results to be expected from its use, or the results and material features of tests or checks carried out on the product;
- (c) the extent of the trader's commitments, the motives for the commercial practice and the **nature of the sales process**, any statement or symbol in relation to direct or indirect sponsorship or approval of the trader or the product;
- (d) the price or the manner in which the price is calculated, or the existence of a specific price advantage;
- (e) the need for a service, part, replacement or repair;
- (f) the nature, attributes and rights of the trader or his agent, such as his identity and assets, his qualifications, status, approval, affiliation or connection and **ownership of industrial, commercial or intellectual property rights** or his awards and distinctions;
- (g) the consumer's rights, including the right to replacement or reimbursement under Directive 1999/44/EC of the European Parliament and of the Council of 25 May 1999 on certain aspects of the sale of consumer goods and associated guarantees (1), or the risks he may face.

These provisions may concern metaverse to the extent metaverse sellers advertise their services in a misleading way, as discussed in the chapter on real estate and metaverse and in sections on NFTs.

[Unfair terms in consumer contracts directive](#) (Council Directive 93/13/EEC of 5 April 1993 on unfair terms in consumer contracts) applies to contractual terms which **have not been individually negotiated** and which shall be regarded as unfair if, **contrary to the requirement of good faith**, they causes a **significant imbalance in the parties' rights and obligations arising under the contract, to the detriment of the consumer**.

These provisions apply to terms of reference contracts imposed by metaverse platforms in case they impose significant imbalance in the parties' rights. Examples of terms of reference in this study indicate at an existence of such imbalance.

Certainly, a **unified European Civil Code** would significantly increase accessibility, comprehensiveness, homogeneity and transparency of provisions applicable to European citizens and businesses as well as their protection. Since the Brexit resulted in the departure of the only common

²⁶⁸ [Art. 3 \(7\)](#)

law country from the European Union, the **significant effort made by European academia** in the preparatory work for the European Civil Code and **significant benefits** a unified European civil law would have for European citizen, call for a prompt review of possibilities to further develop European Civil Code.

Similarly, in the area of commercial law, European instruments are numerous. They come in the form of directives and have, over the past decades, led to a certain degree of harmonization. This is the case, for example, for the law of commercial registers, the law of commercial agents, the law of annual statements, and the law of regional branches. In addition, a large number of European instruments have harmonized – and at times unified – aspects of company law, banking law, capital market law, employment law, insolvency law as well as insurance law. However, when it comes to commercial contracts as such, the European legislature has remained remarkably inactive until platform specific legislation.

Digital Services Act (Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market For Digital Services and amending Directive 2000/31/EC (Digital Services Act)) applies to **intermediary services offered to recipients of the service that have their place of establishment or are located in the Union, irrespective of where the providers of those intermediary services have their place of establishment.**

The regulation contains provisions on liability of providers of intermediary services, due diligence obligations for a transparent and safe online environment, notice and action mechanisms, internal complaint-handling system, out-of-court dispute settlement before certified out-of-court dispute settlement body with regard to certain decisions, measures against misuse, advertising, transparency, protection of minors, traceability of traders, compliance by design, right to information, additional obligations for providers of very large online platforms and of very large online search engines to manage systemic risks.

Promoting fairness and transparency for business users of online intermediation services regulation (Regulation (EU) 2019/1150 of the European Parliament and of the Council of 20 June 2019 on promoting fairness and transparency for business users of online intermediation services) ensures that business users of online intermediation services and corporate website users in relation to online search engines are granted appropriate transparency, fairness and effective redress possibilities.

The regulation applies to **online intermediation services and online search engines provided, or offered to be provided, to business users and corporate website users, respectively, that have their place of establishment or residence in the Union and that, through those online intermediation services or online search engines, offer goods or services to consumers located in the Union, irrespective of the place of establishment or residence of the providers of those services and irrespective of the law otherwise applicable.**

The regulation contains provisions on the quality of terms and conditions, restriction, suspension and termination, ranking, differentiated treatment, specific contractual terms, access to data, internal complaint handling, mediations, codes of conduct.

Misleading and comparative advertising directive (Directive 2006/114/EC of the European Parliament and of the Council of 12 December 2006 concerning misleading and comparative advertising (codified version) aimed to **protect traders** against misleading advertising and the unfair consequences thereof and to lay down the conditions under which comparative advertising is permitted. The directive defines misleading advertising as *any advertising which in any way, including its presentation, deceives or is likely to deceive the persons to whom it is addressed or whom it reaches and*

which, by reason of its deceptive nature, is likely to affect their economic behaviour or which, for those reasons, injures or is likely to injure a competitor.

Lack of unified civil and commercial law results in a **highly specialized and fragmented system**. These provisions offer effective remedies. However, they lack homogeneity and comprehensiveness that would make them understandable to the large public or to address new technological developments on the basis of well-established principles.

These provisions are also **prevalently focused on protection of consumers**, while European enterprises, start-ups, SMEs and prosumers have weaker means of defense against their U.S. counterparts - often, powerful platforms - unless they can claim to offer their products or services to consumers. This situation was improved in the Digital Services Act and the Digital Markets Act.

As a result of fragmentation of legal norms, each technological development provokes a crisis, which seems to be outside of binding provisions and to require ad-hoc fragmented regulatory effort. Such fragmentation is user unfriendly and requires high degree of legal specialization which is not available even to lawyers, including judges, in Member States.²⁶⁹

6.2. Civil and commercial law in the U.S.

The American legal system is based on common law, which relies heavily on court precedent in formal adjudications. In the common law system, even when a statute is at issue, judicial determinations in earlier court cases are extremely critical to the court's resolution of the matter before it. The American legal system is based on a system of federalism, or decentralization. While the national or federal government itself possesses significant powers, the individual states retain powers not specifically enumerated as exclusively federal. Most states have court systems which mirror that of the federal court system. Contracts are mainly governed by state [statutory](#) and common (judge-made) law and private law (i.e. the private agreement). Private law principally includes the terms of the agreement between the parties who are exchanging promises. This private law may override many of the rules otherwise established by state law.²⁷⁰

Most of the principles of the common law of contracts are outlined in the Restatement of Law, Second Contracts published by the American Law Institute. The [Uniform Commercial Code](#), whose original articles have been adopted in nearly every state, represents a body of statutory law that governs important categories of contracts. The main articles that deal with the law of contracts are [Article 1 \(General Provisions\)](#) and [Article 2 \(Sales\)](#). Sections of [Article 9 \(Secured Transactions\)](#) govern contracts assigning the rights to payment in security interest agreements. Contracts related to particular activities or business sectors may be highly regulated by state and/or federal law. In 1988, the United States joined the [United Nations Convention on Contracts for the International Sale of Goods](#) which now governs contracts within its scope.²⁷¹

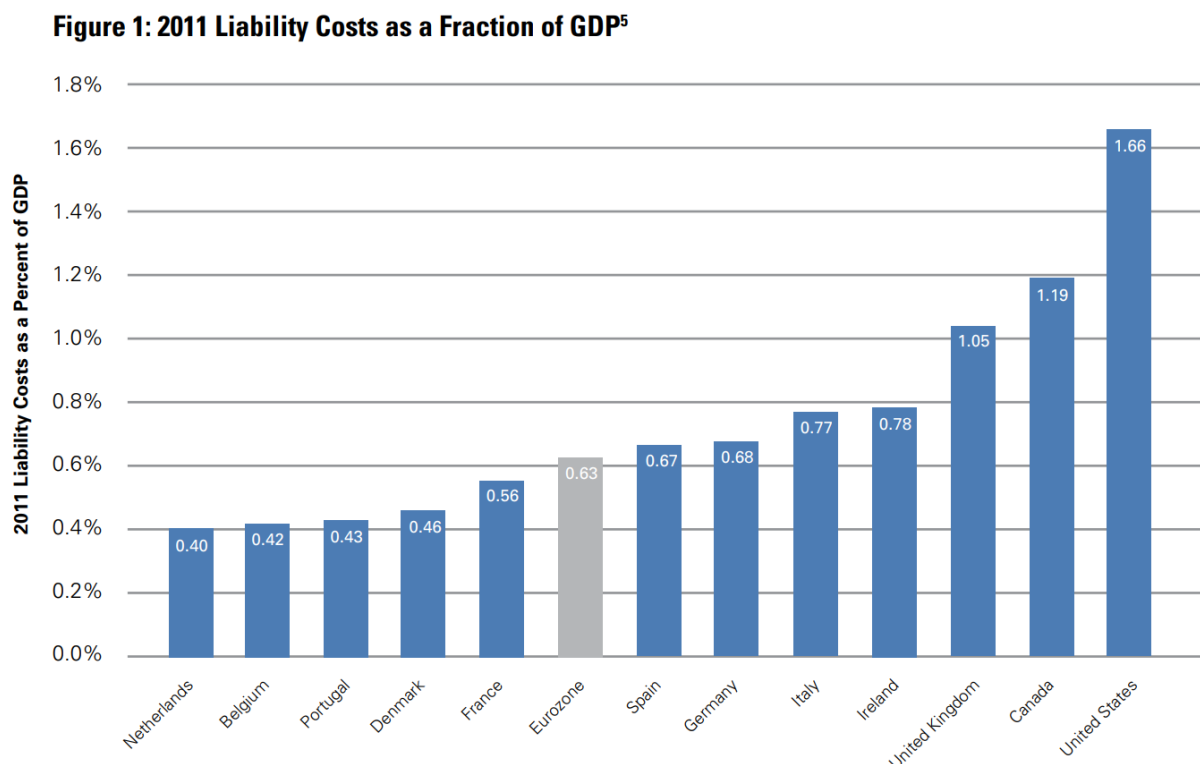
The U.S. litigation system imposes a much greater cost burden on companies than systems outside the United States.

²⁶⁹ Leijon K, Glavina M., Why passive? Exploring national judges' motives for not requesting preliminary rulings, Maastricht Journal of European and Comparative Law 2022, Vol. 29(2) 263–285, <https://pure.eur.nl/ws/portalfiles/portal/54614032/1023263x221091768.pdf>

²⁷⁰ <https://www.lexisnexis.com/en-us/lawschool/pre-law/intro-to-american-legal-system.page>

²⁷¹ <https://www.law.cornell.edu/wex/contract>

Figure 23: Comparison of litigation costs



Source: International Comparisons of Litigation Costs²⁷²

Multinational company respondents to a survey submitted by lawyers for Civil Justice Civil Justice Reform Group U.S. Chamber Institute for Legal Reform, indicated that they spend a disproportionate amount on litigation in the United States relative to their expenditures in foreign jurisdictions.²⁷³ While only some of the survey respondents were able to provide data on a per case basis, for the period 2006-2008, the average company paid average discovery costs per case of \$621,880 to \$2,993,567. There is no doubt that a significant driver of the higher U.S. costs is the procedural and discovery costs associated with the U.S. justice system. Various studies find that roughly 60 percent of U.S. tort costs are consumed in transaction costs, with only 40 percent benefiting the actual claimant.²⁷⁴

6.3. EU conflict of laws provisions concerning civil and commercial law

EU conflict of laws provisions generally comprise of:

- [Brussels Ia Regulation \(EC\) No 1215/2012](#) on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters,
- [Rome I Regulation \(EC\) No 593/2008](#) applicable, in situations involving a conflict of laws, to contractual obligations in civil and commercial matters, and

²⁷² International Comparisons of Litigation Costs, U.S. Chamber Institute for Legal Reform, 2013, https://instituteoflegalreform.com/wp-content/uploads/media/ILR_NERA_Study_International_Liability_Costs-update.pdf

²⁷³ https://www.uscourts.gov/sites/default/files/litigation_cost_survey_of_major_companies_0.pdf

²⁷⁴ Idem.

- [Rome II Regulation \(EC\) No 864/2007](#), which applies, in situations involving a conflict of laws, to non-contractual obligations in civil and commercial matters.

Competent courts

[Brussels Ia Regulation \(EC\) No 1215/2012](#), applicable in civil and commercial matters, generally allows parties to agree on the court that will be competent to review their dispute. If the parties, regardless of their domicile, have agreed that a court or the courts of a Member State are to have jurisdiction to settle any disputes which have arisen or which may arise in connection with a particular legal relationship, that court or those courts shall have jurisdiction, unless the agreement is null and void as to its substantive validity under the law of that Member State. Such jurisdiction shall be exclusive unless the parties have agreed otherwise.

In the absence of such agreement, the regulation indicates at courts of a Member State where the defendant is domiciled as having jurisdiction. A company or other legal person or association of natural or legal persons is domiciled at the place where it has its (a) statutory seat, or (b) central administration, or (c) principal place of business.

If the defendant is not domiciled in a Member State, the jurisdiction of the courts of each Member State shall be determined by the law of that Member State. As against such a defendant, any person domiciled in a Member State may, whatever his nationality, avail himself in that Member State of the rules of jurisdiction there in force, and in particular those of which the Member States are to notify the Commission, in the same way as nationals of that Member State.

A person domiciled in a Member State may be sued in another Member State in matters relating to a contract, in the courts for the place of performance of the obligation in question. The place of performance of the obligation in question shall be in the case of the provision of services, the place in a Member State where, under the contract, the services were provided or should have been provided.

As regards a civil claim for damages or restitution which is based on an act giving rise to criminal proceedings, a defendant can be sued in the court seized of those proceedings, to the extent that that court has jurisdiction under its own law to entertain civil proceedings.

Concerning a dispute arising out of the operations of a branch, agency or other establishment, a defendant can be sued in the courts for the place where the branch, agency or other establishment is situated.

Dispute brought against a settlor, trustee or beneficiary of a trust created by the operation of a statute, or by a written instrument, or created orally and evidenced in writing, dispute can be brought in the courts of the Member State in which the trust is domiciled.

Brussels Ia Regulation contains special provisions on **consumer contracts** which apply if the contract has been concluded with a person who pursues commercial or professional activities in the Member State of the consumer's domicile or, by any means, directs such activities to that Member State or to several States including that Member State, and the contract falls within the scope of such activities..

Where a consumer enters into a contract with a party who is not domiciled in the Member State but has a branch, agency or other establishment in one of the Member States, that party shall, in disputes arising out of the operations of the branch, agency or establishment, be deemed to be domiciled in that State.

A consumer may bring proceedings against the other party to a contract either in the courts of the Member State in which that party is domiciled or, regardless of the domicile of the other party, in the courts for the place where the consumer is domiciled.

Proceedings may be brought against a consumer by the other party to the contract only in the courts of the Member State in which the consumer is domiciled.

This provision does not affect the right to bring a counter-claim in the court in which, in accordance with this Section, the original claim is pending.

The provisions of this Section may be departed from only by an agreement:

- (1) which is entered into after the dispute has arisen;
- (2) which allows the consumer to bring proceedings in courts other than those indicated in this Section; or
- (3) which is entered into by the consumer and the other party to the contract, both of whom are at the time of conclusion of the contract domiciled or habitually resident in the same Member State, and which confers jurisdiction on the courts of that Member State, provided that such an agreement is not contrary to the law of that Member State..

Rules that apply to **torts, delicts and quasi-delicts** stipulate for a possibility to sue in the place where harmful event occurred or may occur. Limitations of this system are however evident from Sheville case where the ECJ held that a victim of tort could sue in each Member State in which tort occurred (injury to reputation) but only with regard to damage suffered in that state.

Overall, Brussels Ia Regulation provides for a good level of protection in the cases of torts, delicts and quasi-delicts as well as in the case of European consumers.

However, in the case where an activity is considered as being a part of trade of profession, it allows for a choice of forum, which if imposed by a stronger party (e.g. metaverse platform), may not be in the interest of the other party to the agreement (e.g. a person investing or trading with the services offered by the platform, or an SME).

Applicable procedural law

The competent court applies in general national procedural law of the Member States where it is located with all particular procedural limitations and restrictions which may have an impact on the possibility to bring a cross-border claim. Among these limitations are rules on standing limited to national organisation or bodies (under Finnish Group Action Act only Finnish consumer ombudsman has legal standing, under sec. 47B of the UK Competition Act only British consumer association may bring an action, under art. L 421-1 of the Code de la consommation only consumer organisations registered in France can bring action) and selective character of specific instruments.

Applicable substantive law

From the point of view of substantive law the legal landscape in the EU quite complex.

[Rome I Regulation \(EC\) No 593/2008](#) is applicable, in situations involving a conflict of laws, to contractual obligations in civil and commercial matters, while non-contractual obligations come under the Rome II Regulation (EC) No 864/2007.

Rome I Regulation is of universal application, thus any law specified by this Regulation shall be applied whether or not it is the law of a Member State.

Rome I Regulation provides that a contract shall be governed by the **law chosen by the parties**. The choice shall be made expressly or clearly demonstrated by the terms of the contract or the circumstances of the case. By their choice the parties can select the law applicable to the whole or to part only of the contract.

Importantly, where all other elements relevant to the situation at the time of the choice are located in one or more Member States, parties' choice of applicable law other than that of a Member State shall not prejudice the application of provisions of Community law, where appropriate as implemented in the Member State of the forum, which cannot be derogated from by agreement.

In the absence of choice of law, a contract for the provision of services (such as a typical metaverse contract) shall be governed by the law of the country where **the service provider has his habitual residence**.

A franchise contract shall be governed by the law of the country where the franchisee has his habitual residence.

For the purposes of this Regulation, the habitual residence of companies and other bodies, corporate or unincorporated, shall be the place of central administration.

Where the contract is concluded in the course of the operations of a branch, agency or any other establishment, or if, under the contract, performance is the responsibility of such a branch, agency or establishment, the place where the branch, agency or any other establishment is located shall be treated as the place of habitual residence.

A contract concluded by a natural person for a purpose which can be regarded as being outside his trade or profession (**the consumer**) with another person acting in the exercise of his trade or profession (the professional) shall be governed by the law of the country where the consumer has his habitual residence provided that the professional: (a) pursues his commercial or professional activities in the country where the consumer has his habitual residence, or (b) by any means, directs such activities to that country or to several countries including that country, and the contract falls within the scope of such activities.

The parties may choose the law applicable to a contract. Such a choice may not, however, have the result of depriving the consumer of the protection afforded to him by provisions that cannot be derogated from by agreement by virtue of the law which, in the absence of choice, would have been applicable.

Rome I Regulation provides as well that effect may be given to the overriding mandatory provisions of the law of the country where the obligations arising out of the contract have to be or have been performed, in so far as those overriding mandatory provisions render the performance of the contract unlawful. In considering whether to give effect to those provisions, regard shall be had to their nature and purpose and to the consequences of their application or non-application. Overriding mandatory provisions are provisions the respect for which is regarded as crucial by a country for safeguarding its public interests, such as its political, social or economic organisation, to such an extent that they are applicable to any situation falling within their scope, irrespective of the law otherwise applicable to the contract under the regulation.

This system provides for a good level of protection to European consumers since the choice of law, if imposed by a metaverse platform depriving the consumer of the protection afforded to him by

provisions that cannot be derogated from by agreement by virtue of the law which, in the absence of choice, would have been applicable.

However, in case where an activity is considered as being a part of trade or profession, it allows for a choice of forum. Such choice, in particular if imposed by a stronger party (e.g. metaverse platform) may not be in the interest of the other party to the agreement (e.g. a person investing into services or trading with the services offered by the platform). The only protection is that where all other elements relevant to the situation at the time of the choice are located in one or more Member States, parties' choice of applicable law other than that of a Member State shall not prejudice the application of provisions of Community law, where appropriate as implemented in the Member State of the forum, which cannot be derogated from by agreement.

In case of metaverse platforms which have a branch, agency or any other establishment, Rome I Regulation will allow for the law of the Member State where the branch, agency or any other establishment is located to be applied.

Rome II Regulation (EC) No 864/2007, applies, in situations involving a conflict of laws, to non-contractual obligations in civil and commercial matters.

Similarly to Rome I Regulation, it has **universal application** as any law specified by this Regulation shall be applied whether or not it is the law of a Member State.

As a general rule, the law applicable to a non-contractual obligation arising out of a tort/delict shall be the law of the country in which the damage occurs irrespective of the country in which the event giving rise to the damage occurred and irrespective of the country or countries in which the indirect consequences of that event occur.

However, where the person claimed to be liable and the person sustaining damage both have their habitual residence (the habitual residence of companies and other bodies, corporate or unincorporated, shall be the place of central administration) in the same country at the time when the damage occurs, the law of that country shall apply.

Where it is clear from all the circumstances of the case that the tort/delict is manifestly more closely connected with a country other than that indicated in paragraphs 1 or 2, the law of that other country shall apply. A manifestly closer connection with another country might be based in particular on a pre-existing relationship between the parties, such as a contract, that is closely connected with the tort/delict in question.

The parties may agree to submit non-contractual obligations to the law of their choice: (a) by an agreement entered into after the event giving rise to the damage occurred; or (b) where all the parties are pursuing a commercial activity, also by an agreement freely negotiated before the event giving rise to the damage occurred.

The choice shall be expressed or demonstrated with reasonable certainty by the circumstances of the case and shall not prejudice the rights of third parties.

The law applicable to non-contractual obligations under this Regulation shall govern in particular:

- (a) the basis and extent of liability, including the determination of persons who may be held liable for acts performed by them;
- (b) the grounds for exemption from liability, any limitation of liability and any division of liability;
- (c) the existence, the nature and the assessment of damage or the remedy claimed;

- (d) within the limits of powers conferred on the court by its procedural law, the measures which a court may take to prevent or terminate injury or damage or to ensure the provision of compensation;
- (e) the question whether a right to claim damages or a remedy may be transferred, including by inheritance;
- (f) persons entitled to compensation for damage sustained personally;
- (g) liability for the acts of another person;
- (h) the manner in which an obligation may be extinguished and rules of prescription and limitation, including rules relating to the commencement, interruption and suspension of a period of prescription or limitation.

Nothing in this Rome II Regulation shall restrict the application of the provisions of the law of the forum in a situation where they are **mandatory** irrespective of the law otherwise applicable to the non-contractual obligation.

In assessing the conduct of the person claimed to be liable, account shall be taken, as a matter of fact and in so far as is appropriate, of the **rules of safety and conduct** which were in force at the place and time of the event giving rise to the liability.

Additional provisions on conflict of laws

Article 6(2) of the Unfair Terms Directive 93/13/EEC, like many of such instruments on the protection of consumers established before 2011, requires the Member States to take “the necessary measures to ensure that the consumer does not lose the protection granted [by the respective legal instrument] by virtue of the choice of the law of a non-Member country as the law applicable to the contract if the latter has a close connection with the territory of the Member States”.

There are no additional special provisions on the conflict of laws in the [directive on digital content and digital services](#) setting up the rules on the conformity of digital content or a digital service with the contract applicable to any contract where the trader supplies or undertakes to supply digital content or a digital service to the consumer and the consumer pays or undertakes to pay a price²⁷⁵ or other directives issued after 2011.²⁷⁶

The latest legislation tends to use clauses stating that their provisions apply irrespective of the place of establishment or residence of the providers of those services and/or irrespective of the law otherwise applicable.

Recognition and enforcement of judgments

[Brussels Ia Regulation \(EC\) No 1215/2012](#) governs recognition and enforcement of judgments given by a court or tribunal of a Member State. In the context of metaverse platforms, these provision will be applicable in case the platform had a branch, agency or other establishment in one of the Member States, in case of consumer contracts with no choice of law clause or in case of torts.

Recognition and Enforcement of Foreign Arbitral Awards

²⁷⁵ Directive (EU) of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the supply of digital content and digital services.

²⁷⁶ Wilcke F., The Silent Death of Conflict-of-Law Provisions in EU Directives?, 2022, <https://eapil.org/2022/12/06/the-silent-death-of-conflict-of-law-provisions-in-eu-directives/>

United Nations Convention on the Recognition and Enforcement of Foreign Arbitral Awards (New York, 10 June 1958) governs the recognition and enforcement of foreign arbitral awards and the referral by a court to arbitration and applies to the recognition and enforcement of arbitral awards made in the territory of a State other than the State where the recognition and enforcement of such awards are sought, and arising out of differences between persons, whether physical or legal.

Member States of the European Union and the U.S. are contracting parties to the Convention. The United States of America apply the Convention, on the basis of reciprocity, to the recognition and enforcement of only those awards made in the territory of another Contracting State. The United States of America apply the Convention only to differences arising out of legal relationships, whether contractual or not, which are considered as commercial under the national law of the United States.

"Arbitral awards" include not only awards made by arbitrators appointed for each case but also those made by permanent arbitral bodies to which the parties have submitted.

Each Contracting State shall recognize an agreement in writing under which the parties undertake to submit to arbitration all or any differences which have arisen or which may arise between them in respect of a defined legal relationship, whether contractual or not, concerning a subject matter capable of settlement by arbitration.

The court of a Contracting State, when seized of an action in a matter in respect of which the parties have made an agreement within the meaning of this article, shall, at the request of one of the parties, refer the parties to arbitration, unless it finds that the said agreement is null and void, inoperative or incapable of being performed.

Each Contracting State shall recognize arbitral awards as binding and enforce them in accordance with the rules of procedure of the territory where the award is relied upon, under the conditions laid down in the following articles. There shall not be imposed substantially more onerous conditions or higher fees or charges on the recognition or enforcement of arbitral awards to which this Convention applies than are imposed on the recognition or enforcement of domestic arbitral awards.

However, recognition and enforcement of an arbitral award may be refused if the competent authority in the country where recognition and enforcement is sought finds that: (a) The subject matter of the difference is not capable of settlement by arbitration under the law of that country; or (b) The recognition or enforcement of the award would be contrary to the public policy of that country.

This latter provision gives some protection to European consumers that would enter into unsuccessful dispute with American metaverse platforms.

In addition, the EU acceded to the 2005 Hague Convention on the Choice of Court Agreements (so-called COCA) in 2015. The Council of the EU took the decision to accede to the 2019 Hague Convention the Recognition and Enforcement of Foreign Judgments in Civil or Commercial Matters in July 2022 after the European Parliament gave its consent based on a recommendation by its Legal Affairs Committee, whose [report](#) expressed i.a. the view that *"the signature of the Convention by the [US] appears remarkable and could pave the way, if followed by ratification, to a transatlantic trade in which businesses no longer have to rely solely on the New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards of 1958"*.

Initial assessment of existing legal framework and possibilities to improve it.

European consumers can count on protection by European courts, unless they will give up such a protection by an agreement concluded after the dispute has arisen.

This situation is different once it is established that a person is acting within his/her trade or profession. Such a situation may be claimed in case of developing a business project on metaverse or acquiring property for investment on metaverse. European SMEs face metaverse platforms imposing terms of reference that point to foreign, typically American, courts or arbitration as a place of conflict resolution with resulting difficulties regarding distance and substantive costs of litigation.

The situation is better in case of tort responsibility with consequences occurring in the EU.

The issue which court is competent has an important impact on possible applicability of additional safeguards foreseen in European law as foreign courts may be unwilling to look into the European law when hearing cases in front of them.

Concerning the choice of substantive law **the situation of European consumers is safeguarded** by the guarantee that a contract concluded by a natural person for a purpose which can be regarded as being outside his trade or profession (**the consumer**) with another person acting in the exercise of his trade or profession (the professional) shall be governed by **the law of the country where the consumer has his habitual residence** provided that the professional: (a) pursues his commercial or professional activities in the country where the consumer has his habitual residence, or (b) by any means, directs such activities to that country or to several countries including that country, and the contract falls within the scope of such activities.

However, in case the above conditions are not met, which can occur in the case of consumers investing or building a small business activity on a metaverse platform as well as in the case of SMEs, such persons will face metaverse platforms imposing terms of reference that point to foreign, typically American, courts or arbitration as a place of conflict resolution with difficulties regarding distance and substantive costs of litigation in case of disagreement. In case of the absence of a choice of law clause, the contract is governed by the law of the country where **the service provider has his habitual residence, which in case of majority of metaverse platform may point at complex foreign provisions.**

The situation is again better in case of torts since the law applicable to a non-contractual obligation arising out of a tort/delict is the law of the country in which the damage occurs. This guarantee is additionally reinforced by applicability of mandatory requirements.

European Parliament could consider **according additional protection for Europeans making small investments on metaverse platforms and SMEs** engaging on such platforms as there is **significant disequilibrium** between such parties to contracts that may be deepened even further if European citizens or SMEs have to litigate in front of foreign, typically, U.S. courts and/or according to foreign laws.

6.4. U.S. conflict of laws provisions concerning civil and commercial law

The fifty U.S. states are separate jurisdictions. However, the issue of jurisdiction is regulated in the U.S. Constitution. Thus, on the most fundamental level all states share the same jurisdictional rules. IN addition it is common for state laws regulating jurisdiction to simply adopt the limitations imposed by the Constitution.

The jurisdiction of U.S. courts is regulated by the 14th Amendment of the U.S. Constitution, which in its due process clause states: *"No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws."*

U.S. law distinguishes general and specific jurisdiction. The first one gives the court jurisdiction over a party in all situations, while the latter gives the court jurisdiction only in relation to the very question at hand.

General jurisdiction is exercised when a party's ties to the forum are continuous, systematic, and ongoing. The assertion of general jurisdiction must also be reasonable.

The specific jurisdiction can be claimed when the facts of the case show that there is at least a "minimum contact" between the forum and the case.²⁷⁷ International Shoe Co v Washington judgment explains this concept:

[D]ue process requires only that in order to subject a defendant to a judgement in personam, if he be not present within the territory of the forum, he have certain minimum contacts with it such that the maintenance of the suit does not offend 'traditional notions of fair play and substantial justice'.

6.5. Examples of metaverse contracts clauses.

Below we give some examples of terms of use or service imposed by metaverse platforms with provisions concerning the nature and continuity of services, guarantees, ownership of content and assets, liability, choice of forum and of law, binding arbitration and class action waivers.

In terms of the **age of users** Sandbox [terms of use](#) clarify: *The Sandbox is offered and available to users who are 18 years of age or older. By accessing or using The Sandbox, you represent and warrant that you are of legal age to form a binding contract with TSB and meet the foregoing eligibility requirements. If you do not meet all of these requirements, you must not access or use The Sandbox.*

Decentraland [terms of use](#) on **age of the user**: *you are representing and warranting that you are of the legal age of majority in your jurisdiction as is required to access such Tools and Content and enter into arrangements as provided by the Tools; ... You affirm that you are over the age of 13, as the Tools are not intended for children under ## 13.*

In terms of **nature of the services** Sandbox [terms of use](#) clarify the following: *We grant you a limited, non-exclusive, non-sublicensable and non-transferable license to use the Services as they are provided to you by us, only as set forth in these Terms.*

In terms of **nature of the services** Decentraland [terms of use](#) provide: *Decentraland is governed by a decentralized autonomous organization (the "DAO"). For further information please see <https://dao.decentraland.org>. The Foundation has no continuing obligation to operate the Tools and the Site and may cease to operate one or more of the Tools in the future, at its exclusive discretion, with no liability whatsoever in connection thereto. ... the Foundation reserves the right, at the sole discretion of the DAO, to modify or replace the Terms of Use at any time.*

On **continuity of the services** Decentraland [terms of use](#) provide: *The DAO may decide to terminate or suspend all or part of the Site and the Tools and your access to the Site and the Tools immediately, without prior notice or liability. You will not receive any refunds if you cancel your Account, or if these Terms are otherwise terminated. You agree that the DAO, in its sole discretion and for any or no reason, may terminate these Terms and suspend your Account(s) for the Tools. You agree that any suspension of your access to the Site or the Tools may be without prior notice, and that the DAO and/or the Foundation (and its officers and employees) will not be liable to you or to any third party for any such suspension.*

²⁷⁷ Svantesson D.J.B., Private International Law and the Internet, Wolters Kluwer, 2012.

On **guarantees** Roblox [terms of use](#) state: *THE SERVICES AND ALL MATERIALS AND CONTENT AVAILABLE THROUGH THE SERVICES ARE PROVIDED "AS IS" AND ON AN "AS AVAILABLE" BASIS, WITHOUT WARRANTY OR CONDITION OF ANY KIND, EITHER EXPRESS OR IMPLIED.*

On **guarantees** Decentraland [terms of use](#) provide: *The Tools and the Site are provided on an "AS IS" and "AS AVAILABLE" basis, without warranties of any kind, either express or implied, including, without limitation, implied warranties of merchantability, fitness for a particular purpose or non-infringement. You acknowledge and agree that the DAO and/or the Foundation has no obligation to take any action regarding: which users gain access to or use the Tools; what effects the Tools may have on you; the LAND you own; how you may interpret or use the Tools; or what actions you may take or fail to take as a result of having been exposed to the Tools. ... YOU ACKNOWLEDGE AND AGREE THAT YOUR USE OF THE SITE AND TOOLS IS AT YOUR OWN RISK. YOU ACKNOWLEDGE AND AGREE THAT THE TOOLS ARE PROVIDED "AS IS" AND "AS AVAILABLE" WITHOUT WARRANTIES OF ANY KIND, WHETHER EXPRESS OR IMPLIED. RECOGNIZING SUCH, YOU ACKNOWLEDGE AND AGREE THAT, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, NEITHER THE FOUNDATION, ITS DIRECTORS, OFFICERS AND EMPLOYEES, THE DAO, NOR ITS SUPPLIERS OR LICENSORS WILL BE LIABLE TO YOU FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL, PUNITIVE, EXEMPLARY OR OTHER DAMAGES OF ANY KIND, INCLUDING WITHOUT LIMITATION DAMAGES FOR LOSS OF PROFITS, GOODWILL, USE, DATA OR OTHER TANGIBLE OR INTANGIBLE LOSSES OR ANY OTHER DAMAGES BASED ON CONTRACT, TORT, STRICT LIABILITY, INFRINGEMENT OF INTELLECTUAL PROPERTY OR THEFT OR MISAPPROPRIATION OF PROPERTY OR ANY OTHER THEORY (EVEN IF THE FOUNDATION HAD BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES), RESULTING FROM THE SITE OR TOOLS;*

Sandbox [terms of use](#) provide on the **ownership of assets** the following: *By using the Services, you grant TSB a worldwide, non-exclusive, royalty-free, perpetual, irrevocable, sub-licensable (through multiple tiers), transferable right and license to use, reproduce, publicly display, distribute and adapt the publicly shared Assets and Games for the purposes of developing, distributing, providing, improving, and promoting the Services, our activities, and your publicly shared Assets and Games. You further grant TSB the right to use your name and trademarks, if any, in connection with our use of your publicly shared Assets and Games.*

On **ownership of contributions** Epic Games [terms of service](#) state: *Any User Contribution that you Post will be considered non-confidential and non-proprietary, and you grant Epic a nonexclusive, royalty-free, perpetual, irrevocable, and fully sublicensable right to use, copy, reproduce, modify, adapt, publish, translate, create derivative works from, distribute, and display such User Contribution throughout the world in any media; however, Epic will only share personal information that you provide in accordance with Epic's [Privacy Policy](#).*

On the **ownership** Decentraland [terms of use](#) provide: *LAND PARCELS, WEARABLES AND ANY AND ALL ERC-721 TOKENS ARE INTANGIBLE DIGITAL ASSETS THAT EXIST ONLY BY VIRTUE OF THE OWNERSHIP RECORD MAINTAINED IN THE ETHEREUM NETWORK. ALL SMART CONTRACTS ARE CONDUCTED AND OCCUR ON THE DECENTRALIZED LEDGER WITHIN THE ETHEREUM PLATFORM. THE FOUNDATION HAS NO CONTROL OVER AND MAKES NO GUARANTEES OR PROMISES WITH RESPECT TO THE OWNERSHIP RECORD OR SMART CONTRACTS.*

Sandbox [terms of use](#) provide on the **user content** the following: *You hereby grant (and you represent and warrant that you have the right to grant) to Company an irrevocable, nonexclusive, royalty-free and fully paid, worldwide license to reproduce, distribute, publicly display and perform, prepare derivative works of, incorporate into other works, and otherwise use and exploit your User Content, and to grant sublicenses of the foregoing rights, solely for the purposes of including your User Content in the Site. You hereby*

irrevocably waive (and agree to cause to be waived) any claims and assertions of moral rights or attribution with respect to your User Content.

On privacy Epic Games [terms of service](#) state: *When you use the Epic Services, your information may be transferred to or stored in the United States or other countries where we or our service providers operate. The data protection laws and rules in these countries may be different than those where you live. We rely on various legal mechanisms to help lawfully support transfers of information outside the country of collection where appropriate. If permissible under local law, you're authorizing Epic to process your information in any of the locations where we operate (including the United States) by using the Epic Services.*

On **liability** of platform consumers Sandbox [terms of use](#) provide: *You agree to indemnify and hold TSB, its directors, officers and employees harmless from and against any claims, causes of action, demands, loss or damage by reason of (i) a breach of any representation, warranty or covenant hereunder, (ii) any exhibition, presentation, distribution or exploitation of your Assets and/or Games or any rights therein, and (iii) the negligence, fault or default of you, your employees, authorized agents, servants or independent contractors hired by you, or any subcontractor hired by any of the foregoing. (b) You shall comply with all applicable state, city, and federal laws, ordinances, codes, and regulations which affect your creation of any Assets and Games under these Terms and/or your relationship with TSB. (c) You agree to notify TSB promptly, in writing, of any legal claim or action of which you have knowledge, which is in any way related to these Terms, your Assets, your Games, or your obligations hereunder. (d) The warranties, representations and indemnifications contained herein shall survive any termination or expiration of these Terms or your relationship with TSB.*

On **liability** Decentraland [terms of use](#) provide: *You shall release and indemnify, defend and hold harmless the Foundation, the DAO, and its officers, directors, employees and representatives from and against any and all losses, liabilities, expenses, damages, costs (including attorneys' fees and court costs) claims or actions of any kind whatsoever arising or resulting from your use of the Tools or the Site, your violation of these Terms of Use, and any of your acts or omissions.*

On **liability** Roblox [terms of use](#) state: *Roblox is not liable for, nor is Roblox obligated to screen, approve, edit or control, UGC that Creators or others upload or otherwise make available on the Services. Roblox may, however, at any time and without notice, and without any obligation to User, remove, edit, or block or suspend the availability of any UGC that Roblox thinks violates the Roblox Terms or is otherwise objectionable.*

On the **choice of forum and governing law** Sandbox [terms of use](#) provide: *The rights and obligations of the parties hereunder and the interpretation of these Terms will be governed by the laws of Malta, without giving effect to its principles of conflicts of law. If either party brings against the other party any proceeding arising out of these Terms, that party may bring proceedings only in the courts of Malta and no other courts, and each party hereby submits to the exclusive jurisdiction of those courts for purposes of any such proceeding.*

On the **choice of forum and applicable law** Epic Games [terms of service](#) indicate: *any dispute or claim by you arising out of or related to these Terms shall be governed by North Carolina law, exclusive of its choice of law rules. For any disputes deemed not subject to binding individual arbitration, as provided in the section immediately below, you and Epic agree to submit to the exclusive jurisdiction of the Superior Court of Wake County, North Carolina, or, if federal court jurisdiction exists, the United States District Court for the Eastern District of North Carolina. You and Epic agree to waive any jurisdictional, venue, or inconvenient forum objections to such courts (without affecting either party's rights to remove a case to federal court if permissible), as well as any right to a jury trial. The Convention on Contracts for the International Sale of*

Goods will not apply. Any law or regulation which provides that the language of a contract shall be construed against the drafter will not apply to these Terms. This paragraph will be interpreted as broadly as applicable law permits.

On **jurisdiction for personal data** Sandbox [privacy policy](#) provides: Your Personal Information may be stored and processed in any country where we have facilities or in which we engage service providers, and by using the Services you understand that your information will be transferred to countries outside of your country of residence, including the United States, which may have data protection rules that are different from those of your country. In certain circumstances, courts, law enforcement agencies, regulatory agencies or security authorities in those other countries may be entitled to access your Personal Information.

On **binding arbitration** Decentraland [terms of use](#) provide: any dispute that is not resolved under the Initial Dispute Resolution provision shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce. The following shall apply in respect of such arbitration: (i) the number of arbitrators shall be three (one nominated by each party and one nominated by the ICC); (ii) the decision of the arbitrators will be binding and enforceable against the parties and a judgment upon any award rendered by the arbitrators may be entered in any court having jurisdiction thereto (provided that in no event will the arbitrator have the authority to make any award that provides for punitive or exemplary damages or to award damages excluded by these Terms or in excess of the limitations contained in these Terms); (iii) the seat, or legal place, of arbitration shall be the City of Panama, Panama; and (iv) the language to be used in the arbitral proceedings shall be English, any documents submitted as evidence that are in another language must be accompanied by an English translation and the award will be in the English language. ... The parties further agree that any arbitration shall be conducted in their individual capacities only and not as a class action or other representative action, and the parties expressly **waive their right to file a class action or seek relief on a class basis**.

On **class action waiver**, Roblox [terms of use](#) provide: USER AGREES THAT USER IS GIVING UP THE RIGHT TO FILE A LAWSUIT IN COURT BEFORE A JUDGE OR JURY, INCLUDING IN A CLASS ACTION, FOR DISPUTES THAT ARE SUBJECT TO ARBITRATION.

On **compulsory arbitration and class action waiver** Epic Games [terms of service](#) state: You and Epic agree that Disputes will be settled by binding individual arbitration conducted by the Judicial Arbitration Mediation Services, Inc. ("JAMS") subject to the U.S. Federal Arbitration Act and federal arbitration law and according to the JAMS Streamlined Arbitration Rules and Procedures effective July 1, 2014 (the "JAMS Rules") as modified by these Terms. ... To the maximum extent permitted by applicable law, You and Epic agree to only bring Disputes in an individual capacity and shall not: seek to bring, join, or participate in any class or representative action, collective or class-wide arbitration, or any other action where another individual or entity acts in a representative capacity (e.g., private attorney general actions); or consolidate or combine individual proceedings or permit an arbitrator to do so without the express consent of all parties to these Terms and all other actions or arbitrations.

7. INTELLECTUAL PROPERTY AND METAVERSE

Intellectual property was conceived as a tool to **preserve authors' rights**, in Europe, and to **stimulate creativity and innovation**, in the U.S. It allows for, pecuniary or moral, recognition of innovation, and as such creates an incentive to share innovation and creativity. However, over time intellectual property rights have evolved as well as a business tool enabling price discrimination, market segmentation and tax avoidance.

The World Trade Organization (WTO) Agreement on "Trade-Related Aspects of Intellectual Property Rights" (TRIPS) defines Intellectual Property Rights (IPRs) as "...the rights given to persons over the creations of their minds" ([World Trade Organization, 2021](#)). It further describes as a key function of IPRs that they "...usually give the creator an exclusive right over the use of his/her creation for a certain period of time."²⁷⁸

Intellectual property fully applies to metaverse. Intellectual property law applies to virtual goods and services like avatars²⁷⁹, virtual buildings and digital work.²⁸⁰ Tracking and pursuing intellectual property enforcement has generally proved to be difficult and similar challenges can be expected in the metaverse.

Metaverse is an IPR intense technology. The technology itself is subject to extensive patents. Everything in metaverse is either copied from physical original, which is often covered by intellectual property or data protection, or created and thus benefiting from such protection. A confirmation of this can be found in terms of use of metaverse platforms:

- Roblox terms of use state: *The interfaces, graphics, trademarks, design, information, artwork, data, code, products, software, and all other elements of the Services, including the rights therein and any derivatives, (the "Roblox Intellectual Property" or "Roblox IP") are protected by law.*
- Decentraland [terms of use](#) indicate: *The visual interfaces, graphics (including, without limitation, all art and drawings associated with Tools), design, systems, methods, information, computer code, software, "look and feel", organization, compilation of the content, code, data, and all other elements of the Site and the Tools (but excluding the Content submitted by Users) (collectively, the "Foundation Materials") are owned by the Foundation, and are protected by copyright, trade dress, patent, and trademark laws, international conventions, other relevant intellectual property and*

²⁷⁸ Intellectual property rights are in general divided into two main areas:

- (i) Copyright and rights related to copyright - the rights of authors of literary and artistic works (such as books and other writings, musical compositions, paintings, sculpture, computer programs and films) are protected by copyright, during life and, for a minimum period, after the death of the author. Also protected through copyright and related (sometimes referred to as "neighbouring") rights are the rights of performers (e.g. actors, singers and musicians), producers of phonograms (sound recordings) and broadcasting organizations. The main social purpose of protection of copyright and related rights is to encourage and reward creative work.
- (ii) Industrial property - industrial property can usefully be divided into two main areas:
 - 1) one area can be characterized as the protection of distinctive signs, in particular trademarks (which distinguish the goods or services of one undertaking from those of other undertakings) and geographical indications (which identify a good as originating in a place where a given characteristic of the good is essentially attributable to its geographical origin), 2) other types of industrial property are protected primarily to stimulate innovation, design and the creation of technology. In this category fall inventions (protected by patents), industrial designs and trade secrets.

https://www.wto.org/english/tratop_e/trips_e/intel1_e.htm#:~:text=Intellectual%20property%20rights%20are%20the,a%20certain%20period%20of%20time.

²⁷⁹ Cheong B.Ch., Avatars in the metaverse: potential legal issues and remedies, International Cybersecurity Law Review, 2022.

²⁸⁰ Mack O., What Laws Apply in Metaverse?, 2022.

proprietary rights, and applicable laws. All the Foundation Materials are the copyrighted property of the Foundation or its licensors, and all trademarks, logos, service marks, and trade names contained in the Foundation Materials are proprietary to the Foundation or its licensors.

The creation of new types of assets, such as digital assets and digital collectibles documented via NFT, has raised novel intellectual property issues, among them the scope of the right to use the content held by the NFT owner. NFT creators and content licensors are developing different licensing models.

Use and exploitation of previously licensed or acquired intellectual property rights in the metaverse raise novel questions for licensees and acquirers around the breadth and scope of rights they have obtained under agreements that may have long predated the Internet and the metaverse. These important issues around the scope of rights licensed or granted – many of which have previously led to disputes between parties with the advents of new content exploitation methods over the past decades – have and will arise in the context of the metaverse and may pose new legal questions and challenges which are unique due to the way the metaverse operates.

While the scope of intellectual property protection in the metaverse is not clear, the new NFT market has already seen a number of intellectual property disputes. The possibility of disputes in the metaverse is even greater. Traditional approaches on enforcement of intellectual rights will need to be revisited.

Some **43,700 patent applications** related to the metaverse and immersive content were made from 2016 to 2020 in the U.S., China, South Korea, Japan and Europe, which grew nearly threefold over those filed in the previous five years. In the United States 17,293 applications were filed, China is now no 2 in metaverse-related global patent applications with a nearly 30 percent share gathered through its 14,291 applications, and South Korea ranks third with 7,808 applications, or 16 percent of the total.²⁸¹

Metaverse technologies that companies are patenting are “systems for optimizing shared views of virtual objects to multiple wearers of VR headsets; algorithms for generating and moving virtual shapes and scenes in a VR environment based on hand gestures, head motion, or line of sight of the user; systems for generating haptic feedback corresponding to users’ interaction with virtual objects in a virtual environment; and methods for generating 3D avatars of the users, which emulate users’ appearance and behavior,” among others.²⁸²

New areas for patents in metaverse open due to a possibility to create purely digital products in metaverse or to twin physical and digital products. Nike and RTFKT patent their Nike Dunk shoes, making them customizable in the metaverse. Nike’s “Cryptokicks” patent is one of the most recognized patents in the metaverse, in the context of virtual fashion and footwear.²⁸³

However, patenting inventions for simulations can be difficult in the EPO - as illustrated by [European Patent Office’s decision G1/19](#) - while obtaining patents for these inventions in other jurisdictions could be easier.²⁸⁴

A similar pattern occurs in trademark registration. Many fashion tycoons, including [Hugo Boss](#), [Tommy Hilfiger](#), [Levi’s](#), [Champion](#), and [Versace](#), as well as food producers and entertainment companies, filed

²⁸¹ <https://www.chinadaily.com.cn/a/202302/07/WS63e18c29a31057c47ebad3e5.html>

²⁸² Fainberg M., Zaryab M., Patenting the Metaverse, ARENTFOX SCHIFF (Mar. 24, 2022), <https://www.afslaw.com/perspectives/alerts/patenting-the-metaverse>

²⁸³ Zerbo J., Patents in the Metaverse: From Sneakers to Hardware for the Virtual World, The Fashion Law (Oct. 31, 2022), <https://www.thefashionlaw.com/patents-in-the-metaverse-from-sneakers-to-hardware-for-the-virtual-world/>

²⁸⁴ <https://minesoft.com/patenting-innovations-in-the-metaverse/>

trademark applications to enter the metaverse and embrace the world of non-fungible tokens (NFTs). These companies seek to deliver new and interesting immersive experiences to their customers by offering virtual goods such as clothes, footwear, and headwear, as well as virtual spaces where people can socialize and establish communities.²⁸⁵

International Trademark Association issued a [White Paper](#) listing problems with trademarks in metaverse:

- 1) there is a need to harmonize classification of trademarks for metaverse activity and digital assets. The current approach of the USPTO and EUIPO of establishing Classes 9, 35, 41, and 42 as the main Nice Classes to protect virtual goods/services should be taken into account when crafting filing strategies. However, some stakeholders appear to be in favor of establishing a new Nice Class 46 for digital goods and services, while even others have argued for virtual goods to be registered under the same classes as their non-virtual or physical good counterpart,
- 2) trademark owners have no certainty that under a traditional zone of expansion analysis, a court would find that virtual goods are in the natural zone of expansion of their physical world counterparts,
- 3) INTA should take a stance on how use of a trademark in the metaverse should be assessed. Since national trademark laws and offices already take diverse views of trademark use for the purposes of trademark registration, renewals, and enforcement, INTA should consider how it might advocate for better international alignment so that there are commonly understood norms of trademark use across both borders and metaverse platforms,
- 4) questions on how licensing practices should adapt to the metaverse landscape as its development evolves are ripe for study. It would be beneficial for INTA to set forth best practices or educational campaigns regarding ownership, licensing, and assignment of digital assets and their underlying intellectual property rights,
- 5) the legal concepts of habitual residence, domicile, place of business of the parties or real estate property location, which are traditionally at the core of private international law rules, are based on geographical or territorial terms. However, the upcoming decentralization of the Internet will make these concepts less meaningful. Thus, in IP law, unique barriers to successful counterfeit detection and enforcement of trademarks, design rights, and trade dress that exist in the metaverse, including the difficulty in identifying infringers and establishing court jurisdiction, create uncertainty for brand owners.

With regard to copyright, it is undisputable that copyright law applies to the software that is used to "create" the metaverse and the graphic user interface that represents virtual reality. With respect to the use of creative work in the metaverse over which copyright originally exists, due permission by way of licensing and/or assignment of such copyrighted works must be ascertained by the participant-user of such copyright work in the metaverse. Avatars, virtual items, such as clothes, images, virtualized audiovisual performances, vehicles, weapons, or furniture, all of which may feature IP protected works. The builders and users of the metaverse are under an obvious obligation to respect the right holders prerogative of any exclusive exploitation of their intangible rights within the metaverse.²⁸⁶

²⁸⁵ <https://blog.cryptoflies.com/do-metaverse-and-nfts-have-a-future-these-statistics-on-trademark-fillings-will-convince-you/>

²⁸⁶ Mezei P. et al., Copyright and Metaverse, Chapter 11 - Copyright and Metaverse, in Michel Cannarsa & Larry Alan Di Matteo (eds): Research Handbook on Metaverse and the Law, Edward Elgar, 2023 (Forthcoming), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4444608

A creative work, including physical goods, can be converted in the metaverse in a digital format - such as a photo, video or a scan, and every such digital collectible may be used as a non-fungible token (NFT). A NFT transfers the ownership interest over the metadata of the token rather than the work itself. In case of sale, any person who buys such a NFT, is merely vested with the property rights attached to it as provided in a smart contract, without any transfer of copyrights and other ancillary interests of ownership embedded to the artistic work underlying such NFT. Hence, the buyer cannot further commercialize the NFT and his rights are only limited to exploiting the said NFT for personal purposes only.²⁸⁷

There is a separate range of intellectual property issues concerning AI, which can collect the data from copyrighted, patented or trademarked work, mash it and reproduce in algorithmically automated way unlimited amount of times in metaverse. This means effectively **copying of copyrighted, patented or trademarked work**, by the **new technology** which avoids remuneration for authors. A prolonged discussion if the outcomes of AI could themselves benefit from IPR protection proves that, in the next step, AI and metaverse could jointly serve not only as a tool of fee-free exploitation of IPR covered work, but also as **a means of appropriation of IPR rights on existing work**.

Training of AI on copyrighted, patented or trademarked work should be seen as a new exploitation field requiring a license and a fee to remunerate creators and innovators. Such a solution is feasible and logical in blockchain technology.²⁸⁸

Blockchain and hypermedia technologies allow for tracing which copyrighted, trademarked or patented material was utilized by AI. Using these technologies for traceability of consulted content could be more efficient as it could be engineered into AI systems.

7.1. Intellectual property rights in the European Union

Governed by various international and national laws, intellectual property rights (IPR) are also subject to EU legislation. Article 118 TFEU provides that in the context of the establishment and functioning of the single market, Parliament and the Council, acting in accordance with the ordinary legislative procedure, establish measures for the creation of EU intellectual property law in order to provide uniform protection of IPR throughout the EU, and for the setting-up of centralised, EU-wide authorisation, coordination and supervision arrangements. The legislative activity of the EU consists chiefly of harmonising certain specific aspects of IPR through the creation of its own system, as is the case for the EU trademark and design, and patents. Many of the EU instruments reflect the Member States' international obligations under the Berne and Rome Conventions, as well as under the [World Trade Organization Agreement on Trade-Related Aspects of Intellectual Property Rights \(TRIPS\)](#) and the 1996 [World Intellectual Property Organization](#) (WIPO) international Treaties.

Copyright and related rights

EU copyright legislation consists of 13 directives and two regulations which harmonise the essential rights of authors, performers, producers and broadcasters. By setting EU legislation, national discrepancies are reduced, a level of protection required to foster creativity and investment in creativity

²⁸⁷ Ibidem.

²⁸⁸ For hypermedia solutions see: Maciejewski M. et al., Streaming and online access to content and services, Policy Department, European Parliament, 2014, [https://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/492435/IPOL-IMCO_ET\(2014\)492435_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/492435/IPOL-IMCO_ET(2014)492435_EN.pdf)

is ensured, cultural diversity is promoted and access for consumers and businesses to digital content and services across the single market is facilitated.

[Directive 2001/29/EC](#) of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society adapted legislation on copyright and related rights to technological developments, but is out of pace with the extraordinarily fast developments that have taken place in the digital world, **with 49% of internet users in the EU accessing music, audiovisual content and games online** (Eurostat estimate).

The EU **Copyright Directive** (Directive [\(EU\) 2019/790](#)) of 17 April 2019 provides for an ancillary copyright for press publishers and fair remuneration for copyrighted content. So far, online platforms have had no legal responsibility for using and uploading copyrighted content on their sites. The new requirements do not affect the non-commercial upload of copyrighted works to online encyclopedias such as Wikipedia. Directive (EU) 2019/789 (the [CabSat Directive](#)) was adopted on the same day and aims to increase the number of **TV and radio programmes** available online to EU consumers. Broadcasting organisations are increasingly offering online services in addition to their traditional broadcasts, as users expect to have access to television and radio content at anytime, anywhere. The directive introduces the country of origin principle to facilitate the licencing of rights for certain programmes that broadcasters offer on their online platforms (e.g. simulcasting and catch-up services).

[Regulation \(EU\) 2017/1128](#) of 14 June 2017 on cross-border **portability of online content** services in the internal market aims to ensure that consumers who buy or subscribe to films, sports broadcasts, music, e-books and games can access them when they travel to other EU Member States.

These rights are protected for life and for **70 years after the death of the author/creator**. [Directive 2011/77/EU](#) amending Directive 2006/116/EC on the term of protection of copyright and certain related rights extended the term of copyright protection for performers of sound recordings from 50 to 70 years after recording, and for authors of music, such as composers and lyricists, to 70 years after the author's death. The term of 70 years has become an international standard for the protection of sound recordings. Currently 64 countries around the world protect sound recordings for 70 years or longer.

Computer programs and databases

[Directive 91/250/EEC](#) requires Member States to **protect computer programs**, by copyright, as literary works under the Berne Convention for the Protection of Literary and Artistic Works. It was codified by [Directive 2009/24/EC](#).

[Directive 96/9/EC](#) (the Database Directive) provides for the **legal protection of databases**, defining a database as **'a collection of independent works, data or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means'**. The Database Directive provides protection for databases with a two-fold system, first, through copyright (Articles 3 et seq.) and, second, through the sui generis right for the database maker (Articles 7 et seq.). While copyright protects an author's own intellectual creation expressed in the selection or arrangement of the database's content, the sui generis right enables the database maker to prevent any extraction

and/or re-utilisation of the database's content where there has been a substantial investment in obtaining, verification or presentation of these contents.²⁸⁹

On 23 February 2022, the Commission presented a proposal for a new regulation on harmonised rules on fair access to and use of data (the [data act](#)) aimed at ensuring fairness in the allocation of value from data among actors in the data economy and at fostering access to and the use of data. Parliament's plenary adopted the [report](#) on 14 March 2023, opening the path for trilogue negotiations. The data act will review certain aspects of the Database Directive. Notably, it will clarify that databases containing data from internet-of-things devices and objects should not be subject to separate legal protection.

On 30 May 2022, Parliament and the Council adopted the [Data Governance Act](#), which introduces mechanisms to facilitate the reuse of certain categories of protected public sector data, increase trust in data intermediation services and foster data altruism across the EU.

A licence must be obtained from the different holders of copyright and related rights before content protected by such rights may be disseminated. Rights holders may entrust their rights to a **collecting society**, which manages those rights on their behalf. Unless a collective management organisation has justified reasons to refuse management, it is obliged to manage these rights. [Directive 2014/26/EU](#) on collective management of copyright and related rights and multi-territorial licensing of rights in musical works for online use in the internal market lays down requirements for collective management organisations, with a view to ensuring high standards of governance, financial management, transparency and reporting. It aims to ensure that rights holders have a say in the management of their rights and envisages a better functioning of collective management organisations by means of EU-wide standards. Member States must ensure that collective management organisations act in the best interests of the rights holders whose rights they represent.

The proposal of AI Act as amended by MEPs states that: *"It should be clarified that this Regulation should be **without prejudice to Union law on copyright and related rights**, including Directives 2001/29/EC, 2004/48/ECR and (EU) 2019/790 of the European Parliament and of the Council."* European Parliament's amendments introduce as well an obligation to publish **sufficiently detailed summaries of copyrighted data used for training**. Such summaries should serve therefore as a way to reveal to authors and inventors that their work was consulted.

However, legal requirement should go further in clarifying that creators could demand a fair remuneration for allowing AI to be trained on their work and also that they should have a say if they would agree on such generative exploitation of their work.

Patents

A **patent** is a legal title that can be granted to any invention having a technical character, provided that it is **new**, involves an **inventive step** and could have an **industrial application**. A patent gives the owner the right to prevent others from making, using or selling an **invention** without permission. Patents encourage companies to make the necessary investment in innovation, and provide an incentive for individuals and companies to devote resources to research and development. In Europe, technical inventions can be protected either by national patents granted by the competent national

²⁸⁹ Leistner A, Antoine L, IPR and the use of open data and data sharing initiatives by public and private actors, Policy Department, European Parliament, 2022, [https://www.europarl.europa.eu/RegData/etudes/STUD/2022/732266/IPOL_STU\(2022\)732266_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2022/732266/IPOL_STU(2022)732266_EN.pdf)

authorities, or by European patents granted centrally by the [European Patent Office](#). The latter is the executive branch of the European Patent Organisation, which now has 38 contracting states.

After years of discussions among the Member States, Parliament and the Council approved the legal basis for a **European patent with unitary effect (unitary patent)** in 2012. An international agreement between the Member States thus set up a single and specialised patent jurisdiction.

The Court of Justice's (CJEU's) confirmation of the patent package in its judgment of 5 May 2015 in cases C-146/13 and C-147/13 cleared the way for a [truly European patent](#). The previous regime coexists with the new system with [transitory measures](#) in place. The Unitary Patent system [starts its full operation](#) on 1 June 2023.

Once granted by the European Patent Office, a **unitary patent** will provide uniform protection with equal effect in all participating countries (currently 17 Member States). Businesses will have the option of protecting their inventions in all EU Member States with a single unitary patent. They will also be able to challenge and defend unitary patents in a single court action through the new Unified Patent Court (UPC). This will streamline the system and save translation costs. The wording of the UPC Agreement (UPCA) provides that the **primacy of EU law** must be respected (Article 20 of the UPCA) and that the decisions of the CJEU are binding on the UPC.

Standard essential patents (SEPs) are patents that cover inventions necessary for complying with technical standards. They protect core technologies required for implementing specific standards like 4G, 5G, Wi-Fi, and USB. Standards organizations typically require their members to disclose and license their patents on fair, reasonable, and non-discriminatory (FRAND) terms.

FRAND licensing ensures that all manufacturers have access to essential patents, promoting interoperability, encouraging research and development (R&D), and facilitating technology transfers. It also prevents licensing abuse based on monopolistic advantages. When a patent is declared essential by a standard contributor, it becomes a standard essential patent, and its licensing must follow FRAND principles.

O 24 April 2023, the European Commission has proposed a [regulation on standard essential patents](#) to mediate SEP disputes through a centralized Competence Centre within the European Union Intellectual Property Office (EUIPO). This initiative aims to enhance transparency by establishing SEP and knowledge databases. The Competence Centre would manage a roster of SEP evaluators, assess the essentiality of SEPs, and facilitate the disclosure of essential patents.²⁹⁰

Critics argue²⁹¹ that the EUIPO lacks patent expertise, but the EU Commission aims to harmonize, modify, and improve the SEP licensing system based on transparency, predictability, and efficiency. The Competence Centre will also offer alternative dispute resolution processes, such as mediation and arbitration.²⁹²

The proposed regulation requires SEP owners to register their European SEPs with the Centre to enforce them in European courts, including the [Unified Patent Court](#) (UPC). It establishes a mandatory conciliation process for FRAND determination before litigation in the UPC. SEP holders and implementers must request a FRAND license, aiming to resolve licensing disputes amicably.

²⁹⁰ https://single-market-economy.ec.europa.eu/system/files/2023-04/COM_2023_232_1_EN_ACT_part1_v13.pdf

²⁹¹ <https://www.fosspatents.com/2023/04/european-commissions-formal-sep.html?m=1>

²⁹² https://single-market-economy.ec.europa.eu/system/files/2023-04/COM_2023_232_1_EN_ACT_part1_v13.pdf

The regulation has faced criticism from both licensors and licensees of standard-essential patents, with concerns about its one-sidedness and lack of real-world SEP licensing understanding.²⁹³

In both the United States and the European Union, FRAND licensing has been a subject of debate and litigation. Although there are areas of convergence, differences exist in their approaches. For example, the availability of injunctive relief for FRAND-encumbered SEPs differs, with the US being more reluctant compared to the EU.²⁹⁴

For example an article published in the U.S. highlights that : *The U.S. and German approaches to resolving disputes involving FRAND-committed standard-essential patents (SEP) diverge in many respects. While U.S. courts are reluctant to award injunctive relief in SEP cases, but have shown some willingness to determine FRAND royalties in both bench and jury trials, the German approach is precisely the opposite—with German courts interpreting the CJEU's decision in Huawei v. ZTE as authorizing awards of injunctive relief in many instances, while showing little enthusiasm for actually determining FRAND royalties themselves. The U.S. and Germany also differ in their tolerance for antisuit injunctions, which have become a recurrent topic in global FRAND disputes; and the countries' perspectives on antitrust law differ fundamentally as well, with antitrust providing one of the few avenues for denying injunctive relief in Germany, while having relatively little bearing on SEP disputes in the U.S. thus far. These divergences reflect not only important differences in legal cultures and institutions but also, arguably, different understandings of optimal innovation policy. One way to transcend these differences might be through the establishment of a global FRAND tribunal or mandatory FRAND arbitration, as others have suggested, though whether such a solution will ever be forthcoming remains to be seen.*²⁹⁵

Trademarks, designs and models

In the EU, the legal framework for trademarks is based on a four-tier system for trademark registration, which coexists with **national trademark systems harmonised** by means of the Trademark Directive ([Directive \(EU\) 2015/2436](#) of 16 December 2015 to approximate the laws of the Member States relating to trademarks). In addition to the national route, possible routes to trademark protection in the EU are the **Benelux route**, the **EU trademark**, introduced in 1994, and the **international route**. [Regulation \(EU\) 2017/1001](#) of 14 June 2017 on the European Union trademark (the EU Trademark Regulation), which codifies and replaces all earlier EC regulations on the EU trademark. The codification was carried out in the interests of clarity, given that the EU trademark system had already been substantially amended several times. The EU trademark has a unitary character and equal effect throughout the EU. The [European Union Intellectual Property Office](#) (EUIPO) is responsible for managing the EU trademark and design. The EU Trademark Regulation also sets the fee amounts payable to EUIPO. They are fixed at a level which ensures that the revenue they produce covers EUIPO's expenses and that they complement the existing national trademark systems.

Registration in the European Union Intellectual Property Office in Alicante, confers Europe-wide rights. [Directive 98/71/EC](#) of 13 October 1998 approximated national legislation on the legal protection of **designs and models**. [Council Regulation \(EC\) No 6/2002](#) of 12 December 2001 (amended) instituted a Community system for the protection of designs and models. [Council Decision 2006/954/EC](#) and

²⁹³ <https://www.fosspatents.com/2023/04/european-commissions-formal-sep.html?m=1>; <https://www.iam-media.com/article/jw-column-30th-march-2023-ec-sep-licensing-plans>

²⁹⁴ <https://dc.law.utah.edu/cgi/viewcontent.cgi?article=1193&context=scholarship>

²⁹⁵ *Like Ships That Pass in the Night: U.S. and German Approaches to FRAND Disputes*, forthcoming in *FRAND: German Case Law and Global Perspectives* (Peter George Picht, Erik Habich & Thomas F. Cotter eds., Edward Elgar Publishing Ltd. 2023).

[Council Regulation \(EC\) No 1891/2006](#), both of 18 December 2006, linked the EU system for the registration of designs or models to the international registration system for industrial designs and models of [WIPO](#).

Trade secrets

Trade secrets can include a vast amount of information and know-how that is not protectable or cannot be protected properly through patents, such as: early-stage inventions, manufacturing processes, lists of suppliers and clients. The level of protection afforded to confidential information cannot be compared to other areas of intellectual property law such as patents, copyrights and trademarks, but can, in principle, apply indefinitely, rather than for a limited period only.

Since 2016, an EU legal framework has existed, namely [Directive \(EU\) 2016/943](#) on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use and disclosure.

Geographical indications

European agri-food products and wines are protected as Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI), and spirit drinks as Geographical Indications (GI). European Union also protects Traditional Specialities Guaranteed (TSG), highlighting the traditional aspects of a product without being linked to a specific geographical area.²⁹⁶

Products whose names are protected by the European Union as "Geographical Indications" (GIs) represent a sales value of €74.76 billion. Famous geographical indications include for example Bayerisches Bier, Champagne, Irish Whiskey, Kalamata olives, Parmigiano Reggiano, Polish Vodka, Queso Manchego, Roquefort.²⁹⁷

On 31 March 2022, the Commission put forward a legislative [proposal on EU geographical indications for wine, spirit drinks and agricultural products, and quality schemes for agricultural products](#), voted by the EP plenary at the end of May 2023.

On 7 March 2023, the Committee on Legal Affairs adopted a [report](#) on the [proposal](#) for a regulation of the European Parliament and of the Council on geographical indication protection for craft and industrial products and amending Regulations (EU) 2017/1001 and (EU) 2019/1753 of the European Parliament and of the Council and Council Decision (EU) 2019/1754. After plenary's confirmation of the Committee on Legal Affairs' decision to enter into interinstitutional negotiations, Parliament and Council negotiators reached an [agreement](#) on 30 May 2023.

AI, metaverse and IPR

As discussed in previous chapters, non-transparent artificial intelligence may act as a "black box" which processes data that could be protected by copyrights, patents or trademarks or data protection, and on this basis, from various elements, produces an outcome, which is deprived of any reference to intellectual property rights, data protection, or integrity of persons and objects. By breaking data into smaller units and reassembling them it can effectively appropriate intellectual property and personal data.

Artificial intelligence is an important element in constructing and populating metaverse.

²⁹⁶ https://ec.europa.eu/commission/presscorner/detail/en/IP_20_683

²⁹⁷ Idem.

European Parliament's [resolution of 20 October 2020 on intellectual property rights for the development of artificial intelligence technologies](#) noted that the issue of the protection of IPRs in the context of the development of AI and related technologies has not been addressed by the Commission in its White Paper on artificial intelligence, despite the key importance of these rights. The Parliament stressed the key importance of balanced IPR protection in relation to AI technologies, and of the multidimensional nature of such protection, and, at the same time, stresses the importance of ensuring a high level of protection of IPRs. The Parliament also recommended that priority be given to assessment by sector and type of IPR implications of AI technologies; considers that such an approach should take into account, for example, the degree of human intervention, the autonomy of AI, the importance of the role and the origin of the data and copyright-protected material used and the possible involvement of other relevant factors.

Despite a clear request for an assessment of impact of AI on IPR, the European Commission did not include these considerations into its [impact assessment](#) of the proposal of the AI Act.

The [current text](#) of the Act, after substantial work performed by MEPs, contains the following amendments on this issue:

Recital 60 h: *As foundation models are a new and fast-evolving development in the field of artificial intelligence, it is appropriate for the Commission and the AI Office to monitor and periodically assess the legislative and governance framework of such models and in particular of generative AI systems based on such models, which raise significant questions related to the generation of content in breach of Union law, **copyright rules**, and potential misuse. It should be clarified that this Regulation should be **without prejudice to Union law on copyright and related rights**, including Directives 2001/29/EC, 2004/48/ECR and (EU) 2019/790 of the European Parliament and of the Council,*

Art 28b (4)(c) *without prejudice to Union or national or Union legislation on copyright, document and make publicly available a **sufficiently detailed summary of the use of training data protected under copyright law**.*

It could be considered if the clause “without prejudice” could be extended to the Union intellectual property rights laws.

The use for training of data protected by intellectual property rights, not just copyright, should be evidenced in a precise way, to avoid creating a loophole for using artificial intelligence effectively as an appropriation tool in a variety of fields covered by IPR, e.g. by training it specifically to make modifications to existing creations, patents, designs or trademarks. Such use for training purposes on the basis of IPR covered data should be remunerated, while copying should be blocked. While computers cannot be holders of intellectual property, IPR can be claimed on the basis of minimum human input or by use of trademark.

7.2. Intellectual property rights in the U.S.

Basis for intellectual property rights is provided in the U.S. Constitution's with grants the Congress the power “to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”²⁹⁸

²⁹⁸ U.S. Constitution art I. § 8 cl.8.

Under this clause, patents and copyrights are intended to encourage innovation and the spread of knowledge by providing incentives to create new works, generate useful technological inventions, publish and disclose them.

Other federal intellectual property laws, covering subjects such as trademarks and trade secrets, are enacted under the Commerce Clause, which grants Congress authority *"to regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes."*²⁹⁹ These laws are an aspect of Congress's power to regulate economic activity and establish rules for fair competition.

Copyrights

Copyright law in the U.S. is governed by the [Copyright Act](#) of 1976.

Copyright protection is granted by the U.S. law to *original works of authorship fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device.*

Works of authorship include: (1) *literary works*; (2) *musical works, including any accompanying words*; (3) *dramatic works, including any accompanying music*; (4) *pantomimes and choreographic works*; (5) *pictorial, graphic, and sculptural works*; (6) *motion pictures and other audiovisual works*; (7) *sound recordings*; and (8) *architectural works*.³⁰⁰

*In no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work.*³⁰¹

Copyright grants creators of "original works of authorship" a set of exclusive rights in their creative works. According to section 106 of the Copyright act *the owner of copyright ... has the exclusive rights to do and to authorize any of the following:*

- (1) to reproduce the copyrighted work in copies or phonorecords;**
- (2) to prepare derivative works based upon the copyrighted work;**
- (3) to distribute copies or phonorecords of the copyrighted work to the public by sale or other transfer of ownership, or by rental, lease, or lending;*
- (4) in the case of literary, musical, dramatic, and choreographic works, pantomimes, and motion pictures and other audiovisual works, to perform the copyrighted work publicly;*
- (5) in the case of literary, musical, dramatic, and choreographic works, pantomimes, and pictorial, graphic, or sculptural works, including the individual images of a motion picture or other audiovisual work, to display the copyrighted work publicly; and*
- (6) in the case of sound recordings, to perform the copyrighted work publicly by means of a digital audio transmission.*

U.S. law recognises as well rights of attribution and **integrity** providing in particular that *the author of a work of visual art [has a right] to prevent any intentional distortion, mutilation, or other modification of*

²⁹⁹ U.S. Constitution art I, § 8, cl. 3.

³⁰⁰ Sec. 102 (a) of the U.S. Copyright Act.

³⁰¹ Sec. 102 (b) of the U.S. Copyright Act.

that work which would be prejudicial to his or her honor or reputation, and any intentional distortion, mutilation, or modification of that work is a violation of that right.

In terms of fair use the U.S. Copyright Code provides that: *the fair use of a copyrighted work, including such use by reproduction in copies or phonorecords or by any other means specified by that section, for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright. In determining whether the use made of a work in any particular case is a fair use the factors to be considered shall include—*

*(1) the purpose and character of the use, including whether such use is of a **commercial nature** or is for nonprofit educational purposes;*

(2) the nature of the copyrighted work;

*(3) the **amount and substantiality of the portion used** in relation to the copyrighted work as a whole; and*

*(4) the **effect of the use upon the potential market for or value of the copyrighted work.***

*The fact that a work is unpublished shall not itself bar a finding of fair use if such finding is made upon consideration of all the above factors.*³⁰²

Section 202 of the Copyright Code clarifies that *[o]wnership of a copyright, or of any of the exclusive rights under a copyright, is **distinct from ownership of any material object in which the work is embodied.** Transfer of ownership of any material object, including the copy or phonorecord in which the work is first fixed, does not of itself convey any rights in the copyrighted work embodied in the object; nor, in the absence of an agreement, does transfer of ownership of a copyright or of any exclusive rights under a copyright convey property rights in any material object.*³⁰³

Copyright is a personal property right, and it is subject to various state laws and regulations that govern the ownership, inheritance, or transfer of personal property. Copyright as a bundle of rights granted by the U.S. Copyright Act. Any or all of these rights, or any subdivision of those rights, may be transferred. However, the transfer of exclusive rights is not valid unless that transfer is in writing and signed by the owner of the rights conveyed. Transfer of a right on a nonexclusive basis does not require a written agreement.

A document transferring copyright ownership or any other document pertaining to a copyright may be recorded in the [Copyright Office](#). While not required to make a valid transfer of a copyright, recordation of the transfer document does provide certain legal advantages and may be required to validate the transfer as against third parties.

Any person who takes one of those actions without the permission of the copyright owner is potentially legally liable for copyright infringement. Once a copyright holder registers the copyright, he or she may sue infringers in federal court to seek injunctions, damages, and other legal remedies. In addition to these civil remedies, certain wilful copyright infringements may be criminal offenses.

In the U.S. databases are protected by copyrights as compilations defined as a "*collection and assembling of preexisting materials or of data that are selected in such a way that the resulting work as a*

³⁰² Sec. 107 of the U.S. Copyright Act.

³⁰³ Sec. 202 of the U.S. Copyright Act.

whole constitutes an original work of authorship". The standard for deciding whether a database can gain copyright protection is its originality rather than its creator's effort.³⁰⁴

While there is a provision for website blocking in legislation in the EU, **U.S. law does not provide a clear legal basis for website blocking**. In the EU, website blocking is available pursuant to Article 8(3) of the Directive 2001/29/EC (["InfoSoc Directive"](#)) which provides that **"Member States shall ensure that rights holders are in a position to apply for an injunction against intermediaries whose services are used by a third party to infringe a copyright or related right"** and Article 11 of the EU IPR Enforcement Directive, and is available in most EU Member States. Pursuant to Article 8(3) of the InfoSoc Directive, regardless of safe harbours, right holders can apply for injunctive relief and, in particular, injunctions requiring ISPs to block access to infringing websites.³⁰⁵ The absence of a clear legal basis for website blocking against online intermediaries in the US, which is a fair and effective measure to stop the availability of illegal services, is a potential shortcoming.

U.S. online liability framework: The so-called "ISP safe harbours" were designed and introduced, in the U.S. Law by Section 512 of the 1998 Digital Millennium Communication Act (DMCA) and in the EU law by the 2000 E-commerce directive, to protect passive and neutral technology intermediaries from lawsuits in respect of the content flowing across or stored in their networks, subject to certain important eligibility conditions. Over the years the use of safe harbours sometimes diverted from the original intention of legislators and became a potential shield allowing some internet services to build business models based on the distribution of illegal content. While the European Union has meanwhile intervened with several legislations (and court decisions) – such as DSA regulation³⁰⁶ and DSM copyright) directive³⁰⁷ – to adapt the legislation so to prevent an inappropriate application of safe harbours, the US has been passive, and omitted to address deficiencies in the current application of the DMCA safe harbour regime. As made clear in a recent Report of the US Copyright Office, as currently applied, the system is not an adequate template upon which to base liability privileges. The Report states that *"Over the decades, the shift in the balance of the benefits and obligations for copyright owners and OSPs under section 512 has resulted in an increasing burden on rightsholders to adequately monitor and enforce their rights online, while providing enhanced protections for OSPs in circumstances beyond those originally anticipated by Congress"*³⁰⁸.

Patents

Existence of a patent in the U.S. depends upon it being examined and granted by the [United States Patent and Trademark Office](#).³⁰⁹ Any person who invents or discovers *"any new and useful process,*

³⁰⁴ See: [Feist Publications, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340 \(1991\)](#)

³⁰⁵ In addition to the EU, website blocking injunctions have been ordered in many countries around the world including Argentina, Australia, Brazil, Canada, Ecuador, India, Indonesia, Malaysia, Mexico, Peru, Singapore, Turkey and Uruguay, in relation to over 4,900 infringing websites containing music.

³⁰⁶ <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020PC0825&from=en>

³⁰⁷ <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32019L0790&from=EN>

³⁰⁸ US Copyright Office Report on Section 512 of the Digital Millennium Copyright Act. <https://www.copyright.gov/policy/section512/>

³⁰⁹ Kono T. (ed.), Intellectual Property and Private International Law, Comparative Perspectives, Hart Publishing, 2012, p. 1116.

machine, manufacture, or composition of matter, or any new and useful improvement thereof” may apply for a patent under U.S. law³¹⁰.

To obtain a patent, the inventor must file a formal application with the U.S. Patent and Trademark Office (USPTO). The patent application must contain a written specification that describes the claimed invention with enough detail that a person skilled in the relevant technical field can make and use the invention. Adequate disclosure and enablement are important conditions of the patent system aimed at diffusion and sharing of innovation and knowledge..

A USPTO patent examiner reviews the application to determine whether the claimed invention meets the following four conditions: meet four conditions: 1) able to be used (the invention must work and cannot just be a theory), 2) a clear description of how to make and use the invention, 3) new, or “novel” (something not done before), 4) “not obvious,” as related to a change to something already invented.

A U.S. patent gives the inventor the right to “exclude others from making, using, offering for sale, or selling” an invention or “importing” it into the U.S. Patents typically expire twenty years after the initial patent application is filed. Any other person who makes, uses, sells, or imports the invention without the patent holder’s permission is said to “infringe” the patent and is potentially legally liable. To enforce the patent, the patent holder may sue alleged infringers in federal court to seek an injunction (i.e., a judicial order to cease infringing activity), damages, and other remedies³¹¹. U.S. patents are effective only within the U.S. and its territories and possessions.

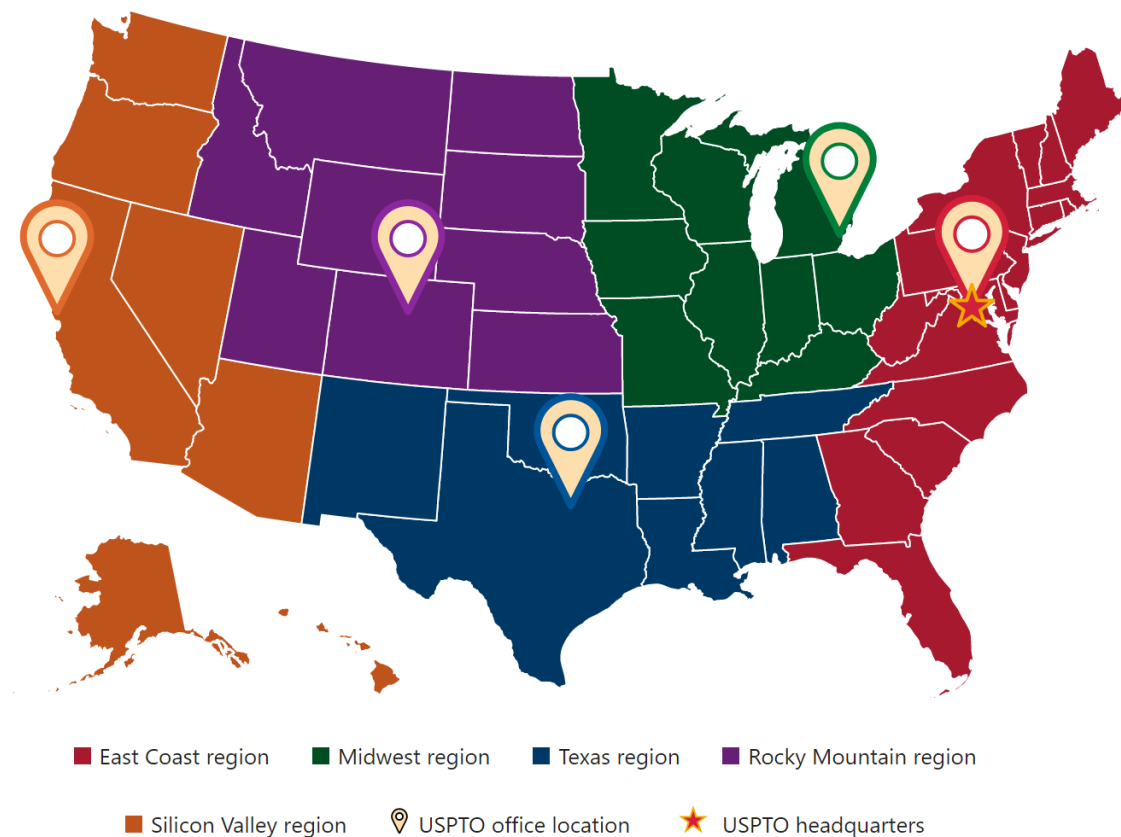
The U.S. law distinguishes a utility patent, which may cover “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof”; a design patent, which may cover “any new, original, and ornamental design for an article of manufacture”; and a plant patent.³¹²

³¹⁰ 35 United States Code. § 101.

³¹¹ United States Code 35 §§ 281, 283–285.

³¹² <https://www.uspto.gov/patents/basics/essentials>

Figure 24: U.S. Patent and Trademark Office (USPTO)



Source: The United States Patent and Trademark Office

Patents **can be searched, also digitally, and consulted free of charge**. The USPTO has [five locations](#) in the U.S., a headquarters and Eastern Regional Outreach Office in Alexandria, Virginia, and four additional regional offices across the nation, including one in Silicon Valley.

Trademarks

In order to obtain rights under the [United States federal Trademark Act](#), known as Lanham Act, the owner of the trademark **may** apply for registration on the [Principal Register](#) of the [U.S. Patent and Trademark Office](#). [Waiting time](#) in case of new applications is approximately one year.

Although registration is not a prerequisite to trademark protection, it gives significant advantages if performed in the Principal Register: 1) nationwide constructive use and notice cutting off rights of other users of the same or similar marks, 2) incontestable status after five years, 3) a prima facie presumption of validity.³¹³

The application includes a specification of the applicant's domicile and citizenship, the date of the applicant's first use of the mark, the date of the applicant's first use of the mark in commerce, the goods in connection with which the mark is used, and a drawing of the mark.

³¹³ Merges R.P., Song S.H., Transnational Intellectual Property Laws, Edward Elgar Publishing, 2018, p. 504.

In general, any “word, name, symbol, or device” may be used as a trademark or service mark to identify a particular business’s goods or services.

The availability of trademark protection depends on the distinctiveness of the proposed mark. Generic terms (i.e., a common descriptive name for a particular type of product) and deceptive terms (i.e., those that materially misrepresent the product) may not be registered or protected as a trademark. Descriptive terms (i.e., those that convey information about the qualities of the product), surnames, and geographically descriptive marks generally cannot be registered or protected as a trademark unless such terms acquire an association by consumers with a particular source of a product: so-called “secondary meaning.”

Administrative proceedings concerning trademarks in the U.S. are among the most stringent in the world. Applications are reviewed to make sure that they meet formal requirements (set on para 1 of the Lanham Act) and substantive requirements (para 2 of the Lanham Act).³¹⁴

There are five basis for filing trademark application in Lanham Act:

1. actual use of the mark in commerce,
2. bona fide intent of use of the mark in commerce (most of trademarks are registered under this base),
3. a claim of priority based on an earlier-filed foreign application to register the mark,
4. registration of the mark in a foreign applicant’s country of origin,
5. extension of protection of an international registration under the Madrid System for the international registration of trademarks.³¹⁵

If a trade mark, service mark or designation of geographic origin is granted registration on the Principal Register, the title is initially in the name of registrant and after five years becomes incontestable.

Owners of valid trademarks generally have the **right to prevent other businesses or persons from using the trademark without their consent/licence and from using similar marks** to identify their products if the use is likely to cause consumer confusion as to the product’s source.

Trademark owners may sue in federal or state court to obtain injunctions, damages, and other legal remedies. In addition to civil remedies, intentional trafficking in goods or services using a counterfeited mark is a federal criminal offense.

Each registration of a trademark remains in force for 10 years. If properly renewed and maintained, trademark rights may last indefinitely.

In case of a denial of a registration on the Principal Register, applicants may register on Supplemental Register which gives notice that the registrant claims to have trade mark rights³¹⁶ and is available for marks capable of distinguishing goods and services. It is not available for generic names but is available for registration of trade dress.

Trade secrets

³¹⁴ Merges R.P., Song S.H., Transnational Intellectual Property Laws, Edward Elgar Publishing, 2018, p. 503.

³¹⁵ Merges R.P., Song S.H., Transnational Intellectual Property Laws, Edward Elgar Publishing, 2018, p. 505.

³¹⁶ Kono T. (ed.), Intellectual Property and Private International Law, Comparative Perspectives, Hart Publishing, 2012, p. 1117.

Trade secret law protects competitively valuable, confidential information. Trade secrets include “all forms and types of financial, business, scientific, technical, economic, or engineering information” where (1) the owner has taken reasonable measures to keep the information secret; and (2) the information derives actual or potential independent economic value from not being generally known or readily ascertainable to another person (usually, a business competitor)³¹⁷. Examples include secret recipes, formulas, financial information, source code, or manufacturing processes. Matters of public knowledge or information generally known in an industry may not be a trade secret.

Until recently, trade secret protection was mainly a matter of state law. In 2016, Congress passed the Defend Trade Secrets Act (DTSA)³¹⁸, which created a federal civil remedy for trade secret misappropriation. The DTSA is built upon the Economic Espionage Act of 1996, which criminalized economic espionage and certain thefts of trade secrets. Under the DTSA, the misappropriation of a trade secret is a federal civil violation that may be remedied through a lawsuit by the trade secret's owner. Protection for trade secrets is also available under state laws, which are generally similar to federal requirements.

Owners of commercially valuable information need not formally apply with federal or state governments to obtain legal protection for an asserted trade secret. However, the owner must take “reasonable measures” to keep the information secret.

Federal and state law provide a remedy only when a trade secret is “misappropriated.”

Owners of trade secrets may sue in state or federal court to enjoin actual or threatened misappropriations and obtain monetary damages for losses caused by misappropriations³¹⁹.

Geographical indications

The United States has provided protection to foreign and domestic GIs since at least 1946, decades prior to the implementation of the TRIPS Agreement (1995) when the term “geographical indication” came into wide use.

The United States' GI system uses administrative trademark structures already in place, and provides opportunities for any interested party to oppose or cancel a registered GI if that party believes that it will be damaged by the registration or continued existence of a registration. The same governmental authority (the United States Patent and Trademark Office) processes applications for both trademarks and GIs.

The United States does not protect geographic terms or signs that are generic for goods/services. A geographic term or sign is considered “generic” when it is so widely used that consumers view it as designating a category of all of the goods/services of the same type, rather than as a geographic origin.

³¹⁷ 18 United States Code § 1839(3). Factors that courts may consider in determining whether information is a trade secret include (1) the extent to which the information is known outside of the business; (2) the extent to which the information is known by employees and others involved in the business; (3) the extent of measures taken by the owner to guard the secrecy of the information; (4) the value of the information to the owner and the owner's competitors; (5) the amount of effort or money expended by the owner in developing the information; and (6) the ease or difficulty with which the information could be properly acquired or duplicated by others.

³¹⁸ <https://www.congress.gov/bill/114th-congress/senate-bill/1890/text>

³¹⁹ 18 United States Code § 1836(b)(3)(A)–(B).

7.3. The EU conflict of laws system concerning intellectual property rights and metaverse

The complexity of cross-border intellectual property law relations and litigation that may be involved in metaverse encompasses issues of identifying competent courts, procedural and substantive law among different judicial systems of the Member States and possible the U.S. legal system where main metaverse services are based. Rules on enforcement add additional complexity to this landscape.

The regulations, which are applicable to civil and commercial matters, as discussed in preceding section, are horizontal in their effect, with some specific matters being treated separately (e.g. jurisdiction concerning registration of intellectual property rights).

This was the initial situation with European patent law, which changed with introduction of unitary patent leading to growing competence of the Unitary Patent Court.

EU trade marks are unitary titles issued by the EUIPO. Only special EUTM courts can deal with EUTM-related matters.

Copyright and related rights are applied by national courts.

The harmonization of European patent law has been achieved through the European patent Convention, which is not an EU legal instrument.

Unitary EU trademarks imply the harmonization of the substantive law.

Finally, copyright and related rights are national rights granted by national laws subject to harmonisation by a set of EU Directives, such as the InfoSoc Directive (injunctive relieve (art. 8(3), E-Commerce Directive (liability exemptions in art. 12, 13 and 14), Copyright in the Digital Single Market Directive, (art. 17 on liability of the online content sharing service providers for the infringement of copyright) and Digital Services Act (art. 16 notice and action system).

The Consumer Rights Directive and the new Sale of Goods Directive, the Supply of Digital Content and Digital Services Directive do not contain a conflict-of-law provisions.³²⁰ They rely rather on mandatory or imperative clauses.

A number of earlier directives contain specific private international law provisions. Beginning with Article 6(2) of the Unfair Terms Directive 93/13/EEC, many of such instruments on the protection of consumers required the Member States to take “the necessary measures to ensure that the consumer does not lose the protection granted [by the respective legal instrument] by virtue of the choice of the law of a non-Member country as the law applicable to the contract if the latter has a close connection with the territory of the Member States”.³²¹

³²⁰ Wielke F., The Silent Death of Conflict-of-Law Provisions in EU Directives?, THE EUROPEAN ASSOCIATION OF PRIVATE INTERNATIONAL LAW, 2022, <https://eapil.org/2022/12/06/the-silent-death-of-conflict-of-law-provisions-in-eu-directives/>

³²¹ Wilcke F., The Silent Death of Conflict-of-Law Provisions in EU Directives?, 2022, <https://eapil.org/2022/12/06/the-silent-death-of-conflict-of-law-provisions-in-eu-directives/>

7.4. The U.S. conflict of laws system concerning intellectual property rights and metaverse

U.S. state courts have a general (non-limited) subject matter jurisdiction which gives them authority to hear majority of cases. U.S. federal courts have exclusive (limited) jurisdiction on cases exclusively entrusted to them by Congress.

Most litigation between citizens of the United States and citizens of foreign countries takes place in the federal system on the basis of section 2 of Article III of the U.S. Constitution.³²²

Under 28 U.S. Code para 1338(a) "the district courts have original jurisdiction of any civil action arising under any Act of Congress relating to patents, plant variety protection, copyright and trademarks. No State court shall have jurisdiction over any claim for relief arising under and Act of Congress relating to patents, plant variety protection, or copyrights".

Cases involving trademarks can be brought in state or federal courts.

Concerning personal jurisdiction two doctrines coexist:

- general jurisdiction is established when a defendant is in systematic and constant contact with the state of the forum, and
- specific jurisdiction is established in case of a purposeful act of infringement towards the forum state that is in case of deed constituting infringement which took place within the territory of the forum; there is no federal statute dealing with the issue of personal jurisdiction and federal courts apply state "long-arm" statutes limited by due process, when a foreign elements is present on a case by case basis. The following doctrines developed in the case law:
 - minimum connection test: purposeful and substantial connection with the forum leading to reasonableness of jurisdiction,
 - Calder effect test: intentional and harmful actions aimed at the forum state,
 - five-part test: intentional and harmful action aimed at the forum and causing injury at the forum, while fair play and substantial justice are not offended.

The United States Court of Appeals for the Federal Circuit has exclusive appellate jurisdiction over all cases involving questions of patent law. Thus, all district courts are required to follow rulings of the Federal Circuit on patent matters regardless of the circuit in which the district court is located.³²³

In the United States the federal courts' subject matter jurisdiction over most trademark claims rests upon their adjudicating a claim under the Lanham Act, which in turn rests upon the Lanham Act (i.e., U.S. law) being chosen as the applicable law.³²⁴ If the court decides that a trademark infringement claim should not be decided under U.S. law, then the court will dismiss the claim for lack of subject matter jurisdiction because the claim does not "arise under federal law".³²⁵ Thus the choice of forum and substantive law remain closely intertwined.

³²² Kono T. (ed.), *Intellectual Property and Private International Law, Comparative Perspectives*, Hart Publishing, 2012, p. 1113.

³²³ Kono T. (ed.), *Intellectual Property and Private International Law, Comparative Perspectives*, Hart Publishing, 2012, p. 1114.

³²⁴ Dinwoodie G.B., *Private International Aspects of Trademarks*, WIPO, 2001.

³²⁵ Ibidem.

As to the Choice of law, the U.S. courts in general accept that parties are free to specify in their contract which jurisdiction's law governs the contract.³²⁶

The Restatement of Conflict of Laws confirms this position taken by case law:

§ 187. Law Of The State Chosen By The Parties

(1) The law of the state chosen by the parties to govern their contractual rights and duties will be applied if the particular issue is one which the parties could have resolved by an explicit provision in their agreement directed to that issue.

(2) The law of the state chosen by the parties to govern their contractual rights and duties will be applied, even if the particular issue is one which the parties could not have resolved by an explicit provision in their agreement directed to that issue, unless either

(a) the chosen state has no substantial relationship to the parties or the transaction and there is no other reasonable basis for the parties' choice, or

(b) application of the law of the chosen state would be contrary to a fundamental policy of a state which has a materially greater interest than the chosen state in the determination of the particular issue and which, under the rule of § 188, would be the state of the applicable law in the absence of an effective choice of law by the parties.

(3) In the absence of a contrary indication of intention, the reference is to the local law of the state of the chosen law.

In the absence of a contractual choice of law, the law applied will be *'the local law of the state which, with respect to that issue, has the most significant relation to the transaction and the parties'*.³²⁷

³²⁶ Kono T. (ed.), *Intellectual Property and Private International Law, Comparative Perspectives*, Hart Publishing, 2012, p. 1115.

³²⁷ Kono T. (ed.), *Intellectual Property and Private International Law, Comparative Perspectives*, Hart Publishing, 2012, p. 1115.

8. COURTS AND LAWYERS IN METAVERSE

Virtual and hybrid courts

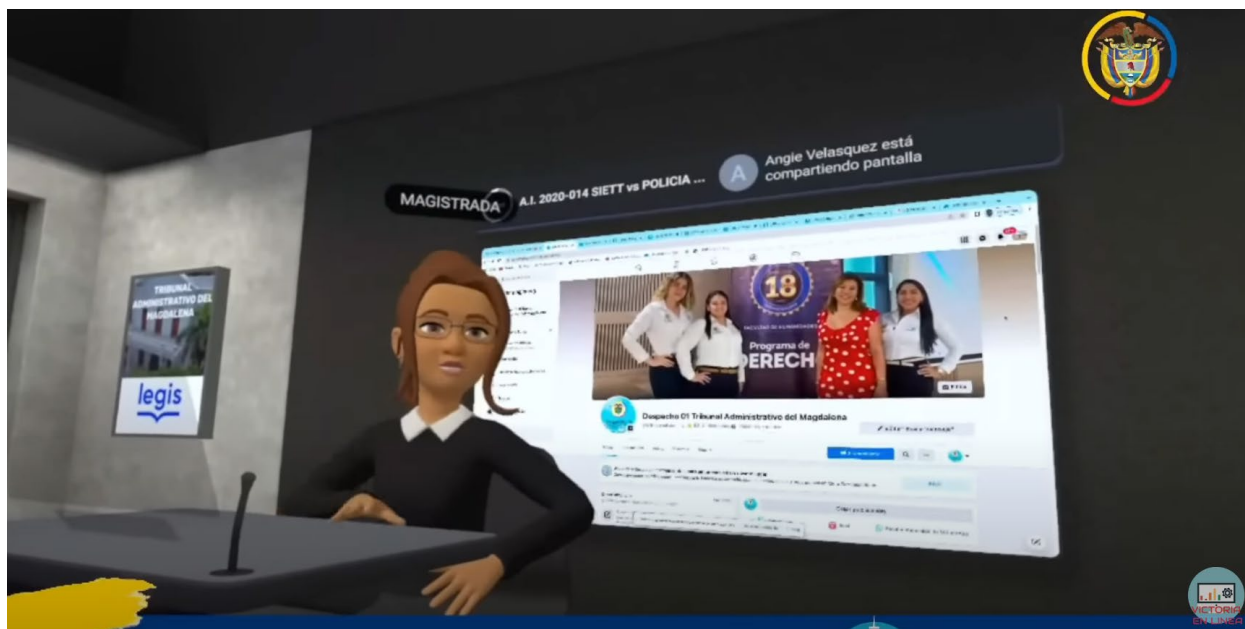
The role of video in justice systems has now firmly established itself and [virtual and hybrid courts](#) have shifted the landscape of justice and legal proceedings.

The ability to hold virtual or hybrid court hearings has allowed judiciaries to improve the efficiency of their operations, reduce no-shows due to greater convenience, save time, and reduce costs. It is also a powerful way to tackle case backlogs created by the COVID-19 pandemic due to postponed hearings.

For most part a virtual court means nowadays a court that holds its proceedings by means of video transmission e.g. on Zoom.³²⁸

However, in 2022 the Court of Paraíba, in the northeast of Brazil, held the first national judicial hearing in the metaverse. The Brazilian case was a conciliatory session in which the parties, represented by their respective customised 3D avatars, signed an agreement that ended a process on-going since 2018.³²⁹

Recently, a Colombian court held the first-ever court hearing in the metaverse. On February 15, 2023 the administrative court of Magdalena conducted a [court session](#) from the metaverse to hear a case against the Colombian Ministry of Defence and the National Police.



Source: YouTube

The court magistrate, María Victoria Quiñones, accepted a direct request from the plaintiff to hold the public audience in the metaverse, which was also accepted by the defendant. Artificial intelligence and the metaverse is admissible in judicial proceedings due to Colombian legislation passed in 2022,

³²⁸ <https://www.thestreet.com/cryptocurrency/news/colombia-metaverse-court-hearing-body-language-horizon-workrooms>

³²⁹ <https://www.euronews.com/next/2023/03/01/future-of-justice-colombia-makes-history-by-hosting-its-first-ever-court-hearing-in-the-me>

known as Ley 2213, expressly establishing that cutting-edge information technology can be used in the country.³³⁰

During the hearing, judge Quiñones stated that the metaverse allowed for “a real interaction” and the use of the immersive technology aimed to make procedural cases more efficient, “as it allowed to bring people in the same virtual space, even when they were physically elsewhere - all without leaving aside the procedural guarantees and the principles of digital justice”.

The judge told those in the hearing that she was “all alone in my courtroom; my colleagues are in their offices, the counsel lawyer is in her house, and the other lawyers are in their own premises where they have chosen to connect from”.³³¹

The Colombian courtroom hosted the legal session in Horizon Workrooms 18, the free virtual collaborative application developed by Meta, which allows a group of people in the metaverse to meet in a virtual space through their respective avatars.

The proceedings triggered numerous questions as to the feasibility of such proceedings in different jurisdictions, implications for access to justice and possibilities to follow facial expressions and body language in the court room.³³²

Avatar Lawyers

The [2022 Legal Trends Report](#) found that working from a home office has a negligible influence on a client’s decision to hire a lawyer. Moreover, 25% more clients prefer meeting virtually—and the rest indicated no strong preference either way, meaning they’re adaptable.

As the metaverse becomes mainstream, it will not be surprising to see avatar lawyers emerge in these digital realms to provide services like company incorporation, virtual legal firms and arbitrating digital land disputes.

The credentials, skills and knowledge of these personas must be established and rights to practice will need to be agreed upon in the metaverse. A pure AI-driven digital lawyer could be vastly different from the digital twin of a human lawyer, with different case types and outcomes based on specific factors.³³³

Metaverse Forensics

While blockchain and VR forensics are maturing fast, they are still nascent. Many e-discovery professionals will need to enhance their skills to adapt to this change in basic assumptions, for we could see a shortage of skilled professionals even after standards are established.

Many existing e-discovery softwares have not adapted to the current trends of cloud or social. With the advent of the metaverse, there will be a need for orchestration platforms for e-discovery to adapt to

³³⁰ <https://www.law.com/international-edition/2023/02/19/justice-in-the-metaverse-heres-what-the-first-virtual-court-hearing-in-colombia-looked-like/?slreturn=20230427182507>

³³¹ <https://www.euronews.com/next/2023/03/01/future-of-justice-colombia-makes-history-by-hosting-its-first-ever-court-hearing-in-the-me>

³³² <https://www.lexology.com/library/detail.aspx?g=e52b1286-4100-4674-bda6-e4ea90deaf6f>

³³³ Kumar N., Six Unaddressed Legal Concerns For The Metaverse, Forbes, 2022, <https://www.forbes.com/sites/forbestechcouncil/2022/02/17/six-unaddressed-legal-concerns-for-the-metaverse/?sh=482b6a2d7a94>

the new processes from legal hold, preservation, collection and in an automated and integrated matter that are integrated into smart contracts.³³⁴

³³⁴ Kumar N., Six Unaddressed Legal Concerns For The Metaverse, Forbes, 2022, <https://www.forbes.com/sites/forbestechcouncil/2022/02/17/six-unaddressed-legal-concerns-for-the-metaverse/?sh=482b6a2d7a94>

9. EUROPEAN PARLIAMENT IN METAVERSE

On 13 November 2014, a Policy Department organized in the European Parliament a workshop on [Building Blocks of the Ubiquitous Digital Single Market](#). During the workshop, Mr Nick Sohnemann ([Future Candy](#)) discussed with MEPs advantages and developments of augmented reality, data glasses and e-commerce as well as approach of Silicon Valley-based technology.



Source: Proceedings from the workshop: Building Blocks of the Ubiquitous Digital Single Market³³⁵

On 28 May 2016 during European Parliament's Open Day, EP Policy Departments organized a Tech Corner and presented research prepared for the European Parliament on the [Digital Single Market and digital revolution](#) along with virtual reality hardware and software.



Source: European Parliament's Policy Department

³³⁵ Scheibe F., Building Blocks of the Ubiquitous Digital Single Market, Policy Department, European Parliament, 2015, [https://www.europarl.europa.eu/RegData/etudes/STUD/2015/518772/IPOL_STU\(2015\)518772_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2015/518772/IPOL_STU(2015)518772_EN.pdf)

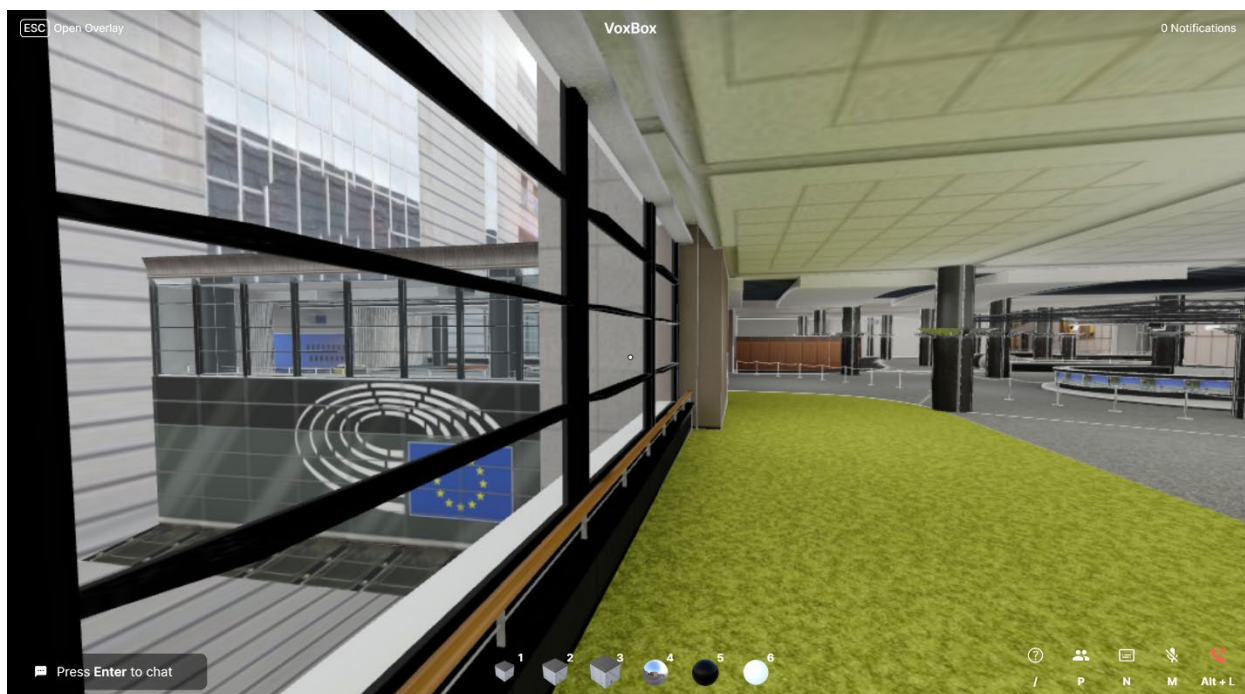
DG ITEC innovation team explored the metaverse, virtual and augmented reality since 2016. This process has been accelerated during the pandemic by developing several Proof Of Concepts to assess the technical feasibility of the technology inside the EP infrastructure.

Technological innovations were set up on the European Parliament's own infrastructure to insure that the experience is compliant with EP policies concerning cybersecurity and data privacy. European hardware was extensively tested not just headset but also controllers, other devices for smell, eye tracking, etc.

Consequently, special attention was given to open-source testing e.g Mozilla Hubs and Matrix ThirdRoom or hardware solutions designed right here in Europe e.g headsets made in France like Lynx or Varjo in Finland.

The area around the VoxBox was reproduced virtually, picked as one of the most familiar location. This challenging work was done mostly remotely as this was built at the height of the pandemic. This meant being able to represent the "essence" of the building while working on a limited bandwidth, with limited graphic performances and through a complex network.

The EP metaverse can be experienced by MEPs in the DG ITEC Lab by booking a visit on ITEC-innovation@europarl.europa.eu



Source: European Parliament's DG ITEC

Other ideas of EP services explored with metaverse in mind include:

- immersive experiencing of Committee meetings through [360 video streaming](#) tested in 2018 in [ENVI](#) and [PETI](#) Committees meetings; when viewed with virtual reality headset, this technology allows citizens to explore the event as if they were actually there;
- immersive [virtual exhibitions with 360 imaging](#) with the use of equirectangular images immersing viewers in a manner that is not possible with traditional photography; viewers are motivated to engage with the content for a longer time, which creates a lasting impression; in addition, 360 images can easily

be displayed on websites and on social media platforms, meaning that they are accessible, while they can also be viewed through VR headsets for an ultimate immersive experience;

- sharing [virtual reality spaces in meetings](#);
- 360 virtual tour of the [Library](#) in Brussels;
- [Virtual Reality Desk](#) for visual impaired people.

DG ITEC opened a space for colleagues to discuss on its intranet various possibilities, resulting in discussions including solutions such as the well-known "[Alice](#)" [virtual receptionist](#) or even iPad-based solutions such as "[Greetly](#)" and others where the virtual info points/receptionists could be interconnected with the EP infrastructure from which it can access specific information and even used as an extension of the EP intranet³³⁶ or an idea of virtual assistants.³³⁷

During Covid-19 crisis, DG ITEC created a [virtual tour](#) of European House of History, considering virtual visits based on 360 photographs (made from stitching wide angle cameras), 3D models done by artists, photogrammetry and finally a blend of all these techniques.³³⁸

On 24 February 2022, the INNOVIT unit organised a [webinar on Metaverse: beyond the buzzwords](#) with Elgin-Skye McLaren, a Senior Product Manager at Mozilla Hubs, involving 240 participants.

Between 15-17 November 2022 DG ITEC organised [innovation week](#) holding a number of presentations involving metaverse considerations:

- **New generation of core robotic and AI technologies** (Arash Ajoudani) - introducing a new generation of core robotic and AI technologies that aim to achieve sustainable and resource-efficient production and improve human comfort and trust in intelligent automation, in hybrid human-plus-robot industrial environments. Such technologies are built on the basis of human work processes backed by decision support tools, assistive and interactive robots, and smart self-adapting workplace automation.
- **Augmented and virtual headsets : challenges and opportunities** (Stan Larroque) - presenting the challenges of building augmented and virtual headsets, and why it's important for the EU to have players in this field that are not be dependent, again, on the platforms that own the previous computing platforms.
- **Web3, NFTs and the metaverse** (Samuel Eggermont) - discussing what is Web3, how does Web3 differ from our current Internet and will Web3 bring a new wave of digital disruption?
- **Future of work in progress** (Cécile Cremer) - discussing work in progress zooms in on various aspects of life, in particular work, automatization, talent binding, life-long learning and humans in progress and their underpinning consumer trends.
- **The metaverse by Meta: the future of digital connection** (Juan Bossicard).
- **Gen (z)Alpha in META, the dawn of the Metaverse generation** (Maarten Leyts) - indicating that every second two children go online for the first time. 40% of the new internet population are children. Corona reinforced that: children flocked to online playgrounds like Minecraft, Roblox, where they could meet each other virtually. The Metaverse, is actually already a reality in the minds of this generation. Teenagers meet up in environments such as Fortnite, where

³³⁶ <https://innovate.in.ep.europa.eu/pages/viewpage.action?pagelId=37158994>

³³⁷ <https://innovate.in.ep.europa.eu/display/TIS/Professional+Virtual+Assistant>

³³⁸ <https://innovate.in.ep.europa.eu/pages/viewpage.action?pagelId=182747141>

they can, for example, catch an exclusive performance. Youngsters are used to create 3D avatars and buy and trade digital assets. For the author, Generation Alpha is Gen Z on speed. They are so immersed in virtual worlds and experiences that their expectations on what they want to experience have also evolved. Where Generation Z demanded that the digital experience approach the real experience, Generation Alpha will be the generation that demands the opposite.

- **NFT** (Zuzana Bastian).

DG ITEC prepared also a [brochure "Future is real"](#) pointing at new ways to interact with remote teams, AI technology that blurs the frontier between reality and digital, and the Metaverse as a future workplace, to accompany the innovation week.

There are various ways to visit European Parliament, including with the use of digital technology: the [European Parliament in Strasbourg](#), the [European Parliament Hemicycle](#), [Parlamentarium](#), [Europa Experience](#), [European Parliament's Liaison Offices](#).

It is possible to take a [360 degree digital tour](#) of the European Parliament.

This preparatory work opens possibilities for the European Parliament, ahead of elections of 2024, to become a leader in adopting ethical metaverse and provide a new channel of information about the EU. This adoption could include a number of aspects that are important for the institution and democracy in Europe:

- providing information about current legislative work and achievements of the European Parliament by a metaverse access to its legislative projects and to independent expertise delivered to Parliamentary Committees by Policy Departments,
- providing information about European project through metaverse access of premises of the European Parliament, Parlamentarium, Europa Experience, European Parliament's Liaison Offices.

European Parliament could consider as well adopting in its metaverse, ethical AI services developed to the benefit of citizens by European academia, such as [Claudette](#), an online system which uses **machine learning techniques to automatically detect unfair clauses in online contracts and in privacy policies**. The Claudette system for online contracts has been trained on a data set of more than one hundred online contracts, in which unfair clauses have been identified and classified (terms of service). On this basis, using multiple algorithms for machine learning, the system has acquired the capacity to detect and classify unfair clauses in new contracts. A similar methodology has been used to provide Claudette with the capacity to identify unlawful clauses in privacy policies.

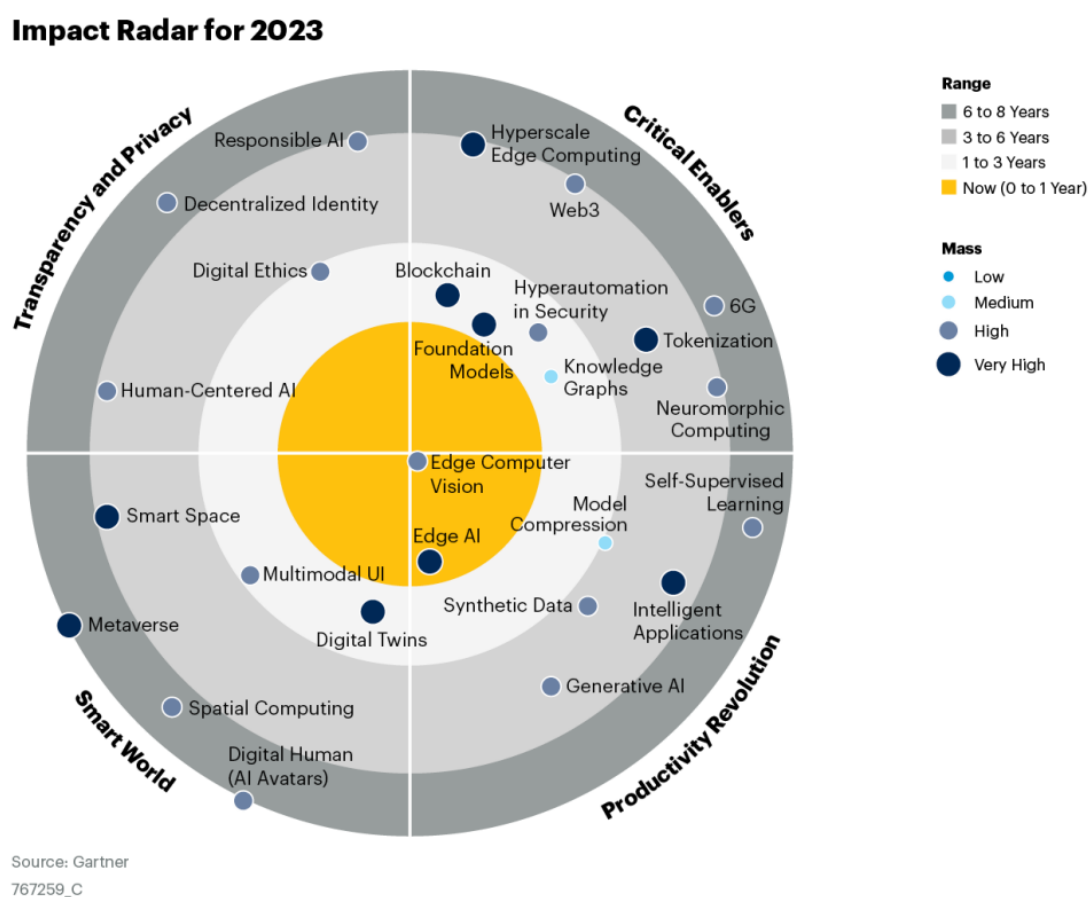
Such developments need to be done keeping in mind requirements necessary to minimise cybersickness, take into account age limitations, providing users with information on a necessity to limit time spent in metaverse and importance of observing conduct rules in metaverse, with the highest standards of cybersecurity, IPR and without collection of data generated by users.

10. CONCLUSIONS AND RECOMMENDATIONS

A **metaverse is a digital simulation of a multidimensional space**. The metaverse can be provided by **public or private actors** for single users or as a networking platform. It can **mirror reality, create a simulation of an entirely new space and actors (bots), or mix both**. There can be one, interoperable metaverse or a myriad of four-walled metaverses (alike today's social media).

Forecasts indicate that we are experiencing a decade of metaverse and that it will take 6 to 8 years to achieve the full potential of metaverse. Once it happens economic benefits gains can be very significant. However, important elements of metaverse such as **digital ethics, digital twins, blockchain, generative AI, tokenization, digital humans** will start to have significant impact much earlier (1 to 3 years and 3 to 6 years in the case of generative AI, tokenization and digital human).³³⁹

Figure 25: Impact Radar for 2023



Gartner

³³⁹ <https://emtemp.gcom.cloud/ngw/globalassets/en/doc/documents/767259-emerging-tech-impact-radar-2023-excerpt.pdf>

Figure 26: Metaverse impact potential by 2030, \$trillion

By 2030 the metaverse could generate \$ 4 trillion to \$ 5 trillion across consumer and enterprise use cases

In addition to its economic impact, metaverse can resolve complexity of current compliance systems both in the U.S.³⁴⁰ and in the EU.³⁴¹ It can improve e-government, public's accessibility to and engagement with legislators and government agencies, healthcare, agriculture, education and accessibility of art.



However, there is also a number of problems currently affecting metaverse, such as **cybersickness** triggered by the use of headsets, unprecedented levels of **violence and harassment** user experience online, **cybersecurity** concerns, omnipresent **advertising, commercial and political manipulation** and monetizing models based on **gambling and addiction**.

There is a growing issue of **surveillance capitalism** enabled over the last two decades by laxist tax, data and even monetary policies (cryptocurrencies).

With the **raise of AI and metaverse**, the new prevailing reason for collection of data is building **digital automation services for hybrid and digital spaces**. A capacity to digitize all aspects of surrounding universe, including **human activities, knowledge and content, buildings, entire cities and physical spaces including real-time movement that occurs on them**, transforms everything into **information and data which can be collected, processed and placed into metaverse**.

In **industrial metaverse** businesses **build virtual twins of work environments and workers, by creating digital humans and AI enabled assistants**.

Metaverse is also a **dual use technology**, a term used to describe technologies with both peaceful and military applications.³⁴² Just like AI can be used for operating autonomous weapons, metaverse is used to **create digital twins of spaces and persons considered adversary**. **Military metaverse**³⁴³ can allow real time monitoring of such spaces and persons with the use of satellites and Internet of Things, including their mobile devices, running different scenarios, training and **deployment of arms**.³⁴⁴ Metaverse technology serves as a tool to build *Single Synthetic Environments* (SSE). Every area can be a battlefield subject to simulations and real arms deployment. Similar utility of metaverse can be found

³⁴⁰ McBride W., Testimony: The Costs and Complexity of the Federal Tax Code Demand Reform, <https://taxfoundation.org/federal-tax-complexity-costs-reform/#conclusion> prepared for Senate Budget Committee hearing on April 18, 2023, titled, "A Rigged System: The Cost of Tax Dodging by the Wealthy and Big Corporations."

³⁴¹ <https://www.aatcomment.org.uk/accountancy-resources/brexit/the-true-economic-cost-of-cross-border-tax-complexity-revealed/>

³⁴² Barrat J., Our Final Invention. Artificial Intelligence and the End of the Human Era, Thomas Dunne Books, 2013. p.155.

³⁴³ <https://capsulesight.com/metaverse/15-examples-of-the-use-of-metaverse-in-military/>

³⁴⁴ <https://nationalinterest.org/blog/techland-when-great-power-competition-meets-digital-world/how-metaverse-will-revolutionize>

by **special services and police**.³⁴⁵ This may lead to more far reaching surveillance concerns, impacting democracy and individual rights, than those triggered by the use of [Pegasus spyware](#). Metaverse could be deployed along AI enabled automation of nuclear defence, or AI-enabled autonomous systems carrying **nuclear weapons**.³⁴⁶

European Parliament made an important preparatory work on artificial intelligence. This work needs to be continued with regard to metaverse, including ethical aspects, human integrity and comprehensive scope of ethical values and fundamental principles of law. Metaverse, like AI, is not just another consumer product. **European ethical values, fundamental rights and rule of law need to be applied across a broad spectrum of policies and play an important role also in the areas affected by national and public security.** These rights are an ethical and legal fundament of the European project.

As a new platform for governance, metaverse should be built, following better regulation model, on the principles of 1) *universal fundamental rights, not exceptions*, 2) *innovation, not exploitation*, 2) *cooperation, not confrontation*.

In the area of **civil and commercial law** we note a broad and misleading campaign of companies selling virtual 'lands' characterized by volatility of prices as well as numerous unfair clauses in contracts imposed by metaverse platforms. European civil law has effective but highly fragmented and specialised legislation focused on protection of consumers. JURI Committee could consider to renew the substantive academic effort that has been invested into construction of European Civil Code. Harmonised civil law is essential to bring clarity into contractual arrangements with global metaverse platforms, including by clarifying what sort of contracts can be concluded by minors who are prevalently present on metaverse platforms despite age limitations. We note as well a need to reinforce protection for small investors and SMEs, whose position towards metaverse platforms is often similar to that of consumers.

Data protection and intellectual property rights may play crucial role helping Europeans to deal with the new wave of datafication, digital 'humans' and AI enabled 'work colleagues'. MEPs included these considerations into the text of proposed AI Act. Understanding that metaverse will magnify the problem should prompt a reflection on how it could, along with other elements of European legal system, empower citizens and ascertain that citizens will participate in economic benefits of metaverse.

Following an excellent example of the Working Group on Robotics and Artificial Intelligence, JURI Committee could initiate a **Working Group on Metaverse** to analyse problems posed, and opportunities created, by metaverse. Policy Department can organise a Metaverse Observatory, a network of academics and independent experts, to assist the Working Group with ongoing independent expertise. European Parliament has a unique system of providing Parliamentary Committees by Policy Departments with European independent expertise.

Benefiting from preparatory work of DG ITEC, the **European Parliament in metaverse** can become a leader of ethical adoption and setting an example on how metaverse can operate as a new channel of information about the EU. This adoption could include e.g.:

³⁴⁵ Vanorio F., Metaverse: Implications for Security and Intelligence, 2022, <https://www.natofoundation.org/wp-content/uploads/2022/02/NDCF-Paper-Vanorio-110222.pdf>

³⁴⁶ Adam Lowther, Curtis McGiffin, "America Needs a "Dead Hand"", War on the Rocks, 16 August 2019, <https://warontherocks.com/2019/08/america-needs-a-dead-hand/>

- providing information about current legislative work and achievements of the European Parliament by a metaverse access to its legislative projects and to independent expertise delivered to Parliamentary Committees by Policy Departments,
- providing information about European project through metaverse access of premises of the [European Parliament](#), [Parlamentarium](#), [Europa Experience](#), [European Parliament's Liaison Offices](#).

European Parliament could consider as well adopting in its metaverse, ethical AI services developed for the benefit of citizens by European academia, such as [Claudette](#), an online system which uses machine learning techniques to automatically detect unfair clauses in online contracts.

European Parliament's initiatives and legislation contribute billions of Euros to European GDP, stimulate social and environmental sustainability.³⁴⁷ European Parliament is the world leader in using independent expertise and scientific evidence, when formulating such initiatives and legislation.³⁴⁸ It is important that once formulated, such initiatives are **effectively carried out** by the executive branch. The cost of delays in such cases negatively reflects important benefits that could be achieved by prompt implementation.³⁴⁹

³⁴⁷ Scott J.S., Contribution to Growth: The European Digital Single Market Delivering economic benefits for citizens and businesses, Policy Department, European Parliament, 2019, [https://www.europarl.europa.eu/RegData/etudes/STUD/2019/631044/IPOL_STU\(2019\)631044_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2019/631044/IPOL_STU(2019)631044_EN.pdf)

³⁴⁸ Maciejewski M. et al., EP-EUI Roundtable - Role of the European Parliament in promoting the use of independent expertise in the legislative process, Policy Department, European Parliament, 2018, [https://www.europarl.europa.eu/RegData/etudes/STUD/2018/626085/IPOL_STU\(2018\)626085_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2018/626085/IPOL_STU(2018)626085_EN.pdf)

³⁴⁹ Jones S. et al. Better regulation in the EU: Improving quality and reducing delays, Policy Department, European Parliament, 2022, [https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/734712/IPOL_BRI\(2022\)734712_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/734712/IPOL_BRI(2022)734712_EN.pdf)

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This study was prepared by the European Parliament's Policy Department for Citizens' Rights and Constitutional Affairs at the request of the JURI Committee.

Commercial, industrial and military applications of metaverse bring both opportunities as well as significant concerns for everyday life, health, work, and security.

Legislative initiatives promoting fundamental principles of law, legislative and judicial oversight, applied comprehensively across a broad range of policies, are necessary to make sure that metaverse will play a positive role.

PE 751.222

Print ISBN 978-92-848-0864-9 | doi:10.2861/488931 | QA-03-23-321-EN-C

PDF ISBN 978-92-848-0863-2 | doi:10.2861/624181 | QA-03-23-321-EN-N