

A Tale of Two Metaverses: How America, China, and Europe Are Shaping the “New Internet”

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Abstract

The Metaverse, a virtual shared space created by the convergence of physical and virtual reality, is still in its infancy. Yet, China and the EU have already formulated differing visions for the future of the “new internet,” and issued policies meant to advance that future. The US has neither articulated a specific vision nor adopted specific policies for the emergent Metaverse but has designated it as a critical technology and promoted its use in military contexts. Additionally, it has implemented a range of policy measures that support the technology industry in general and has therefore allowed its Big Tech companies to make large investments in the Metaverse. In this article, I argue that the divergent stances of the three powers have led to two imagined Metaverses and two actual Metaverses taking shape and competing. In terms of visions, China promotes an industrial Metaverse led by its biggest companies that strengthens the Chinese Communist Party, contributes to economic growth, and to China’s geopolitical leadership. In contrast, the EU envisions an open and interoperable Metaverse that respects digital rights and provides opportunities for European companies. Reality contrasts starkly with the European vision, as there is currently a closed, consumer-focused Western version of the Metaverse dominated by American Big Tech and a closed, industry-focused Chinese version dominated by Chinese Big Tech. However, since the Metaverse is still emergent and contested, there is room for policymakers to direct it towards a version that serves more than just commercial or geopolitical interests.

Keywords

competition; digital platforms; digital sovereignty; geopolitics; Metaverse; political economy

1. Introduction

The “Metaverse” has been a buzzword since 2021 (Weinberger, 2022), when American social media company Facebook changed its name to Meta Platforms to reflect its growing focus on becoming a Metaverse company (Meta, 2021). However, there are competing definitions of what the Metaverse actually is (discussed in more detail in Section 2) and—since the Metaverse is still emergent—competing visions of what it ought to become and in what direction its development and use should be steered (discussed in more detail in Section 4). These competing visions are articulated by (potential) users, policymakers in different countries, and individual developers and companies building the Metaverse. Their visions diverge in terms of how open or centralized the Metaverse should be, how it should be governed, who it should benefit, and what role companies and governments should play within it (Gilbert, 2022, p. 1).

In this article, I focus on the competing visions for the Metaverse articulated by policymakers in the US, China, and the EU. I analyze what kind of Metaverse these visions aim to establish, to what extent they have been translated into concrete policies and implemented, and how—and with what consequences—they have shaped current instantiations of the Metaverse. In addition, I analyze to what extent companies, and especially the largest digital platform companies, have shaped the Metaverse—either in alignment or in competition with governments. Thus, in this article, I answer the following research question: *What visions and policies for the development and use of the Metaverse have the US, China, and the EU articulated, and to what extent and with what consequences have these visions and policies shaped the Metaverse?*

I chose the US, China, and the EU as focal points for my analysis. There are certainly other countries that have articulated visions and policies for the Metaverse. Examples are Japan, South Korea, and the United Arab Emirates (Virtual Dimension Center, 2025). My choice is motivated by the fact that the US, China, and the EU (a) are among the most advanced when it comes to formulating policies for the development and use of the Metaverse (in the case of China and the EU); (b) are locked in a fierce rivalry that makes the Metaverse a technopolitical battleground (especially the US and China); and (c) are home to companies that have come the farthest in actually building the Metaverse—in the case of the US and China (Ball, 2022). They are also interesting because they differ widely in terms of the extent to which, and the direction in which, they want to steer the development and use of the Metaverse. The US has not formulated any specific policies for the Metaverse so far (Garcia, 2023) and is letting its domestic digital platform companies develop the Metaverse as they see fit, enabling them to make important decisions about the centralization, governance, and use cases of the Metaverse. The EU, in contrast, has published various policy documents detailing its vision for the Metaverse (European Commission, 2023). All of these documents emphasize that Europe is seeking to build a standards-based, open, and interoperable Metaverse that empowers people, respects the EU’s values, and strengthens European industry. China, finally, has both published a detailed strategy for the Metaverse and implemented parts of this strategy. The Metaverse policies of the Chinese Communist Party aim to ensure that Metaverse technologies contribute to China’s economic development (Gray & Tang, 2025, p. 2), strengthen the country’s technological sovereignty, and cement the power of the Chinese Communist Party (Pohle & Voelsen, 2022).

The US, China, and the EU not only have different visions and policies for the Metaverse but also differ in their ability to shape the development and use of the Metaverse through these policies. The most obvious and important divide among the three powers is the number of domestic Big Tech companies at home in each

geography. This matters because Big Tech companies—such as Alphabet, Amazon, Apple, Meta, and Microsoft in the US and Alibaba, Baidu, Tencent, and Xiaomi in China—are in a prime position to build the Metaverse and make choices about its structure, governance, and use cases (as discussed in Section 4, this is particularly true in the American context, in which the government has so far not put forth any dedicated policies for guiding the development and use of the Metaverse, leaving important decisions to companies). Europe, on the other hand, does not have any Big Tech companies of its own. This means that, at this moment, American and Chinese digital platforms are making crucial decisions shaping the Metaverse, many of which do not align with Europe's vision for this new digital space.

Thus, while policymakers in Brussels envision an open, interoperable Metaverse that safeguards digital rights and empowers the citizenry, American and Chinese Big Tech companies are busy leveraging their dominance in cloud computing, their ownership of data and cutting-edge AI, and their large financial resources to build their own versions of the Metaverse. In the process of colonizing this new digital Frontierland, Big Tech firms are gaining influence over yet another aspect of users' digital lives and building closed technological ecosystems that further increase their ability to collect and monetize user data and suppress market competition.

In what follows, I analyze the visions and policies of the US, China, and the EU regarding the Metaverse. I then explain why these three powers differ in their capabilities to bring these visions to life and how this has shaped the Metaverse, in particular its political economy. Before discussing visions and policies for the Metaverse, however, I will define what the term “Metaverse” means. This is not a straightforward task, as the Metaverse is a complex concept and several competing definitions exist. Rather than adding my own definition to the list, I adopt one of the most widely cited, most complete, and most helpful definitions of the concept, provided by the well-known Metaverse thinker Matthew Ball in his book *The Metaverse: And How It Will Revolutionize Everything* (Ball, 2022, p. 29). I then explain why the US and China are in a much better position to shape the Metaverse than the EU. Finally, I discuss what consequences the influence of the US and China has for the Metaverse.

Efforts to formulate technical standards for the Metaverse, predominantly driven by the EU, may lead the Metaverse down a different path. Right now, however, such efforts are still in their infancy, and it is unclear how impactful they will be (Gilbert, 2022, p. 3). By explaining who is currently shaping the Metaverse, and with what consequences, I contribute to a better understanding of the emerging political economy of the Metaverse. I show that American and Chinese Big Tech companies dominate current instantiations of the Metaverse. European companies play a less prominent role in the Metaverse, and those that thrive do so by using the infrastructures created by American Big Tech, further entrenching the dominance of these US tech giants in the digital economy, with attendant consequences for openness, interoperability, and market fairness.

2. Theorizing the Metaverse and the Role of Digital Platform Companies Within It

In this section, I first define what the Metaverse is and how it is currently being used. I then explain how large digital platforms shape the Metaverse and what consequences their involvement has for the political economy of the Metaverse.

2.1. Understanding the Metaverse: Definitions, Current Instantiations, and Use Cases

The simplest definition of the Metaverse is that it is a virtual shared space created by the convergence of physical and virtual reality. However, while this definition is brief and provides some insight into the meaning of the term, it fails to capture some important aspects of what the Metaverse really is. Given the complex, multifaceted nature of the concept, defining it is no easy task. Different academic disciplines, such as economics, business, and sociology, offer different definitions (Dwivedi et al., 2022). Recognizing this diversity, Weinberger (2022, p. 322) formulates the following definition based on a meta-analysis of scientific articles from all fields:

The Metaverse is an interconnected web of ubiquitous virtual worlds partly overlapping with and enhancing the physical world. These virtual worlds enable users who are represented by avatars to connect and interact with each other, and to experience and consume user-generated content in an immersive, scalable, synchronous, and persistent environment. An economic system provides incentives for contributing to the Metaverse.

Weinberger's definition contains many elements of the definition offered by Ball (2022), who writes that the Metaverse is:

[A] massively scaled and interoperable network of real-time rendered 3D virtual worlds that can be experienced synchronously and persistently by an effectively unlimited number of users with an individual sense of presence, and with continuity of data, such as identity, history, entitlements, objects, communications, and payments. (Ball, 2022, p. 29)

Because the definition by Ball is shorter but at the same time more complete than Weinberger's (for example, it explicitly recognizes that there is continuity of data), I use Ball's definition for the remainder of this article.

It is worth pointing out that the Metaverse, as defined by Ball (or Weinberger for that matter), does not currently exist (Egliston et al., 2024, p. 11). Rather, Ball is describing what the Metaverse *could* be if it reaches its full potential. This does not make his definition any weaker, however. Rather, it aids an understanding of what private companies and, to a certain extent, governments are trying to achieve in this space and why there are such widely differing visions and policies with regard to the Metaverse. It is also notable that Ball speaks of a "network of...virtual worlds," i.e., the Metaverse is not just one virtual world. This reflects the reality that there are currently a number of different virtual worlds for gaming and entertainment purposes as well as for more "serious" pursuits, such as education and training (Buchholz et al., 2022)—which, however, will become interoperable and will allow for continuity of data if Ball's vision is fully realized. At the moment, these virtual worlds are mostly self-contained and non-interoperable (see the last paragraph of the present section for some exceptions). Thus, a Metaverse that is an "interconnected web of...virtual worlds" (Weinberger, 2022, p. 322) does not yet exist (Gilbert, 2022). Instead, as will be discussed in more detail in the case studies in Section 4, there are a number of virtual worlds built atop the infrastructure of the dominant American and Chinese companies that are popular with users in Western markets and in the Chinese market, respectively. The most sensible conceptualization, then, is that of a Western Metaverse underpinned by the infrastructure of American Big Tech and a Chinese Metaverse underpinned by the infrastructure of Chinese Big Tech. It nevertheless makes sense to speak of "the

Metaverse” (singular), just as we speak of “the internet” (singular), despite the existence of billions of websites set up by governments, companies, and individuals (Ball, 2022). While the EU has expressed a strong vision for the Metaverse, there are no Metaverse companies from Europe that could play a leading role in realizing that vision (Gilbert, 2022).

Currently, various activities take place in the Metaverse. These activities can take the form of social, political, or cultural interactions. Some of the most famous events that have taken place in the Metaverse to date include a concert by American musician Travis Scott in Fortnite, which attracted over 12 million live participants (Haasch, 2020); a Metaverse Fashion Week (McKinsey, 2022b); a Sotheby’s virtual art auction (Jhala, 2021) in Decentraland; and a Gucci virtual exhibition (McDowell, 2021) in Roblox. Beyond cultural and social events, the Metaverse has also served as a site for political protests. Thus, in 2020, Hong Kong pro-democracy activists set up memorials and created protest art on the platform Animal Crossing: New Horizons to commemorate China’s Tiananmen Square massacre (Borak, 2020). This led to China banning Animal Crossing shortly after (“Animal Crossing removed from sale,” 2020), showing that beyond being a “playground” for fun social and cultural events, the Metaverse is also a contested political space. This contestation is exemplified by researchers’ warning that extremists and terrorist groups are using the Metaverse to spread propaganda and recruit users for their respective causes (Schlegel & Kowert, 2024).

In general, people “use the Metaverse to work, socialize, and play” (Gilbert, 2022, p. 2)—much like the internet. However, the Metaverse provides a user experience that is different from the current internet in that users interact in three-dimensional (3D) immersive digital spaces that fuse the physical and virtual worlds. This allows users to take on different identities and engage in life-like activities in which they would not necessarily partake in the real world. Examples include conducting archival research, racing motorbikes, and fighting with samurai swords (Gilbert, 2022, p. 2). The Metaverse has therefore also opened new revenue streams for businesses and content creators, who can, for example, offer training and education in the Metaverse or make new forms of art and entertainment (Bowles, 2022). It has also enabled new forms of economic transactions utilizing digital currencies and new business models (Ahn et al., 2024)—e.g., the hosting of virtual events and the sale of non-fungible tokens (NFTs) and digital items. Thus, the Metaverse “presents a promising new arena of economic opportunity” for businesses that create “experiences and worlds in a way that platforms currently do not allow” (Bowles, 2022).

It bears repeating that the Metaverse as an “interconnected web of...virtual worlds” (Weinberger, 2022, p. 322) does not currently exist. Instead, the Metaverse at this point comprises both open, decentralized, and closed, self-contained virtual worlds (examples of the former are Decentraland, Somnium, and Fortnite; while examples of the latter are Minecraft and IMVU). These virtual worlds are characterized not only by different levels of centralization but also by different governance models. Thus, Decentraland (owned by the Decentraland Foundation) and Somnium (owned by Somnium Space) are part of the so-called “Web3” movement (Ray, 2023), using blockchain to enable cross-platform identity and ownership of NFTs. In addition, Decentraland is governed by its users through a decentralized autonomous organization. Fortnite is privately owned (by Epic Games) but offers interoperability with other platforms and brings in content from other franchises such as Marvel and Star Wars (Fang, 2024). Decentraland, Somnium, and Fortnite are therefore part of an interconnected virtual ecosystem in which integration with other platforms, applications, or services is the norm. Minecraft (owned by Microsoft) and IMVU (owned by Together Labs), in contrast, are self-contained digital spaces, where most of the content and interactions stay within the

platform itself. Thus, Minecraft and IMVU do not natively support integration with other platforms or persistent digital identities outside their own virtual worlds. This points to a larger rift in the Metaverse: while some companies and users in the Web3 movement would like the Metaverse to be an open, interconnected, and interoperable web of virtual worlds based on the blockchain and governed by users, others are content for the Metaverse to be a collection of self-contained digital spaces that are owned and governed (mostly) by large corporations. The visions of policymakers in China and the EU also diverge on these points, while the US government has not expressed a vision for the Metaverse.

2.2. Theorizing the Role of Big Tech Firms in the Metaverse

Both American and Chinese Big Tech companies are devoting significant resources in the form of engineering talent and financial capital to building the Metaverse, “with an expectation of returns in much less time than it will take to complete the Metaverse” (Gilbert, 2022, p. 4). Venture capitalists have also poured large amounts of money into Metaverse startups (McKinsey, 2022b), but Big Tech firms have several competitive advantages when it comes to capturing opportunities in the Metaverse. For one, given their trillion-dollar market capitalizations, they have the money to continuously make large investments into what some believe will be the “next iteration of the Internet” (Weinberger, 2022, p. 310; see also McKinsey, 2022b), without worrying about whether the Metaverse will quickly gain traction (Kaplan & Haenlein, 2024). Unlike firms that have fewer resources or investors with short time horizons, Big Tech can simply make the necessary (risky) investments to try and capture the significant revenue potential associated with the Metaverse (Dalton, 2024; McKinsey, 2022a; Vigkos et al., 2022), even if this potential takes years to materialize.

Big Tech firms can also leverage their existing users and the data they have collected about them to easily expand into adjacent markets and new technologies, such as the Metaverse. Thus, “network effects and asymmetrical power over data” (Cioffi et al., 2022, p. 821; Kenney & Zysman, 2016), combined with their large financial resources, allow these firms to (a) recognize when a new technology becomes popular; (b) copy the “hot” new technology or buy up the firm(s) that built it; (c) effectively market the new technology to existing users; and (d) squash emerging competitors. Digital platforms generally benefit from both direct network effects, which occur when new users make the platform more valuable for existing users (Grewal, 2008) and data network effects, which stem from the fact that more data—at least up to a point—allow for constant improvements to the algorithms underlying apps, digital services, and smart devices (von Ingersleben-Seip & Georgieva, 2024, p. 333). In other words, digital platforms’ “distinctive attributes endow them with extraordinary capacities for expansion” (Cioffi et al., 2022, p. 820).

When it comes to capturing opportunities in the Metaverse, Big Tech firms are further helped by their “infrastructural power” (Kelton et al., 2022; Plantin & Punathambekar, 2019), established most lastingly through their dominance in cloud computing and by their ownership of cutting-edge AI. As Plantin and Punathambekar (2019, p. 164) point out, Big Tech firms have made massive investments in infrastructure projects in recent years, including in “building and maintaining data centers, enhancing telecommunications networks, and [entering] the business of Internet service provision.” This, in turn, has enabled them to increase and entrench their power “at every imaginable layer of digital culture” (Plantin & Punathambekar, 2019, p. 164). Particularly their ownership of data centers and their build-up of cloud computing capacity have enabled them to rapidly scale (which has led them to become known as “hyperscalers”) and build out the fundamental “socio-technical infrastructures” (van der Vlist et al., 2024, p. 1) supporting their massive

growth and the establishment of “platform capitalism” (Narayan, 2022). Amazon Web Services (AWS), which is the world’s most-used cloud platform along with Microsoft Azure and Google Cloud Platform, has been called the “primary operating system of the Internet” (van der Vlist et al., 2024, p. 2). Cloud computing is likely to play a similarly important role in the “new internet”—i.e., the Metaverse—because persistent, immersive, and interactive digital worlds rely on the horsepower, scalability, and flexibility provided by cloud computing (Sundaravadivazhagan et al., 2025). Thus, ownership of cloud platforms provides companies with significant advantages in the Metaverse. Cloud computing also supports the integration of AI and machine learning in Metaverse applications, which in turn allows for the creation of more interactive and responsive environments (Sundaravadivazhagan et al., 2025, p. 88). Given that Big Tech firms are the main developers of cutting-edge AI (van der Vlist et al., 2024, p. 2), they can leverage both their cloud computing capacities and AI prowess to extend their dominance to the Metaverse.

The problems raised by Big Tech’s excessive power in Web 2.0 have been extensively debated in the literature. “Platformization” (van Dijck et al., 2018) and “platform capitalism” (Narayan, 2022) actively drive the massive collection and monetization of data (van Dijck et al., 2018), entrench “surveillance capitalism” (Zuboff, 2019), and exploit “data labor” (Jonker, 2025). They further fuel the spread of fake news (e.g., Aïmeur et al., 2023) and political manipulation (e.g., Woolley & Howard, 2018), consolidate market power (e.g., Nuccio & Guerzoni, 2019), and systematically undermine market contestability and fairness (e.g., Tombal, 2022). The digital platforms owned by Big Tech have moreover acquired such power that not having access to them severely limits our social and cultural life (Plantin & Punathambekar, 2019, p. 164) and that they can influence political decisions (Wen, 2023), without democratic accountability.

Until recently, there was a general lack of awareness among policymakers about the negative effects of digital platforms’ “rapid rise, expansion, and growing asymmetric power” (Cioffi et al., 2022, p. 820). This has, however, changed in the last few years, resulting in increased scrutiny of digital platforms’ role in Web 2.0. In some geographies, notably in the EU, this scrutiny has led to regulatory interventions (such as the EU Digital Markets Act and Digital Services Act) that aim to curb the power of Big Tech. These interventions indicate “a shift in regulatory emphasis from competition (and antitrust) policy and law towards more intensive and encompassing forms of socioeconomic regulation” (Cioffi et al., 2022, p. 820).

Thus, while Big Tech firms are in a prime position to extend their dominance from the context of Web 2.0 into the Metaverse, this is not an inevitability. As of now, the Metaverse is still in its infancy and policymakers have a chance to shape it to ensure it serves the common good rather than just the interests of a few Big Tech firms. As Pohle and Voelsen (2022, p. 13) explain, the “techno-political configuration” of the current internet is the outcome of struggles between different stakeholder groups with different visions. Thus, the internet is a product of the choices that arose from “continuous tensions between processes of centralization and decentralization of the Internet’s technical foundations and its governance” (Pohle & Voelsen, 2022, p. 13). Similarly, Greenstein (2015) notes that the transformation of the internet from an academic and military network to a widely used commercial technology was not inevitable but rather resulted from a series of strategic decisions, innovations, and collaborations between public and private actors. Similar dynamics are at work when it comes to the Metaverse. Right now, the deliberate choices of a handful of private firms (predominantly the Big Tech platforms and a number of gaming companies) are decisively shaping the way the “new internet” is developed and used, hampering visions for an open, interconnected Metaverse. However, policymakers can steer the Metaverse in a different direction through

policies that foster openness, interoperability, decentralization, and digital rights. Multi-stakeholder consultations and standard setting play particularly important roles here, as recognized by the European Commission (2023).

In Section 3, I describe my research design and methods. In Section 4, I lay out the Metaverse visions and policies of the US, China, and the EU, explaining how each shapes the Metaverse and with what consequences for openness, interoperability, decentralization, and digital rights.

3. Research Design and Methods

This article draws on a comparative qualitative analysis of policy documents and related materials produced by governmental bodies in the EU, the US, and China between 2012 and 2025. The goal was to identify each jurisdiction's vision and governance strategy, particularly because the Metaverse, to a large degree, has not materialized yet (Martini, 2025), and policies can therefore decisively shape how it is developed and used. Thus, the analysis I conducted focused on the frames, strategic priorities, regulatory models, and institutional approaches in each jurisdiction.

For the EU and the US, I included official strategy papers, communications, and regulatory initiatives. In the case of China, due to language limitations, I relied on high-quality secondary sources and English-language reports from think tanks and research institutes. These were cross-referenced with translations and translated summaries of primary Chinese government statements, white papers, and provincial Metaverse industry plans to mitigate potential bias. A summary of key documents analyzed for all three jurisdictions is provided as a Supplementary File.

Additionally, in order to understand how each jurisdiction's vision and policies, as well as the actions of Big Tech, affect the development and use of the Metaverse, I conducted a systematic analysis of the Metaverse technology stack. In line with Narang (2023), who draws on a study by the strategy consulting firm McKinsey (2022b), I conceptualize the stack as consisting of four core layers with several components each (as depicted in Figure 1). The first layer is the Content and Experience Layer, which includes content, applications (apps), and virtual meeting spaces. The second layer is the Platform Layer, which encompasses platforms for those

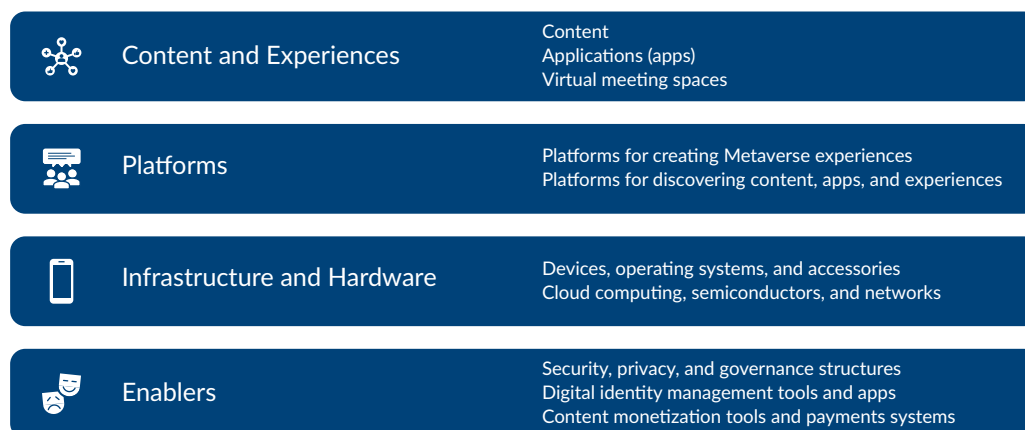


Figure 1. The Metaverse technology stack.

creating experiences in the Metaverse and platforms for discovering the content, apps, and experiences in the first layer. The third layer is the Infrastructure and Hardware Layer. This layer consists of the devices, operating systems, and accessories that people use to interact with the Metaverse. It also consists of the infrastructure powering the Metaverse, e.g., cloud computing, semiconductors, and networks. The fourth layer consists of the enablers. Examples include security, privacy, and governance structures; tools and apps for managing digital identities; and tools for accessing the Metaverse economy, monetizing content and experiences, and making payments (McKinsey, 2022b; Narang, 2023). The Metaverse technology stack is depicted in Figure 1.

For each layer, I analyzed which companies from the US, China, and the EU are especially dominant in the layer in question. This analysis allows for a structured assessment of the actors who currently shape the Metaverse and the ways in which they do so. Understanding which actors currently shape the Metaverse, and how, enables me to explain how government visions and policies for the Metaverse either entrench or challenge current power structures and shape the future of this emerging digital space.

To find out which companies currently dominate the Metaverse, I systematically analyzed competition in each layer by studying company reports and press releases of the American Big Tech firms, as well as the Chinese digital giants. To gain insights into the role of smaller companies—as well as European companies—in the Metaverse, I additionally looked at a wide range of industry reports, newspaper articles, and market research describing who does what in the Metaverse. Doing so provided me with an in-depth understanding of the role of American Big Tech companies, Chinese digital giants, European tech firms, and of startups and SMEs from all three jurisdictions, in all four layers of the Metaverse tech stack.

4. A Tale of Two Metaverses: American, Chinese, and European Visions and Policies for the “New Internet”

In 2023, the European Commission announced in its Initiative on Virtual Worlds and Web 4.0 (European Commission, 2023) that it seeks a prominent role for European companies in the Metaverse in order to foster the digital sovereignty of the EU. However, it might be difficult for European companies to fulfill the hopes of the Commission. European firms are seeking to carve out a space for themselves, but might find it challenging to compete with American and Chinese platform firms due to their incumbent advantages. American platforms hold significant sway over the development and governance of the Metaverse in markets outside China, while large Chinese platforms dominate the Metaverse in their home market.

4.1. America’s Vision and Policies for the Metaverse

In line with its free market ethos (Lippit, 2007) and “market-driven regulatory model” (Bradford, 2023; Lippit, 2007), the US has not adopted a centralized federal policy or articulated a clear vision for the Metaverse (Garcia, 2023). Nonetheless, the Metaverse has been recognized as a critical technology by both the National Science and Technology Council and the Department of Defense, which has begun using Metaverse simulations in training exercises (Aaronson et al., 2023; Copeland et al., 2022). Broader US industrial policies supporting AI, semiconductor design, supply chains, and digital infrastructure indirectly strengthen Big Tech’s role in shaping the Metaverse. The absence of a unified federal Metaverse strategy, combined with strong industrial policy in adjacent areas, effectively delegates authority to large platform companies, allowing them to define the “new internet.”

American Big Tech firms dominate every layer of the Metaverse stack. In the Content and Experience Layer, Google and Meta leverage their user-generated content (Alphabet, Inc., 2024; Google Ireland Limited, 2024; Thompson, 2022) and recommendation algorithms to build immersive, closed ecosystems that limit competition and centralize control. They also control app ecosystems—Google via Google Play and Apple via the App Store, Apple Music, and other proprietary channels (Apple, 2021; Thompson, 2025). Virtual environments like Meta’s Horizon store and Microsoft’s Mesh allow these firms to promote their own content and apps over third-party alternatives, reinforcing their dominance. These advantages are bolstered by AI capabilities that drive content personalization, monetization, and advertising (Chen & Huang, 2024; Patel et al., 2023), as well as by closed ecosystems that raise entry barriers (Birch & Cochrane, 2022). US dominance in this layer is further reflected in the role of prominent gaming firms like Epic Games, Electronic Arts, Valve, and Roblox (Radoff, 2024). In the Platform Layer, firms like Meta, Google, and Apple exploit data network effects enabled by user activity data and recommendation algorithms, allowing them to shape visibility and monetization while suppressing rival content (Khanal et al., 2024; Mayer-Schönberger & Ramge, 2018; von Ingersleben-Seip & Georgieva, 2024). In the Infrastructure and Hardware Layer cloud and AI providers such as AWS, Microsoft Azure, and Google Cloud play a central role by offering the compute power and tools needed for Metaverse applications (Sasthy et al., 2024). AI models like OpenAI’s GPT rely on these services (Microsoft, n.d.), increasing developer dependency on Big Tech. While Nvidia currently dominates AI chips, Big Tech is shifting towards in-house chip design (Mann, 2024; Siegel, 2023), further consolidating control. VR/AR hardware is similarly led by Meta (Quest), Apple (VisionPro), and Microsoft (HoloLens), whose devices collect behavioral and biometric data to enhance user profiling and personalization (Reid, 2022; Tiwari, 2025; Wheeler, 2024). Operating systems like iOS, Android, and Windows provide additional chokepoints, especially as devices like VisionPro and Quest run on proprietary operating systems that restrict interoperability. In the Enablers Layer—covering security, privacy, identity, payments, and governance—Big Tech controls key infrastructure such as login systems (Google, Meta, or Apple), payments (Apple Pay and Meta Novi), and cybersecurity (Google or Microsoft). Their AI capabilities enhance fraud detection and lock-in. With no widespread decentralized identity systems to rival these (Ghosh et al., 2024), the US firms maintain control over user access and data flows across the Metaverse.

Thus, US Big Tech firms are firmly entrenched in all layers of the Metaverse. And while the federal government has not articulated a vision for the Metaverse or issued any specific Metaverse policies, it has implemented over the last few years a whole host of policies that support the development and use of the Metaverse—and the position of American firms within it—in indirect ways. These include, first, President Trump’s Executive Orders on AI (The White House, 2020, 2025), which reduce regulatory oversight of AI companies and accelerate the build-out of AI infrastructure. This enables Big Tech companies, which currently lead in AI, to charge ahead unconstrained, which further cements their AI-driven advantages in the Metaverse. Second, the US government has implemented several initiatives, such as the CHIPS and Science Act of 2022 to bolster its semiconductor industry. These have a significant impact on Metaverse development, as advanced chips are foundational to the development and maintenance of immersive virtual environments. Third, the US has implemented a whole host of initiatives to secure and strengthen its supply chains. The most prominent of these is the National Strategy for Global Supply Chain Security, which aims to foster a global supply chain system resilient to evolving threats and hazards (The White House, 2012). Since the Metaverse relies heavily on advanced technologies, such as high-performance computing and graphics processing units, securing the supply chain and ensuring consistent access to the hardware necessary to develop Metaverse companies provides American firms with an edge vis-à-vis foreign competitors who face

challenges in accessing such advanced technologies. Fourth, and importantly, the US has expanded broadband access across the nation, secured digital infrastructure against evolving threats (National Telecommunications and Information Administration, n.d.), and promoted cloud adoption across federal agencies (Digital.gov, 2020). Taken together, these policies expand the potential user base and therefore the demand for the Metaverse; ensure that the foundational networks supporting the Metaverse are robust, reliable, and secure; and create enhanced cloud services that offer scalable and efficient computing resources essential for hosting complex virtual environments. These policies, therefore, further support the leading position of American companies in the Metaverse.

4.2. China's Vision and Policies for the Metaverse

The Chinese government has made the Metaverse one of its technology policy priorities for the coming years. As US think tank New America points out, "China has the most robust metaverse plan backed by significant resources and government intent to be a global leader in this space" (Garcia, 2023). In November 2022, the Chinese Ministry for Industry and Information Technology (MIIT) released a five-year plan solely dedicated to virtual reality (Garcia, 2023), a key tool for creating immersive Metaverse experiences. In addition, China is investing in 100 "core companies" and forming 10 "public service platforms" by 2026 in order to make progress in extended reality (XR, an umbrella term that refers to all immersive technologies that blend the digital and physical worlds) in various industries such as tourism, education, and media (Ye, 2022). At the same time, the Chinese Communist Party is wary of the Metaverse undermining the party's control of the citizenry and has cracked down on the domestic gaming industry to ensure video games do not lead young Chinese people astray (Ball, 2022, p. XIII). Thus, China's main focus is the creation of an industrial Metaverse. Beyond economic opportunities, China's quest for leadership is driven by geopolitical competition: The China Academy of Information and Communications, a state-sponsored think tank, wrote in 2022 that China's Metaverse ambitions should be seen in the context of the US government having designated virtual reality an important industry (Ye, 2022).

Chinese firms have made significant advances in the Metaverse, with Huawei at the technological forefront (Hurun Research Institute, 2024). In the Content and Experience Layer, Tencent and Bytedance dominate domestically through platforms such as WeChat, QQ, and Douyin, while other firms such as NetEase and miHoYo are also active (Radoff, 2024). In the Platform Layer, Tencent is central to content discovery and gaming, with strategic investments in Epic Games and Roblox China, as well as full ownership of Riot Games and the streaming platform Tencent Video (Hou & Gafni, 2022; Wei, 2019). ByteDance combines its AI-powered recommendation engines with its 2021 acquisition of VR company Pico (Kamath, 2022), competing with Meta Quest's ecosystem. Bilibili, a major video streaming platform, supports Metaverse content in ways akin to YouTube or Twitch (Liao, 2017). Alibaba, by contrast, focuses on enterprise Metaverse solutions, developing AI-generated 3D content and infrastructure (Fang, 2023). However, while China has strong players in the Platform Layer, their influence is largely confined to the domestic market due to regulatory and censorship barriers (Global Times, 2021; Kai, 2017) that limit their influence abroad.

In the Infrastructure and Hardware Layer, Alibaba Cloud and Huawei Cloud are key players within China but face bans abroad due to security concerns ("US official says Chinese cloud companies," 2023). Despite homegrown semiconductor firms like SMIC and Cambricon, US sanctions restrict China's access to cutting-edge chipmaking technology. Huawei leads globally in 5G networking and is investing

heavily in low-latency Metaverse infrastructure (Huawei, 2024; Peng, 2023), but its presence is limited in Western markets due to bans in the US, UK, and parts of the EU (Cerulus et al., 2023). Thus, while Chinese firms control critical domestic Metaverse infrastructure—cloud, chips, and 5G—they face major hurdles internationally.

The Enablers Layer in China is shaped by extensive state control (Allen et al., 2022; Guluzade, 2019). Platforms like WeChat and Alipay require real-name verification and use government-approved AI models to monitor transactions and content (“Huawei, Alibaba among companies,” 2023; Humphries, 2023). The Chinese government also enforces financial control via the digital yuan (e-CNY), which enables full traceability of Metaverse payments (Huld, 2022). As a result, no user is anonymous, and no Metaverse economy can operate beyond government oversight. These structural differences illustrate how China’s Metaverse is shaped by centralized control in contrast to the market-led model of the US.

In line with its “state-driven regulatory model” (Bradford, 2023), the Chinese government has formulated and is in the process of implementing a range of federal policies for the Metaverse. According to Gray and Tang (2025, p. 1), “China’s policy agenda for XR is strikingly ambitious.” China expects breakthroughs in Metaverse technologies, industrial and administrative applications by 2025, including immersive digital life applications in healthcare, tourism, and education (MIIT, 2023). The Metaverse is seen by Chinese authorities not just as a technological evolution but as a geostrategic opportunity to shape the next generation of the internet on Chinese terms (Faggella, 2022).

Already in 2016, the MIIT founded the Industry of Virtual Reality Alliance (IVRA), a public-private initiative aimed at securing a strategic position for China in the evolving Metaverse (Gray & Tang, 2025, p. 10). The IVRA and other industry alliances aim to create a collaborative ecosystem between government, industry, and academia to accelerate innovation in Metaverse technologies (MIIT, 2023). Thus, the launch of the IVRA was merely the first of several initiatives aimed at fostering industry development of the Metaverse, supported by government investments and incentives. In the years after the IVRA was established, China opened several industry parks and innovation centers aimed at accelerating the development of the Metaverse. Examples include the National Manufacturing Innovation Center for VR, established by the Ministry in 2022, and the Metaverse Industrial Innovation Parks created by the Shanghai Municipal Government. Metaverse-focused industry parks established under the Ministry’s guidance aim to foster integration of XR and AI in key sectors, including automotive and aerospace (MIIT, 2023; Tan, 2023).

China is also actively engaged in standard setting for the Metaverse. It is working to create a comprehensive system of national, industry, and group standards for the Metaverse, and encourages international harmonization of these efforts (MIIT, 2023). In line with this ambition, Chinese companies and experts are participating in the Metaverse Standards Forum (The Metaverse Standards Forum, n.d.), which is supposed to play a key role in fostering interoperability in the Metaverse. Additionally, the Chinese government aims to speed up the development of the industrial Metaverse by integrating XR with other advanced technologies such as AI, blockchain, and cloud computing (Gray & Tang, 2025, p. 4). This provides an edge to China’s biggest tech companies, which are already leaders in AI and cloud computing.

In September 2023, the MIIT unveiled the ambitious Three-Year Action Plan for the Industrial Innovation and Development of the Metaverse (2023–2025; Interesse, 2023). The plan outlines China’s vision for Metaverse

industry development, with one key catalyst being the establishment of three to five clusters that revolve around emerging technologies. The plan details the potential applications of the Metaverse across almost all sectors of the Chinese economy and lays out five key task areas: technology integration, 3D industrial Metaverse, immersive applications, industrial support, and governance mechanisms (MIIT, 2023).

Major initiatives for achieving these objectives include the establishment of a regulatory framework for the Metaverse, the creation of an evaluation and testing system for Metaverse products, and the development of advanced computing infrastructure. While the Chinese government intends to closely guide and oversee developments in the Metaverse (Gray & Tang, 2025, p. 10), the action plan promotes engagement in international standard setting to achieve congruence between global Metaverse governance frameworks and domestic regulations for the Metaverse. It further emphasizes the need for the growth of diverse market players in the Metaverse ecosystem, including innovative small and medium-sized enterprises. Success in aligning global governance frameworks and domestic regulations for the Metaverse would create better conditions for Chinese companies to expand their influence in the Metaverse from the Chinese market (where they currently dominate) to international markets.

4.3. Europe's Vision and Policies for the Metaverse

The European Commission in 2023 proactively adopted a strategy on Web 4.0—the immersive, spatial, AI-driven internet—and virtual worlds (European Commission, 2023). In line with the European “rights-driven regulatory model” (Bradford, 2023) and Europe’s quest for digital sovereignty, the strategy emphasizes the importance of interoperability, inclusivity, and respect for digital rights within the emerging Metaverse. The explicit aim of the Commission is to “ensure an open, secure, trustworthy, fair and inclusive digital environment for EU citizens, businesses, and public administrations” (European Commission, 2023). In addition, the Commission emphasizes the business opportunities for European companies, pointing out that the market size for global virtual worlds is expected to grow from €27 billion in 2022 to over €800 billion by 2030.

The European Commission’s ambition to ensure that the EU becomes a “world leader” in the Metaverse faces significant challenges, as European firms currently play a limited role across the Metaverse stack. In the Content and Experience Layer, companies like Ubisoft (from France) and Spotify (from Sweden) hold strong positions in gaming and audio content, respectively (Radoff, 2024). Yet, they depend on infrastructure owned by US Big Tech—namely AWS (Amazon), Azure (Microsoft), and Google Cloud—creating structural dependencies that constrain competition and innovation.

In the Platform Layer, Europe lacks major consumer-facing Metaverse platforms. While it is home to firms such as Steam (a firm from the UK focused on gaming discovery), Unity (a game engine from Denmark), and Ubisoft (a Metaverse gaming company from France; Radoff, 2024), these do not match the scale or influence of dominant US or Chinese platforms. In the *Infrastructure and Hardware* Layer, Europe’s cloud capabilities remain modest, with OVH Cloud (from France) representing Europe’s largest cloud provider (Expert Market Research, 2024). Europe’s strengths lie in telecom and chip design: Ericsson (from Sweden) and Nokia (from Finland) are global 5G leaders (Ericsson, 2025; Kadia, 2025) and Nokia also excels in cloud connectivity and AI-driven edge computing (Uitto, 2024), while Graphcore (from the UK) and Arm (originally from the UK but now majority-owned by Japanese investor Softbank) contribute to AI chip architecture and innovation (Silver,

2019; Tarasov, 2023). ST Microelectronics (from France and Italy) specializes in AI chips for automotive and IoT use cases (STMicroelectronics, n.d.). However, none of these firms offer full-stack capabilities comparable to Nvidia or US cloud giants, leaving Europe reliant on American firms for cloud AI processing which is key for a scalable, intelligent, and dynamic Metaverse.

In the Enablers Layer, European companies such as Darktrace (from the UK) and Atos (from France) offer cybersecurity solutions that are compliant with Europe's General Data Protection Regulation (Saunders, 2025), while Thales (from France) and IDNow (from Germany) focus on digital identity and biometric verification (Tanner, 2023). Still, these firms lack the global consumer reach of US competitors (Saunders, 2025). In payments, fintechs like Adyen (from the Netherlands), Klarna (from Sweden), and Revolut (from the UK) lead in real-time and cross-border transactions, but they operate within infrastructures controlled by traditional and US-based financial networks (Farrell & Newman, 2019). In sum, while Europe shows strength in niche areas—particularly in telecom and fintech—its dependence on US infrastructure and platforms constrains its ability to lead in the Metaverse.

The Metaverse is thought to provide massive financial opportunities for companies. As strategy consultancy McKinsey (n.d.) puts it: "With its potential to create up to \$5 trillion in value by 2030, the [M]etaverse is too big for companies to ignore." Policymakers similarly have recognized the potential associated with the Metaverse and are seeking to support domestic companies in capturing opportunities related to the development and use of the "new internet." According to Martini (2025, p. 852), European policymakers view the creation and development of the Metaverse as a chance to "secure a leading role in global standards-setting for digital environments." Beyond identifying opportunities, however, policymakers also perceive risks inherent in companies' forays into the Metaverse. Thus, the European Commission's strategy states that Web 4.0 and virtual worlds should respect EU values and principles, creating environments "where people's rights fully apply and where European businesses can thrive" (European Commission, 2023). To achieve these aims, the Commission has identified four key strategy pillars that foster European norms and interests in the Metaverse. The first pillar focuses on empowering people and reinforcing skills through projects funded by the Digital Europe Program (European Commission, 2025a) and, for creators of digital content, the Creative Europe program (European Commission, 2025b).

The second pillar focuses on businesses and aims to support a European Web 4.0 industrial ecosystem. The Commission seeks to address fragmentation by creating an EU ecosystem that brings together the different players of the value chain on virtual worlds and Web 4.0. Likely this year, the Commission will start a Partnership on Virtual Worlds under Horizon Europe to foster excellence in research and draw up an industrial and technological roadmap for virtual worlds. The Commission also aims to empower European creators and media companies to test new creation tools, bring together developers and industrial users, and work with member states to develop regulatory sandboxes for Web 4.0 and virtual worlds (European Commission, 2023).

The third and fourth pillars focus on the actions that governments and the Commission can take to foster virtual public services and to shape global standards for open and interoperable virtual worlds. Concerning the third pillar, the Commission points out that the EU is already investing in major initiatives such as Destination Earth (DestinE; European Commission, 2024), Local Digital Twins for smart communities (European Commission, 2021), or the European Digital Twin of the Ocean (Directorate General for Research

and Innovation, 2024) to enable researchers to further scientific advancements, industries to create precision applications, and public authorities to make well-informed policy decisions. In addition, the Commission has launched two new flagship initiatives: CitiVerse, a digital twin of an immersive urban environment that allows for better city planning and management (European Commission, n.d.-a); and a European Virtual Human Twin (European Commission, n.d.-b), which replicates the human body to support medical decisions and personalized treatment. As regards the fourth pillar, the Commission states that it intends to shape global standards for Web 4.0 by engaging with internet governance stakeholders around the world, to ensure that such standards “will not be dominated by a few big players” (European Commission, 2023). The Commission then reiterates that it hopes to promote standards for the Metaverse that are in line with the EU’s visions and values. In other words, the Commission sees the Metaverse as “an economic opportunity that necessitates both government support and oversight” (Gray & Tang, 2025, p. 4). Chances for European companies lie in creating more interoperability and in setting ethical and technical standards for the Metaverse.

However, as Martini (2025, p. 852) points out, the EU has positioned itself more “as an enabler than a critical challenger” of “massive corporate-owned datafication.” Thus, currently, the EU is not making progress in promoting a decentralized, interoperable Metaverse based on blockchain technologies. And while the EU is traditionally good at influencing technical standard setting (Büthe & Mattli, 2011), there is not much movement towards technical standards for the Metaverse at the moment (Gilbert, 2022, p. 3). Therefore, the EU is acquiescing to a future where the Metaverse is controlled by US and Chinese Big Tech, with negative consequences for openness, digital rights, and market contestability.

5. Conclusion

The Metaverse is still an “emergent phenomenon” (Dolata & Schwabe, 2023, p. 239). Yet, China and the EU have already formulated distinct visions and policy strategies for the future of the “new internet.” China has also implemented many of these policies and has made significant progress towards a domestic industrial Metaverse led by the country’s Big Tech firms. Europe, on the other hand, has not yet been able to realize its vision of an open, interoperable Metaverse that respects digital rights and opens business opportunities for European companies. The US is “behind the curve” (Aaronson et al., 2023, p. 3) when it comes to specific visions or policies for the Metaverse. Nonetheless, it has implemented several policies that support the technology industry and have enabled its Big Tech firms to extend their dominance from the internet to the Metaverse. Thus, there are currently two competing visions for the future of the Metaverse articulated by China and the EU, and two actual instantiations of the Metaverse dominated by Chinese and American Big Tech firms, respectively. Neither the Chinese nor the American-dominated version of the Metaverse truly fosters openness, digital rights, or market contestability. Technical standard-setting processes (which have the potential to lead to a more open and interoperable Metaverse that provides businesses opportunities for many firms, not just for the largest digital platforms) are, moreover, largely dormant right now (Gilbert, 2022, p. 3).

However, a future in which the Metaverse is closed and dominated by Chinese and American Big Tech (in Chinese and Western markets, respectively) is not an inevitability. The Metaverse is still in its infancy and its “techno-political configuration” (Pohle & Voelsen, 2022, p. 13) can be contested, negotiated, and shaped by political and commercial choices, as was the case for the internet. If policymakers seize the moment and

take decisive action fostering interoperability, digital rights, and market competition, they can still “reorient [the Metaverse] towards humanist values rather than singular interests” (Dolata & Schwabe, 2023, p. 239).

In this article, I make three contributions. First, I examine and compare the Metaverse policies and strategies of the US, China, and the EU. Such a structured, systematic assessment of three different cases allows for more robust cross-country comparisons, which enables the insight that there are currently two different visions of the Metaverse, a European one and a Chinese one. Second, I explain how these divergent visions and policies shape the emergent Metaverse and either challenge or entrench the power of the companies that are currently building the “new internet.” Third, I systematically analyze the Metaverse technology stack to figure out which companies dominate each layer of the stack. This analysis reveals that there is currently a Chinese industry-focused version of the Metaverse dominated by Chinese Big Tech and a consumer-focused Western version of the Metaverse dominated by American Big Tech. Overall, my analysis sheds light on the visions for, and contestation of, the Metaverse and contributes to a better understanding of this “hyper digital reality” (Tencent, 2021) and the emerging economic and political dynamics within it.

If visions of the Metaverse as a parallel, virtual plane of existence in which we spend much of our time—and significant chunks of our money—materialize, the firms dominating the Metaverse will not only make huge profits but also “become more powerful than any government” (Sweeney, 2015, as cited in Takahashi, 2016; Ball, 2022). Therefore, it is important to analyze the emergent Metaverse, critically examine its political, social, and economic implications, and understand how both companies and policymakers can steer it in a direction that is beneficial for society. One interesting direction for future research is to figure out how technical standard setting can contribute to an open and interoperable Metaverse, and how the EU can promote efforts to set standards in this realm. If shared technical standards are adopted through multi-stakeholder consultations in transnational standard-setting organizations, this could be a boon for digital rights and market competition in the Metaverse.

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Conflict of Interests

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Supplementary Material

Supplementary material for this article is available online in the format provided by the author (unedited).

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