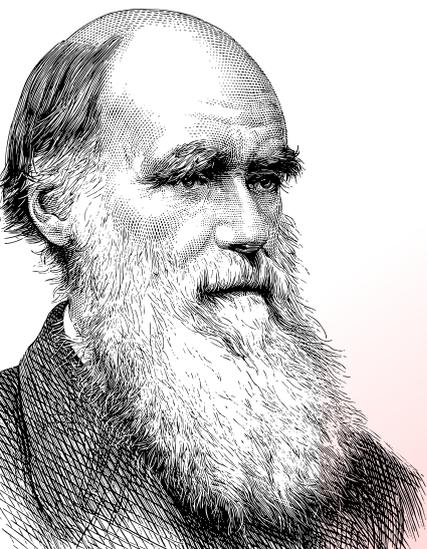


The Complex Relationship Between Web2 Giants and Web3 Projects

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The complex relationship between Web2 giants and Web3 projects[☆]



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ABSTRACT

Web2 giants and Web3 projects entertain a complex relationship. They cooperate to maximize their chances of survival, yet they also compete through a combination of dynamic factors and anti-competitive strategies. The present contribution untangles Web2 and Web3's relationship, explores their distinct value propositions, and outlines what may be one of tomorrow's enforcement priorities for antitrust agencies.

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1. Introduction

The relationship between Web2 giants and Web3 projects is “complicated.”¹ More than complicated, the relationship is complex.² Web2 giants and Web3 projects cooperate and they compete.³ The present contribution untangles their relationship, explores their distinct value propositions, and draws the

lines of what could be one of tomorrow's new enforcement priorities for antitrust agencies.

Antitrust readers are well-versed in how big tech companies function but may be less familiar with Web3. Web3 refers to “decentralized products and services running on top of public permissionless blockchains” (also called Layer 1). Layer 1 blockchains are decentralized (control is spread amongst all participants) and distributed (the ledger—database—is shared

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¹ For a brief history of “complicated” relationships, see Liz Spikol, *Now My Relationship With Facebook Is Complicated*, PHILADELPHIA MAGAZINE (Jul. 10, 2013) <https://perma.cc/SQP4-BTLU>. For the rest, please note that the present article focuses exclusively on Web2 companies commonly referred to as GAFAM, which includes Google (now Alphabet), Amazon, Facebook (now Meta), Apple, and Microsoft. The term “giant” does not solely refer to the size of these Web2 companies but also their dynamic capacities in the face of uncertainty.

² See JOHN H. MILLER & SCOTT PAGE, *COMPLEX ADAPTIVE SYSTEMS: AN INTRODUCTION TO COMPUTATIONAL MODELS OF SOCIAL LIFE*, 9 (Princeton, 2007) (“In a complicated world, the various elements that make up the system maintain a degree of independence from one another. Thus, removing one such element (which reduces the level of complication) does not fundamentally alter the system's behavior apart from that which directly resulted from the piece that was removed. Complexity arises when the dependencies among the elements become important. In such a system, removing one such element destroys system behavior to an extent that goes well beyond what is embodied by the particular element that is removed.”). For an introduction to complexity science, see MELANIE MITCHELL, *COMPLEXITY: A GUIDED TOUR* (Oxford, 2009).

³ Web2 and Web3 are engaged in what is sometimes called ‘coopetition’.

over the entire network).⁴ Bitcoin and Ethereum are good examples: there is no top-down command and control.⁵

Products and services functioning on top of public, permissionless blockchains benefit from Layer 1's core characteristics.⁶ Steemit.com, PeakD, and Ecency are good examples of decentralized social media.⁷ Decentraland and The Sandbox are decentralized metaverses.⁸

Web3 seeks to transfer power from platforms to protocols—in contrast to Web2 giants.⁹ On paper, the products offered by these giants (Facebook, Google, Amazon, Microsoft, Apple, etc.) and Web3 projects have little in common. Their ideologies are different, their structures are different, and their business perspectives are different. While Web2 giants already provide users with products and services they like, Web3 development is still in its infancy and may or may not flourish. But if Web3 is to grow, a closer look at the relationship between Web2 giants and Web3 projects indicates a complex relationship—both cooperative (1.) and competitive (2.)—that has important antitrust implications.

2. Web2 + Web3: a cooperation

Web2 and Web3 need each other. Web2 seeks Web3's support to increase trust and generate new revenues (1.1.). Web3 requires Web2's support to ensure computational capacities and accelerate adoption (1.2.)

2.1. Web2 needs Web3

Growing distrust in centralized governance is arguably an important reason users consider leaving big tech's products and services. Recent examples include users leaving Facebook due

⁴ See THIBAUT SCHREPEL, *BLOCKCHAIN + ANTITRUST: THE DECENTRALIZATION FORMULA*, 25-26 (Edward Elgar, 2021) (exploring the distinction between decentralization and distribution in the context of public permissionless blockchains).

⁵ That said, a nucleus of core developers, miners, and users exerts a strong influence on the blockchain to maximize survival chances, see THIBAUT SCHREPEL, *BLOCKCHAIN + ANTITRUST: THE DECENTRALIZATION FORMULA*, 122 (Edward Elgar, 2021).

⁶ As we will further discuss, hybrid projects are emerging where the software runs on top of the blockchain, but the data is stored in centralized servers. Also, decentralization is a spectrum: Decentralized autonomous organizations ("DAOs") can govern Web3 applications. When DAOs are involved in Web3 governance, designated users get specific powers. For instance, users can be awarded more tokens than others, or certain votes can be submitted only to designated users. The governance is then more centralized than Web3 applications functioning without DAOs.

⁷ Steemit, <https://perma.cc/5ULR-5C58>; PeakD, *Decentralized Social Media with True Ownership*, <https://perma.cc/4RK9-B8UR>; Welcome to Ecency, <https://perma.cc/3QYT-LNTV>.

⁸ Welcome to Decentraland, <https://perma.cc/E3VA-RPP9>; The Sandbox Game, <https://www.sandbox.game/en/> (last accessed on Aug. 1, 2022).

⁹ Nilay Patel, *Chris Dixon Thinks Web3 Is The Future Of The Internet — Is It?*, THE VERGE (Apr. 12, 2022) <https://perma.cc/4TMJ-LMNZ> ("(...) the question is, do the network effects accrue to the company, or do they accrue to the protocol? In Web1, they accrue to the protocol, in Web2, they accrue to the company. In Web3, we are trying to architect it such that they will accrue to the protocol.").

to a distrust in Mark Zuckerberg's data handling¹⁰ and, more recently, users leaving Twitter (in favor of a more decentralized social media, i.e., Mastodon) due to distrust in Elon Musk's intentions.¹¹ Trust issues are reportedly the primary reason why some Internet users do not use Meta's products.¹² Such trends illustrate the limitations of centralized ecosystems with a single (or few) pilot(s) in the cockpit: these pilots can send the plane in an innovative direction (e.g., Steve Jobs), but they can also create trust issues— or do both at the same time.

Defiance toward centralized institutions, be they private such as banks and tech companies, or public, such as governments, is creating a new space for decentralized systems. Vitalik Buterin famously had the idea for creating Ethereum after World of Warcraft's developers unilaterally removed his "beloved warlock's Siphon Life spell."¹³ Decentralized systems are more resilient to unilateral conduct.

In response, Web2 giants have started to adopt blockchain-based products and services to fill the gap and, they hope, reintroduce trust. In recent months, Amazon has announced the launch of an NFT marketplace.¹⁴ Twitter has allowed users to showcase their NFTs as avatars,¹⁵ and also announced its intention to decentralize its social network.¹⁶ Microsoft is reportedly testing the integration of a crypto wallet in its Edge web browser.¹⁷ The company from Redmond also introduced blockchain-based digital identity,¹⁸ invested in Web3 game developer,¹⁹ and introduced a multi-cloud blockchain solution.²⁰ Meta has allowed the display of non-fungible tokens ("NFT") in its metaverse,²¹ and Instagram has introduced

¹⁰ Heather Kelly & Emily Guskin, *Americans Widely Distrust Facebook, TikTok And Instagram With Their Data, Poll Finds*, THE WASHINGTON POST (Dec. 22, 2021) <https://perma.cc/BRR4-LK53> (showing that Facebook has the highest level of distrust of any big tech company).

¹¹ Kalley Huang, *What Is Mastodon and Why Are People Leaving Twitter for It?*, NYTIMES (Nov. 8, 2022) <https://perma.cc/WMB9-XGXC>.

¹² See Casey Newton, *The Verge Tech Survey 2020: How People Feel about Apple, Google, Facebook, and More*, THE VERGE (Mar. 2, 2020) <https://perma.cc/957Q-EDF2> (46 percent of respondents declared that trust was the primary reason why they do not use Facebook).

¹³ Owen S. Good, *NFT Mastermind Says He Created Ethereum Because Warcraft Nerfed His Character*, Polygon (Oct. 4, 2021) <https://perma.cc/KPU5-3Z62>.

¹⁴ Michael Bodley, *Amazon NFT Initiative Coming Soon*, BLOCKWORKS (January 26, 2023) <https://perma.cc/67MA-KYF6>.

¹⁵ Nelson Aguilar, *How to Turn Your NFT Into a Verified Profile Picture on Twitter*, CNET (Jan. 24, 2022) <https://perma.cc/74WG-SSKD>.

¹⁶ Jack Dorsey, TWITTER (Mar. 25, 2021) <https://twitter.com/jack/status/1375126834958884865> (accessed on Aug. 1, 2022).

¹⁷ Yogita Khatri, *Microsoft Testing Crypto Wallet in Its Web Browser Edge*, THE BLOCK (Mar. 18, 2023) <https://perma.cc/CBU7-YRFU>; Tom Warren, *Microsoft Is Building A Cryptocurrency Wallet Into Its Edge Browser*, THE VERGE (Mar. 21, 2023) <https://perma.cc/TLT2-R9UT>.

¹⁸ Microsoft, *Decentralized Identity: Own And Control Your Identity*, MICROSOFT.COM <https://perma.cc/C3W5-7XLR>.

¹⁹ Manish Singh, *Microsoft Backs Game Developer Wemade In Web3 Push*, TECHCRUNCH (Nov. 2, 2022) <https://perma.cc/8YF4-XUXE>.

²⁰ Microsoft, *Multi-cloud Blockchain DLT*, MICROSOFT.COM (2023) <https://perma.cc/4FGS-TZQ2>.

²¹ Meta, *Helping Creators Build a Business Now — And for The Metaverse*, META'S OFFICIAL WEBSITE (Jun. 22, 2022) <https://perma.cc/C332-M78W>.

functionalities for users to post and mint NFTs.²² Similar examples abound.²³

Such initiatives show the increasing reliance of Web2 giants on blockchain technology, and a surrender. Tech companies have nothing to gain from creating public permissionless layer 1 blockchains of their own because they would not control them unilaterally. So, instead of competing at the layer 1 level, Web2 giants are trying to add value to blockchain applications and services by enabling them in Web2 environments. These giants are also seeking to generate business opportunities to offer blockchain developers competing capacities (e.g., Amazon Managed Blockchain).²⁴

Tech giant strategy benefits existing blockchain layers 1. Layers 1 are “fat protocols,” i.e., the more people transact at upper layers, the bigger they become. But Web2 strategy also helps their survival by allowing tech companies to generate new profits, keep users, attract some more, and, they hope, regain their trust.

In the future, one will expect Web2 giants to leverage blockchain technology where it will benefit their business models the most. There are already early signs of such a strategy. Consider two examples. Microsoft experimented with creating “smarter and more efficient supply chains, reduc[ing] fraud, verify[ing] transactions faster, and creat[ing] disruptive new business models,” in line with its focus on industries.²⁵ A company like Google—known for end-users’ services (e.g., search)—is integrating new functions to explore blockchains.²⁶ Search functions for NFTs and DAOs will likely come sooner rather than later.

With that in mind, the logical next step is questioning the likelihood Web2 giants will not only adopt Web3 features, but will also transform their business models around the Web3 ecosystem.²⁷ On the one hand, Web2 companies are facing a typical innovator dilemma. Tech giants face the risk of declin-

ing if they do not adopt Web3. Again, consider the pressure on Twitter or Facebook to decentralize governance. But for Web2 giants to embrace Web3—more than marginally, these giants must abandon their existing business models. The centralization of data enables Web2 giants to monetize their products and services, and to tailor a unique user experience. Web2 would lose the edge on data exclusivity when data becomes more widely available because it lives on public blockchains. Web2 would then recreate intermediaries on top of decentralized infrastructures, but we see that Web3 intermediaries (e.g., OpenSea) generate lower profits than Web2 intermediaries because market entry is easier in decentralized environments. Will Web2 companies cannibalize themselves by moving the Web3 to maximize survival chances? Chances are they will not, at least from a strict business perspective. Big tech companies are thus to remain largely Web2-based.

On the other hand, Web3 adoption may allow Web2 (or, at least, so they wish) to escape or reduce liability. Decentralization rhymes with (spreading) control, and since control equals liability in a Rule of Law system—see the logic behind Section 230 of the Communications Decency Act—Web2 giants have already engaged in decentralization to manage their liability.²⁸ We are seeing Web2 attempts to decentralize content governance by creating independent courts,²⁹ fact-checking bodies,³⁰ etc. We are also witnessing the introduction of end-to-end encrypted solutions that the Web2 giants cannot decrypt.³¹

All in all, legal considerations play a role in addressing the innovator dilemma. They tip the balance in favor of Web2 giants integrating Web3 features to limit liability over maintaining more lucrative business models. The more enforcers come after Web2 giants, the more they will be tempted to decentralize.

2.2. Web3 needs Web2

Blockchains do not exist in a vacuum. Blockchain relies on Web2’s products and services on a technical level. If one can theoretically store blockchain ledgers on personal computers, they mostly rely on cloud solutions.³² Reliance on cloud services allows blockchain nodes to operate without creating or investing in their own digital storage. These nodes can also operate at a low cost—AWS is notably inexpensive.³³

²² Instagram, *Introducing Digital Collectibles: Supporting Creators and Collectors in Showcasing their NFTs on Instagram*, INSTAGRAM’S OFFICIAL WEBSITE (May 10, 2022) <https://perma.cc/2KCM-MGWQ>; Rosie Perper, *Instagram Users Will Soon Be Able to Mint and Sell NFTs*, COINDESK (Nov. 2, 2022) <https://perma.cc/CD4V-UTMZ>. Please note the idea has been abandoned, see Jay Peters, *Meta Gives Up On NFTs for Facebook and Instagram*, THE VERGE (Mar. 13, 2023) <https://perma.cc/4AMK-6DJG>. One reason for Meta abandoning the idea could be related to significant layoffs, see Natalie Sherman, *Facebook Owner Meta Sees Latest Layoffs Begin*, BBC (Apr. 20, 2023) <https://perma.cc/N6AC-PB6H> (reporting that Meta laid off 21,000 employees in one year). Another reason could be Meta’s pivot to AI. A third could be the lack of profitability.

²³ Smita Verma, *How Leading Big Tech Firms Embracing Web3 Technology?*, BLOCKCHAIN COUNCIL (Sept. 1, 2022).

²⁴ Amazon Manage Blockchain, [aws.amazon.com, https://perma.cc/KM2Z-JLP7](https://perma.cc/KM2Z-JLP7).

²⁵ Blockchain, [azure.microsoft.com https://perma.cc/J88Z-JQN4](https://perma.cc/J88Z-JQN4).

²⁶ Allen Day & Evgeny Medvedev, *Introducing six new cryptocurrencies in BigQuery Public Datasets—and how to analyze them*, GOOGLE CLOUD BLOG (Feb. 6, 2019) <https://perma.cc/QQN5-YUCS>; Brayden Lindrea, *You can now search ETH addresses on Google — But what about Bitcoin?*, COINTELEGRAPH (Oct. 12, 2022) <https://perma.cc/5TV9-PWB3>.

²⁷ Gavin Wood, *DApps: What Web 3.0 Looks Like*, INSIGHTS INTO A MODERN WORLD (Apr. 17, 2014) <https://perma.cc/6S2U-T785> (predicting that Web2 companies will first “utilize Web 3.0-like components” before the emergence of fully Web3-based platforms).

²⁸ Thibault Schrepel, “Control = Liability”: Exploring Section 230, the DSA, Big Tech, Wikipedia and Blockchains, *Network Law Review*, Winter 2021, <https://perma.cc/SGW4-LQJP>.

²⁹ Kate Klonick, *Inside the Making of Facebook’s Supreme Court*, NEW YORKER (Feb. 12, 2021) <https://perma.cc/LSX5-RZEU>.

³⁰ Program Impact, *How Meta’s Third-Party Fact-Checking Program Works*, META (Jun. 1, 2021) <https://perma.cc/6STA-2LSR>.

³¹ Robert McMillan, Joanna Stern & Dustin Volz, *Apple Plans New Encryption System to Ward Off Hackers and Protect iCloud Data*, WSJ (Dec. 7, 2022) <https://perma.cc/LY9T-BC49>; Nikki Main, *Google Introduces End-to-End Encryption for Gmail*, GIZMODO (Dec. 19, 2022).

³² See *Ethereum Mainnet Statistics*, ETHERNODES (Aug. 1, 2022) <https://perma.cc/HSV2-XBGP>. In concrete terms, these copies—nodes—are using AWS computational power to download new versions of the Ethereum ledger.

³³ Ben Gilbert & David Rosenthal, *Amazon Web Services, Acquired* (Sept. 5, 2022) <https://perma.cc/VVZ4-LQ95>.

The pendulum movement swings in favor of Web3 increasing reliance on Web2 products and services. Competition between Web2 companies to attract Web3 projects is growing, resulting in better, cheaper, and more attractive solutions. Consider how Google Cloud is actively targeting blockchain ecosystems to compete with AWS.³⁴ In business terms, Web2 companies are investing their Schumpeterian super-profits in attracting Web3 projects. Because Web3 has proven less profitable than Web2 business models, at least for now, Web2 companies have greater R&D investment capacity, resulting in innovative solutions and increasing their attractiveness over time as long as it does not damage the reputation of Web3 projects.³⁵

From a non-technical perspective, Web3 also relies on Web2 services, for example, to advertise new Web3 products and services. Web3 enthusiasts often spread the word on Twitter, Reddit, and other centralized social media such as Telegram, Discord, and Signal. Here again, Web2 giants' deep pockets allow these companies to offer inexpensive advertising toward their wide network.

Does this all mean that Web3 is not decentralized? Decentralization, as I argued elsewhere, is a dynamic and multi-level concept.³⁶ Dynamism implies measuring decentralization over time because power relationships encounter non-linear changes. Web3 projects tend toward decentralization to various degrees, depending, in part, on their reliance on Web2 and other choke points, such as the power of core developers and mining whales.³⁷ In any case, the decentralization level varies constantly and cannot be captured simply by looking at instant T.

On top of that, decentralization is a multi-level concept, meaning one cannot assess decentralization by considering only one layer. Web3 may rely on Web2 for advertisement, but it does not make Web3 centralized in its entirety. The same applies to mining and core developers' concentration, etc.³⁸ Web3 governance is a complex adaptive system with checks and balances.³⁹ When one end centralizes, the other end pushes back toward decentralization, which impacts Web3's entire governance. For example, we have seen blockchain forks break away from governance where core developers were too powerful.⁴⁰ Similarly, we have seen discussions about choosing between layer 1 blockchains based on their reliance on Web2 giants' cloud and computing services.⁴¹

All in all, one cannot assess Web3 (de)centralization by looking at one variable (e.g., relationship with Web2) at a single moment in time. That being said, even if not centralized, the fact remains that Web3 depends on Web2, which creates conditions for the co-evolution of these two ecosystems and raises opportunities for anti-competitive strategies (2.).

3. Web2 vs. Web3: a competition

Web2 and Web3 are striving for survival. The natural dynamic between these two life forms is bound to produce intense competition (2.1.) and anti-competitive behaviors (2.2.).

3.1. The natural dynamic

Several factors define the competitive dynamic between Web2 and Web3. They often blend normative, economic, technical, and legal features. Should Web3 expand, decentralized products and services will partially enter Web2's territory by capturing users. In this hypothesis, the following features will shape the emergent competition between Web2 and Web3. This means that the following section should not be read as a prediction of Web3 success or an attempt to forecast the future of digital products and services, but as an analytical framework for understanding the conditions under which competition between Web2 and Web3 will intensify should Web3 expand its reach.

| | Web2 | Web3 |
|--------------------------|-----------------------------|--------------------------------|
| Ideology | Centralization is efficient | Decentralization is democratic |
| Infrastructure | Platforms and aggregators | Protocols |
| Attractivity | Network effect | Network & tokens effects |
| Governance | One pilot in the cockpit | All passengers are pilots |
| Value proposition | Flexible ecosystem | Intangible property rights |
| Value capture | Schumpeterian | Open source |
| Legal environment | Confrontational | Confrontational & cooperative |

First and foremost, **ideology** plays a central role in setting the natural boundaries between Web2 and Web3. Web2 and Web3 ecosystems share few supporters in common. Web3 maximalists mainly criticize Web2 concentration levels and 'tyrannical' behaviors.⁴² They advocate for decentralized governance structures, more privacy, and digital freedom.⁴³ Web3 acts as a magnet for tech giant skeptics and open-source enthusiasts. Meanwhile, some Web2 players describe Web3 as

³⁴ Ron Miller, *Google Cloud Gets into Web3 Act with Managed Blockchain Node Service*, TECHCRUNCH (Oct. 27, 2022) <https://perma.cc/NM7G-X99C?type=image>.

³⁵ Yolande Piazza, *Google Cloud launches new dedicated Digital Assets Team*, GOOGLE CLOUD BLOG (Jan. 27, 2022) <https://perma.cc/4XHY-MXY2>.

³⁶ See THIBAUT SCHREPEL, *BLOCKCHAIN + ANTITRUST: THE DECENTRALIZATION FORMULA*, 56 (Edward Elgar, 2021).

³⁷ *Id.* at 122.

³⁸ *Id.*, at 61.

³⁹ *Id.*, at 58.

⁴⁰ See Paddy Baker, *Steem Hard Fork Confiscates \$6.3M, Community Immediately Takes It Back*, COINDESK (May 20, 2022) <https://perma.cc/FNK2-N6VB>.

⁴¹ For example, see Prashant Jha, *Ethereum at The Center of Centralization Debate as SEC Lays Claim*, COINTELEGRAPH (Oct. 24, 2022) <https://perma.cc/M2U6-Q6E7>.

⁴² Solo Ceesay, *Breaking Barriers to the Web 3 Creator Economy*, COINDESK (May 17, 2022) <https://perma.cc/9KSC-2KM7>; Nozomi Hayase, *Bitcoin Paves a Way for Evolution of the Species*, COINDESK (Apr. 25, 2015) <https://perma.cc/NAA2-M48P>.

⁴³ Arjun Kharpal, *What Is 'Web3'? Here's The Vision for The Future of The Internet From The Man Who Coined The Phrase*, CNBC (Apr. 19, 2022) <https://perma.cc/UKL7-T3C5>; Kara Swisher, *As Bitcoin Busts, What's the Future of Web3? And What Even Is Web3?*, NYTIMES SWAY (Jun. 16, 2022) <https://perma.cc/77UD-CUQL>.

being right-wing libertarian, anarcho-capitalist, environmentally unsustainable, and blind to important issues such as fake news and anti-democratic behaviors.⁴⁴ They highlight Web2 efficiencies in delivering products and services end-users like to use.⁴⁵

Ideological differences explain why there are reportedly few Web3 proponents in the Web2 ecosystems and vice versa. But there are notable exceptions. The people behind Ethereum discussed making it a corporation in its early days.⁴⁶ Web2 giants also express pro-Web3 positions, especially since these giants can benefit from Web3 on economic grounds.⁴⁷ Economic attractiveness often curves ideological stances.

Second, Web2 and Web3 operate different **infrastructures**. These infrastructures embody their ideologies. Web2 giants provide platforms and aggregators.⁴⁸ The network effect is created at the product (or service) layer. Web3 projects—in their original form—offer protocols. The network effect occurs at the app layer, but also at the underlying blockchain layer, which makes Web2 and Web3 fundamentally different.

In Web3 ecosystems, users hold data and digital assets in personal wallets that they control. They can connect and disconnect their wallet to all compatible applications with a click. For example, one user can disconnect his wallet from SteemPeak.com and connect to DTube without losing any publication. Switching becomes easy, which may push apps and services to raise the rewards they offer to users to stay attractive.

In addition, the emergence of aggregators making all public data available in one place (e.g., all NFTs for sale), pushes original applications and services to offer even greater attractiveness if they want to retain users.⁴⁹ The practice of “yield farming,” i.e., locking crypto assets in a decentralized application in exchange for rewards, shows how users can leverage control over their assets by algorithmically allocating them based on the best offers they receive.⁵⁰

Looking at the underlying economics, Web3 offers greater compatibility between apps and services, and thus reduces consumers’ lock-in. But from a business perspective, one may question whether application developers will invest resources in a non-sticky environment where market positions could be more fragile than Web2’s.

Third, Web2 and Web3 rely on different **mechanisms to attract users**. Web3 projects benefit from network and token effects, while Web2 giants only benefit from the former. The concept of ‘token effect’ refers to the incentive to join a network due to the potential increase in value of the token (also called speculation).⁵¹ The token effect creates a disconnect between the number of users and the value each user can derive from the network. Imagine a decentralized metaverse called June. June can issue free tokens during a launch period, thus creating an incentive for potential users to join the network. June can incentivize individuals to use the metaverse by offering more tokens every time users perform specific actions such as inviting friends, spending time on it, etc. Eventually, the token effect helps create a network effect.⁵²

Web2 giants do not benefit from the token effect. Tech giants have tried to create centralized tokens, but their endeavors have failed.⁵³ All in all, the combination of network and token effects could help Web3 projects to compete with Web2 giants more aggressively than Web2 companies can. On the downside, the variations of tokens’ value can repel users because they may perceive decentralized projects as speculative endeavors—which they may very well be. Significant value fluctuations can also weaken Web3 projects’ stability.

Fourth, Web2 and Web3 offer different **governance structures**. Web2 giants feature a ‘pilot in the cockpit,’ i.e., a CEO, executive board, and shareholders in a position to take the company in the desired direction. Web3 projects—in their original form—do not have a single pilot after they launch. All the passengers drive projects in emerging directions based on predefined rules.

Having a pilot helps reduce transaction costs insofar as top-down decisions are non-negotiable, thus saving time.⁵⁴ Pilots can also take Web2 giants in innovative directions and anticipate users’ desires, which explains why Web2 has a better user experience than Web3. And pilots can make quick decisions on their own, i.e., Web2 is faster than Web3 which needs to build consensus. But pilots are also hazardous. A bad—or distrusted—pilot can take Web2 giants in directions where

⁴⁴ Elizabeth Rosenberg, Jesse Spiro & Sam Dorshimer, *Financial Attacks on Democracy: The Role of Cryptocurrency in Election Interference*, CENTER FOR A NEW AMERICAN SECURITY (Nov. 20, 2020) <https://perma.cc/K45D-UUUK>; Nouriel Roubini, *Blockchain Isn’t About Democracy and Decentralisation – It’s About Greed*, THE GUARDIAN (Oct. 15, 2018) <https://perma.cc/9BD2-627P>.

⁴⁵ See Fabio Manganiello, *Web 3.0 Will Not Achieve Decentralization and Scale, Here’s Why*, HACKERNOON (Jan. 19, 2022) <https://perma.cc/G9K7-VGV7> (stressing that “[d]ecentralized protocols move much slower than centralized platforms”). Even the Ethereum foundation is making the point see Paul Wackerow, *Web2 vs Web3*, ETHEREUM FOUNDATION (Sept. 26, 2022) <https://perma.cc/DQ7H-PA6U> (Web2 usually has “higher performance (higher throughput, fewer total computational resources expended) and [is] easier to implement” than Web3).

⁴⁶ Acquired, *Ethereum* (Jul. 6, 2021) <https://perma.cc/R3F2-8AZN>.

⁴⁷ Yolande Piazza, *Google Cloud launches new dedicated Digital Assets Team*, GOOGLE CLOUD BLOG (Jan. 27, 2022) <https://perma.cc/4XHY-MXY2> (calling blockchain a “tremendous innovation”).

⁴⁸ Thibault Schrepel, *Platforms or Aggregators: Implications for Digital Antitrust Law*, 12 J. EUR. COMPET. LAW PRACT. 1 (2021) (exploring the distinction between platforms and aggregators from an antitrust perspective).

⁴⁹ GEM.xyz at <https://www.gem.xyz>, for instance, aggregates all NFTs for sale on OpenSea, Rarible, etc., and allows its users to buy all these NFTs without having to go to individual marketplaces.

⁵⁰ Brady Dale, *What Is Yield Farming? The Rocket Fuel of DeFi, Explained*, COINDESK (Nov. 17, 2022), <https://perma.cc/9L27-BE2Q>.

⁵¹ THIBAUT SCHREPEL, *BLOCKCHAIN + ANTITRUST: THE DECENTRALIZATION FORMULA*, 261 (Edward Elgar, 2021) (explains “token effect” dynamics).

⁵² Please note that the relationship goes both ways: users will acquire the token in the first place only if they have reasons to believe the product or service is attractive and could therefore benefit from a network effect.

⁵³ Who even remembers ‘Facebook Credits’? See Josh Constine, *Facebook Sunsets Credits, Transitions To Local Currencies To Boost International Payments*, TECHCRUNCH (Sept. 13, 2013) <https://perma.cc/TRL9-YHMQ>. Similarly, see Gareth Jones, *Facebook Libra: the inside story of how the company’s cryptocurrency dream died*, FINANCIAL TIMES (Mar. 10, 2022) <https://perma.cc/39H8-HRR4>.

⁵⁴ See THIBAUT SCHREPEL, *BLOCKCHAIN + ANTITRUST: THE DECENTRALIZATION FORMULA*, 56 (Edward Elgar, 2021) (exploring the firm and blockchain’s different paths to reduce transaction costs).

users do not want to go.⁵⁵ That explains Web3's attractiveness: no single pilot can direct decentralized projects and change them to the sole cockpit's benefit.⁵⁶ On the downside, pilots prove helpful in emergencies—such as bug discoveries, hacks, or ongoing fraudulent activities. Web3's struggles to coordinate quickly can be overcome, as illustrated by the Awemany Bitcoin Cash bug discovery, but such coordination relies on the good spirit of decentralized nodes.⁵⁷ Web3's projects can thus suffer from coordination problems, creating a tragedy of the common 3.0 in the absence of efficient governance mechanisms.⁵⁸

Fifth, Web2 and Web3 offer **different value propositions**. The choice between providing users with unique and intangible assets or ensuring the ecosystem's flexibility will shape the competition between Web2 giants and Web3 projects.

NFTs are digital assets one can possess, exchange, or sell. At the core, NFTs are access rights, i.e., the right to send the NFT to another wallet, the right to showcase the NFT, etc.⁵⁹ These days, the NFT market is primarily a speculative market in digital art where users try their best to predict future popularity. But NFTs offer more possibilities; for example, NFTs can provide access to digital spaces such as locations in the metaverse, physical places such as VIP rooms at conferences, airports, or nightclubs, and products or services such as special editions.

Web2 giants are implementing innovative ways to enable the use of NFTs in their centralized environments. But Web2 giants rely on public permissionless blockchains to record NFTs and ensure immutability. The point, simply put, is that Web2 giants must establish a correspondence between their ecosystem and the blockchain space.

Suppose a Web2 giant wants to enable users to create NFTs of their tweets, Instagram posts, or TikTok videos. The company would need to record these digital items (i.e., tweets, posts, videos) on a blockchain. The recording would generate a public address (i.e., linking to a blockchain transaction), and the company would then create a correspondence between the digital items and their addresses. Buyers would need to trust the correspondence has been well established. Even then, buyers would need to trust that the creator would not delete the tweet, post, or video, or else the blockchain address would point out a no-longer-existing item.

⁵⁵ Nokia's CEO famously took its customers in the direction of physical QWERTY keyboards. Customers did not like it. There is a plethora of similar examples—always easier to rationalize after the facts.

⁵⁶ More generally, the absence of a single pilot explains the attraction for Decentralized Autonomous Organizations (DAOs). DAOs recreate pilots' rights and, therefore, recentralize Web3 application governance.

⁵⁷ See THIBAUT SCHREPEL, *BLOCKCHAIN + ANTITRUST: THE DECENTRALIZATION FORMULA*, 14 (Edward Elgar, 2021) (explores how public permissionless blockchains react to bug discovery).

⁵⁸ On the tragedy of the commons, and emerging solutions to the tragedy, see Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action*, 32 NAT. RESOURCES J. 415 (1992).

⁵⁹ An airline company could, for instance, issue NFTs to its more frequent travelers. When showing their NFTs, individuals could access lounges, taxi services, etc. Being blockchain-based, NFTs could not be shared secretly with another user.

In contrast, Web3 projects are built on top of public permissionless blockchains. Such projects can easily issue 'native NFTs,' that is, NFTs whose first existence is on-chain. June could, for instance, create an NFT for each achievement in the metaverse. These NFTs would be automatically recorded on the chain and thus become immutable. Buyers would be guaranteed a long-lasting digital item. Insofar as blockchain ensures the traceability of all transactions, buyers could also verify that the seller is the actual owner of the items offered for sale.

But Web3 immutability comes with less flexibility than Web2 ecosystems, where users can change minds and enjoy the freedom to renounce themselves, i.e., edit or delete content. Steemit and Ecency, for example, warn users they cannot remove information after being published.⁶⁰ In practice, these decentralized social media could refuse to display specific information—should a company operate the media, should a consensus be found amongst users, or should a fork be successfully implemented—but the data would remain at the layer 1 level.⁶¹ Immutability enables property titles, but it has a price—renouncing one's future self—that may be too high for numerous users.⁶²

⁶⁰ See Steemit, FAQ: *Can I Delete Something I Posted?*, OFFICIAL WEBSITE <https://perma.cc/8TU8-RTEY> ("Can I delete something I posted? The blockchain will always contain the full edit history of posts and comments, so it can never be completely deleted. If you would like to update a post so that users cannot see the content via steemit.com, you can edit the post and replace it with blank content for as long as the post is active. After seven days, the post can no longer be edited via steemit.com."). Similarly, Ecency does not offer the possibility to remove information, see Ecency, FAQ: *The Services*, OFFICIAL WEBSITE <https://perma.cc/HEH5-TANL> ("No Cancellations or Modifications. Once transaction details have been submitted to the Hive blockchain via the Services, The Services cannot assist you to cancel or otherwise modify your transaction details. We have no control over the Hive blockchain and do not have the ability to facilitate any cancellation or modification requests.").

⁶¹ Nathaniel Popper, *They Found a Way to Limit Big Tech's Power: Using the Design of Bitcoin*, NYTIMES (Jan. 26, 2021) <https://perma.cc/5QWK-EYX5> ("While anyone will be able to create an account and register content on the LBRY blockchain that the company cannot delete — similar to the way anyone can create an email address and send emails — most people will get access to videos through a site on top of it. That allows LBRY to enforce moderation policies, much as Google can filter out spam and illegal content in email, he said.").

⁶² See Steemit, FAQ: *Can I Delete Something I Posted?*, OFFICIAL WEBSITE <https://perma.cc/8TU8-RTEY> ("Can I delete something I posted? The blockchain will always contain the full edit history of posts and comments, so it can never be completely deleted. If you would like to update a post so that users cannot see the content via steemit.com, you can edit the post and replace it with blank content for as long as the post is active. After seven days, the post can no longer be edited via steemit.com."). Similarly, Ecency does not offer the possibility to remove information, see Ecency, FAQ: *The Services*, OFFICIAL WEBSITE <https://perma.cc/HEH5-TANL> ("No Cancellations or Modifications. Once transaction details have been submitted to the Hive blockchain via the Services, The Services cannot assist you to cancel or otherwise modify your transaction details. We have no control over the Hive blockchain and do not have the ability to facilitate any cancellation or modification requests.").

Sixth, on top of their different value propositions at a micro-level, Web2 and Web3 allow for diverging **value capture** at a more macro-level. Web2 giants are non-distributed (i.e., location) and centralized (i.e., power), meaning only they can access the data generated by their products and services, and only they control the data. It allows Web2 to capture most of the value they create thanks to network effect, generate superprofits, and dedicate large R&D budgets to innovation in a true Schumpeterian fashion.⁶³ Innovation is top-down, centralized.

Web3 offers a different value capture. It promises to stay distributed and decentralized, meaning all participants will see the data while no single participant will get control over the data. If it keeps its promise, Web3 will share value capture with its participants who, in a true Californian Ideology fashion, will be incentivized to innovate for the good of the network.⁶⁴ Some players will capture the profits from their Web3 applications, but they cannot capture the profits from the infrastructure itself.⁶⁵

Consider data storage as an example. Web2 giants are default identity identifiers, e.g., Instagram's users log in with Instagram credentials, Google's users use Google credentials, etc. Web2 identities are centralized within their servers. Web3 offers a potentially disruptive alternative. Solutions like the Interplanetary File System ("IPFS") offer the creation of a network of computers to store data, thereby eliminating the need for centralized cloud storage. IPFS leverages the hard-drive space of networked computers toward decentralization.⁶⁶ Innovation is bottom-up; it follows an open-source fashion. Web3 thus creates strong incentives to join, but there are limits to relying on bottom-up solutions. Most of the world's computers run on proprietary operating systems, indicating that great, centralized coordinators often improve user experience.

Seventh and last, Web2 and Web3's **legal environment(s)** play a crucial role in defining their evolution. US and EU regulators have recently proposed new rules that target Web2 giants. In the United States, this includes the Open App Markets Act,⁶⁷ the Ending Platform Monopolies Act,⁶⁸ American Choice and Innovation Online Act,⁶⁹ Platform Competition and Opportunity Act,⁷⁰ Augmenting Compatibility and Competition

by Enabling Service Switching Act,⁷¹ etc. In Europe, this includes the Digital Services Act,⁷² Digital Markets Act,⁷³ the Artificial Intelligence Act,⁷⁴ the Data Act,⁷⁵ etc. Enforcement agencies, such as antitrust, tax, and data protection bodies, have also targeted Web2 giants in recent years. The case law is slowly establishing a clear, confrontational direction. These regulations aim to tame Web2 companies, limit their power and behaviors.

Web3 is freer from specific legal rules and standards, but the legal environment is fast-changing. The Web3 legal environment is both confrontational and cooperative. In the United States, the Biden administration asked several federal agencies to develop proposals for regulating blockchain while maintaining the country's attractiveness.⁷⁶ A few months after, the White House Council of Economic Advisers insisted on the "risks for financial markets, investors and consumers" created by blockchain, and called for strong regulation.⁷⁷ Gary Gensler, the Chair of the U.S. Securities and Exchange Commission, implied that "[e]verything other than Bitcoin" is a security.⁷⁸ In Europe, the Data Act seeks to leverage smart contracts for data portability, but the Markets in Crypto-Assets ("MiCA")⁷⁹ and a revision of the Transfer of Funds Regulation⁸⁰ are currently debated to constrain crypto-activities. Other parts of the world follow the same dual approach. Several governments seek to attract crypto-investments,⁸¹ while others have passed prohibition rules.⁸² In all likelihood, some governments will end up affecting Web3's survival chances by altering the balance among the six differentiating factors we just exposed, e.g., by decreasing the token effect and NFTs

⁶³ There are still different business models. Consider two examples: YouTube and TikTok. YouTube pays content creators, but TikTok does not.

⁶⁴ On Californian Ideology, see Richard Barbrook & Andy Cameron, *The Californian Ideology*, 6 *Science as Culture* 44 (1996); Gabor Soos, *Smart Decentralization? The Radical Anti-Establishment Worldview of Blockchain Initiatives*, 2 *SMART CITIES AND REGIONAL DEVELOPMENT* 37 (2018).

⁶⁵ Gavin Wood, *DApps: What Web 3.0 Looks Like*, *INSIGHTS INTO A MODERN WORLD* (Apr. 17, 2014) <https://perma.cc/6S2U-T785> (explaining that front-end and back-ends are separated in Web3).

⁶⁶ What is IPFS? The hard drive for Blockchain, *icomunity.io*, <https://perma.cc/A5F7-XRSB>.

⁶⁷ S.2710 – Open App Markets Act, 117th Congress (2022).

⁶⁸ H.R.3825 – Ending Platform Monopolies Act, 117th Congress (2022).

⁶⁹ H.R.3816 – American Choice and Innovation Online Act, 117th Congress (2022).

⁷⁰ H.R.3826 – Platform Competition and Opportunity Act of 2021, 117th Congress (2022).

⁷¹ H.R.3849 – ACCESS Act of 2021, 117th Congress (2022).

⁷² The Digital Services Act package, EUR. COMM'N <https://perma.cc/5YXH-94D9>.

⁷³ *Ibid.*

⁷⁴ Proposal for a Regulation of The European Parliament and of The Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) And Amending Certain Union Legislative Acts, COM/2021/206 final.

⁷⁵ Proposal for a Regulation of The European Parliament and of The Council on Harmonised Rules on Fair Access to And Use of Data (Data Act), COM/2022/68 final.

⁷⁶ The White House, *Executive Order on Ensuring Responsible Development of Digital Assets*, *Presidential Actions Briefing Room* (Mar. 9, 2022) <https://perma.cc/57RD-YKGD>.

⁷⁷ The White House, *Economic Report of the President* (Mar. 2023) <https://perma.cc/LTD5-PMUM>.

⁷⁸ Ankush Khardori, *Can Gary Gensler Survive Crypto Winter?* D.C.'S *Top Financial Cop on Bankman-Fried Blowback*, *NEW YORK MAGAZINE* (Feb. 23, 2023) <https://perma.cc/7GVG-2DSF>.

⁷⁹ Proposal for a Regulation of The European Parliament And of The Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937, COM(2020) 593 final. MiCA was voted on by the members of the European Parliament on April 20, 2023.

⁸⁰ Proposal for a Regulation of The European Parliament and of The Council on Information Accompanying Transfers of Funds and Certain Crypto-Assets (recast), COM/2021/422 final.

⁸¹ Tunbosun Oyinloye, *Top 12 Most Friendly Countries for Crypto Investment*, *DAILYCOIN* (Jul. 31, 2022) <https://perma.cc/C9UD-556R>; Thibault Schrepel, *Competition Policy and Antitrust Law In Biden's Blockchain Executive Order*, *NETWORK LAW REVIEW*, Winter 2022 <https://perma.cc/PW7P-4SGT>.

⁸² Chloe Orji, *Bitcoin Ban: These Are the Countries Where Crypto Is Restricted or Illegal*, *EURONEWS* (Aug. 25, 2022).

attractiveness after calling most of them securities.⁸³ Others will tip the balance in favor of Web3.

What overall dynamic should we expect considering these seven differences? Forecasts are always hazardous, but I should like to conclude that the odds stand in favor of both Web2's and Web3's survival. Their value is too distinct to overlap entirely. Web2 will always move faster than Web3 projects, but Web3 will remain more trustworthy than Web2 giants. The absence of a single fittest competitor means the fight for survival will intensify between Web2 and Web3, along with anti-competitive behaviors.

3.2. Anti-competitive behaviors

Because Web2 giants feature a 'pilot in the cockpit,' they can more easily implement anti-competitive strategies than Web3 projects against Web2.⁸⁴ The following developments highlight Web3 dependence on Web2 giants and tackle Web2's practices in that context, but do not incriminate them. Antitrust requires nuance and careful analysis. In other words, the following section takes ground in current observations that have not been, and should not necessarily be, translated into antitrust sanctions.

With that in mind, I address two choke points: first, where Web2 is able to impact Web3 infrastructure, and second, where Web2 companies can slow down Web3 adoption. In the absence of case law, I offer a potential antitrust translation of these frictions.

| Web2 anti-competitive playbook | Web3 infrastructure | Web3 adoption |
|--------------------------------|--|---|
| Technical strategy | <ol style="list-style-type: none"> 1. Limit Web3 access to computational power and storage capacity 2. Restrict access to Web3 code and websites 3. Limit the use of Web2 communication protocols | <ol style="list-style-type: none"> 1. Prevent access to Web2 hardware and software 2. Ban Web3 assets 3. Limit the use of Web3 assets to unlock content and identities |
| Non-technical strategy | <ol style="list-style-type: none"> 1. Initiate smear campaigns against Web3 | <ol style="list-style-type: none"> 1. Impact Web3 prices 2. Ban Web3 advertisement |

⁸³ This is not to say that tokens should never be called securities, but that calling them securities has other implications than financial ones. All implications should be balanced.

⁸⁴ See THIBAUT SCHREPEL, BLOCKCHAIN + ANTITRUST: THE DECENTRALIZATION FORMULA, 194 (Edward Elgar, 2021) (explaining that, in public permissionless blockchains, anti-competitive practices would have to be permitted in the blockchain original design or would have to be permitted by the majority of participants).

3.2.1. Web infrastructure

Blockchains often rely on Web2 **computational power and storage capacity**. As of April 2023, approximately 64% of the Ethereum nodes—computers running the core software—run on cloud services.⁸⁵ Approximately 67% of this 64% run on Amazon AWS, meaning around 43% of all Ethereum nodes are AWS run.⁸⁶ These nodes are using AWS computational power to download new versions of the Ethereum ledger, which are then stored on the AWS cloud. Looking at other Web2 giants, 3,4% run Ethereum nodes on Google Cloud, and 2,6% run on Oracle Cloud.

AWS's importance in the Ethereum ecosystem is one example of Web3 reliance on Web2 storage capacity and the danger it represents.⁸⁷ AWS could shut down half of the Ethereum capacities in just a second.⁸⁸ The same logic goes for Solana. Approximately 13% of the RPC nodes are hosted on AWS.⁸⁹ In November 2022, 20% of the blockchain nodes went down after one cloud provider shut them down.⁹⁰ Google also became a validator on Solana.⁹¹ As for Cardano, approximately 10% of the nodes are hosted on AWS in April 2023.⁹²

Moreover, Web2 giants often host Web3 **code and websites**. Developers typically store Web3 code on GitHub, a company fully controlled by Microsoft. Thus, Microsoft can de-host code and interfere with repositories, which the company did when delisting Tornado Cash's code.⁹³ As for the user-facing front-end of most websites offering or promoting Web3, it often relies on centralized cloud services.⁹⁴ For example, centralized exchanges such as Coinbase and Binance host their front end on Cloudflare and Amazon.⁹⁵ Perhaps more surprisingly, decentralized exchanges such as UniSwap and

⁸⁵ See *Ethereum Mainnet Statistics*, ETHERNODES (Apr. 26, 2023) <https://perma.cc/6332-QUNX>. Running a node means "continuously running client software on a computer while connected to the internet," see *Ethereum, Run A Node* <https://perma.cc/9E6K-XGGL>.

⁸⁶ See *Ethereum Mainnet Statistics*, ETHERNODES (Apr. 26, 2023) <https://perma.cc/86A5-Z2XL>.

⁸⁷ Google has recently entered the space. The company now competes with AWS, see *Kate Irwin, Google Web3 Lead Says Google Cloud Is a 'Layer Zero' for Crypto*, DECRYPT (Sept. 28, 2022) <https://perma.cc/SS65-5RZQ>; *Surojit Chatterjee, Announcing Coinbase + Google Cloud*, COINBASE (Oct. 11, 2022) <https://perma.cc/S9T6-CYMY>; *Kate Irwin, Google Launches Cloud Node Engine For Ethereum Developers*, DECRYPT (Oct. 27, 2022) <https://perma.cc/S7DG-Q8PX>.

⁸⁸ Other centralized cloud services include Microsoft Azure, Google Cloud, and Alibaba Cloud. Such Web2 giants could also collide against Web3 projects.

⁸⁹ *TheSamPadilla, solana-node-scrapers*, GITHUB, <https://perma.cc/XP55-GCG8>. Also, *Solana Validator Guidebook, What is an RPC Node?*, <https://perma.cc/VE7L-HTW5> ("RPC node runs the same software as a validator but it does not participate in the consensus process.")

⁹⁰ *Sander Lutz, Is Solana Decentralized? Cloud Provider Hetzner Ban Raises Questions*, DECRYPT (Nov. 3, 2022) <https://perma.cc/VJF8-K9LJ>.

⁹¹ *Stephen Graves, Google Cloud Just Became a Solana Validator*, DECRYPT (Nov. 5, 2022) <https://perma.cc/FGN6-4U82>.

⁹² *Cardano PoolTool* (Apr. 26, 2023), <https://perma.cc/KR8P-V6ZZ>.

⁹³ *Tim Hakki, 'It Doesn't Change Anything' Says Tornado Cash After Code Disappears From GitHub*, DECRYPT (Aug. 9, 2022) <https://perma.cc/B9Y8-YKQ5>.

⁹⁴ One can use <https://hostingchecker.com/> to identify host services.

⁹⁵ *Ibid.*

SushiSwap also rely on Cloudflare and Amazon.⁹⁶ And ironically, the Ethereum and Bitcoin foundations' websites are hosted on Google Cloud.⁹⁷ Knowing the U.S. Federal Trade Commission is investigating whether Amazon offers preferential AWS treatments to the companies it works with exclusively (as opposed to those that work with rival cloud providers), one can only fear that reliance on centralized cloud services puts Web3 at risk of anti-competitive behaviors.⁹⁸

Furthermore, Web2 giants hold **communication protocols**—e.g., Teams, Twitter—that are vital to Web3 applications such as DAOs where communication between members is a key coordinating element. Discord, a messaging service that remains independent to this day, plays a central role in Web3 communication. Agencies should closely monitor recent talks of Discord acquisition by a Web2 giant.⁹⁹ Should Discord be acquired, agencies should thoroughly analyze the deal's effect on Web3.

Last, Web2 companies possess digital infrastructures, products, and services that (can) influence public opinion about the stability and desirability of Web3 as an infrastructure. In the past, these companies—and their CEOs—have expressed strong opinions about blockchain and Web3 projects. Elon Musk notably expressed pro-Dogecoin views, which clearly impacted the blockchain layer 1 adoption curve.¹⁰⁰

Inversely, Web2 companies can **initiate smear campaigns** against Web3, hoping to impact Web3 stability. Web2 companies invest in great lobbying efforts.¹⁰¹ These efforts can lead to regulatory capture under the guise of protecting Web2 employment, combating Web3 hate speech, etc. If one doubts the success of Web2 lobbying efforts, consider that governments may show a preference for having just a few Web2 companies to monitor as opposed to a plethora of Web3 projects. The Digital Services Act, for example, relies on a preference for big companies because the bigger they get, the more (reporting) obligations they have.¹⁰²

3.2.2. Web3 adoption

Web2 giants hold power to slow down Web3 propagation. Web2 giants possess hardware and operating systems ("OSs")

which put them in a position to ban Web3-related applications or self-preference their own Web2 alternatives.¹⁰³

First, Web2 giants can **prevent Web3 applications' access to essential hardware** components. For example, Web3 applications need access to smartphones' NFC antenna to offer contactless payment solutions.¹⁰⁴ The recent European Commission case against Apple shows Web2 companies have a record of refusing to grant access to all components.¹⁰⁵

Second, Web2 companies can **ban Web3 assets**—such as NFTs—from their ecosystem. For instance, Microsoft-owned video game Minecraft banned NFTs in July 2022, thereby prohibiting several existing NFT initiatives.¹⁰⁶ The company justified its practice by underlining that NFTs conflict with Minecraft's "spirit."¹⁰⁷ Web3 supporters quickly underlined the risk of building projects on top of Web2 networks that can limit access to their infrastructure.¹⁰⁸

Third, Web2 can **limit the use of Web3 assets**. Web2 companies such as Apple are limiting the use of Web3 to unlock content by prohibiting "[a]pps [from using] their own mechanisms to unlock content or functionality, such as license keys, augmented reality markers, QR codes, cryptocurrencies and cryptocurrency wallets, etc."¹⁰⁹ Web2 companies can also limit the use of Web3 to access digital identities, such as limiting the use of NFTs or crypto wallets to access Web2 accounts to play video games or operate web browsers.¹¹⁰ Safari, for example, does not support the MetaMask add-on.¹¹¹

Fourth, Web2 can **impact Web3 prices**. Apple announced in October 2022 a new 30% tax on all "in-app purchase[s] to sell and sell services related to non-fungible tokens," knowing that "apps may not include buttons, external links, or other calls to action that direct customers to purchasing mechanisms

⁹⁶ *Ibid.*

⁹⁷ *Ibid.*

⁹⁸ David McLaughlin, Dina Bass & Naomi Nix, *Amazon Cloud Unit Draws Antitrust Scrutiny from Khan's FTC*, BLOOMBERG (Dec. 22, 2021) <https://perma.cc/X9Z8-MMVY>. Google announced its intention to put Google Cloud at the center of blockchain ecosystems, see Alphabet Q4 2021 Earnings Call, <https://perma.cc/RT9B-YCDX> ("Our Cloud team is looking at how they can support our customers' needs in building, transacting, storing value and deploying new products on blockchain-based platforms").

⁹⁹ Wesley Hilliard, *Microsoft Discord Deal Dead, As Sony Buys Minority Stake in The Company*, APPLE INSIDER (May 4, 2021) <https://perma.cc/8KCD-9EVN>.

¹⁰⁰ Parikshit Mishra, *Musk Takes Nearly \$3B Stake in Twitter; DOGE Spikes*, COINDESK (Apr. 4, 2022) <https://perma.cc/T8S3-AZNY>; Rohan Goswami & Lora Kolodny, *Dogecoin Jumps More Than 30% After Musk Changes Twitter Logo To Image Of Shiba Inu*, CNBC (Apr. 3, 2023) <https://perma.cc/U84J-TNJ5>.

¹⁰¹ Emily Birnbaum, *Tech Spent Big on Lobbying Last Year*, POLITICO (Jan. 24, 2022) <https://perma.cc/A5LJ-5A8H>.

¹⁰² The Digital Services Act package, EUR. COMM'N <https://perma.cc/5YXH-94D9>.

¹⁰³ For example, a company like Microsoft, which is developing its metaverse, could refuse to integrate decentralized metaverses into Office applications, Xbox, etc.

¹⁰⁴ French Competition Agency, *Opinion 21-A-05 of 29 April 2021 on The Sector of New Technologies Applied to Payment Activities* (2021) <https://perma.cc/8C2C-AFQR>.

¹⁰⁵ For a similar case currently investigated, see European Commission, *Antitrust: Commission sends Statement of Objections to Apple over practices regarding Apple Pay*, EUR. COMM'N (May 2, 2022) <https://perma.cc/RRH5-B8KC>.

¹⁰⁶ Eli Tan, *Minecraft Bans NFTs, Sending One In-Game Builder's Token Spiraling*, COINDESK (Jul. 20, 2022) <https://perma.cc/9LLZ-GU9W>.

¹⁰⁷ Minecraft Staff, *Minecraft And NFTs*, MINECRAFT (Jul. 20, 2022) <https://perma.cc/F24E-43AM> ("The speculative pricing and investment mentality around NFTs takes the focus away from playing the game and encourages profiteering, which we think is inconsistent with the long-term joy and success of our players.")

¹⁰⁸ Nick Statt & Janko Roettgers, *Minecraft's NFT Ban Starts a Reckoning for Blockchain Games*, PROTOCOL (Jul. 26, 2022) <https://perma.cc/GS5E-P44Q>.

¹⁰⁹ App Store, *App Store Review Guidelines*, APPLE (Nov. 11, 2022) <https://perma.cc/9J25-RSVR>.

¹¹⁰ Investigating restrictions on mobile browsers, see Competition and Markets Authority, *Investigation Into Cloud Gaming and Browsers to Support UK Tech and Consumers* (Nov. 22, 2022), <https://perma.cc/M8CU-P5P5>.

¹¹¹ *Install MetaMask for Your Browser*, METAMASK <https://perma.cc/L8HJ-M2PF> ("Safari is not supported. Please download a browser that supports MetaMask.").

other than in-app purchase.”¹¹² Apple policies are expected to impact NFT prices and the cost of using Web3 products and services when users rely on NFTs to unlock content and features. Coinbase already announced Apple blocked the company’s latest app version, thus preventing users from sending NFTs on Coinbase Wallet iOS.¹¹³ Besides, Web2 giants can impact Web3 prices by raising their transaction fees when people use payment services such as Apple Pay and Google Pay to buy cryptocurrencies or blockchain assets. In late December 2022, Binance announced the possibility to buy cryptocurrencies using these two services.¹¹⁴

Last, Web2 giants can **ban advertisements** for Web3 projects. YouTube has deleted popular channels educating users on Web3’s benefits several times.¹¹⁵ The company has also reinstated the channels and apologized several times, but it shows that bans are more than theoretical and may not always be justified. Facebook also banned advertisements for blockchain-related products before allowing them—days after announcing NFTs’ compatibility with its virtual world.¹¹⁶ Evidently, these anecdotal examples call for thorough analyses. Security concerns or consumer protection may justify bans. But these bans are part of a growing trend one can only hope antitrust agencies will soon investigate.

The above Web2 giants’ practices highlight the limit of “code is law,” i.e., code regulates like the law.¹¹⁷ Blockchain code is helpless against practices implemented outside the ecosystem, such as decisions to ban Web3 advertisements. Besides relying on code, Web3 projects must rely on legal rules and standards. If Web3 projects never seek the help of the legal system, Web2 giants will be well positioned to hamper Web3 developments to an extent that remains difficult to predict. On the one hand, it is reasonable to doubt that Web2 giants have the power to eliminate Web3 projects, knowing that these projects can technically survive without Web2 giants. On the other hand, Web3 projects need access to the technical and social infrastructures of Web2 in order to expand drastically. In this sense, antitrust has an important role to play, whether Web3 projects initiate private antitrust actions or whether agencies investigate the relationship between Web2 and Web3 on their own initiative.

3.3. Antitrust law’s crucial role

Augmenting Web3 with the protection of antitrust laws will benefit both businesses and consumers. There are two main reasons for this.

First, Web3 applications rely on blockchains as underlying infrastructures, which means Web3 escapes the leveraging strategies antitrust agencies tackle within Web2 ecosystems. Let us consider one last example. Should June run on top of Ethereum, it would be guaranteed access to the layer 1. No one ‘at’ Ethereum could cut June’s access or change the conditions. In antitrust terms, no one could refuse to deal, discriminate, or self-preference against June.¹¹⁸

Past cases and ongoing investigations, such as those introduced against Windows Video Player,¹¹⁹ Google Shopping,¹²⁰ Google Android,¹²¹ Amazon Marketplace,¹²² and Google auction-based advertising exchange,¹²³ are nonsensical in public permissionless blockchains. And while bills, acts, and new proposals such as the Digital Markets Act,¹²⁴ the Open App Markets Act,¹²⁵ and the American Innovation and Choice Online Act¹²⁶ mostly (seek to) prohibit Web2 giants from leveraging technical and economic power, blockchain code and governance already protect app developers against these strategies.¹²⁷

Second, Web3 creates data commons that contribute to improving consumer welfare.¹²⁸ Layer 1 public permissionless blockchains enable developers to create products and services whose usage data is stored on the blockchain, not in centralized servers. Typically, smart contracts automate the sharing of data created by Web3 products and services—as envisioned in the Data Act.¹²⁹ The data is then stored in a

¹¹⁸ Thibault Schrepeel & Vitalik Buterin, *Blockchain Code as Antitrust*, BERKELEY TECH. L.J. 9 (2021) (“When no one provider can exercise a direct form of control on the foundation, no one blockchain participant can possibly abuse any natural monopoly at that level.”).

¹¹⁹ European Commission, 24 March 2004, Case AT.37792, *Microsoft*.

¹²⁰ European Commission, 27 June 2017, Case AT.39740, *Google Shopping*.

¹²¹ European Commission, 18 June 2018, Case AT.40099, *Google Android*.

¹²² European Commission, Antitrust: Commission sends Statement of Objections to Amazon for the use of non-public independent seller data and opens second investigation into its e-commerce business practices, EUR. COMM’N (Nov. 10, 2021) <https://perma.cc/W9E8-GH7B>; European Commission, Antitrust: Commission accepts commitments by Amazon barring it from using marketplace seller data, and ensuring equal access to Buy Box and Prime, EUR. COMM’N (Dec. 20, 2022), <https://perma.cc/WTZ5-ES9R>.

¹²³ Case 1:21-md-03010-PKC (Jan. 14, 2022).

¹²⁴ The Digital Services Act package, EUR. COMM’N <https://perma.cc/5YXH-94D9>.

¹²⁵ S.2710 – Open App Markets Act, 117th Congress (2022).

¹²⁶ S.2992 – American Innovation and Choice Online Act, 117th Congress (2022).

¹²⁷ Thibault Schrepeel & Vitalik Buterin, *Blockchain Code as Antitrust*, 35 BERKELEY TECH. L.J. 1 (2021).

¹²⁸ See Jason Potts, *A Proposal For A New Type Of Intellectual Property: Time-Locked Data Vaults*, ALTI FORUM (Feb. 17, 2022) <https://perma.cc/7LE8-D25V>.

¹²⁹ Proposal for a Regulation of The European Parliament and of The Council on Harmonised Rules on Fair Access to And Use of Data (Data Act), COM/2022/68 final (underlining that smart con-

¹¹² *App Store Review Guideline Updates Now Available*, APPLE (Oct. 24, 2022) <https://perma.cc/2YB6-WDDN>

¹¹³ Coinbase, TWITTER (Dec. 1, 2022), <https://perma.cc/P6TB-B9VC>.

¹¹⁴ Binance News, *Apple Pay And Google Pay Are Now Available On Binance*, BINANCE (Dec. 30, 2022), <https://perma.cc/67J8-W68F>.

¹¹⁵ Tim Copeland, *Youtube Admits Bitcoin Ban Was a Mistake*, DECRYPT (Dec. 26, 2019) <https://perma.cc/Y8H4-VFYZ>; Tim Copeland, *Youtube Bans Bitcoin Videos Again: When Will It End?*, DECRYPT (Jan. 20, 2020) <https://perma.cc/9VGJ-FV4P>; Scott Chipolina, *YouTube Permanently Bans Prominent Bitcoin Influencer*, DECRYPT (Sept. 30, 2020) <https://perma.cc/RF7D-7UND>; Kevin Reynolds, Stephen Alpher & Elaine Ramirez, *Bankless Crypto Channel Banned From YouTube*, COINDESK (May 8, 2022) <https://perma.cc/JDK9-XS8T>.

¹¹⁶ Eli Tan, *Facebook’s Metaverse Will Support NFTs*, COINDESK (Oct. 28, 2021) <https://perma.cc/A4D4-L5MM>; Jessica Bursztynsky & Salvador Rodriguez, *Facebook Retreats from Crypto Ad Ban*, CNBC (Dec. 1, 2021) <https://perma.cc/V7G2-8KTF>.

¹¹⁷ Thibault Schrepeel, *Law + Technology*, J.L. & TECH. AT TEX. 9 (2023).

public, immutable ledger. Web3 thus augments the benefits of data sharing—i.e., making it automatic and permanent. In doing so, Web3 complements the legal provisions one finds in the Digital Markets Act or substitutes the provisions in the now-delayed American Innovation and Choice Online Act. By the same token (pun intended), Web3 should please antitrust agencies that have shown a strong interest in data sharing over the years.¹³⁰

Against this backdrop, the role of antitrust agencies is to protect Web3 projects from abusive practices implemented by Web2 companies. Section 2.2 illustrates the choke points where Web3's code proves insufficient to neutralize Web2 giants' strategies. Enforcement is needed to protect Web3's chances of flourishing and let users decide whether Web3 is indeed to succeed.

Enforcing antitrust laws against Web2's strategies directed toward Web3's projects will not only benefit consumers but will also send a strong signal to the Web3 ecosystem—an ecosystem that remains skeptical of centralized institutions—that the Rule of Law can benefit them. This enforcement activity will improve the relationship between Web3 projects and enforcers, which, in the long run, will increase mutual understanding and help reach common objectives. Moreover, this enforcement strategy will police the Web2 giants at the elbow. If the overall impact of antitrust enforcement on big tech companies is still widely debated – i.e., one cannot expect that Web2 giants will entirely refrain to leverage their control over

critical infrastructure because of past sanctions, making the defense of fair competition between Web2 and Web3 a public priority will certainly shape the latter.

4. Conclusion

Web2 and Web3 offer different paths to increasing consumer welfare. The two are likely to survive, provided one does not eliminate the other thanks to anti-competitive strategies. Because Web3 projects lack the power to command and control, anti-competitive practices will come from Web2 companies against Web3, not the other way around. Antitrust agencies, regulators, and policymakers must ensure Web3 protection against Web2 giants.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

tracts “have the potential to provide data holders and data recipients with guarantees that conditions for sharing data are respected.”).

¹³⁰ For example, see Case T-201/04, *Microsoft Corp. v Comm'n*, 2007 E.C.R. II-3601; Case C-418/01, *IMS Health GmbH & Co. OHG v. NDC Health GmbH & Co. KG*, 2004 E.C.R. 1-5039; Joined Cases C-241/91 P & C-242/91 P, *Radio Telefis Eireann (RTE) and Indep. Television Publ'ns Ltd (ITP) v Comm'n of the European Communities*, 1995 E.C.R. 1-743. More broadly, see European Commission, *Moving Towards a European Data Space: New EU Law For Data-Sharing*, EUR. COMM'N (Jan. 7, 2022) <https://perma.cc/KWV4-4E37>.