WALLED GARDENS & FORBIDDEN APPLES: SOFTWARE ACCESS AMID ANTIMONOPOLY RESURGENCE

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Cite as: Jake A. Evinger, *Walled Gardens & Forbidden Apples: Software Access Amid Antimonopoly Resurgence*, 31 RICH. J.L. & TECH. 1 (2024).

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Abstract

As consumer technology markets mature, one must question why the ways we use our devices are so restrictive. Some landmark legal cases, such as *Epic Games, Inc. v. Apple, Inc.*, have sought to address that question. Additionally, regulators have recognized the need for better software distribution. The European Union recently forced Apple to open its iPhone to third-party application stores via the Digital Markets Act. The Department of Justice attacked the closed nature of the iPhone. This shift in sentiments, however, is not restricted to smartphones and will become more critical as emerging technologies vie for consumer attention.

Almost every consumer technology category has an example of a walled garden, a closed ecosystem of distinct functions restricted from other ecosystems under ordinary conditions. Walled gardens may lead to greater convenience and safety but come with overbearing costs. Limitations in consumer choice, developer choice, and consumer welfare have rung few alarm bells relative to the scope of the issues. This scenario is true for video game software markets, with digital-only software distribution becoming the norm despite a history of relative openness. In smartphones, there exists only one centralized digital software marketplace for Apple devices, the App Store, and effectively only one digital software marketplace for Android devices, though others are technically available. In the emerging cloud computing market, the major companies seem to be entrenching the same anti-consumer and anti-developer conditions that have existed in other device categories for the past decade.

Preventative remedies are necessary to evade a future in which consumers are at the whims of tech giants as to how they may use their personal devices. Common carrier principles are the best place to start, with plenty more potential remedies available to encourage competition in bottlenecked software markets. An interconnected future necessitates rules that champion developer freedom and facilitate consumer choice.

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I. INTRODUCTION

[1] The electronic devices we use in our daily lives cannot operate without software, the applications, and programs that function within them. For instance, iPhones have little point if they simply exist as glass and aluminum slabs inside our pockets, no matter how well-designed their hardware is. Conversely, our applications cannot perform in an ethereal state without a device to execute their capabilities. Therefore, how software is distributed and made accessible to consumers is massively significant.

[2] Software accessibility has changed markedly over the last two decades. Software was often decentralized, scattered across various websites, and sometimes in physical form, like compact discs or similar storage solutions. Now, digital software marketplaces ("DSMs"), commonly referred to as "app stores," are the norm on most of our essential devices.[1] This new standard is not inherently detrimental. It becomes problematic when these centralized, first-party options are the only channels for software access. For instance, if a consumer wants to download, install, and ultimately use an application like Spotify on their iPhone, they must acquire the application through Apple's proprietary App Store. Said differently, a single pre-installed app store operated by the same company that designs the phone, produces the phone operating system, and develops a competing application acts as the exclusive channel for this software. This web of restrictions creates a walled garden, a closed ecosystem of distinct functions restricted from other ecosystems under ordinary conditions.

[1] Digital software marketplaces, DSMs for ease, are used here as a uniform term to describe "app stores" and other similarly postured software distribution channels that function as a platform for developers to serve software to users. These can range in form and may present additional complementary functions, such as payment processing services. *See Safeguarding Digital Transactions: Security Measures in Software Marketplaces*, SEC. SCI., https://www.securityscientist.net/blog/safeguarding-digital-transactions-security-measures-in-software-marketplaces/ [perma.cc/PH9Y-SKDH] (last accessed Sept. 18, 2024).

[3] This Article argues that walled gardens for software harm consumers and developers. Legal mechanisms, particularly preventative rulemaking, should be employed to alleviate or eliminate this harm. The first part of this article provides a brief history of software distribution and definitions for some mechanisms by which software is made available, or sometimes unavailable, to consumers. The second part of this Article dives deeper into the state of software distribution in three broad software market categories: legacy markets, current markets, and emerging markets. The third part of this Article describes legal actions related to walled-garden software distribution and how those may affect future access to software. The fourth part of this Article presents this author's proposed remedies that would most likely prevent harm from occurring due to walled-garden software distribution.

II. BACKGROUND

A. Brief History of Software Distribution

[4] Software and hardware for personal electronic devices cannot exist without each other. Software, in a general sense, is information that instructs a computing device to perform certain functions.[2] This is generally in the form of computer programs, also called applications.[3] In the alternative, hardware is the physical device that runs the software.[4] Between software applications and the computer, hardware is a middle layer, the operating system.[5] Operating systems are a form of software that control a device's

[2] *Software*, BLACK'S LAW DICTIONARY (11th ed. 2019).

[3] MORGAN RICKS, GANESH SITARAMAN, SHELLEY WELTON & LEV MENAND, NETWORKS, PLATFORMS & UTILITIES: LAW & POLICY 935 (1st ed. 2022).

[4] *Id.*

[5] *Id.*

most basic functions, like its central processor, and provide common services to applications running on the device. [6]

[5] Going back to the rise of consumer-grade personal computers in the 1970s, hardware and software were designed to be flexible, though the availability of valuable applications was much more limited.[7] As operating systems developed to help facilitate practical applications, new software was more easily accessible, allowing innovation in personal computing to flourish.[8] Distribution of commercial software took place in a few ways in the earliest days of personal computing, often via booklets of source code for consumers to type by hand.[9] More convenient solutions, like cassette tapes, became available as the commercial software market grew to encompass regular people, not just computer aficionados.[10]

[6] *Id.*

[7] Hardware and software interoperability was also an intentional design feature that is commonly lacking in devices today. *See* Kyle Chayka, *The Birth of the Personal Computer*, NEW YORKER (May 18, 2023), https://www.newyorker.com/culture/infinite-scroll/the-birth-of-the-personal-computer [perma.cc/7CNE-9ZGF] ("The user [of Apple II] chose her own operating system and display monitor, and whichever appendages she desired, such as a modem or game controllers . . . what's most striking, revisiting the history of the Apple II, is how much less personalizable our machines have become.").

[8] NATHAN L. ENSMENGER, THE COMPUTER BOYS TAKE OVER 5 (William Aspray ed., 2010) ("What makes the modern electronic digital computer so unique in all the history of technology — so powerful, flexible, and capable of being applied to such an extraordinarily diverse range of purposes — is its ability to be reconfigured, via software, into a seemingly infinite number of devices.").

[9] *See Oral History of Peter Jennings*, COMPUT. HIST. MUSEUM (Feb. 1, 2005) https://www.computerhistory.org/chess/orl-4334404555680/ [perma.cc/DT2V-QLWH] (discussing code booklets).

[10] *Id.*

[6] A shift took place in the 1980s following the bundling of Microsoft's MS-DOS operating system with IBM's personal computers, creating the dominant PC platform that has effectively evolved into what today is still the dominant PC operating system, Windows.[11] The intensive effort to develop a single version of a program began to go away with this shift toward mass-market software.[12] During this time, consumer software was more common as pre-packaged applications available in physical form, like floppy disks, cartridges, and other similar variants.[13] Software downloading was available to consumers in the early 1980s, though access to downloading services was minimal.[14]

[7] The proliferation of the Internet in the 1990s, of course, changed everything. Software could be distributed over the Internet for the first time, though early bandwidth limits meant this was still not widely available.[15]

[11] *See* Chris Morgan, *Of IBM, Operating Systems, and Rosetta Stones*, BYTE MAG., Jan. 1982, at 6–10; *see also* Bryan Lunduke, *Quick and Dirty: The Story of 86-DOS & MS-DOS*, SUBSTACK: LUNDUKE J. TECH. (Sept. 12, 2022), https://open.substack.com /pub/lunduke/p/quick-and-dirty-the-story-of-86-dos?utm_campaign=post&utm _medium=web [perma.cc/E6BT-9CDY] (retelling computer history).

[12] THOMAS HAIGH & PAUL E. CERUZZI, A NEW HISTORY OF MODERN COMPUTING 179–84 (2021).

[13] *Id.*

[14] Justin Olivetti, *The Game Archaeologist: GameLine*, ENGADGET (March 9, 2013), https://www.engadget.com/2013-03-09-the-game-archaeologist-gameline.html. [https://perma.cc/HX23-WYNV] Somewhat ironically, the company behind the GameLine service eventually became AOL, the Internet powerhouse of the 1990s. *Id.*

[15] HAIGH & CERUZZI, *supra* note 12, at 335–39.

Access to websites via browser applications was much more common, creating a universe of functionality accessible via a single application.[16]

[8] As consumer technology has advanced in the last two decades, devices and services have become complementary and often interdependent. This interdependence extends beyond just software, though software is usually the binding element. Platforms, more colloquially called ecosystems, may offer consumers synergy when purchasing compatible products and services.[17] This synergy adds beneficial functionality; however, the downside is that many of these platforms are walled off, often

[16] *Id.* This expanded functionality of the web browser was a major concern for Microsoft, theorizing that "middleware" would become the consumers' window into computer functionality instead of the operating system. *See* ANDREW I. GAVIL & HARRY FIRST, THE MICROSOFT ANTITRUST CASES 52 (2014) (describing Microsoft's plans to overtake the Netscape Navigator browser application). Microsoft's Internet Explorer was later made available and was free to Windows users by being bundled with the operating system. *See Microsoft Internet Explorer Web Browser Available on All Major Platforms, Offers Broadest International Support*, MICROSOFT (Apr. 30, 1996), https://news.microsoft.com/1996/04/30/microsoft-internet-explorer-web-browser-available-on-all-major-platforms-offers-broadest-international-support/ [perma.cc/8H8U-YHRV] (announcing the introduction of Internet Explorer).

[17] Note that "ecosystem" and "platform" do not have precisely the same meaning. Here, they are used interchangeably to describe the same concept in consumer technology on the macro level, a group of interconnected consumer technologies. *See* Elettra Bietti, *A Genealogy of Digital Platform Regulation*, 7 GEO. L. TECH. REV. 1, 25 (2023) ("[T]he notion of a 'platform' encompasses an incredibly diverse array of companies, organization structures, and business models, that range from very large to medium- and small-sized entities."); *see also* Philip J. Weiser, *Regulating Interoperability: Lessons from AT&T, Microsoft, and Beyond*, 76 ANTITRUST L. J. 271, 272–74 (2009) ("By platform owner, I mean a firm that controls a network, facility, or essential input that those providing a complementary good or service (i.e., the 'application') must rely on."). A single platform, in some circumstances, may be a part of a larger ecosystem. Admittedly, much of technology industry discussion can present conflicting or confusing definitions. *See* Honeywell, Inc. v. Lithonia Lighting, Inc., 317 F. Supp. 406, 408 (N.D. Ga. 1970) ("[T]he experts in the computer field, while using exactly the same words, uniformly disagree as to precisely what they mean.").

limiting their functionality to only what a platform's operator directly supports. The limited functionality becomes particularly concerning when these limitations are ingrained into the core of the software, operating system, or device. This limited functionality is where the issue of the walled garden arises

B. The Walled Garden

[9] A walled garden is a closed ecosystem of distinct functions restricted from other ecosystems under ordinary conditions.[18] Parts of a consumer's interactions with an electronic device are "walled off" from other potential interactions.[19] This term is often used in the context of digital platforms, though not exclusively, to describe a closed platform excluding connections to or with other platforms.[20] This model is like a gated community, or even the biblical Garden of Eden, in which a user can only access what is available within that walled garden while within it. The walled garden concept extends beyond just software distribution and can be used to describe any digital platform that employs measures to limit access.

[18] *Cf.* Epic Games, Inc. v. Apple Inc., 559 F. Supp. 3d 898, 922 (N.D. Cal. 2021), *aff'd in part, rev'd in part*, 67 F.4th 946 (9th Cir. 2023), *cert. denied*, 144 S. Ct. 682 (2024) ("Apple's creation and cultivation of the iOS device (and its ecosystem) has been described as a walled garden. Said differently, it is a closed platform whereby Apple controls and supervises access to any software which accesses the iOS devices.").

[19] *Id.*

[20] *See* Alan Z. Rozenshtein, *Moderating the Fediverse: Content Moderation on Distributed Social Media*, 3 J. FREE SPEECH L. 217, 217 (2023) ("Current approaches to content moderation generally assume the continued dominance of 'walled gardens': social-media platforms that control who can use their services and how."); *see also* Mike Masnick, *Protocols, Not Platforms: A Technological Approach to Free Speech*, KNIGHT FIRST AMEND. INST. (Aug. 21, 2019), https://knightcolumbia.org/content/protocols-not-platforms-a-technological-approach-to-free-speech [https://perma.cc/9C23-2KBX] ("In the past few decades, however, rather than building new protocols, the internet has grown up around controlled platforms that are privately owned. These can function in ways that appear similar to the earlier protocols, but they are controlled by a single entity.").

Even where a device or operating system is relatively open by design, a software platform may employ restrictions to lock down its platform to such an extent that it becomes a walled garden.[21] The earliest examples of walled gardens were communications platforms like past versions of AT&T and AOL.[22]

[10] While this Article focuses on the negative implications of walled gardens as they affect software access, they are not inherently detrimental. The control of walled gardens inversely allows a vertical integration that would be difficult to implement otherwise.[23] Many consumers seem to have embraced the benefits of this integration, like convenience and security, even if they come at the expense of foreseeable potential market

[21] *Cf.* Saif M. Khan, *Copyright, Data Protection, and Privacy with Digital Rights Management and Trusted Systems: Negotiating a Compromise between Proprietors and Users*, 5 ISJLP J. L. & POL'Y FOR INFO. SOC'Y 603, 608–612 (2010) (explaining how restrictive digital rights management protects content owner's rights but can undermine the innovative potential of networks and restrict user activities).

[22] Susan Crawford, *Here's Why the Comcast-Time Warner Merger Is Bad*, MIT TECH. REV. (Apr. 10, 2014), https://www.technologyreview.com/2014/04/10/173417/heres-why-the-comcast-time-warner-merger-is- bad/ [https://perma.cc/E8BE-TKTG] (noting the term "walled garden" was first coined by John Malone, the founder of Tele-Communications, Inc., later acquired by AT&T); *see also* Emily Faro, *Entertainment Consolidation, Content Monopolies, and the Future of Information*, 39 CARDOZO ARTS & ENT. L. J. 1029, 1035 (2021) ("AT&T is often regarded as one of the first and long-lasting information monopolies.").

[23] Ben Bajarin, *Why Competing with Apple Is So Difficult*, TIME (July 1, 2011), https://techland.time.com/2011/07/01/why-competing-with-apple-is-so-difficult/ [perma.cc/4AKJ-EUJA] ("But competing with Apple is difficult because Apple, Inc. is actually four diverse and thriving companies all wrapped up into one. It's a hardware company, a software company, a services company, and a retail company. Most technology companies in the world can manage one or two of these disciplines, but only Apple has all four entities working in harmony. Apple, as we say, is vertically integrated.").

alternatives.[24] We are, however, approaching a breaking point, and the benefits of walled gardens are beginning to sour.

C. Evasive Measures

[11] A walled garden is not always an actual barrier to software access. There are enough savvy consumers with the expertise needed to evade the walls that restrict their devices and platforms.

[12] There are open platforms that offer users choice and developers the freedom to create, tinker, and innovate.[25] This openness can vary in degrees, including free access to code to open-source software with free licenses.[26] The most famous example of this in consumer software is the Linux operating system.[27] Though Android is often seen as somewhat restrictive

[24] *See* Adina Claici et al., *The Economic Rationale for Vertical Integration in the Tech Sector*, COPENHAGEN ECON. (Nov. 2020), https://copenhageneconomics.com/wp-content/uploads/2021/12/copenhagen-economics-the-economic-rationale-for-vertical-integration-in-tech.pdf [perma.cc/D44Y-NJCA] (discussing a study on vertical integration commissioned by Apple); *see also* Roger D. Blair et al., *Analyzing Vertical Mergers: Accounting for the Unilateral Effects Tradeoff and Thinking Holistically About Efficiencies*, 27 GEO. MASON L. REV. 761, 763 (2020) ("Year by year, the economic evidence has indicated ever more clearly that vertical integration – whether by merger or otherwise – is typically procompetitive.").

[25] *See, e.g.*, Jack Wallen, *8 Things You Can Do with Linux That You Can't Do with MacOS or Windows*, ZDNET (Aug. 16, 2023, 9:53 AM PT), https://www.zdnet.com/article/8-things-you-can-do-with-linux-that-you-cant-do-with-macos-or-windows/ [perma.cc/4WF9-SD3D].

[26] *See generally* Peter S. Menell, *Economic Analysis of Network Effects and Intellectual Property*, 34 BERKELEY TECH. L. J. 219, 228 (2019) (discussing variations of intellectual property protections and licensing).

[27] *Id.* at 263–264; *see also* Ramon Casadesus-Masanell & Pankaj Ghemawat, *Dynamic Mixed Duopoly: A Model Motivated by Linux vs. Windows*, 52 MGMT. SCI. 1072, 1072 (2006) (discussing the popularity of Linux).

as Google has developed it further, the original branch of Android is still available as the Android Open-Source Project.[28] Developers may seek out open-source or relatively open software tools in the development of their software to reduce costs associated with tools from closed platforms.[29] Some consumers may seek open-source options for operating systems or software applications, evading the walled gardens before their effects can be felt. This ability to evade walled gardens, however, is only available to consumers with the skill and foresight to make it happen. So, open-source software cannot act as a genuine alternative to walled gardens.

[13] "Jailbreaking" is the modifying of a computer or software system to remove restrictions imposed by the manufacturer or platform operator, often at the operating system level.[30] The practice rose in popularity in response to the locked-down nature of early versions of iOS for iPhone.[31] Since then,

[28] *Android Open Source Project*, ANDROID, https://source.android.com [perma.cc/CXU5-TFL6] (last accessed Sept. 20, 2024); *see also* Joseph Gratz & Mark A. Lemley, *Platforms and Interoperability in* Oracle v. Google, 31 HARV. J. L. & TECH. 603, 608–609 (2018).

[29] *See* Andrew Park, *Open Source vs. Proprietary: Development, Licensing, Business Models, Security, and More*, HEAVYBIT (Apr. 13, 2023), https://www.heavybit.com/library/article/open-source-vs-proprietary [perma.cc/3M6S-NLU7].

[30] *Cf. Unauthorized Modification of iOS*, APPLE, https://support.apple.com/guide/iphone/unauthorized-modification-of- ios-iph9385bb26a/ios [perma.cc/9SUB-HGQV] (last accessed Aug. 28, 2024).

[31] *See* Thomas Ricker, *iPhone Hackers: "We Have Owned the Filesystem"*, ENGADGET (July 10, 2007), https://www.engadget.com/2007-07-10-iphone-hackers-we-have-owned-the-filesystem.html [perma.cc/5RZR-FHZE] (showing early references to iPhone jailbreaking by consumers); *iPhone Serial Hacked, Full Interactive Shell*, HACKINT0SH, http://www.hackint0sh.org/showthread.php?p=7989 [https://web.archive.org/web/20090930025750/http://www.hackint0sh.org/showthread.php?p=7989] [perma.cc/5LDQ-D4M5] (July 6, 2007, 10:40 PM).

the term "jailbreak" has expanded to encompass a broader range of direct circumventions of software restrictions.[32]

[14] "Sideloading" is the process of installing software obtained from a third party rather than from an official channel, such as an app store.[33] This definition, taken broadly, could apply to all software downloading and installation outside of a central, official channel. Generally, this term is limited to devices where distribution via a centralized, first-party DSM is the norm.[34] Even devices with walled gardens may be capable of

[32] *See, e.g.*, Emma Street, *How to Jailbreak ChatGPT*, TECHRADAR (Mar. 23, 2024), https://www.techradar.com/how-to/how-to-jailbreak-chatgpt [perma.cc/BD7H-NW5V] (describing how to jailbreak ChatGPT); *see also Jailbreaking*, PC MAG., https://www.pcmag.com/encyclopedia/term/jailbreaking [perma.cc/L937-GSAS] (describing a common definition of jailbreaking).

[33] *See* Fiona Scott Morton, *Entry and Competition in Mobile App Stores* 6 (Bruegel, Working Paper No. 03/2023, 2024), https://www.bruegel.org/system/files/2024-01/WP%2003%202024_0.pdf [perma.cc/EP8N-6CW3] ("The [Digital Markets Act] also requires that a developer be able to get onto the handset without going through the gatekeeper app store. Today this is known as sideloading."); *see also* Anjanette H. Raymond & Inna Kouper, *Misplaced Trust, Failure of Contract, and the Need to Create Robust Options for Consumers*, 34 LOY. CONSUMER L. REV. 582, 587 (2023) ("Apple prevents the sideloading of iPhone apps, claiming the practice would make its phones less secure and trustworthy for users."). *But see Building a Trusted Ecosystem for Millions of Apps*, APPLE (June 2021), https://www.apple.com/privacy/docs/Building_a_Trusted_Ecosystem_for_Millions_of_Apps.pdf [perma.cc/EG96-E4NR] ("Allowing sideloading would degrade the security of the iOS platform and expose users to serious security risks not only on third-party app stores, but also on the App Store.").

[34] So, downloading an application on Windows PC from the application developer's website rather than from the Microsoft Store would not commonly be called sideloading because software distribution on the Microsoft Store is not the norm on Windows PCs despite it acting as a first-party channel for software distribution. *See* Robert Sheldon & Collin Steele, *Sideloading*, TECHTARGET, https://www.techtarget.com/searchmobilecomputing/definition/sideloading [perma.cc/B4YF-NWR9] (last accessed Nov. 10, 2024) (discussing the common app stores that utilize sideloading).

sideloading, though this functionality may be limited to development purposes only.[35]

[15] "Emulation" is the reproduction of the functions of another computer system.[36] Emulation sometimes involves running an operating system as an application on top of the primary operating system.[37] Emulation is especially popular for consumers interested in retro software, often video games, which are no longer commercially available.[38] Opponents of emulation may cite software piracy concerns.[39] Despite some legal wins in favor of emulation, it is still limited in its ability to circumvent walled gardens, both legally and practically.[40]

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[35] *See, e.g.*, *Beta Testing Made Simple with TestFlight*, APPLE DEV., https://developer.apple.com/testflight/ [perma.cc/SA8Q-PM7U] (last accessed Sept. 21, 2024) (describing a developer program for Apple devices enabling sideloading).

[36] *See* Sony Comput. Ent., Inc. v. Connectix Corp., 203 F.3d 596, 599 (9th Cir. 2000) (describing an example of emulation); *see also* Pamela Samuelson & Clark D. Asay, *Saving Software's Fair Use Future*, 31 HARV. J. L. & TECH. 535, 548 (2018) (further detailing an instance of emulation).

[37] *See Sony*, 203 F.3d at 601.

[38] Andrew Leung, *Video Game Emulation and the Law*, UCLA J.L. & TECH: NOTES 12 (2002); *see* Jethro Dean Lord IV, *Would You Like to Play Again? Saving Classic Video Games from Virtual Extinction Through Statutory Licensing*, 35 SW. U. L. REV. 405, 405 (2006) (discussing emulation of classic video games); *see also* Jeffrey S. Libby, *The Best Games in Life Are Free?: Videogame Emulation in a Copyrighted World*, 36 SUFFOLK U. L. REV. 843, 843 (2003) (discussing emulation as a potential form of privacy).

[39] *See, e.g.*, Davidson & Assocs. v. Jung, 422 F.3d 630, 630 (8th Cir. 2005) (granting video game developer summary judgment against a producer of a video game server emulator for circumventing copyright protections.).

[40] *Cf. Sony*, 203 F.3d at 607 (noting "Sony understandably seeks control over the market for devices that play games Sony produces or licenses. The copyright law, however, does not confer such a monopoly.").

[16] "Peer-to-peer file sharing" is a platform where users create a network to digital files directly with other devices on that network.[41] This file sharing platform is often used in the context of torrenting.[42] Peer-to-peer file sharing, of course, is not just for sharing software.[43] Admittedly, peer-to-peer file sharing is also helpful for piracy, as it completely subverts any digital rights management or copyright protections.[44] Accordingly, this article does not advocate for peer-to-peer file sharing as a viable alternative to walled-garden software distribution, though it is a commonly used one.

III. STATE OF SOFTWARE DISTRIBUTION

A. Scope of Analysis

[17] The analysis here is practically limited to three broad categories of software markets: legacy markets, current markets, and emerging markets. Legacy markets are defined, firstly, by existing before the current "app economy" paradigm seen in current markets. Legacy markets are also characterized by the inherent flexibility of the hardware for which the

[41] *See* Carlos Baquero, *What Ever Happened to Peer-to-Peer Systems?*, 66 COMMS. ACM 14, 14 (Mar. 1, 2023), https://cacm.acm.org/article/what-ever-happened-to-peer-to-peer-systems/ [perma.cc/K8UH-WP8V] (providing context on what a "peer-to-peer" system is).

[42] *See* Christian Rigg, *Are torrents actually dangerous?*, TOM'S GUIDE (Sep. 16, 2022), https://www.tomsguide.com/features/are-torrents-actually-dangerous [perma.cc/S2LX-Z9T6] ("Torrenting is a highly popular type of file sharing based on P2P, or peer-to-peer, meaning that files are shared directly between users rather than passing through a centralized server.").

[43] Baquero, *supra* note 41 (noting peer to peer file sharing can involve sharing of any kind of audio file such as audio files for music).

[44] *Id.*; *see also* A&M Recs. v. Napster, Inc., 284 F.3d 1091, 1091 (9th Cir. 2002) (describing music piracy via peer-to-peer software, Napster).

software is designed.[45] Current markets are software designed first for mobile devices, like smartphones. Emerging markets are characterized primarily by not being tied to hardware, generally with a high level of mobility due to nearly all software functions operating via the cloud.[46] While there are overlaps, the implications of these designations become more evident in the forthcoming analysis.

B. Legacy Markets

[18] Though smartphones and similar devices are now the driving force behind consumer technology markets, the markets for personal computer and video game console software have survived over the decades. These markets represent a baseline for how and where software might be distributed. Furthermore, these legacy software markets have remained relatively consistent, though they have evolved to incorporate some less desirable elements in current software markets.

[19] The analysis here focuses on the dominant traditional video game console platform, the PlayStation 5. Today, the three leading video game

[45] In particular, legacy software markets exist for hardware initially designed with the complexities of interchangeable components in mind, even if they are not so interchangeable today. The level of hardware interchangeability differs between the devices subject to this legacy markets category. On the high-end of interchangeability exist bespoke PCs assembled with off-the-shelf parts. On the low-end are consoles like the PlayStation 5 which offer only minimal hardware interchangeability. *See, e.g.*, *How to Add an M.2 SSD to a PS5 Console*, PLAYSTATION, https://www.playstation.com/en-us/support/hardware/ps5-install-m2-ssd/ [perma.cc/GTF3-F5K4] (last accessed Sept. 22, 2024) (discussing upgrading PlayStation 5 storage capacity).

[46] The meaning of "the cloud" in the context of the consumer technology industry may be unclear given its status as a common buzzword. It simply describes a computer process that is operated on an external server, such as remote data storage, rather than directly on a device. *See generally* Cameron Koob, *Cloud Computing*, 6 GEO. L. TECH. REV. 363, 363 (2022) (providing succinct information on cloud computing from a legal perspective).

console producers are PlayStation (owned by Sony), Nintendo, and Xbox (owned by Microsoft).[47] Nintendo, however, has shifted away from the traditional video game console market to a hybrid of stationary and mobile gaming with their Nintendo Switch system.[48] As of 2023, 65% of Americans play video games at least one hour a week.[49] Further, the US video game industry contributed nearly $66 billion to US GDP in 2023.[50]

[20] The current PlayStation 5 consoles still only accept software specifically made for the platform. There are two main methods of acquiring video game software for the PlayStation 5: video games on physical discs available from typical retailers and digital downloads of video games on PlayStation's proprietary PlayStation Store. PlayStation also offers a subscription model for temporary game licenses as an extension of this digital marketplace.[51] While these digital options for software are newer,

[47] *See* GDC, *The Defining Themes of the Modern Console Market*, YOUTUBE, at 20:22, https://youtu.be/BWt-4Gn9UeM?si=ijlIepfcZwzyZ-rz [perma.cc/8T53-JCXZ] (last accessed Sept. 22, 2024) (noting the major video game console producers and their approximate market share).

[48] *Id.*

[49] *2023 Essential Facts About the U.S. Video Game Industry*, ENT. SOFTWARE ASS'N, https://www.theesa.com/2023-essential-facts/ [perma.cc/GQ85-9WRU] (last accessed Sept. 22, 2024).

[50] Martin Grueber & Dylan Yetter, *The 2024 Economic Impact Report*, ENT. SOFTWARE ASS'N, https://www.theesa.com/resources/2024-economic-impact-report/. [perma.cc/K4D4-97KG].

[51] *Sony and Microsoft to Explore Strategic Partnership*, MICROSOFT (May 16, 2019), https://news.microsoft.com/2019/05/16/sony-and-microsoft-to-explore-strategic-partnership/ [perma.cc/H6K9-REL7] (providing cloud-based infrastructure for PlayStation Plus to run on Microsoft Azure); Tom Warren, *Sony Starts Testing Cloud Streaming PS5 Games*, VERGE (June 14, 2023, 12:08 PM), https://www.theverge.com/2023/6/14/23760879/sony-ps5-cloud-streaming-games-test [perma.cc/5V7X-C7ZZ] (discussing Sony's use of cloud streaming technology, potentially Microsoft's).

the traditional distribution model for PlayStation video game software is functionally the same as it has always been: locked down with no direct third-party access. In other words, a video game cannot exist on the PlayStation platform without approval from PlayStation, whether via disc or digital download.[52] Specialized proprietary hardware, a "dev kit," is generally required for developers to begin developing for the PlayStation platform. Technically, a user may attempt to jailbreak their PlayStation 5 to obtain content not approved by PlayStation, but that is no easy feat.[53]

[21] The market for video games on physical discs has declined over the years, with PlayStation introducing its first digital-only console as part of the newest generation of consoles.[54] At their launch in 2020, the PlayStation 5 model with an optical disc drive costs $499, while the digital-only model without a disc drive costs $399, a significant reduction in price for a single, technically unnecessary component.[55] Better yet, both models had essentially the same computational performance.[56] Yet, this digital-only model made the PlayStation Store the only software distribution method for the platform. In late 2023, PlayStation announced a smaller PlayStation 5

[52] *Cf. PlayStation Partners*, PLAYSTATION, https://partners.playstation.net/ [perma.cc/7YS4-JDSV].

[53] *See, e.g.*, Ethan Gach, *PS5 Seemingly Jailbroken Using PS4 Exploit, Can Now Run Kojima's P.T.*, KOTAKU (Oct. 3, 2022), https://kotaku.com/ps5-jailbreak-hack-kernel-exploit-p-t-kojima-ps4-1849609372 [perma.cc/9ZPK-9PSQ] (on jailbreaking a PlayStation to access software removed from PlayStation's first-party, digital video game store).

[54] Jim Ryan, *PlayStation 5 Launches in November, Starting at $399 for PS5 Digital Edition and $499 for PS5 with Ultra HD Blu-Ray Disc Drive*, PLAYSTATION (Sept. 16, 2020), https://blog.playstation.com/2020/09/16/playstation-5-launches-in-november-starting-at-399-for-ps5-digital-edition-and-499-for-ps5-with-ultra-hd-blu-ray-disc-drive/ [perma.cc/PX7E-RRLK].

[55] *Id.*

[56] *Id.*

design to replace the 2020 design while retaining the same dichotomy of one model with a disc drive and another cheaper digital-only model.[57] This time, however, consumers can upgrade their digital-only model after purchase to equip it with a disc drive.[58]

[22] Xbox, arguably PlayStation's main competitor, has taken a much different approach. Xbox has made strides towards digital-only software distribution, yet all signals point to Xbox leveraging its experience in personal computing to create a more open Xbox platform.[59] Microsoft's CEO of Gaming has suggested that the company's goal is to break down Xbox's walled garden by allowing third-party DSMs on their consoles.[60]

[57] Sid Shuman, *New Look for PS5 Console This Holiday Season*, PLAYSTATION (Oct. 10, 2023), https://blog.playstation.com/2023/10/10/new-look-for-ps5-console-this-holiday-season/ [perma.cc/5CWZ-MK62].

[58] *Id.*

[59] Tom Warren, *The Future of the Xbox Looks a Lot Like a PC*, VERGE (Apr. 18, 2024, 12:39 AM), https://www.theverge.com/2024/4/18/24123318/microsoft-next-xbox-pc-future [perma.cc/W5D5-UBP5]; *see also* Alex Stedman, *Phil Spencer Briefly Explains the Decision to Bring Doom: The Dark Ages to PlayStation 5 - IGN Live 2024*, IGN (June 9, 2024 6:43 PM), https://www.ign.com/articles/phil-spencer-briefly-explains-the-decision-to-bring-doom-the-dark-ages-to-playstation-5-ign-live-2024 [perma.cc/QHU7-T37U] (discussing blockbuster Microsoft-owned video game releasing on PlayStation 5).

[60] Chris Plante, *Phil Spencer Wants Epic Games Store and Others on Xbox Consoles*, POLYGON (Mar. 26, 2024, 11:30 AM), https://www.polygon.com/24108670/xbox-epic-games-store-phil-spencer-interview [perma.cc/4YDH-6VN5].

Admittedly, Xbox has not executed this strategy well so far.[61] PlayStation has historically been less open to removing such barriers.[62] More recently, PlayStation has pushed to offer video games previously exclusive to their consoles to consumers on PC as well, though the execution is not always perfect.[63] This change does not open up the PlayStation platform, but it does show that PlayStation has realized some of the benefits of loosening its grip on its software.

[23] Like video game consoles, there have been changes in the PC software market. Some DSMs and software platforms are becoming relatively restrictive, especially for PC video games and select productivity

[61] *See* Tom Warren, *FTC Blasts Microsoft's New 'Degraded' Xbox Game Pass Standard Tier and Price Increases*, VERGE (July 18, 2024, 7:51 PM), https://www.theverge.com/2024/7/18/24201576/ftc-microsoft-xbox-game-pass-price-increases-standard-tier [perma.cc/2LAH-XLNY] ("'Microsoft's price increases and product degradation — combined with Microsoft's reduced investments in output and product quality via employee layoffs — are the hallmarks of a firm exercising market power post-merger,' the FTC said."); *see also* Jason Schreier, *Xbox's 'Exclusive' Video Game Strategy Leaves Everyone Confused*, BLOOMBERG (Aug. 23, 2024, 1:00 PM), https://www.bloomberg.com/news/newsletters/2024-08-23/xbox-s-exclusive-video-game-strategy-leaves-everyone-confused [perma.cc/49PQ-KB35] ("But since closing the Activision [acquisition] last fall, Xbox has made a series of moves that have left fans and analysts baffled about its overall strategy.").

[62] *See* Tom Warren, *Sony's Excuse for Blocking PlayStation and Xbox Cross-Platform Play Is Hostile and Stupid*, VERGE (Jun. 15, 2017, 6:19 AM), https://www.theverge.com/2017/6/15/15807138/sony-playstation-cross-network-play-xbox-block-response [perma.cc/PG2B-TFUL] (explaining Sony's disinterest in video game console networking interoperability).

[63] *See* Erik Kain, *Sony Is Making a Truly Terrible Mistake with 'Helldivers 2' – Update: Sony Reverses Course*, FORBES (May 6, 2024, 1:46 AM), https://www.forbes.com/sites/erikkain/2024/05/05/sony-is-making-a-truly-terrible-mistake-with-helldivers-2/?sh=61305d1b77f5 [perma.cc/3TTY-NRQK] ("Sony is poised to squander a ton of the goodwill the company has accrued, not just from Helldivers 2, but from all its efforts to port PlayStation exclusives like Horizon Zero Dawn and The Last Of Us, to PC.").

software.[64] The overall market for personal computing software is too diverse for these restrictive moves to significantly affect users on operating system platforms like Windows and Linux. While Apple's Mac computers have veered towards the direction of its mobile devices in both hardware and software, the macOS platform remains relatively open regarding end-user software accessibility.[65] One could speculate that PC platform operators would still prefer consumers to use their first-party DSMs for the revenue cut. More than likely, however, it would be too difficult to put the software-accessibility genie back in the bottle.

C. Current Markets

[24] Current software markets include software for smartphones, smartwatches, tablets, smart TVs, and virtual reality headsets. The focus here, along with the most prominent legal actions related to software distribution, is the iPhone. The arrival of the iPhone's App Store in 2008 revolutionized software distribution for mobile devices. One of the iPhone's early victories was balancing the App Store's secure nature with third-party developers' ability to distribute software applications directly on the App

[64] *See, e.g.*, Vernor v. Autodesk, Inc., 621 F.3d 1102, 1111–12 (9th Cir. 2010) (limiting consumer's ability to resell licenses of Autodesk software because plaintiff was ruled to not have actually owned it).

[65] *See How to Develop Apple Apps: Using Xcode & Swift to Program for iOS & macOS*, SITEPOINT (May 16, 2022), https://www.sitepoint.com/develop-apple-apps/#h-frequently-asked-questions-faqs-about-developing-apple-apps [perma.cc/3MB6-FY8E] (providing a brief tutorial on starting to develop Apple apps); David Bolton, *Windows vs. Linux vs. Mac: What's the Best Dev Platform for You?*, DICE (Sept. 27, 2023), https://www.dice.com/career-advice/windows-vs.-linux-vs.-mac-whats-the- best-dev-platform-for-you [perma.cc/25ZT-AEH5].

Store.[66] The incumbent smartphone manufacturer of the time, BlackBerry, notably did not allow such third-party access on their devices.[67]

[25] Today, however, the App Store is seen as exorbitantly restrictive. Regulators have taken notice, with Federal Trade Commission Chair Lina Khan remarking:

> Nearly forty years ago, President Reagan famously declared that the nine most terrifying words in the English language are "I'm from the government, and I'm here to help." . . . For many developers and startups, the most terrifying words in the English language may be "I'm from the App Store developer support team, and your application has been rejected."[68]

[26] The iPhone's market share by revenue is approximately 70% in the performance smartphone market in the United States.[69] All the while, Apple

[66] *See* Sam Gustin, *The Fatal Mistake That Doomed BlackBerry*, TIME (Sept. 24, 2013), https://business.time.com/2013/09/24/the-fatal-mistake-that-doomed-blackberry/ [perma.cc/F79J-E5EQ] ("Blackberry was blindsided by the emergence of the 'app economy'. . . and failed to realize that smartphones would evolve beyond mere communication devices to become full-fledged mobile entertainment hubs.").

[67] BlackBerry's ultimate failure despite its market dominance in the 2000s is in part due to the company's unwillingness to become more open as a platform. *Id.*

[68] RemedyFest, *LIVE: RemedyFest*, YOUTUBE, at 2:16:00 (Feb. 27, 2024), https://www.youtube.com/live/DuykIQ15Lag [perma.cc/ZX6S-NUNW] (showing FTC Chair speaking at livestreamed event hosted by Bloomberg Beta and YCombinator to discuss how antitrust enforcement can promote innovation and level the playing field for developers).

[69] Complaint at ¶ 22, United States v. Apple, Inc., No. 2:24-cv-04055 (D.N.J. Mar. 21, 2024); *see also Mobile Operating System Market Share United States of America*, STATCOUNTER, http://gs.statcounter.com/os-market-share/mobile/united-states-of-america [perma.cc/6LL6-MPH3] (last accessed Sept. 22, 2024) (documenting, as of Aug. 2024, iOS captured 57.09% of the mobile operating system market).

charges as much as $1,599 for an iPhone.[70] This high price alone is a barrier on the iPhone platform. Apple provides many of the most essential applications out of the box, like a Weather app and a Calendar app.[71] The App Store then provides all applications for Apple's iOS mobile devices that are not installed on a user's device. To publish applications on the App Store, developers must be members of Apple's Developer Program, often at a fee.[72] Similarly, Apple charges a 30% revenue split for developers on its iOS platform, with all of it channeled through the App Store and Apple's in-app payment processor, sometimes referred to as IAP.[73]

[27] So, any software purchase on iPhone, whether within the App Store or in-app, is subject to this 30% cut.[74] Some smaller businesses are subject

[70] Complaint at ¶ 5, United States v. Apple, Inc., No. 2:24-cv-04055 (D.N.J. Mar. 21, 2024).

[71] Apple bought a rival weather application developer and shuttered the third-party application in 2020 while incorporating its unique features into Apple's first-party Weather application, a seemingly common behavior. *See* Jared Newman, *Apple's Dark Sky Acquisition Could be Bad News for Indie Weather Apps*, FAST CO. (Apr. 2, 2020), https://www.fastcompany.com/90485131/apples-dark-sky-acquisition-could-be-bad-news-for-indie-weather-apps [perma.cc/8J6L-H6YH] ("The idea that Apple might kneecap third-party developers in the process of boosting its own services, however, is not novel at all.").

[72] *Enrolling, Verifying, and Renewing with the Apple Developer App*, APPLE, https://developer.apple.com/support/app-account/ [perma.cc/42DE-5U8L] (last accessed Sept. 22, 2024).

[73] *See Choosing a Business Model*, APPLE, https://developer.apple.com/app-store/business-models/ [perma.cc/N7GU-248C] (last accessed Sept. 22, 2024) (outlining the App Store business models).

[74] Lina M. Khan, *The Separation of Platforms and Commerce*, 119 COLUM. L. REV. 973, 1007 (2019) (citing *The Case*, TIME TO PLAY FAIR, https://timetoplayfair.com/the-case/ [perma.cc/M7KC-SBMG] (last accessed Aug. 28, 2024)).

to a more modest but still significant 15% cut.[75] Still, Apple sees its stewardship of the App Store as value-creating rather than restraining.[76] The iPhone is notable in how the platform integrates with other Apple devices, like Macs, Apple Watches, AirPods, and more. At the same time, developers lack access to beneficial features, like source code access and closed APIs, that they could otherwise use to operate more effectively on the iPhone platform.[77] All of these restrictive factors are harmful to both developers and the downstream consumers.

[28] Despite Apple's best efforts to keep its walled garden intact, the iPhone is opening up. Several of Apple's critics formed a coalition in 2020 for developers to collectively fight against unfair behavior by app store operators, with Apple as the primary target.[78] The iPhone's software landscape looks very different following recent legal actions, particularly

[75] *See Apple Store Small Business Program*, APPLE, https://developer.apple.com/app-store/small-business-program/ [perma.cc/R89T-K6DK] (last accessed Sept. 22, 2024) (explaining reduced revenue splits with Apple for smaller apps).

[76] *See The App Store, Spotify, and Europe's Thriving Digital Music Market*, APPLE (Mar. 4, 2024), https://www.apple.com/newsroom/2024/03/the-app-store-spotify-and-europes-thriving-digital-music-market/ [perma.cc/RN39-PZEN] ("Every day, teams at Apple work to keep that dream alive. We do it by making the App Store the safest and best experience for our users. We do it by giving developers the means to make incredible apps.").

[77] *See* Filipe Espósito, *Apple Now Lets Developers Submit 'Interoperability Requests' for iOS Apps in the EU*, 9TO5MAC (Jan. 25, 2024, 12:12 PM), https://9to5mac.com/2024/01/25/apple-interoperability-requests-ios-apps/ [perma.cc/82FP-9JV7] ("A major complaint from many iOS developers is how inflexible Apple is about some of the system's APIs."); *Requesting Interoperability with iOS and iPadOS in the European Union*, APPLE, https://developer.apple.com/support/ios-interoperability/ [perma.cc/2ZPY-NKNN] (last accessed Aug. 28, 2024).

[78] *App Developers Deserve a Level Playing Field*, COAL. FOR APP FAIRNESS, https://appfairness.org/ [perma.cc/E23L-QSAF] (last accessed Aug. 28, 2024).

the Digital Markets Act.[79] Some of the changes, like introducing emulators onto the App Store, have trickled down to the U.S.[80]

[29] Though the iPad's platform is considered less anticompetitive than the iPhone's, many of its features are functionally the same as the iPhone's and just as anticompetitive, particularly its integration of the App Store as a single, first-party DSM. The European Commission recently recognized the gatekeeping potential of iPadOS.[81] While the iPad platform has notable differences from the iPhone platform, such as the lack of telecommunications capabilities, the software distribution method is essentially the same. The same can be said for Apple's other mobile device categories, like the Apple Watch and the Apple Vision Pro.

[30] Android is the only significant competing smartphone platform, though it is only an operating system, not a product line. Various companies like Samsung, OnePlus, and Motorola design the smartphones themselves.[82] Though Google is the steward of Android and has its own branded smartphone line, it does not hold a tight grip on the overall operating system. Google's control of the Google Play store and related software, however, is significant.[83] Despite the limitations, consumer-friendly features like third-

[79] *See* Espósito, *supra* note 77.

[80] *See* Megan Farokhmanesh, *Delta Is an iOS Game Boy Emulator That (Likely) Won't Get Taken Down*, WIRED (Apr. 17, 2024, 4:33 PM), https://www.wired.com/story/delta-game-boy-emulator-apple-app-store [perma.cc/8DQ8-WTWG] (explaining how EU regulations are indirectly expanding emulation software access in the US).

[81] European Commission Press Release IP/24/2363, The Commission, Commission Designates Apple's iPadOS Under the Digital Markets Act (Apr. 28. 2024).

[82] *See, e.g.*, *Phones*, ANDROID, https://www.android.com/phones/ [perma.cc/YHS3-MZBN] (last accessed Nov. 10, 2024).

[83] *Cf.* Complaint for Injunctive Relief, Epic Games, Inc. v. Google LLC, No. 3:20-cv-05671 (N.D. Cal. Aug. 13, 2020).

party app stores and sideloading are available on most Android phones.[84] Android, as an operating system, even exists as an open-source option separate from the main Google branch for developers who wish to use it on their own devices.[85]

D. Emerging Markets

[31] Cloud computing has been around in some form for decades.[86] Cloud applications are relatively new. Cloud infrastructure is already highly concentrated, which complicates the potential of cloud computing.[87] Amazon, Google, and Microsoft collectively hold around 67% of the cloud-infrastructure-provider market share in the United States as of the fourth

[84] *But see* Ben Schoon, *Samsung Galaxy Phones Now Stop You from Sideloading Android Apps by Default*, 9TO5GOOGLE (July 23, 2024, 11:55 AM), https://9to5google.com /2024/07/23/samsung-galaxy-sideloading-android-apps/ [perma.cc/3BJH-7H7K].

[85] *See* WVFRM Podcast, *CyanogenMod and the Death of the Android ROM*, YOUTUBE (Nov. 15, 2023), https://youtu.be/TDOMekBPR4U?si=UxX_je2vZg4ZTVi7 [perma.cc/ZR2P-CAJX] (discussing the early evolution of Android Open Source Project in the hands of consumers turned developers); *see also* CHET HAASE, ANDROIDS: THE TEAM THAT BUILT THE ANDROID OPERATING SYSTEM (2021) (explaining the origins of Android).

[86] *See, e.g.*, Blesson Varghese, *History of the Cloud*, BCS (Mar. 19, 2019), https://www.bcs.org/articles-opinion-and-research/history-of-the-cloud [perma.cc/NB3W-3DZC].

[87] *See* Kamila Benzina, *Cloud Infrastructure-as-a-Service as an Essential Facility: Market Structure, Competition, and the Need for Industry and Regulatory Solutions*, 34 BERKELEY TECH. L.J. 119, 133 (2019) ("The continued rapid growth of Amazon, Microsoft, and Google, as well as the departure of other smaller IaaS providers, suggests the market is moving toward an oligopoly, if not a duopoly.").

quarter of 2023.[88] Amazon is the clear leader, with a 32% market share.[89] This market dominance leaves little room for smaller players to take advantage of cloud potential. Cloud computing can enable a wide range of applications and functions never possible on standalone hardware. Three examples relevant to this article are hardware-intensive software streaming, persistent virtual experiences, and high-performance artificial intelligence.

[32] Hardware-intensive software streaming in consumer technology today is confined chiefly to video game streaming, like Xbox Game Pass cloud streaming.[90] Still, the technology behind these streaming services goes beyond just video games.[91] There is a potential future in which nearly all intensive computing operates via the cloud. Why would a consumer purchase a $2000 laptop with high-performance hardware and software for video editing, for instance, when they could instead purchase a lower-performance $500 laptop and pay a small subscription fee for access to effectively the same high-performance hardware and software from a cloud computing service provider? Low-performance productivity applications are already available via the cloud, so why not high-performance

[88] *Cloud Market Gets its Mojo Back; AI Helps Push Q4 Increase in Cloud Spending to New Highs*, SYNERGY RSCH. GROUP (Feb. 1, 2024), https://www.srgresearch.com/articles/cloud-market-gets-its-mojo-back-q4-increase-in-cloud-spending-reaches-new-highs [perma.cc/9T33-68TJ].

[89] *Id.*

[90] *See, e.g.*, *Xbox Cloud Gaming (Beta)*, XBOX, https://www.xbox.com/en-US/cloud-gaming#:~:text=Requires%20Xbox%20Game%20Pass%20Ultimate,connection%20(ISP%20fees%20apply [perma.cc/6FXQ-9W2D] (last accessed Sept. 17, 2024).

[91] *AWS End User Computing*, AMAZON WEB SERVICES, https://aws.amazon.com/products/end-user-computing/ [perma.cc/2N5M-G5ZL] (last accessed Nov. 10, 2024); *see, e.g.*, *Run Applications on Any Device, Anywhere*, VAGON, https://vagon.io/ [perma.cc/UWZ7-RX5M] (last accessed Nov. 10, 2024).

applications?[92] Though some enterprise-focused services already exist for hardware-intensive software streaming and similar streaming needs, the market for the typical consumer has not yet materialized.[93]

[33] Persistent virtual experiences, "metaverses" more commonly, have yet to prove themselves as anything more than virtual reality with a dash of science-fiction flair.[94] Still, a potential metaverse market exists if the delivery matches the hype.[95] Most prominently, Meta's strategy in creating its so-called metaverse platform has been unique since its roots are in social media and similar digital services rather than traditional hardware or software design.[96] Current competition has seemed to shift Meta's focus

[92] *See, e.g.*, *Productivity*, GOOGLE WORKSPACE MARKETPLACE, https://workspace.google.com/marketplace/category/productivity [perma.cc/WU9D-CA2W] (last accessed Sept. 17, 2024).

[93] *See* Tom Warren, *Microsoft Wants to Move Windows Fully to the Cloud*, VERGE (June 27, 2023, 6:58 AM), https://www.theverge.com/2023/6/27/23775117/microsoft-windows-11-cloud-consumer-strategy [perma.cc/9AXU-ED6E].

[94] *See* Josh Rush, *Hold the Postmortem: The Metaverse Was Never Alive in the First Place*, FASTCOMPANY (May 11, 2023), https://www.fastcompany.com/90893969/metaverse-was-never-alive-in-first-place [perma.cc/C4Y9-HX89] (explaining the lack of proven success by metaverses); *see also* Lauren Jackson, *Is the Metaverse Just Marketing?*, N.Y. TIMES (Jan. 19, 2024), https://www.nytimes.com/2022/02/11/podcasts/metaverse-marketing.html [perma.cc/9SPX-YE2B] (showing the metaverse as more hype than reality).

[95] *See* Cory Ondrejka, *Escaping the Gilded Cage: User Created Content and Building the Metaverse*, 49 N.Y. L. SCH. L. REV. 81, 83 (2004-2005) ("The Metaverse has the potential to open dramatically larger markets by giving its users the vibrant complexity and dynamics of real-world cities rather than simple, repetitive gameplay.").

[96] *Meta*, BRITANNICA MONEY, https://www.britannica.com/money/Meta-Platforms [perma.cc/G9BV-HAEK] (last accessed Sept. 16, 2024).

away from the metaverse, at least for now.[97] Parties outside of Meta are developing differing ideas adjacent to the so-called metaverse with varying approaches and levels of success.[98] If these persistent virtual experiences become a gateway to further virtual experiences and applications, as has been envisioned, then the accessibility of the software associated with these experiences, whether APIs, applications, or otherwise, will become increasingly important.

[34] High-performance artificial intelligence, particularly generative AI like ChatGPT, is still new but has abundant promise.[99] How one defines "artificial intelligence" can alter an analysis of this market, as algorithmic decision-making is not new.[100] Further, algorithmic decision-making does not necessitate a deep cloud infrastructure, though new generative AI technologies generally do.[101] But, AI-focused end-user applications are not

[97] *See Introducing Our Open Mixed Reality Ecosystem*, META (Apr. 22, 2024), https://about.fb.com/news/2024/04/introducing-our-open-mixed-reality-ecosystem/ [perma.cc/YQK6-3RS8] (indicating Meta's intentions to focus on expanding their ecosystem and invest in mixed reality devices).

[98] *See* Andrew Webster, *Fortnite Is Winning the Metaverse*, VERGE (Feb. 8, 2024, 1:30 PM), https://www.theverge.com/24065901/fortnite-metaverse-disney-epic-partnership [perma.cc/6AL5-UGER] (reporting on Epic's success in a metaverse-like space while other companies fail).

[99] *See* Sadie O'Connor, *Generative AI*, 8 GEO. L. TECH. REV. 364, 403–04 (2024) (providing succinct information on generative artificial intelligence from a legal perspective).

[100] *See* Bernard Marr, *The Difference Between Generative AI and Traditional AI: An Easy Explanation for Anyone*, FORBES (July 24, 2023, 1:41 AM), https://www.forbes.com/sites/bernardmarr/2023/07/24/the-difference-between-generative-ai-and-traditional-ai-an-easy-explanation-for-anyone/?sh=57757e97508a [perma.cc/2ABU-NUSP] (distinguishing between common notions of artificial intelligence and generative artificial intelligence like ChatGPT).

[101] Wes Davis, *Apple Intelligence: Every New AI Feature Coming to the iPhone and Mac*, VERGE (June 10, 2024, 2:11 PM), https://www.theverge.com/2024/6/10/24175405/

common.[102] There have been attempts at hardware designed completely around cloud-based AI with differing approaches to software support, like the Humane AI Pin and the Rabbit R1.[103] Critics, however, have not been kind to these gadgets.[104] The more significant issue with AI is not the business sense of the technology but rather how the largest companies will get a head-start on AI because they are the only ones that can afford it while still in this experimental state.[105] As AI grows, the accessibility of AI

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wwdc-apple-ai-news-features-ios-18-macos-15-iphone-ipad-mac [perma.cc/D4UQ-9U8Q] ("The company says that many features will work on-device, where that's possible. But when you ask for something more complicated, your device — whether an iPhone, Mac, or iPad — will make a call to shunt the request to the cloud automatically."); Dave Kleidermacher & Giles Hogben, *Private AI for All: Our End-to-End Approach to AI Privacy on Android*, GOOGLE SEC. BLOG (Aug. 13, 2024), https://security.googleblog.com/2024/08/android-private-ai-approach.html [perma.cc/X8E6-AL6W] (highlighting Gemini Nano's AI processing of sensitive tasks using an on-device model).

[102] *See* John Martin, *Are End User Orgs Embracing AI? Why or Why Not? We Asked.*, BLUESTAR NATION (Nov. 28, 2022), https://nation.bluestarinc.com/articles/are-end-user-orgs-embracing-ai-we-asked [perma.cc/3GET-T29B].

[103] *See* Joanna Stern, *The AI Gadget That Can Make Your Life Better—and Two That Definitely Won't*, WALL ST. J. (May 3, 2024, 5:30 AM), https://www.wsj.com/tech/personal-tech/the-ai-gadget-that-can-make-your-life-betterand-two-that-definitely-wont-c51f49f0?reflink=desktopwebshare_permalink [perma.cc/N9ZE-DNAJ] (reporting on AI-powered fad gadgets).

[104] *See* Marques Brownlee, *The Worst Product I've Ever Reviewed…For Now*, YOUTUBE, at 14:21 (Apr. 14, 2024), https://youtu.be/TitZV6k8zfA?si=fvC3QaOVPEMFYCH0 [perma.cc/2EFA-MS4C] (speaking on the AI pin, "[t]here just are no apps . . . So, there is no Uber access. There is no Spotify access. There's no WhatsApp. There's no calendar, no Gmail, none of that stuff. I can't book a flight. I can't buy something on Amazon. It just will not do any of that stuff that I just do on my phone.").

[105] Generative AI has been noted for its market concentration with only a few companies controlling the various layers of the artificial intelligence stack. *See* Tejas N. Narechania & Ganesh Sitaraman, *An Antimonopoly Approach to Governing Artificial Intelligence*, YALE L. & POL'Y REV (Jan. 17, 2024) (forthcoming), https://ssrn.com/abstract=4597080 [perma.cc/TV3R-XX7M].

functions within end-user software may become another critical point of discussion.[106] Consider a future where generative AI APIs are distributed like today's mobile apps, such as via the GPT Store.[107] Frankly, the full scope of AI's economic impact is too broad for this article to address in full.[108]

IV. PROMINENT LEGAL ACTIONS

A. Reviewing the Microsoft Cases

[35] In 1998, the U.S. Department of Justice (DOJ) and a coalition of state attorneys general charged Microsoft with engaging in anticompetitive activity related to Microsoft's monopoly in personal computing operating systems and Microsoft's actions to extend that monopoly to internet

[106] *See Generative AI to Become a $1.3 Trillion Market by 2032, Research Finds*, BLOOMBERG L. (June 1, 2023), https://www.bloomberg.com/company/press/generative-ai-to-become-a-1-3-trillion-market-by-2032-research-finds/ [perma.cc/D7FL-JC5G]; *see also* Julianna Lamb, *In the Age of AI, Everything Is an API*, FORBES (Sept. 18, 2023, 6:00 AM), https://www.forbes.com/sites/forbestechcouncil/2023/09/18/in-the-age-of-ai-everything-is-an-api/ [perma.cc/2SP2-6RGQ] ("As AI continues to advance, APIs are evolving in parallel to unlock and amplify this potential.").

[107] *See Introducing the GPT Store*, OPENAI (Jan. 10, 2024), https://openai.com/index/introducing-the-gpt-store/ [perma.cc/Z2PA-E25C] (discussing the launch of GPT Store by OpenAI); *see also* Megan Shahi et al., Generative AI Should Be Developed and Deployed Responsibly at Every Level for Everyone, CAP 20 (Feb. 1, 2024), https://www.americanprogress.org/article/generative-ai-should-be-developed-and-deployed-responsibly-at-every-level-for-everyone/ [perma.cc/77P2-PX5L] ("In addition to building and maintaining first-party AI systems, developers are aggressively expanding the scope of the API access programs, including by significantly reducing barriers to access them. In January 2024, OpenAI announced the launch of the GPT Store, where paying users can access millions of customized GPTs for various uses.").

[108] *Cf.* Shahi et al., *supra* note 107 (explaining that "analysts project that by 2026, more than 80 percent of enterprises will have used generative AI APIs or models and/or have deployed generative AI-enabled applications in production environments").

browsing software.[109] The pattern of anticompetitive activity alleged was broad, with Attorney General Janet Reno stating, "Consumers and computer manufacturers should have the right to choose the software they want installed on their personal computers . . . [w]e are acting to preserve competition and promote innovation in the computer software industry."[110] The focus of the case surrounded Microsoft's tying of the Internet Explorer browser to its Windows operating system and other efforts to unfairly advantage Internet Explorer relative to competing Internet browser software, like Netscape Navigator.[111]

[36] Regulators brought similar actions around that time to hold Microsoft accountable for its anticompetitive behavior in the operating system market.[112] This browser-focused suit acted as the climax in a series of battles against the Microsoft monopoly.[113] This case and the adjacent Microsoft cases have set the foundation for tech antimonopoly law in the last few decades, and scholars consider them to be some of the most significant in the history of the Sherman Act.[114]

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[109] *See* Complaint, United States v. Microsoft Corp., 84 F. Supp. 2d 9 (D.D.C. 1999) (No. 1:98CV01232), 1998 WL 35241886; *see also* Press Release, Dep't of Just., Justice Department Files Antitrust Suit Against Microsoft for Unlawfully Monopolizing Computer Software Markets (May 18, 1998) (on file with author) (announcing the Department of Justice's proceedings against Microsoft).

[110] Dep't of Just., *supra* note 109.

[111] *Id.*

[112] *See* United States v. Microsoft Corp., 56 F.3d 1448, 1450 (D.C. Cir. 1995).

[113] *See generally* KEN AULETTA, WORLD WAR 3.0: MICROSOFT, THE US GOVERNMENT, AND THE BATTLE FOR THE NEW ECONOMY (2001) (illustrating the effects of the landmark civil suit, United States v. Microsoft); *see also* MORGAN RICKS ET AL., *supra* note 3, at 939–69 (studying the browser wars in the context of the Department of Justice proceedings against Microsoft).

[114] MORGAN RICKS ET AL., *supra* note 3, at 939–69; Sherman Act, 15 U.S.C. §§ 1–7.

[37] In 2000, the D.C. District Court held that Microsoft violated the Sherman Act through its monopoly power in the operating system market, attempts to monopolize the web browser market, illegal tying Windows and Internet Explorer, and agreements with third parties to promote Internet Explorer.[115] As a remedy, the court ordered a structural separation, essentially a breakup, of Microsoft's operating system and its other software businesses.[116] Microsoft then appealed to the D.C. Circuit Court of Appeals.[117] There, the court affirmed the overall ruling but not the remedy of structural separation.[118] Instead, the court ordered Microsoft to keep its dealings uniform and non-exclusive and to enact changes to its executive structure, including reporting and oversight requirements.[119] Ultimately, after a change in administration, the DOJ significantly reduced the scope of its suit and settled with Microsoft.[120] This settlement lacked structural remedies and any tying claims like the DOJ pursued earlier in the case.[121] Instead, only the behavioral remedies remained.[122]

[38] While there may have been substantial discourse around the Microsoft case, the ultimate impact has been limited. Microsoft was considered large in 1998, but today's understanding of "Big Tech" has changed significantly. In 2023, Microsoft was allowed to finalize its

[115] United States v. Microsoft Corp., 87 F.Supp.2d 30, 36–39 (D.D.C. 2000).

[116] United States v. Microsoft Corp., 97 F.Supp.2d 59, 64 (D.D.C. 2000).

[117] United States v. Microsoft Corp., 253 F.3d 34, 45 (D.C. Cir. 2001).

[118] *Id.* at 46–47.

[119] *Id.* at 105–07.

[120] United States v. Microsoft Corp., 231 F. Supp.2d 144 (D.D.C. 2002).

[121] *Id.* at 169.

[122] *Id.* at 162.

acquisition of video game publisher Activision Blizzard, the largest single acquisition in the company's history.[123] The acquisition succeeded despite allegations from the Federal Trade Commission that the merger violated the Clayton Act.[124] Today, Microsoft's business has begun to lean away from its aging Windows operating system into other areas, like cloud computing.[125] But have any of the concerns from the DOJ back in 1998 been addressed? Did the outcome of the Microsoft case ensure consumers' "right to choose the software they want installed" on their devices?[126] The answer seems to be a negative one on both counts.

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[123] *See* F.T.C. v. Microsoft Corp., 681 F. Supp. 3d 1069, 1082 (N.D. Cal. 2023) (disclosing the Federal Trade Commission's attempt to block the Activision Blizzard acquisition); *see also* Tom Warren, *Microsoft Completes Activision Blizzard Acquisition, Call of Duty Now Part of Xbox*, VERGE (Oct. 13, 2023, 8:46 AM), https://www.theverge.com/2023/10/13/23791235/microsoft-activision-blizzard-acquisition-complete-finalized [perma.cc/P559-QYRT] (reporting Xbox's announcement on the completion of the Activision Blizzard merger). *But see* Jason Schreier, *Microsoft's Xbox Is Planning More Cuts After Studio Closings*, BLOOMBERG (May 8, 2024, 4:00PM), https://www.bloomberg.com/news/articles/2024-05-08/xbox-studio-closures-microsoft-plans-more-cost-cutting-measures-after-layoffs [perma.cc/CX5H-QNR9] (discussing the shuttering of businesses that Microsoft recently acquired).

[124] *F.T.C.*, 681 F. Supp. 3d at 1069; *see also* Mariella Moon, *The FTC Is as Mad About the Xbox Game Pass Price Increase as You Are*, ENGADGET (July 19, 2024), https://www.engadget.com/the-ftc-is-as-mad-about-the-xbox-game-pass-price-increase-as-you-are-120031248.html [perma.cc/V6T8-VAB5] ("Microsoft has made changes to its Xbox Game Pass service that are 'exactly the sort of consumer harm' from its Activision acquisition that the Federal Trade Commission (FTC) was worried about, the agency wrote.").

[125] *Azure. Limitless Innovation. Turn AI Curious into AI Capable.*, MICROSOFT, https://azure.microsoft.com/en-us/ [perma.cc/5QUV-3F54] (last accessed August 28, 2024).

[126] Dep't of Just., *supra* note 109; *see* Harry First & Andrew I. Gavil, *Re-Framing Windows: The Durable Meaning of the Microsoft Antitrust Litigation*, 2006 UTAH L. REV. 641, 644 (2006) ("The history of the public prosecution of Microsoft reminds us that major monopolization cases are important to bring, but politically difficult to manage to successful conclusion.").

B. The Epic Cases

[39] Of the current legal actions related to walled gardens and their monopolistic implications for consumer software in the United States, the ongoing war between Epic Games, Inc. ("Epic") and Apple is the most significant.[127] In mid-2020, Epic updated "Fortnite," its blockbuster online video game, with an option for discounted "direct payments" to Epic on iOS and Android.[128] This direct payment option effectively bypassed the required payment systems on both platforms, including Apple's in-app payment processing. Apple promptly terminated Epic's developer accounts and blocked further installs and updates of Fortnite from the App Store and, therefore, the entire iOS platform.[129] Epic subsequently sued Apple, alleging that the tech giant unlawfully restricts app distribution on its devices to its store, requires in-app purchases on its devices to use its own IAP, and limits developers' ability to communicate the availability of alternative payment options to device users.[130] Apple countersued Epic for breaching the App Store's developer contracts, including those related to anti-steering.[131]

[127] Epic Games, Inc. v. Apple, Inc., 67 F.4th 946, 966 (9th Cir. 2023), *cert. denied*, 144 S. Ct. 681 (2024).

[128] The Fortnite Team, *The Fortnite Mega Drop - Permanent Discounts Up to 20%*, FORTNITE (Sept. 27, 2023), https://www.fortnite.com/news/the-fortnite-mega-drop-permanent-discounts-up-to-20-percent [perma.cc/MT7Q-8U6N].

[129] *Id.*

[130] Epic Games, Inc. v. Apple Inc., 559 F. Supp. 3d 898 (N.D. Cal. 2021), *aff'd in part, rev'd in part and remanded*, 67 F.4th 946 (9th Cir. 2023).

[131] *Id.*

[40] As with other cases under the Sherman Act, the designation of the relevant market for potential monopoly is a major part of the case.[132] Here, the District Court for the Northern District of California disagreed with both Epic and Apple by finding that the relevant market was digital mobile gaming transactions.[133] Under this market definition, the court found that Apple experienced a 55% market share and "extraordinarily high-profit margins."[134] Still, it held this was insufficient to demonstrate Apple as a monopolist.[135] Under California competition law, however, Apple was held to have engaged in anticompetitive conduct due to the anti-steering provisions.[136] The District Court issued a permanent injunction related to its anti-steering finding.[137] All in all, Epic only won on this single state-law claim.[138] Both parties appealed.[139]

[41] In April 2023, the Ninth Circuit affirmed the ruling with few caveats.[140] Pending its submission of its writ of certiorari with the Supreme Court, the Ninth Circuit granted Apple a stay of the anti-steering permanent

[132] Sherman Act, 15 U.S.C. §§ 1–7; *see, e.g.*, *F.T.C. v. Qualcomm Inc.*, 969 F.3d 974, 992 (9th Cir. 2020) (discussing the importance of defining the relevant market).

[133] *See Epic Games, Inc.*, 559 F. Supp. 3d at 921.

[134] *Id.* at 922.

[135] *Id.*

[136] *Id.* at 1055 (holding that Apple's App Guidelines at the time prevented developers from including "calls to action that direct customers to purchasing mechanisms other than in-app purchase.").

[137] *Id.* at 1068–69.

[138] *Epic Games, Inc.*, 559 F. Supp. 3d at 898.

[139] Epic Games, Inc. v. Apple, Inc., 67 F.4th 946, 973 (9th Cir. 2023).

[140] *Id.*

injunction.[141] Though both parties again appealed, the Supreme Court denied both parties' requests in early 2024.[142] Proceedings for this case are still ongoing to enforce the courts' rulings.

[42] *Epic Games, Inc. v. Apple, Inc.* is especially significant because it shows that current ex-post remedies to anticompetitive activity are ineffective at solving the most salient issues with walled-garden software distribution.[143] All of Epic's federal competition law claims failed.[144] The legal acknowledgment of walled gardens in software markets was also significant, with the Ninth Circuit using the term as a summation of Apple's friction with developers.[145] Epic's story does not end there, though.

[43] Epic's battle against software distribution monopolies extends far beyond *Epic Games v. Apple, Inc*. Epic has also fought Apple in the

[141] Epic Games, Inc. v. Apple, Inc., 73 F.4th 785, 785 (9th Cir. 2023).

[142] Epic Games, Inc. v. Apple, Inc., 144 S. Ct. 682 (2024); Apple Inc. v. Epic Games, Inc., 144 S. Ct. 681 (2024).

[143] Patrice Bougette et al., *Ex-Ante Versus Ex-Post in Competition Law Enforcement: Blurred Boundaries and Economic Rationale* 16 (GREDEG, Working Paper No. 2024-18, 2024).

[144] *Epic Games, Inc. v.*, 559 F. Supp. 3d at 922 (N.D. Cal. 2021).

[145] *See Epic Games, Inc.*, 67 F.4th at 967 ("Apple created a 'walled garden' in which Apple plays a significant curating role. Developers can distribute their apps to iOS devices only through Apple's App Store and after Apple has reviewed an app to ensure that it meets certain security, privacy, content, and reliability requirements. Developers are also required to use Apple's in-app payment processor (IAP) for any purchases that occur within their apps. Subject to some exceptions, Apple collects a 30% commission on initial app purchases (downloading an app from the App Store) and subsequent in-app purchases (purchasing add-on content within an app)").

European Union, though not in the same manner as in the United States.[146] Much of Epic's battle against Apple in the EU is about Apple's allegedly poor compliance with the Digital Markets Act.[147] While most of this battle is limited to aggressive tweets from Epic CEO Tim Sweeney, some real legal consequences have occurred. The most notable event was Apple terminating one of Epic's App Store developer accounts in early 2024.[148] Though Apple later reinstated the permissions, the reason for their initial revocation was questionable and seemingly arbitrary.[149] Apple cited Mr. Sweeney's tweets as justification, but the connection between his "colorful criticism of [Apple's] DMA compliance plan" and Apple's suggestion that Epic intends to break App Store rules is unclear.[150] It should not matter if Apple thinks Epic is "verifiably untrustworthy."[151] Apple does not and should not have carte blanche to exclude developers from its digital platforms at will. This is especially true given the App Store's status as a

[146] PYMNTS, *EU Becomes Battleground as Epic Challenges Apple's App Store Dominance*, PYMNTS (Aug. 16, 2024) https://www.pymnts.com/mobile-applications/2024/europes-a-battleground-as-epic-challenges-apples-app-store-dominance/ [perma.cc/9NDB-XWGS].

[147] *Id.*; *see also infra* note 166.

[148] Epic Games, Inc., *UPDATE: Apple Reinstates Epic Developer Account After Public Backlash for Retaliation*, Epic Games, https://www.epicgames.com/site/en-US/news/apple-terminated-epic-s-developer-account [perma.cc/XVD3-2U9K] (Mar. 8, 2024) [hereinafter *UPDATE*].

[149] *Id.*

[150] *Id.* (quoting an email exchange between Tim Sweeney and Phil Schiller on February 23, 2024).

[151] Antonio Pequeño IV, *Apple Reverses Termination of Epic Games' Developer Account Days After Removing It*, FORBES (Mar. 8, 2024, 2:49 PM), https://www.forbes.com/sites/antoniopequenoiv/2024/03/08/apple-reverses-termination-of-epic-games-developer-account-days-after-removing-it/ [perma.cc/PDC5-ZVQU].

gatekeeper platform under the Digital Markets Act.[152] In truth, this all appears to be an attempt to punish a developer for speaking out against Apple's business model.[153]

[44] At the same time Epic sued Apple in 2020, Epic also sued Google for its operation of the Google Play Store for Android.[154] This suit was much more successful for Epic than its case against Apple. Yet it was still not quite as notable, since Fortnite was available on Android via third-party app stores, like Epic's own Epic Games Store.[155] Epic's claims paralleled those of its Apple case, generally alleging that Google holds an unfair dominance over the Android app distribution market and the Android in-app purchase processing market in violation of the Sherman Act.[156] Surprisingly, Epic

[152] EU: Commission Sends Preliminary Findings to Apple and Opens Additional Non-Compliance Investigation Under the DMA, DATAGUIDANCE (June 24, 2024), https://www.dataguidance.com/news/eu-commission-sends-preliminary-findings-apple-and#:~:text=On%20June%2024%2C%202024%2C%20the,requirements%20for%20third%2Dparty%20app.and#:~:text=On%20June%2024%2C%202024%2C%20the,requirements%20for%20third%2Dparty%20app [perma.cc/5WG8-TW3B].

[153] *Steve Jobs Turning in His Grave as EU Tells Apple: We Won't Let You Silence Critics Like Epic Games – PR Waterloo, $30B at Risk*, GAMES FRAY (Mar. 8, 2024), https://gamesfray.com/steve-jobs-turning-in-his-grave-as-eu-tells-apple-we-wont-let-you-silence-critics-like-epic-games-pr-waterloo-30b-risk/ [perma.cc/PW9V-436P].

[154] Complaint for Injunctive Relief, Epic Games, Inc. v. Google LLC, No. 3:20-cv-05671 (N.D. Cal. Aug. 13, 2020); The Fortnite Team, *The Fortnite Mega Drop - Permanent Discounts Up to 20%*, FORTNITE, https://www.fortnite.com/news/the-fortnite-mega-drop-permanent-discounts-up-to-20-percent [perma.cc/MT7Q-8U6N] (Sept. 27, 2020).

[155] Casey Newton, *An Epic Win Jolts Google*, PLATFORMER (Dec. 12, 2023), https://www.platformer.news/an-epic-win-jolts-google/ [perma.cc/PNS2-TC8T].

[156] Christie Boyden et al., *Historic Jury Verdict Finds Google Monopolized Google Play Store and Google Play Billing*, DECHERT LLP (Dec. 14, 2023), https://www.jdsupra.com/legalnews/historic-jury-verdict-finds-google-7622287/#:~:text=After%20Google%20banned%20Fortnite%20from,in%20an%20unlawful%20tying%20arrangement [perma.cc/8AQH-FCZT].

won both its federal and state competition law claims at trial.[157] Full details of the Google case have not yet been published at the time of writing, but Epic's win is noted by one crucial distinction. Apple's anticompetitive actions, as held, were all internal to Apple.[158] On the other hand, Google made a series of deals with potential competitors and app developers to lessen competition on the Android platform.[159] Spotify, for example, is said to have received a sweetheart deal from Google in which the music streaming service could keep nearly all its revenue rather than a typical 30% cut.[160] There is something unfortunate about the more open company being penalized for its openness, a sentiment even Tim Sweeney has

[157] Complaint for Injunctive Relief, Epic Games, Inc. v. Google LLC, No. 3:20-cv-05671 (N.D. Cal. 2023); *see also* Sean Hollister, *Epic win: Jury Decides Google Has Illegal Monopoly in App Store Fight*, VERGE (Dec. 11, 2023, 8:25 PM), https://www.theverge.com/23994174/epic-google-trial-jury-verdict-monopoly-google-play [perma.cc/YFC3-YXE7] (detailing the so far unpublished case against Google by Epic).

[158] *Epic Games, Inc.*, 559 F. Supp. 3d at 898–99.

[159] Statement of Matthew Gentzkow, Epic Games, Inc. v. Google LLC, No. 3:20-cv-05671-JD (N.D. Cal. May 2, 2024).

[160] *See* Adi Robertson & Sean Hollister, *A Secret Google Deal Let Spotify Completely Bypass Android's App Store Fees*, VERGE (Nov. 20, 2023, 3:47 PM), https://www.theverge.com/2023/11/20/23969690/google-spotify-android-billing-commission-secret-deal [perma.cc/5QQW-YQXD] (highlighting Google's deal to provide discriminatorily positive conditions to Spotify).

acknowledged.[161] Further proceedings may see the details of this Google case come to light.[162]

[45] Though an adjacent, mostly non-legal conflict, Epic has also seen its share of battle scars against Valve Software's "Steam," with both duking it out to be the dominant PC video game DSM. Unfortunately for Epic, Steam is the Goliath to the Epic Game Store's David. In late 2023, Tim Sweeney asserted that Steam's market share was roughly 85%, even after years of competition from the Epic Games Store, potentially implying that this was because of monopoly power.[163] Meanwhile, it would be difficult to call the Epic Games Store a success, even while the platform spends millions trying to lure in consumers and presents a more equitable revenue split for developers.[164] If online PC forum discourse is anything to go by,

[161] Sean Hollister, *Epic CEO Tim Sweeney: The Post-Trial Interview*, VERGE (Dec. 12, 2023, 2:17 PM), https://www.theverge.com/23996474/epic-tim-sweeney-interview-win-google-antitrust-lawsuit-district-court [perma.cc/U8MB-53XD] ("[I]t's a little bit unfortunate that in a lot of ways Apple's restrictions on competition are absolute. Thou shalt not have a competing store on iOS and thou shalt not use a competing payment method. And I think Apple should be receiving at least as harsh antitrust scrutiny as Google.").

[162] *See* In re Google Play Store Antitrust Litig., No. 20-CV-05671-JD, 2024 WL 3302068 (N.D. Cal. July 3, 2024) (rejecting Google's renewed motion for judgment as matter of law or for new trial).

[163] Tim Sweeney (@TimSweeneyEpic), X (Oct. 27, 2023, 6:58 PM), https://x.com/TimSweeneyEpic/status/1718039450255515940 [perma.cc/N3JB-H33Y] ("Steam . . . has roughly 85% market share in multi-publisher PC game stores as measured by revenue.") (Note that this market share assertion is seemingly unbacked by publicly available statistics.).

[164] Paul Tassi, *Tim Sweeney's Epic Games Store Is Still Losing Money After Five Years*, FORBES (Nov. 7, 2023, 9:25 AM), https://www.forbes.com/sites/paultassi/2023/11/07/tim-sweeneys-epic-games-store-is-still-losing-money-after-five-years/?sh=44078f00568e [perma.cc/NP84-EDWY].

these efforts have not won over the hearts and minds of consumers.[165] Even worse for Epic, some developers still consider Steam "quite a democratic platform," despite its revenue split and allegedly high market share.[166] So, is Steam actually anticompetitive? A case similar in style to Epic's suits against Apple and Google has commenced against Valve by an unrelated game developer and may provide further developments in this area.[167]

C. The Department of Justice & Apple

[46] In March 2024, the Department of Justice, with fifteen states and the District of Columbia, filed suit against Apple for anticompetitive conduct in the performance smartphone and general smartphone markets.[168] The prime focus of the suit is the lack of mobility for consumers on Apple's iPhone platform.[169] The DOJ alleges five main anti-competitive mechanisms keeping consumers locked within the iPhone platform: (1)

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[165] *See generally* @Boiofthetimes, *Never Thought About It Like That Before*, REDDIT (Mar. 27, 2024, 11:45 AM), https://www.reddit.com/r/pcmasterrace/comments/1bp6jl0/never_thought_about_it_like_that_before/ [perma.cc/38LH-UEH3] (implying that Steam leadership, like Valve CEO Gabe Newell, "does nothing" yet still succeeds against "competition [that] just keeps shooting themselves in the foot").

[166] Wes Fenlon, *Game Devs Praise Steam as a 'Democratic Platform' That 'Continues to Be Transformative' for PC Gaming Today*, PC GAMER (Apr. 26, 2024), https://www.pcgamer.com/gaming-industry/game-devs-praise-steam-as-a-democratic-platform-that-continues-to-be-transformative-for-pc-gaming-today/ [perma.cc/7W2Y-7NCJ]. *But cf. GDC State of the Industry: Devs Irked by 30 Percent Storefront Revenue Cuts*, GAME DEV. CONF. (Apr. 28, 2021), https://gdconf.com/news/gdc-state-industry-devs-irked-30-percent-storefront-revenue-cuts [perma.cc/HHP4-VB8M].

[167] Wolfire Games LLC v. Valve Corp., No. C21-0563-JCC, 2021 WL 4952220, at *1 (W.D. Wash. May 6, 2022) (illuminating some useful information related to Epic's competition cases, they are not discussed here for ethical reasons).

[168] Complaint, United States v. Apple, Inc., No. 2:24-cv-04055 (D.N.J. Mar. 21, 2024).

[169] *Id.*

prohibitions on super apps, (2) prohibitions on cloud streaming game apps, (3) limitations on messaging apps, (4) limitations on smartwatches, and (5) limitations on digital wallets.[170] The case is still in the early stages. These alleged mechanisms split between Apple's hardware and software, but they all point to the walled garden that is the iPhone platform. The prohibitions on super apps and cloud streaming apps are especially relevant to the issue of walled-garden software distribution since their further functions extend beyond Apple's walled garden. Some changes have already been made in recent history to allow these applications to exist more equitably on iOS, potentially weakening the DOJ's claims.[171]

D. Digital Markets Act in the European Union

[47] The Digital Markets Act ("DMA") is an E.U. regulation that introduces certain proportionate up-front obligations and prohibitions on harmful behaviors by "gatekeeping" digital players in the E.U.'s internal market.[172] The DMA applies specifically to the core platform services of six designated gatekeepers, which include Alphabet (Google), Apple, and Microsoft.[173] The two core platforms for software distribution are Apple's App Store and Google Play.[174] Also relevant are the services in the

[170] *Id.* at ¶ 10; *see also* Press Release, Dep't of Just., Just. Dep't Sues Apple for Monopolizing Smartphone Mkts. (Mar. 21, 2024) (on file with author) (explaining the Department of Justice case against Apple).

[171] *Apple Introduces New Options Worldwide for Streaming Game Services and Apps That Provide Access to Mini Apps and Games*, APPLE (Jan. 25, 2024), https://developer.apple.com/news/?id=f1v8pyay [perma.cc/GM5Q-FDV8] (updating its App Store guidelines to better support "streaming games and mini-programs").

[172] *See generally* Commission Regulation 2022/1925, art. 54, 2022 O.J. (L 265) 1, 1 (EU) (stating the relevant text of the Digital Markets Act).

[173] European Commission Press Release IP/23/4328, Digital Markets Act: Commission Designates Six Gatekeepers (Sept. 6, 2023).

[174] *Id.*

"Operating System" category, like Google's Android services, Apple's iOS, and Windows PC.[175]

[48] The E.U. designated these companies and services as a result of a series of investigations by the European Commission with three main quantitative criteria to identify a gatekeeper, focusing on control of a "core platform service."[176] A core platform service can mean various services, from online intermediation to cloud computing.[177] The general idea is that a gatekeeper experiences a durable economic position with an impact significant enough to justify regulation over their gateway service.[178] The gatekeepers then must follow a broad set of uniform rules, though exactly how gatekeepers enforce these obligations depends on the platform.[179] In software distribution, this effectively means that third parties can steer customers to third-party platforms and host third-party DSMs on the first-party gatekeeper platform while interoperating with first-party services.[180] These uniform rules also grant certain rights to users, like the ability to uninstall pre-installed apps and software.[181] It further prohibits certain kinds of self-preferencing by gatekeepers.[182]

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[175] *Id.*

[176] Commission Regulation 2022/1925, art. 3, 2022 O.J. (L 265) 1, 3 (EU).

[177] *Id.* at art. 2(2).

[178] *Id.* at art. 3.

[179] *See id.* at art. 5–8, 2022 O.J. (L 265) 1, 33–39 (EU).

[180] *See The Digital Markets Act: Ensuring Fair and Open Digital Markets,* EUR. COMM'N, https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/digital-markets-act-ensuring-fair-and-open-digital-markets_en [https://perma.cc/2R4Y-SQ4N] (last accessed Sept. 17, 2024).

[181] *Id.*

[182] *Id.*

[49] One downside of the DMA is that its gatekeeper designation is functionally made on a case-by-case basis. While there are quantitative criteria that apply to the largest of gatekeepers, the DMA also allows for designation of gatekeepers on "qualitative grounds" in an effort to keep up with the evolution of digital markets.[183] The use of a mixed designation method, rather than a universal one, is less predictable and necessitates continued legal action to upkeep and uphold the goals of the DMA. A reliance on continued regulatory action pre-enforcement is one aspect of the DMA that likely could not be replicated in the United States.[184] As seen from the aforementioned Microsoft case, for instance, regulatory regime changes in the United States can heavily affect legal actions with such long timespans.[185]

V. Proposals for Changes

A. Common Carrier Rules

[50] Common carrier principles should extend to DSMs to remedy the concerns of walled gardens. The U.S. legal system has long recognized the principle that "common carriers," firms that experience monopolistic power from bottlenecks in industries like communications and transportation, ought to be subject to special rules.[186] This principle would surely extend to

[183] *See id.*

[184] *See* Saxby Chambliss & Kent Conrad, *Europe's Digital Markets Act: A Cautionary Tale for U.S. Policymakers*, ROLL CALL (Oct. 5, 2023, 1:00 PM), https://rollcall.com/2023/10/05/europes-digital-markets-act-a-cautionary-tale- for-u-s-policymakers/ [perma.cc/MSU9-VZL8] (explaining that American politicians consider legislation of this type relatively heavy-handed).

[185] *See supra* Section IV. A.

[186] Adam Candeub, *Bargaining for Free Speech: Common Carriage, Network Neutrality, and Section 230*, 22 YALE J. L. & TECH. 391, 401–03 (2020).

digital markets.[187] Consumer technology markets have naturally become behemoths due to the network effects common to them and other barriers to entry that benefit incumbent firms.[188]

[51] Rather than concocting completely new rules, a framework for change is already available under U.S. law with common carrier rules.[189] Supreme Court Justice Clarence Thomas has even suggested that "some digital platforms are sufficiently akin to common carriers or places of accommodation to be regulated in this manner."[190] Justice Thomas's point applies to many essential digital platforms, though his comments target First Amendment concerns.[191] There have already been discussions about how "app stores" could be subject to common carrier regulation or something

[187] *Id.*

[188] *See* Kevin Werbach & David Zaring, *Systemically Important Technology*, 101 TEX. L. REV. 811, 817–19 (2023) ("One reason major tech companies are so powerful is that they function as digital platforms. That makes them [m]ultisided markets with strong network effects . . . these giants have become essential conduits through which modern commerce and social interaction flows.") (internal citations omitted); *see also* K. Sabeel Rahman, *Regulating Informational Infrastructure: Internet Platforms as the New Public Utilities*, 2 GEO. L. TECH. REV. 234, 242 (2018) (discussing the gatekeeping power associated with network effects).

[189] *But see* Michael J.K.M. Kinane, *Grandpa Sherman Did Not See Google Coming: Evolutions in Antitrust to Regulate Data Aggregating Firms*, 107 MINN. L. REV. 1759, 1763–65 (2023) (discussing the limitations of current antitrust law).

[190] Biden v. Knight First Amend. Inst. at Columbia Univ., 141 S. Ct. 1220, 1224 (2021) (Thomas, J., concurring).

[191] *Id.*; *see also* Eugene Volokh, *Treating Social Media Platforms Like Common Carriers?*, 1 J. FREE SPEECH L. 377, 381 n.10 (2021) (discussing calls to treat social media platforms as common carriers). *But see* Blake E. Reid, *Uncommon Carriage*, 76 STAN. L. REV. 89, 101 (2024) ("[T]he embrace of common carriage law and an antidiscrimination stance marks a sharp turn from traditional conservative opposition to government regulation of information platforms on economic and libertarian grounds.").

like it, but this needs to go further.[192] Any rules should include all DSMs, not just smartphone app stores. Whether it is a digital video game marketplace or a cloud API distributor, the market conditions underlying them are fundamentally similar. All DSMs act as gatekeepers, and the law should recognize that. These proposed rules aim to preserve the competitive process and limit conflicts of interest that may incentivize anticompetitive conduct in software markets.[193] Common carrier rules entail three main principles: (1) equal access, (2) nondiscretionary rate setting, and (3) no unreasonable deplatforming.[194]

[192] *Cf.* Ganesh Sitaraman & Morgan Ricks, *Tech Platforms and the Common Law of Carriers*, 73 DUKE L. J. 1037, 1078 (2024) ("App stores thus have considerable power over access to the operating system and the device. They can deny service altogether, including to firms that seek access for competitor applications, or discriminate against competitor applications. App stores could self- preference via pricing or search ranking. To the extent that app stores engage in such practices—exclusion from the store, self-preferencing, price discrimination, or search discrimination—there is a strong case that the common law of carriers could provide a cause of action."); *cf.* Nikolas Guggenberger, *Essential Platforms*, 24 STAN. TECH. L. REV. 237, 264 (2021) ("[A]pp platforms hold complete control over access to their ecosystems and reserve the ability and right to delist third-party applications at any time.").

[193] *Cf.* Lina M. Khan, *Amazon's Antitrust Paradox*, 126 YALE L. J. 710, 790–91 (2017) (reforming antitrust laws for platform markets should strengthen prohibitions against predatory pricing and scrutinize vertical integration to protect competition and limit conflicts of interest).

[194] *Cf.* Christopher S. Yoo, *Is There a Role for Common Carriage in an Internet-Based World?*, 51 HOUS. L. REV. 545, 570 (2013) (citing 47 U.S.C. §§ 201–203 (2012)) ("The affirmative obligations imposed on common carriers are established by the provisions of Title II of the Communications Act of 1934… entry restrictions and the duty to serve, the obligation to charge rates that are nondiscriminatory, the obligation to charge rates that are just and reasonable, and structural separation.").

i. Equal Access Rules

[52] Equal access rules would require DSM operators to accept all developers within their DSMs, assuming no unusual costs or risks.[195] Many DSM operators employ heavy technical and non-technical restrictions on developer platform access.[196] These barriers to entry need to be removed or reduced to their minimum.[197] For example, it would be wrong for Apple to ban the Fortnite app, not to mention the Epic developer account, from the App Store when it has not engaged in actively, qualitatively harmful behavior to the consumer.[198] Using a third-party in-app payment processor rather than the first-party in-app payment processor, as in the *Epic Games, Inc. v. Apple, Inc.* case, would not be an example of such consumer-harming behavior.[199] Especially while there is no competition to DSMs themselves via contestable, competitive third-party DSMs, rules obligating equal access are paramount for protecting consumer choice and developer freedom.[200]

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[195] *See* Lina M. Khan, *Sources of Tech Platform Power*, 2 GEO L. TECH. REV. 325, 332 (2018).

[196] *Cf. Digital Rights Management (DRM): Protecting Intellectual Property in the Information Age*, KITEWORKS, https://www.kiteworks.com/risk-compliance-glossary/digital-rights-management/ [perma.cc/45KF-LVY5] (last accessed Sept. 22, 2024) (discussing how publishers, authors, and creators of digital content use digital rights management to restrict access).

[197] *See* Lina Khan, *The Separation of Platforms and Commerce*, 119 COLUM. L. REV. 973, 1029 (2019) (citing Verizon Commc'ns Inc. v. L. Offs. of Curtis V. Trinko LLP, 540 U.S. 398 (2004)) (arguing that a dominant tech platform could, in theory, be liable for discriminatory refusal to deal under Section 2 of the Sherman Act, but the Supreme Court has cast doubt on the practical viability of such claims).

[198] *See App Developers Deserve a Level Playing Field*, *supra* note 78.

[199] Epic Games, Inc. v. Apple, Inc., 73 F.4th 785, 786 (9th Cir. 2023).

[200] Ekaterina Kachalova, *Dominance of App Store & Google Play is Hurting Developers and Users. Telegram Is Just Its Latest Victim*, ADGUARD: BLOG (Nov. 18, 2022), https://adguard.com/en/blog/app-stores-issues-telegram.html [perma.cc/X2EW-KWAS].

[53] The benefits of equal access rules hold true for emerging markets, where other remedies or evasive measures to walled-garden software distribution are nearly impossible to implement due to all computing being operated externally in the cloud and away from consumer modification.[201] Ideally, hardware agnosticism would mean that these cloud platforms could compete in the same way that all DSMs ought to, with different options for developers and consumers to choose as they see fit.

[54] Further, all categories of software, including those for which a DSM operator has competing software, must be allowed. Again, focusing on Apple, this was a major point of the Department of Justice suit, that categories like super apps and cloud streaming apps are unfairly refused from the App Store.[202] These kinds of applications should be allowed to exist on Apple's platform as long as they do not cause harm, particularly qualitative harm, to consumers. Competing software, both end-user applications and API functions within applications, should have equal access to DSMs.

[55] Most importantly, the current barriers to equal DSM access should not be replaced with newer, less egregious barriers. The failure to fully remove anticompetitive barriers is one of the major problems with implementing the DMA in the E.U., as the fluid nature of the DMA has allowed barriers to stay in place even while those barriers are technically

[201] Eric Griffith, *What is Cloud Computing?*, PC MAG (Feb. 15, 2022), https://www.pcmag.com/how-to/what-is-cloud-computing [perma.cc/5F3E-866F].

[202] Complaint at ¶ 10, United States v. Apple, Inc., No. 2:24-cv-04055 (D.N.J. Mar. 21, 2024).

non-compliant.[203] High rates or high costs to become a certified developer should not be used to functionally prevent equal access either. This issue of new barriers replacing the old but with no ultimate increase in consumer welfare is also why this article reflects on the state of all software markets today.[204] Trends overall are moving towards walled gardens rather than away.[205] While some developers might have the means to rise above the barriers, others do not. More competition requires more players, which is where equal access rules come in.[206]

ii. Reasonable Rate Setting

[56] Reasonable rate setting is essential to ensure that developers receive fair compensation for their services, including their choice to use a

[203] *See* Sarah Perez, *Reading the Fine Print of Apple's DMA Rules: 25 Things App Developers Need to Know*, TECHCRUNCH (Jan. 30, 2024, 9:06 AM), https://techcrunch.com/2024/01/30/reading-the-fine-print-of-apples-dma-rules-25-things-app-developers-need-to-know/ [perma.cc/Z4SU-VGS9] ("After digging through the documents Apple provided and speaking to the company, there are a few caveats and details to these rules that developers should know" including that third-party app stores "can only be distributed from developer websites, not the App Store."); *see also* European Commission Press Release IP/24/3433, Commission Sends Preliminary Findings to Apple and Opens Additional Non-Compliance Investigation Against Apple Under the Digital Markets Act (June 24, 2024) ("The European Commission has informed Apple of its preliminary view that its App Store rules are in breach of the Digital Markets Act (DMA), as they prevent app developers from freely steering consumers to alternative channels for offers and content.").

[204] *See* Rob Simpson, *Grow User Acquisition and Store Conversions with the Updated Play Store Listing Certificate Course*, ANDROID DEVS. BLOG (Sept. 7, 2023), https://android-developers.googleblog.com/2023/09/grow-user-acquisition-and-store-conversions-with-updated-play-store-listing-certificate-course.html [perma.cc/2AGU-9593].

[205] *See* Brock Munro, *Walled Gardens,* PUBLIFT (Sept. 18, 2024), https://www.publift.com/blog/walled-gardens [perma.cc/BW6Z-B5M8].

[206] *Id.*

platform's default services. Reasonable rate setting would assist in delivering fair prices to consumers for these services, rather than developers raising prices to keep up with platform revenue splits. The days of the 30% cut for DSMs that do little to justify such a steep price ought to end.

[57] A crucial distinction must be made between common notions of "reasonable rate setting" and what this article proposes. This article does not propose that regulators perform lengthy investigations into what rates, revenue splits, and business costs are fair to developers and consumers in order to reach a set rate that all DSM operators must abide by.[207] Regulated rate setting is not the goal. Instead, first and foremost, DSM operators should be prohibited from rate discrimination. The *Epic Games, Inc. v. Google LLC* case already presents how discriminatory rate setting in DSMs is evidence of anticompetitive behavior.[208] More than that, discriminatory rate setting is itself anticompetitive behavior in software distribution, and the law ought to reflect that without the need to go through more lengthy

[207] *See* THOMAS SOWELL, BASIC ECONOMICS 216 (5th ed. 2015) ("Ideally, a regulatory commission would set prices where they would have been if there were a competitive marketplace. In practice, there is no way to know what those prices would be. Only the actual functioning of a market itself could reveal such prices."); *see also* Frank Pasquale, *Tech Platforms and the Knowledge Problem*, 2 AM. AFFS. J. 3, 3 (2018) ("Knowledge about the price of supplies and labor, and consumers' ability and willingness to pay, is so scattered and protean that even the wisest authorities cannot access all of it. No person knows everything about how goods and services in an economy should be priced.").

[208] *See* Complaint for Injunctive Relief at ¶ 110; Epic Games, Inc. v. Google LLC, No. 3:20-cv-05671 (2023); *see supra* Section IV.B.

litigation to demonstrate this.[209] DSMs cannot set their rates to disadvantage any developers.[210]

[58] That said, nondiscriminatory rate setting as a standalone remedy would likely have little effect where competition is still not allowed to thrive otherwise. In a hypothetical future where third-party DSMs are unavailable, actual rate setting by lawmakers might be a viable, if flawed, alternative to allowing the competitive process to proceed on its own. Regulated rate setting does have some potential for success, though. Looking to rates in other markets, such as credit card and retail revenue splits, may help gauge a general area where rates might be considered "reasonable."[211] The fundamental question asked in the case of any rate setting is: does the rate of revenue called upon by a DSM reflect the value of the service that the DSM provides? Does it reflect the services that developers choose to use? If all the DSM does is host an application, and no further services such as payment processing or marketing are utilized, then the rate should be relatively low, akin to credit card rates.[212] Yet, suppose the placement of the

[209] *Cf.* Lina M. Khan, *The Separation of Platforms and Commerce*, 119 COLUM. L. REV. 973, 1007 (2019) ("Apple charges Spotify and certain other apps a 30% fee on in-app purchases—a fee that, Spotify points out, Apple enforces selectively. Apple's own apps do not pay the fee, and neither do many apps, like Uber, that are not in direct competition with a comparable Apple service.").

[210] *See* Ben Sperry, *Does Apple's "Discrimination" Against Rival Apps in the App Store Harm Consumers?* TRUTH ON MARKET (Oct. 16, 2019), https://truthonthemarket.com/2019/10/16/does-apples-discrimination-against-rival-apps-in-the-app-store-harm-consumers/ [perma.cc/25NT-9Y7W].

[211] *See* Timothy J. Muris, *Payment Card Regulation and the (Mis)application of the Economics of Two-Sided Markets*, 2005 COLUM. BUS. L. REV. 515, 521 (2005) (discussing payment card revenue rates); *see also* Steven Semeraro, *The Antitrust Economics (and Law) of Surcharging Credit Card Transactions*, 14 STAN. J. L. BUS. & FIN. 343, 344–45 (2009) (discussing credit card transaction competition issues).

[212] *Cf.* Dina Srinivasan, *Why Google Dominates Advertising Markets Competition Policy Should Lean on the Principles of Financial Market Regulation*, 24 STAN. TECH. L. REV. 55, 67–68 (2020) (discussing analogizing digital platforms to financial markets).

application within the app store provides value to developers, like being listed as recommended by the DSM operator, akin to preferential shelf placement in retail.[213] In that case, the rate should reflect that curating effect. Apple would likely contend it serves an essential curating function in this way, as its App Store not only provides developers with reach to consumers but also benefits both consumers and developers from reduced costs associated with finding apps they want and consumer acquisition, respectively.[214] Better yet, suppose that in addition to this ability to reach consumers, a DSM adds even further software features, such as social and community functions, as Steam does.[215] There, the rate should reflect that additional value as a social platform. This is the same in the case of a video game console like the PlayStation 5.[216] These are the kinds of considerations that would occur naturally in a genuinely competitive market for DSMs.

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[213] *See, e.g.*, Thomas K. Cheng, *Buyer Power in the Digital Economy: The Case of Uber and Amazon*, 19 N.Y.U. J. L. & BUS. 1, 58 (2022) ("The standard rate of fifteen percent has remained the same since the inception of the Amazon Marketplace in 2000, despite the astronomical expansion of Marketplace's business volume over the years."). *But see* CNET, *Google, Apple, and ALL the Tech Billionaires Fight Antitrust Against Congress*, YOUTUBE, at 39:50 (July 29, 2020), https://www.youtube.com/watch?v=ht-zdeMwxbw [perma.cc/RA5L-EKVK] (quoting the Apple CEO stating that developers "never pay for shelf space," in contrast to retail analogy, while speaking about the positive effects of the App Store).

[214] *The App Store, Spotify, and Europe's Thriving Digital Music Market*, *supra* note 76.

[215] *See, e.g.*, Jessica Conditt, *Skyrim's PC Fans Are Modding the Crap Out of It with Steam Workshop*, ENGADGET (Feb. 14, 2012), https://www.engadget.com/2012/02/14/skyrims-pc-fans-are-modding-the-crap-out-of-it-with-steam-works/ [perma.cc/J4KA-A8J4] (demonstrating additional functions provided by Steam, including Steam's Skyrim Workshop).

[216] *See* Steve Hogarty, *PlayStation 5 Review: Is the Best-Selling Console Worth Your Money?*, INDEPENDENT (Feb. 24, 2024, 3:00 AM), https://www.independent.co.uk/extras/indybest/gadgets-tech/video-games-consoles/ps5-review-playstation-sony-b2501525.html [perma.cc/646B-BZ4Y] (noting that additional features impact the value of the PlayStation 5).

Where natural competition is not possible, rate setting must be reasoned to these already present factors in the minds of both developers and consumers.

[59] Charging a flat 30% revenue cut for platforms that act purely as DSM gatekeepers simply does not make sense anymore.[217] A 30% rate might be reasonable where developers willingly utilize a DSM's total services. If developers choose not to utilize those complementary services, they should not have to pay that flat cut on all revenue.[218] Imagine, instead, a developer choosing to use only the pure DSM service for hosting their application and making it functionally accessible, paying a DSM operator a 12% revenue split. They might choose this option because they can handle all the payment processing, updates, social outreach, on-device advertising, and associated costs. Imagine a mid-size developer without the resources to enlist separate advertising and social outreach. They might instead choose a 20% rate that includes this bundle of services. Requiring bundles of DSM services and adjacent services to be delivered piecemeal at incremental rates would give developers choices about which specific services to utilize rather than having everything tied together. This freedom to choose could then incentivize individual services to improve and compete. This unbundling of DSM services would be especially effective alongside the introduction of third-party DSMs by presenting established competition in the same space as first-party DSM's services. So, while purer competition between multiple DSMs available on the same device is still the best solution to high rates for developers, regulated rate-setting factoring in the

[217] See Sarah Oh Lam, *A Review of 'Big Tech' Antitrust Litigation in the Federal Courts*, 28 RICH. J. L. & TECH. 469, 486 (2022) (discussing that a 30% commission is the industry standard today).

[218] *See* Emma C. Smizer, *Epic Games v. Apple: Tech-Tying and the Future of Antitrust*, 41 LOY. L.A. ENT. L. REV. 215, 230–31 (2021) (discussing smartphone software tying related the Epic cases); *see generally* Thomas H. Au, *Anticompetitive Tying and Bundling Arrangements in the Smartphone Industry*, 16 STAN. TECH. L. REV. 188, 199 (2012) (discussing the anticompetitive effects of software bundling).

DSM's broader value or the compartmentalization of a DSM's broader services could also succeed.[219]

iii. No Unreasonable Deplatforming

[60] Even with rules enforcing equal access, moderation and potential deplatforming should be allowed, but the process must be consistent and transparent. Qualitative harm to the consumer, as described in the equal access proposal, should be the primary factor here. So, "colorful criticism" of a DSM operator, for instance, should never be a reason for deplatforming, and there should be punishments for DSM operators acting as censors.[220] The curating function that many DSMs perform should be about lifting exemplary software and developers to the forefront, not putting down the software that the DSM operator does not approve of.

[61] Deplatforming is an action that should only occur as absolutely necessary. On the surface, deplatforming might seem to be a simple limitation on commerce. In reality, deplatforming is a form of limiting expression. DSMs' services are too critical, implicating existential concerns about software access and access to the broader world.[221] It is for these reasons that deplatforming should never be preemptive. Excluding developers from a DSM simply because they might engage in prohibited behavior is by its nature unreasonable, as the consequences of

[219] *Leading App Developers Form the Coalition for App Fairness to Promote Competition and Protect Innovation on Digital Platforms*, COAL. FOR APP FAIRNESS (Sept. 23, 2020), https://appfairness.org/app-developers-coalition-for-app-fairness-competition-innovation/ [perma.cc/P6T7-YHEQ].

[220] *See UPDATE supra* note 148; *cf.* Ganesh Sitaraman, *Deplatforming*, 133 YALE L. J. 497, 546–48 (2023) (discussing how and when to exclude individuals and businesses from critical services).

[221] *Id.* at 535; *see also* U.S. DEP'T OF COM., COMPETITION IN THE MOBILE APPLICATION ECOSYSTEM 1 (2023) ("Apps are integral to work and commerce").

deplatforming are too disconnected from any suspicions that might arise. Preventative deplatforming entails establishing fair prophylactic conditions before a DSM hosts a developer or software, like via terms of service.[222] These prophylactic conditions are more reasonable because they create a clear "if-then" response to prohibited behavior.[223]

iv. Implementation?

[62] How should these common carrier rules, among other proposals, be implemented? The enforcement of current competition law might be effective, but so far, the results have not demonstrated such.[224] As other scholars have noted, tools already exist for relevant decision-makers to address the unfair market practices associated with walled gardens.[225] A reevaluation of current competition law standards to account for the service-based transactions associated with modern software might help. Yet, that would not create a legal path to competition other than what already exists.[226] Instead, the targeted rulemaking utilizing common carrier principles would be the most viable path.

[222] Sitaraman, *supra* note 221 at 537–38 (explaining preventative deplatforming)

[223] *Id.*

[224] *But see* Yunsieg P. Kim, *A Revolution Without a Cause: The Digital Markets Act and Neo-Brandeisian Antitrust*, 2023 WIS. L. REV. 1247, 1254 (2023).

[225] *See* Pierre Schlaefli, *The App Store Dilemma: Revenue "Cuts," App Restrictions, and Payment Systems, Is There Unfair Competition?*, 61 HOUS. L. REV. 1059, 1082 (2024).

[226] *See* Christos A. Makridis & Joel Thayer, *The Big Tech Antitrust Paradox: A Reevaluation of the Consumer Welfare Standard for Digital Markets*, 27 STAN. TECH. L. REV. 71 (2024) (discussing reevaluating the consumer welfare standard in antitrust law).

[63] That then begs a secondary question: do regulators, like the Federal Trade Commission, have the mandate to enact such regulation?[227] Ideally, an "Open App Markets Act" or something similar from Congress would not be necessary for these remedies to become reality.[228] Even still, is an executive agency, rather than Congress, the more appropriate body to make such broad change? As far as this article is concerned, the answer is yes. The technical nature of software distribution benefits from the expertise and consistency in oversight available at executive agencies.[229] So, while many bodies have the potential to remedy walled-garden software distribution, this article prefers the thoroughness of executive agency action.

[227] *See FTC Announces Rule Banning Noncompetes*, F.T.C. (Apr. 23, 2024), https://www.ftc.gov/news-events/news/press-releases/2024/04/ftc-announces-rule-banning-noncompetes [perma.cc/9C94-BDBA]; *see also* Andrea Hsu, *Federal Judge Partially Blocks U.S. Ban on Noncompetes*, NPR, https://www.npr.org/2024/07/03/nx-s1-5020525/noncompete-ban-block-ftc-competition-ryan-texas [perma.cc/7E3G-V6AA] (July 3, 2024, 6:55 PM).

[228] *See* Open App Markets Act, S. 2710, 117th Cong. § 3 (2021-2022) (exploring potential congressional action against app store monopolies); *see also* Gregory Stamatopoulous, *Ending Duopolies: How the Open App Markets Act Could Change the Digital and Legal Landscape for Big Tech*, MICH. BAR J. (2024), https://www.michbar.org/journal/Details/Ending-duopolies-How-the-Open-App-Markets-Act-could-change-the-digital-and-legal-landscape-for-big-tech?ArticleID=4852#:~:text=If%20passed%2C%20OAMA%20would%20significantly,run%20by%20Apple%20or%20Google. [https://perma.cc/7M7D-NZCE].

[229] *But see* Rory Van Loo, *The Public Stakes of Consumer Law: The Environment, the Economy, Health, Disinformation, and Beyond*, 107 MINN. L. R. 2039, 2081–84 (2023) (discussing resource limitations in enforcing consumer protection and antitrust law by the FTC).

[64] Remedies to the ills of walled-garden software distribution do not begin and end with implementing common carrier rules.[230] This article also suggests three complementary remedies: (1) sideloading accessibility, (2) introduction of third-party DSMs, and (3) prohibitions on self-preferencing for operators of DSMs.

B. Sideloading for All

[65] Sideloading is one of the most potent tools for evading walled-garden software distribution. As previously noted, sideloading allows users to install the software they want on their devices, regardless of whether or not it is available on a first-party DSM, like Apple's App Store or any other DSM.[231] Where the DSM operator holds such tight control over this downstream market, which is software access itself, sideloading should be available to reduce consumers' reliance on the choices of these operators. Though many devices can perform sideloading, device manufacturers and operating system operators tend to make the process difficult.[232] Instead, sideloading should be as accessible as possible. Considerations around

[230] *See generally* JOHN BERGMAYER, TENDING THE GARDEN: HOW TO ENSURE THAT APP STORES PUT USERS FIRST (2020) (discussing potential remedies to app store monopolies that parallel those presented in this note); Brian L. Frye, *John Bergmayer on Regulating App Stores*, YOUTUBE (June 24, 2020), https://www.youtube.com/watch?v=1BfuiF32hxY [perma.cc/69BL-N5ZC] (showing a podcast episode with law professor discussing fundamental issues related to app store regulation).

[231] *See supra* Section II.C.

[232] *See* Ben Schoon, *Epic Games is suing Samsung (and Google) for making it harder to sideload Android apps*, 9TO5 GOOGLE (Sep. 30, 2024), https://9to5google.com/2024/09/30/epic-games-samsung-google-sideloading-lawsuit/ [perma.cc/8NRG-CC3F](on sideloading restrictions within Android); *cf.*, John Davidson, *Judge led through 'sideloading' Fortnite – and finds it all too hard*, AUSTL. FIN. REV. (Mar. 19, 2024, 6:57 PM), https://www.afr.com/technology/judge-led-through-sideloading-fortnite-and-finds-it-all-too-hard-20240319-p5fdoc [perma.cc/QD2S-P4FC] (describing judicial analysis of sideloading prevention within Epic's lawsuit against Google).

sideloading should also extend beyond software policy alone by accounting for hardware interoperability with connectivity standards, like USB-C, which make sideloading more accessible.[233] Sideloading would increase competition in software distribution markets by expanding consumer choice and providing a new avenue for developers who do not fit within moderated DSMs. It additionally increases the accessibility of other paths outside of a walled garden, like third-party DSMs.[234]

[66] Consumers use platforms where centralized software distribution and walled gardens are not the norm, such as Windows PCs. Such platforms have not been harmed to such an extent that tightly restricted software distribution is necessary..[235] Sideloading does not need to be made so easy that one could do it by accident. It just needs to be an option for those who want to use their devices as they see fit. If safety is a concern, staying within a DSM, even a third-party one, is a reasonable option for consumers.

[67] Admittedly, sideloading alone might be ineffective when a consumer cannot access the hardware on which a platform or DSM operates. Developers are obligated to provide their applications to the widest networks of consumers. So, the process of creating software that can operate on-device and be installed separately from a DSM may not be cost-

[233] *Cf.* MICHAEL KADES & FIONA M. SCOTT MORTON, INTEROPERABILITY AS A COMPETITION REMEDY FOR DIGITAL NETWORKS 13 (2021) (discussing software interoperability).

[234] *See* Jennifer Huddleston & Juan Londoño, *Does "Sideloading" Strengthen Competition on Mobile Devices?*, AMERICAN ACTION FORUM (Mar. 3, 2021), https://www.americanactionforum.org/insight/does-sideloading-strengthen-competition-on-mobile-devices/#:~:text=Advocates%20for%20sideloading%20argue%20that%20it%20should%20be%20allowed%20to [perma.cc/KZ5Y-PTNK].

[235] Chris Hoffman, *Which Computing Platforms Are Open, and Which Are Closed?*, HOW TO GEEK (Sept. 22, 2016), https://www.howtogeek.com/149973/htg-explains-which-computing-platforms-are-open-and-which-are-closed/#:~:text=The%20last%20few%20years%20have%20seen%20the%20rise,even%20mobile%20ones%20--%20are%20still%20open%20platforms [perma.cc/PBN9-BDXQ].

effective or reasonable in a world where cloud computing has become the standard over on-device computing.[236] Still, presenting sideloading as a choice for consumers and as an alternative to established DSMs for developers can play a role in encouraging experimentation that could lead to realized benefits down the line.[237]

C. Third-party Digital Software Marketplaces

[68] Third-party DSMs can open a world of possibilities on a device, potentially acting as the most balanced remedy in reducing the power of walled gardens. Similarly, developers should be permitted to use third-party payment processors, especially where third-party software channels are concerned. If the first-party services are superior, competition will only improve them and demonstrate their superiority.[238]

[69] As described previously, no DSM should be forced to host a particular developer under all circumstances.[239] So, if one DSM cannot reasonably host a developer or end-user application, then the developer has alternatives for hosting. The same could be said in the event of consumer deplatforming, though that is much less common software distribution.[240]

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[236] *See* KADES & MORTON, *supra* note 234, at 14.

[237] *See* WVFRM Podcast, *supra* note 85, at 1:16:22.

[238] *See* Henry Fosdike, *What Is a Third-Party (3P) Marketplace?*, INTELLIGENTREACH, https://www.intelligentreach.com/guides/what-is-a-3p-marketplace/#:~:text=A%203P%20Marketplace%20allows%20retailers%20to%20sell%20their%20products%20directly [perma.cc/UP8R-S4R7].

[239] *See supra* Section IV.A.iii.

[240] *See, e.g.*, *Restricted Steam Account*, STEAM, https://help.steampowered.com/en/faqs/view/4F62-35F9-F395-5C23 [perma.cc/2FBU-TTES] (last accessed August 28, 2024) (reporting on Steam users being deplatformed); *If a Message Says 'Your Account Has Been Disabled in the App Store and iTunes'*, APPLE (Nov. 28, 2023), https://support.apple.com/en-us/108100 [perma.cc/HX6B-ZXGX].

Implementing third-party software marketplaces would vary depending on the digital platform and context. Third-party DSMs are a common-sense method for encouraging competition and securing access as they lessen the first-party platform operator's control and, thereby, their anticompetitive effect.[241] Many will likely still prefer the first-party option. If not, then the free market can weigh out the winner.

[70] In keeping with equal access rules, these third-party DSMs should be hostable even on other DSMs, including the centralized, first-party DSM operated by a device manufacturer. This accessibility would mean, for instance, that a consumer could open the App Store on iPhone and download the Microsoft Store without finding access elsewhere. However, when this is not possible due to moderation concerns, sideloading is still a viable option to third-party DSM access. It is probably not reasonable to expect the App Store to host a "Pornography Games Store," (as an extreme hypothetical), as that would likely harm young users. That said, if consumers want to use the third-party DSM and developers want to create for it, that should always be an option as long as the DSM and its applications comply with all other legal obligations, such as intellectual property and privacy laws.

[71] While some solutions to walled-garden software distribution rely predominantly on the introduction of third-party DSMs, such as with the Digital Markets Act, there are limits to the effectiveness of third-party DSMs alone.[242] Device operators, often also acting as first-party DSM

[241] *Cf.* Craig Peters, *Apple and Google App Stores v. Developers*, 22 WASH. U. GLOB. STUD. L. REV. 87, 96 (2023); *see also* Fiona M. Scott Morton et al., *Equitable Interoperability: The "Supertool" of Digital Platform Governance*, 40 YALE J. ON REG. 1013, 1044–45 (2023) ("Under the current market structure, apps have no alternative route to serve Apple users. With equitable interoperability of the iOS store interface, third-party stores would enter, develop brand recognition, and cultivate large user bases of their own.").

[242] *See* Mark MacCarthy, *Overseeing App Stores to Promote Competition in the Digital Markets Act*, BROOKINGS (Mar. 20, 2024), https://www.brookings.edu/articles/overseeing

operators, can still restrict these third-party DSMs under certain conditions.[243] For instance, Android has no direct prohibitions on third-party DSMs like with similar platforms, yet no other DSM has emerged to challenge the Google Play Store.[244] This is because the other conditions within these systems restrict the market, including through self-preferencing behaviors.[245]

D. Prohibitions on Self-preferencing Behaviors

[72] As an extension of common carrier rules, DSMs should prohibit self-preferencing behaviors. Under previously described equal treatment rules, a DSM operator should treat all developers equally.[246] This prohibition is especially necessary in the case where the DSM operator also

-app-stores-to-promote-competition-in-the-digital-markets-act/ [perma.cc/Q8SJ-2E5H] ("App store contestability, of course, means the existence of real companies competing with the incumbent app stores, not merely the possibility of entry.").

[243] *See, e.g.*, Samuel Axon, *After Two Rejections, Apple Approves Epic Games Store App for iOS*, ARS TECHNICA (July 8, 2024, 5:30 PM), https://arstechnica.com/gadgets/2024/07/report-apple-approves-epic-games-store-on-ios-in-europe/ [perma.cc/B7QT-29U2] ("Apple's new policies allow for alternative app marketplaces but with some big caveats regarding the deal that app developers agree to.").

[244] *See* The Intelligence, *Stores of Value: Regulators Lean on App Vendors*, ECONOMIST, at 8:12 (May 24, 2024), https://shows.acast.com/theintelligencepodcast/episodes/stores-of-value-regulators-lean-on-app-vendors [perma.cc/85NZ-LFXS] ("You have always been able to access different types of app stores on Android phones, and no serious contender to [the] Google Play Store, which is Alphabet's big app store, [has] really emerged.").

[245] *Id.*

[246] *See supra* Section V.A.i.

acts as a developer.[247] The self-preferencing of a DSM operator's applications can indirectly lead to obsolescence or functional invisibility for third parties presenting overlapping software.[248] Sometimes, this self-preferencing becomes functional exclusion, such as being hidden from search with a DSM.[249] In addition to providing software within a platform, developers should also be able to utilize functionality already accessible to that platform operator, including API access and data sharing, at least in the aggregate. Prohibitions on self-preferencing would increase competition in software distribution markets by allowing software to compete with a DSM operator's first-party software without handicaps.[250]

[73] Anti-steering is the most discussed type of self-preferencing behavior in recent history.[251] Not much needs to be said in this regard. Developers should not be prevented from communicating with consumers,

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[247] *What is an App Marketplace?*, PARTNER FLEET (June 10, 2024), https://www.partnerfleet.io/blog/what-is-an-app-marketplace#:~:text=Apps%20and%20integrations%20on%20a,are%20available%20from%20the%20start [perma.cc/98L2-89L2].

[248] Guillaume Duquesne et al., *What Constitutes Self-Preferencing and Its Proliferation in Digital Markets*, GLOB. COMPETITION REV. (Dec. 8, 2023), https://globalcompetitionreview.com/guide/digital-markets-guide/third-edition/article/what-constitutes-self-preferencing-and-its-proliferation-in-digital-markets [perma.cc/PRB5-3SJ5].

[249] *See* Erik Hovenkamp, *Platform Exclusion of Competing Sellers*, 49 J. CORP. L. 299, 311–12 (2024) (discussing app store exclusion); *see also* Nikolas Guggenberger, *The Essential Facilities Doctrine in the Digital Economy: Dispelling Persistent Myths*, 23 YALE J. L. & TECH. 301, 325 (2021) ("Audiobooks.com's downloads . . . decreased by 25%, when Apple down-ranked the app . . . [T]here is ample evidence that the iOS App Store . . . up-ranks [Apple's] own application offers.").

[250] Duquesne, *supra* note 249.

[251] *See,* e.g., Nan Chen & Hsin-Tien Tsai, *Steering via Algorithmic Recommendations*, RAND J. OF ECON. 1 (2023).

particularly where the communication is directly beneficial to consumers by directing them to less expensive services, as was the case with Epic Games in the *Epic Games, Inc. v. Apple, Inc.* case.[252] Courts and lawmakers should render anti-steering provisions unenforceable to prevent DSM operators and device operators from erecting yet another wall in the walled garden, one that separates developers from consumers.

[74] As the Microsoft cases addressed, tying and bundling can have profound anticompetitive effects.[253] Tying has already been made illegal under current federal statute.[254] A case of first-party DSMs with no third-party options might be considered an example of unlawful tying.[255] On mobile devices, tying is less common in its strictest form, though the default setting by device manufacturers, usually the same as DSM operators, is typical.[256]

[75] Device operators acting as first-party DSM operators often have significant control over platform defaults at the expense of consumers and

[252] *See* Epic Games, Inc. v. Apple, Inc., 73 F.4th 785, 786–87 (9th Cir. 2023); *supra* Section IV.B.

[253] *See* United States v. Microsoft Corp., 87 F. Supp. 2d 30, 39, 49 (D.D.C. 2000), *aff'd in part*, *rev'd in part and remanded*, 253 F.3d 34 (D.C. Cir. 2001); *supra* Section IV.A.

[254] Sherman Act, 15 U.S.C. § 1 (prohibiting contracts in restraint of trade).

[255] *See* Thomas H. Au, *Anticompetitive Tying and Bundling Arrangements in the Smartphone Industry*, 16 STAN. TECH. L. REV. 188, 207 (2012) ("[I]n markets where there are no significant competitors for application clearinghouses, such as in the Apple iOS market . . . consumers may be largely unaware that they may be suffering higher prices for third-party applications by being restricted to a single application clearinghouse.").

[256] *See,* e.g., Omar Vásquez Duque, *Antitrust Regulation of Big Tech Needs a Better Understanding of Behavioral Economics*, PROMARKET (Dec. 19, 2023), https://www.promarket.org/2023/12/19/antitrust-regulation-of-big-tech-needs-a-better-understanding-of-behavioral-economics/ [perma.cc/4ZHQ-2UUL].

developers.[257] For example, Apple's applications receive greater priority and access than third-party applications on iPhone.[258] Digital wallet apps are neutered while Apple Wallet has full access to the operating system.[259] In many situations, there is no option to select a default application for an activity other than Apple's, nullifying the market for potential third-party apps.[260] Further, Apple may even act in bad faith by essentially copying the functions of a third-party app into its first-party app, effectively replacing it.[261] This third-party nullification becomes even more problematic in emerging markets reliant on cloud technology, as infrastructure must be shared among the cloud platform operator's applications and any

[257] *Id.*; Philip J. Weiser, *The Internet, Innovation, and Intellectual Property Policy*, 103 Colum. L. Rev. 534, 579 (2003) ("In the context of proprietary software, control over these interfaces enables the platform owner to maintain control over its platform both defensively--to prevent rivals from cloning its products--as well as offensively--to prevent competitors from creating compatible products.").

[258] Tripp Mickle, *Apple Dominates App Store Search Results, Thwarting Competitors*, WALL ST. J. (July 23, 2019, 11:53 AM), https://www.wsj.com/articles/apple-dominates-app-store-search-results-thwarting-competitors-11563897221 [perma.cc/72C4-AF2S].

[259] Complaint at ¶¶ 10–11, United States v. Apple, Inc., No. 2:24-cv-04055 (D.N.J. Mar. 21, 2024); *see supra* Section IV.C.

[260] Mark Gurman, *Apple Weighs Letting Users Switch Default iPhone Apps to Rivals*, BLOOMBERG (Feb. 20, 2020, 6:00 AM), https://www.bloomberg.com/news/articles/2020-02-20/apple-weighs-loosening-restrictions-on-rival-iphone-music-apps [perma.cc/PNF8-AFUL].

[261] Newman, *supra* note 71; *see also* Reed Albergotti, *How Apple Uses its App Store to Copy the Best Ideas*, Wash. Post (Sept. 8, 2019, 8:00 AM), https://www.washingtonpost.com/technology/2019/09/05/how-apple-uses-its-app-store-copy-best-ideas/ [perma.cc/829A-RJSZ] (discussing "Sherlocking" and other instances of Apple copying the developers on its platform).

developers using the platform.[262] The law should be reformed to address this inequity.

VI. CONCLUSION

[76] Walled-garden software distribution and similar self-preferencing behavior today present existential threats to competition in the consumer software industry. Mechanisms for software distribution have changed radically since the inception of consumer computing. While antimonopoly measures have been lacking since then, times are changing. Digital software marketplaces, especially those protected by walled gardens, are prime targets for antimonopoly action given their bottleneck on software markets and high concentration level. Software development will continue. The legal systems protecting competition must follow. Now is the time to create rules that prevent operators of digital software marketplaces from acting as unfair, anticompetitive monopolists.

[262] *See* Christophe Carugati, *The Competitive Relationship Between Cloud Computing and Generative AI* 7 (Bruegel, Working Paper No. 19/2023, 2023), https://www.bruegel.org/system/files/2023-12/WP%202023%2019%20Cloud%20111223.pdf [perma.cc/2NTU-5L77] ("Cloud providers might have the ability and incentive to promote their own cloud services over third parties, with potential exclusionaryeffects on third parties.").