Before the
National Telecommunications and Information Administration
United States Department of Commerce
Washington, D.C.

In re	Docket No. 220418-0099
Developing a Report on Competition in the Mobile App Ecosystem	

COMMENTS OF
META PLATFORMS, INC.

I.   Introduction

Meta Platforms, Inc. welcomes this opportunity to contribute to the inquiry of the National Telecommunications and Information Administration (NTIA) into the state of competition of the mobile app ecosystem. Meta has a unique perspective as a third-party developer of some of the world's most popular apps, including Facebook, Instagram, WhatsApp, and Messenger, which are used daily by people worldwide to connect, find communities, and grow businesses. Part II of these comments provides an overview of competition in the mobile app ecosystem and actions at the operating system level that limit growth, competition, and innovation by third-party developers. Part III provides detailed answers to select questions from the April 22, 2022 Request for Public Comment.

II.   Overview

Competition among app developers is robust

Meta competes vigorously against many other services across the world for people's time and attention, as well as for advertising dollars. As the internet has grown over the last 25 years, the ways in which people share and communicate have exploded thanks to dynamic competition. In particular:

- Meta competes with a wide and ever-increasing range of apps for sharing, discovery, connection, and communication. Two million apps were released in 2021, bringing the total ever released to 21 million across both the Apple App Store and Google Play.[1]

- Competition among app developers is robust. In 2021, the most downloaded app was TikTok, which also was the leading app in data.ai's "Social" category by time spent in the United States and worldwide.[2] Other global top-10 apps by downloads in 2021 included Telegram, Snapchat, CapCut (owned by ByteDance), Zoom, and Spotify.[3]

- Each app seeks to innovate and differentiate its product offerings to attract users. Many competing services also have features similar to Facebook and Instagram that enable people to share, connect, discover, and communicate through video, posts, messages, and comments, even though they may look different from Meta's services. In this environment, app developers must constantly innovate because features can become outdated overnight, and a decrease in popularity can rapidly lead to obsolescence. Any loss of engagement with a platform—even at the margin—can have a substantial business impact. For the industry, this can quickly lead to a cycle where a decrease in revenue leads to reduced capital available to reinvest in continuing to improve products and services. In the technology sector, this can ultimately lead to escalating and even permanent damage to a company's competitive position.[4]

- Consumers switch and multi-home[5] between multiple apps and websites. A 2018 report from the Pew Research Center shows that multi-homing is widespread among the end users of social media online platforms. The report further found a substantial amount of overlap between end users of the major social media platforms: 80–90% of these users, for instance, used YouTube as well as Facebook, and 73% of Twitter users and 77% of

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[1] DATA.AI, STATE OF MOBILE 2022 at 9, *available at* https://www.data.ai/en/go/state-of-mobile-2022.

[2] *Id.* at 50.

[3] *Id.* at 67.

[4] David Crawford, Matthew Crupi, Ravi Vijayaraghavan & Chris Johnson, *Disruption, Not Regulation, Should be Tech Companies' Top Concern*, HARV. BUS. REV., Dec. 21, 2020 ("Disruption isn't just more common in tech—it also can be more damaging and permanent. Once a technology company falls behind, it can be difficult for it to catch up. . . . Bain research suggests that a technology company that has been disrupted is 12% less likely to return to sector-average market capitalization growth or higher than companies in retail and 17% less likely than those in healthcare, for example. Even more striking, the data shows that once a technology company trails its sector for three years, its chances of turning things around drop below 20% and continue to decline as time goes on."), *available at* https://hbr.org/2020/12/disruption-not-regulation-should-be-tech-companies-top-concern.

[5] "Multi-homing" refers to a situation in which consumers "use several competing platform services in parallel." *E.g.*, Egidijus Barcevičius, Dovydas Caturianas, Andrew Leming et al., *Multi-Homing: Obstacles, Opportunities, Facilitating Factors* (Eur. Comm'n, Directorate-Gen. for Commc'ns Networks, Content & Tech. Analytical Paper No. 7, 2021), *available at* https://data.europa.eu/doi/10.2759/220253.

Snapchat users also indicated that they used Instagram.[6] Additionally, the "Digital 2022: Global Overview Report" states that only a small fraction of each platform's user base is unique, with more than 99% of Facebook, YouTube, Instagram, Pinterest, LinkedIn, Reddit, Snapchat, Twitter and TikTok users aged 16 to 64 reporting that they use at least one other social platform.[7]

Mobile operating systems play an outsized role in the success of independent apps

- Despite having some of the most popular apps in the world, Meta's ability to innovate on its products and services and even reach its customers is determined, and in some cases, significantly limited, by the most popular mobile operating systems, such as Apple's iOS.

- iOS devices comprise about 60% of smartphones in the United States.[8] This statistic may understate Apple's power and sway over the mobile app ecosystem. The U.K. Competition and Markets Authority (CMA) recently found that consumers "rarely switch between [mobile] operating systems," that "there are material barriers to switching between devices using the iOS and Android operating systems," and that Apple's practices–including those discussed below–may have contributed to these barriers.[9]

Apple restricts third-party apps in ways that reduce consumer choice and market competition

- For years, Apple has engaged in a pattern of business conduct designed to lock consumers into iOS devices and deter them from switching to Android or other devices.

- Cross-platform, high-engagement apps create enormous value for consumers but pose a threat to Apple by also lowering costs that consumers must bear to switch from iOS to Android or other devices. These apps lower barriers to switching, including by:

  o offering device-agnostic ways to perform core functions of a mobile device;

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[6] Aaron Smith & Monica Anderson, *Social Media Use in 2018*, PEW RESEARCH CTR., https://www.pewresearch.org/internet/2018/03/01/social-media-use-in-2018/ (Mar. 1, 2018).

[7] Simon Kemp, *Digital 2022: Global Overview Report*, DATAREPORTAL, https://datareportal.com/reports/digital-2022-global-overview-report (Jan. 26, 2022).

[8] *Mobile Operating System Market Share: United States of America*, STATCOUNTER, https://gs.statcounter.com/os-market-share/mobile/united-states-of-america (Apr. 2022).

[9] U.K. COMPETITION & MKTS. AUTH., MOBILE ECOSYSTEMS MARKET STUDY INTERIM REPORT ¶¶ 36, 37, 59–61, 5.114, 5.137–5.139 (Dec. 14, 2021) [hereinafter CMA MOBILE ECOSYSTEMS MARKET STUDY INTERIM REPORT], *available at* https://www.gov.uk/government/publications/mobile-ecosystems-market-study-interim-report.

- allowing users to save their data in the cloud and easily access it from mobile devices running different operating systems (and sometimes also on non-mobile devices); and

- enabling users of different operating systems to collaborate or interact with one another, reducing the barrier-raising impact of network effects.

- Restrictions that Apple imposes on cross-platform gaming, web-based, and ad-supported apps prevent them from lowering barriers to switching and lock consumers into iOS devices.

- For example, Apple's policies restricting cloud games and HTML5-based games have prevented Meta from introducing features that would enable developers to distribute and monetize, and users of iOS devices to enjoy, a variety of games. Apple's restrictions have also inhibited the development of cloud games and HTML5-based games and prevented them from lowering consumers' switching costs. Both cloud games and HTML5-based games work across devices and mobile operating systems. Cloud games further diminish the importance of a consumer's device because they rely on the cloud, rather than the consumer's device, for processing and storage. Cloud games and HTML5-based games would ordinarily facilitate switching among mobile operating systems, but Apple's restrictions prevent them from realizing this potential. (*See* Response to Question No. 17a)

- Apple's restrictions on independent web browsers prevent web apps from emerging as viable, operating system-agnostic alternatives to native apps (i.e., apps developed for a specific operating system). While third-party browsers (such as Chrome) appear in Apple's App Store, any competition they provide is largely illusory. Apple requires all web browsers on iOS to use WebKit, a degraded version of Apple's Safari browser, to render web pages. Apple thus sets Safari as a functionality ceiling for mobile browsers on iOS. The restrictions on Safari's and other iOS web browsers' capabilities prevent web pages and web apps from providing consumers with robust, cross-platform experiences that would lower switching barriers. (*See* Response to Question No. 11b)

- Apple's App Tracking Transparency (ATT) framework degrades the free, ad-supported app ecosystem by impairing developers' ability to personalize ads and to measure ads' effectiveness. The ATT framework prevents developers from sharing information used for these purposes unless they display a prompt seeking "permission to track [users'] activity across apps and websites owned by other companies" and users explicitly opt in to "tracking." The ATT framework meanwhile exempts Apple's own apps and services from its requirements. (*See* Response to Question No. 11)

- The ATT framework has unsurprisingly made mobile advertising less efficient, raising advertisers' costs, reducing developers' revenues, and resulting in the delivery of less relevant ads to consumers.

- The ATT framework, however, provides Apple with both immediate and long-term benefits. Apple's ads business has already witnessed "explosive growth" as ATT has hobbled its competitors.[10] Over the long term, Apple stands to benefit as ATT raises the costs to consumers of switching from Apple to non-Apple mobile devices. By making ad-based monetization less attractive than it would otherwise be, ATT has already prompted some app developers to shift from ad-based to fee-based monetization (on which Apple collects a 15–30% commission).

- Over the long term, this shift threatens to raise barriers to switching. Unlike free, ad-supported apps, which allow consumers seamlessly to switch from Apple to non-Apple devices, fee-based apps often require switching consumers to repurchase apps, forfeit in-app purchases or subscriptions, or expend time and effort canceling current subscriptions and establishing new ones.

- Taken together, Apple's restrictions on third-party web browsers, its restrictions on third-party gaming apps, and its ATT framework severely limit developers' ability to create and consumers' ability to enjoy cross-platform apps that could lower barriers to switching from Apple to Android and other devices.

- Apple's self-serving tactics prevent consumers from realizing the innovation and benefits of a dynamic and otherwise well-functioning mobile app ecosystem.

III.   Responses to specific questions

Response to Question No. 3a

3. Apps are not all the same. For example, some have different technical features and capabilities (e.g., location-based apps compared to messaging apps), while others are bound by specific regulatory guardrails (e.g., banking apps or children's apps). In the context of framing competitiveness within the ecosystem, how should we categorize types of apps so that they are grouped by distinguishable barriers and other significant factors? Are there ways to best categorize or segment the market to diagnose specific market barriers, such as those that could impact app developers, or consumers?

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[10] Claire Atkinson & Lara O'Reilly, *Apple Is Planning To Shake Up Its Massive Services Business To Push Further into Streaming and Advertising*, INSIDER (May 9, 2022), *available at* https://www.businessinsider.com/apple-shaking-up-services-business-in-streaming-advertising-push-2022-5.

a. Should distinctions be made based on type of content and app functionality?

- Over the past few years, changing consumer preferences, declining attention spans, and increasing demand for "newness," immersive services, features and content have increased competitive pressures among mobile apps. Meta, like its competitors, must continuously add and refine features on its apps, as differentiation and feature-based innovation drive growth. Given the diverse feature sets accommodating many different use cases within a single app, apps are increasingly difficult to categorize by traditional app categories.

- The speed and relative ease with which mobile apps can add or refine features can also make feature-based categorization a fraught endeavor. For example, TikTok has recently begun replacing its "Discover" tab, which displays trending hashtags and videos, with a "Friends" tab as part of an initiative to help users "easily find and enjoy content from people [they]'re connected with."[11]

- Additionally, apps do not necessarily compete only against apps with similar functionality. As Reed Hastings noted when explaining why Netflix's engagement increased 14% during Facebook's October 4, 2021 outage, apps like Facebook and Netflix compete "with a staggeringly large set of activities for consumers' time and attention."[12]

For these reasons, app categories should be defined as broadly as possible.

Software and Support for Developers

Response to Question No. 9

9. What role does interoperability play in supporting and advancing a competitive mobile app ecosystem?

- Outside of the messaging context, "interoperability" is a broad term lacking a common understanding, that merits a more detailed examination of the specific compatibility problem that the ecosystem is trying to solve and its competitive significance. Even assuming that the purpose of a compatibility solution is to create something that consumers value, any regulatory obligations concerning interoperability and/or providing access for rivals would create complex trade-offs around innovation, competition, security, privacy, user preferences, content moderation, and user safety.

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[11] Aisha Malik, *TikTok Rolls Out New 'Friends' Tab to More Users, Replacing the Current 'Discover' Tab*, TECHCRUNCH (May, 9, 2022), https://tcrn.ch/3wBywHr.

[12] Netflix, Inc., Q3 '21 Shareholder Letter at 6 (Oct. 19, 2021), https://s22.q4cdn.com/959853165/files/doc_financials/2021/q3/FINAL-Q3-21-Shareholder-Letter.pdf.

Responses to Questions Nos. 11 and 11b

11. How do policy decisions by firms that operate app stores, build operating systems, or design hardware impact app developers (e.g., terms of service for app developers)? What empirical data exists to support those findings?

- Policy decisions by firms that operate app stores, build operating systems, or design hardware can have substantial impact on app developers and on those who use their apps.

- Several policy decisions by Apple, for example, have impaired app developers' ability to advertise and to monetize their apps and consumers' ability to switch from one mobile operating system to another. A decision that has had a pronounced impact on developers and those who use their apps is Apple's decision to launch its App Tracking Transparency (ATT) framework.

- Apple amended App Store Review Guideline 5.1.2 in February 2021 to require developers to comply with the ATT framework as a condition for distributing their apps on iOS devices.[13] Apple launched the ATT framework in April 2021 with the release of iOS 14.5.

- The ATT framework prohibits third-party apps from engaging in broad categories of data use unless (1) the apps display a prompt to users requesting "permission to track you across apps and websites owned by other companies" and (2) users explicitly opt in to "tracking" through the framework.[14]

- The broad categories of data use that Apple prohibits absent opt-in to "tracking" include displaying targeted ads "based on user data collected from apps and websites owned by other companies," sharing email lists or other identifiers with a third-party ad network that uses that information to retarget, and "[p]lacing a third-party SDK in your app that combines user data from your app with user data from other developers' apps to target advertising or measure advertising efficiency, even if you don't use the SDK for these purposes."[15]

- Other facets of the ATT framework exacerbate its impact on advertisers, developers, and consumers:

  - Any time the display or measurement of an ad implicates cross-app behavior—e.g., one app serves an ad and a consumer installs or takes an action within a second app as a result—the ATT framework requires both apps independently to obtain the consumer's opt-in to "tracking."

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[13] *See App Store Review Guideline Updates Now Available*, APPLE (Feb. 1, 2021), https://developer.apple.com/news/?id=3ozbk628.

[14] *See User Privacy and Data Use*, APPLE (last visited May 20, 2022), https://developer.apple.com/app-store/user-privacy-and-data-use/.
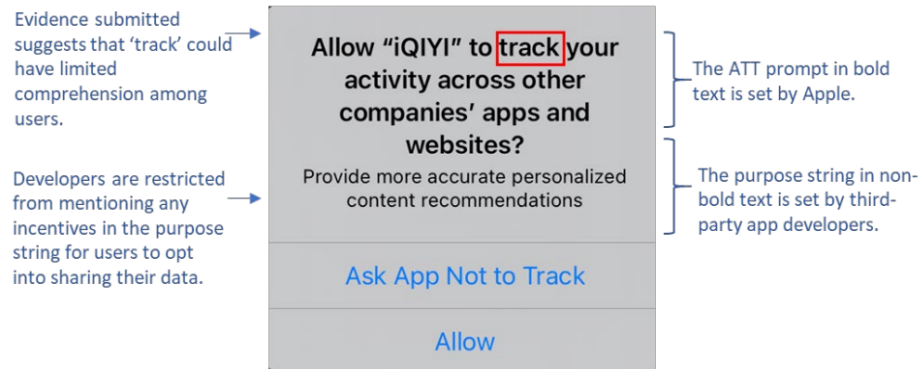
[15] *See id.*

○ The ATT framework prohibits developers from offering users incentives to opt in. The CMA recently observed that, "[g]iven that developers benefit from users opting in . . . , allowing them to offer incentives would enable them to share some of that value with users. This would potentially benefit both users and developers, without restricting user choice."[16] Nonetheless, Apple prohibits developers from proposing such mutually beneficial exchanges.

○ SKAdNetwork, Apple's tool for attributing app installations by users who decline to opt in to "tracking," drastically limits businesses' access to data they need to measure and optimize the effectiveness of ad campaigns. Among other things, SKAdNetwork does not support ad-creative metrics, provides data on a delayed and highly aggregated basis, and supports only a limited number of ad campaigns. Apple has also made sudden and unannounced changes to SKAdNetwork, rendering it an unreliable basis for ad measurement and optimization.

● At the same time, Apple has designed the ATT framework to exempt its own apps and services from the framework's requirements.

○ Apple's own ad service, Apple Search Ads (ASA), targets ads based on data collected in other companies' apps, including data on purchases made within third-party apps.[17]

○ Targeting ads in this manner would be deemed "tracking," by Apple's definition, if undertaken by anyone else. Nonetheless, when Apple launched ATT with iOS 14.5, Apple's apps and services did not display a prompt of any kind, much less a prompt requesting permission to "track" users across apps and websites owned by other parties. Instead, iOS users were automatically "opted-in" to Apple's "tracking," and opting out required users to navigate through multiple menus.

○ With the introduction of iOS 15, Apple began displaying a prompt asking users to opt in to Apple's targeted ads. This prompt, however, does not characterize the use of data collected in other companies' apps to deliver targeted ads as "tracking" (as Apple does in the prompt it requires third-party developers to display). Instead, the prompt applicable to Apple's own apps and services refers to "personalized ads" and emphasizes the benefits that such ads provide consumers. Apple's prompts therefore apply a more favorable choice architecture to Apple's own targeted ads (called "personalized ads") than to its competitors' (called "tracking"). Figures 1 and 2, below, excerpted from the CMA's Mobile

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[16] U.K. COMPETITION & MKTS. AUTH., MOBILE ECOSYSTEMS MARKET STUDY INTERIM REPORT, APPENDIX I: CONSIDERING THE DESIGN AND IMPACTS ON COMPETITION OF APPLE'S ATT CHANGES ¶ 116 (Dec. 14, 2021) [hereinafter CMA 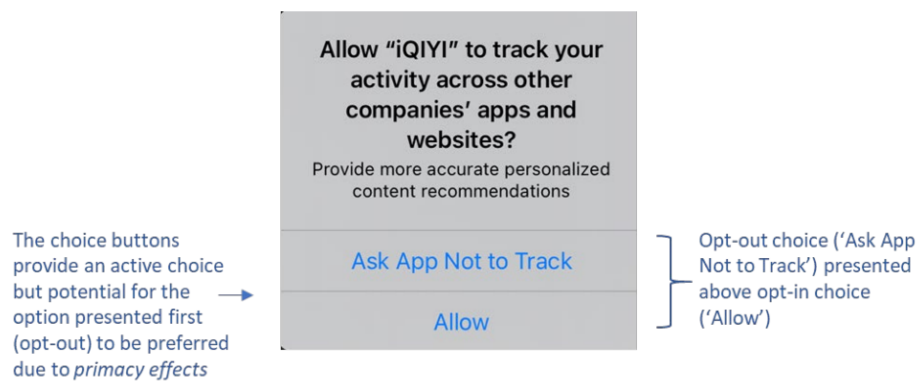MOBILE ECOSYSTEMS INTERIM REPORT, APPENDIX I], *available at* https://www.gov.uk/cma-cases/mobile-ecosystems-market-study#interim-report.

[17] *See Apple Advertising & Privacy*, APPLE (Feb. 15, 2022), https://www.apple.com/legal/privacy/data/en/apple-advertising (Apple's advertising platform may target ads based on the "apps you download, as well as any in-app purchases and subscriptions").

Ecosystems Market Study Interim Report, compare the choice architectures of the ATT prompt and Apple's "Personalized Ads" prompt.

Figure 1. Choice Architecture of the ATT Prompt[18]

Note: Screenshot taken on iPhone XR running iOS 15.1 in November 2021.

Note: Screenshot taken on iPhone XR running iOS 15.1 in November 2021.

[18] CMA MOBILE ECOSYSTEMS INTERIM REPORT, APPENDIX I, *supra* note 16, ¶ 117, Figure I.7.

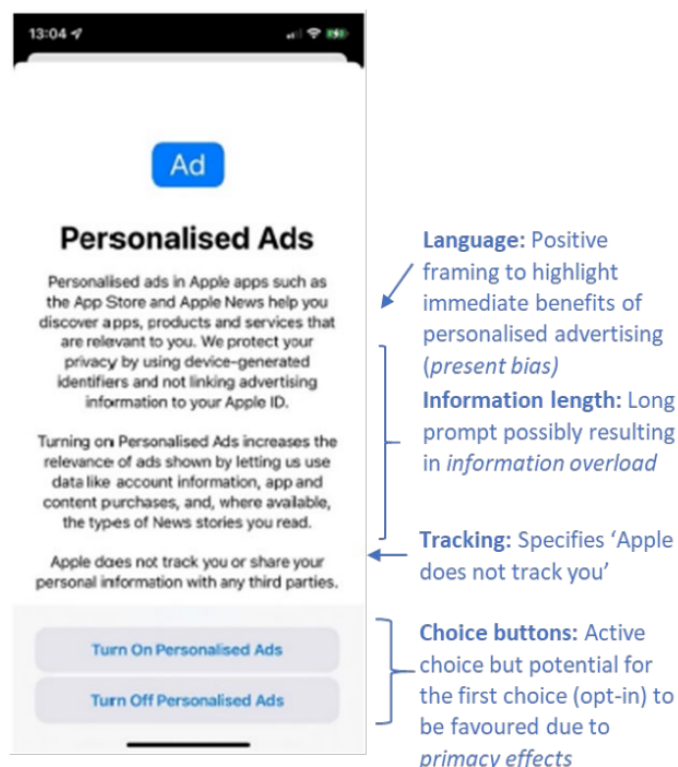Figure 2. Choice Architecture of Apple's Personalized Ads Prompt[19]

Image source: Apple; Analysis: CMA

- ○ Customers of Apple's ad services, unlike customers of competing ad services, need not rely on SKAdNetwork. Instead, Apple makes available to customers of its own ad services the Apple Ads Attribution API. Unlike SKAdNetwork, the Apple Ads Attribution API, among other things, supports ad-creative metrics, provides granular install-attribution data, and provides data without a 24–48 hour delay.[20]

- ○ Apple similarly allows Safari and other standalone web browsers to "track" their users without satisfying the ATT framework's requirements.[21] The web-browser exemption enables Safari, without displaying the ATT prompt or otherwise soliciting users' opt-in, to share information with Google (Safari's default search-engine provider) for ad targeting and measurement purposes. Other apps could not engage in similar data use without securing users' "permission to track [them]

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[19] *Id.* ¶ 124, Figure I.8.

[20] *See id.* ¶¶ 96–103.

[21] *See User Privacy and Data Use*, APPLE (last visited May 20, 2022), https://developer.apple.com/app-store/user-privacy-and-data-use/ (stating that apps that engage in "tracking" need not display the ATT prompt if they "enabl[e] the user to the open web").

across apps and websites owned by other companies." Given the billions of dollars a year that Apple continues to collect from Google Search ads,[22] the preferential treatment the ATT framework accords to web browsers vis-a-vis other apps will likely persist.

- Evidence indicates that the ATT framework has unsurprisingly benefited Apple while harming businesses, app developers, and consumers:

  - By prohibiting third-party apps from engaging in broad categories of data use unless users opt in to "tracking," the ATT framework has predictably made advertising less efficient. One consequence of this inefficiency has been to make advertising more costly. One analyst found that e-commerce companies' costs per acquisition increased by 200% for "tracked" users and 155% for "non-tracked" users after iOS 14.5 and 14.6 were released.[23] By triggering a sharp increase in advertising costs, ATT has harmed businesses large and small, ranging from exercise-equipment vendors[24] to bakeries.[25] Another consequence has been to hamper developers' ability to monetize their apps through advertising.[26]

  - ATT also made it more difficult for small businesses to compete with larger businesses. As analyst Eric Seufert explained in a recent interview, ATT has broken the model that small businesses used to allocate their advertising budgets, because the:

    "model is developed on a traffic base that is going to look markedly different post-ATT than pre-ATT, because the users that were being

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[22] John Moreno, *Google Estimated To Be Paying $15 Billion To Remain Default Search Engine on Safari*, FORBES (Aug. 27, 2021), *available at* https://bit.ly/3GgmUgj.

[23] Anne Freer, *CPA for Mobile e-Commerce Ads Skyrockets*, BUSINESS OF APPS (Aug. 31, 2021), https://www.businessofapps.com/news/cpa-for-mobile-e-commerce-ads-skyrockets/.

[24] Seb Joseph, *Why Apple's ATT Is Casting a Long Shadow over Online Advertising's Latest Quarter*, DIGIDAY (Nov. 15, 2021), https://digiday.com/marketing/apples-att-casts-a-long-shadow-over-online-advertisings-latest-quarter/ (reporting that Peloton "told analysts during its earnings call earlier this month that ATT would hamper its ability to add subscribers to its service as a result of not being able to precisely target as many people based on their interests").

[25] Brian X. Chen, *The Battle for Digital Privacy is Reshaping the Internet*, N.Y. TIMES (Sept. 16, 2021), https://www.nytimes.com/2021/09/16/technology/digital-privacy.html (reporting that Seven Sisters Scones, a mail-order pastry shop, saw its revenue drop from $40,000 to $16,000 following implementation of Apple's ATT framework and was contemplating price increases to offset its lost sales); *see also* Shelby Holliday, *How Apple's Privacy Move Could Affect Your Wallet*, WALL ST. J. (Nov. 4, 2021), https://www.wsj.com/video/series/shelby-holliday/how-apples-privacy-move-could-affect-your-wallet/8E60FFDE-8A21-441A-97FF-2A3CD194B207 (video reviewing the impact of the ATT framework has had on "millions of small businesses that rely on social-media advertising to reach customers," reporting that businesses were already spending 30–100% more in order to acquire customers online, and explaining that some businesses are "raising prices to offset higher marketing costs").

[26] *Brian Bowman: Apple's IDFA Change Has Triggered 15% to 20% Revenue Drops for iOS Developers*, GAMESBEAT (July 13, 2021), https://venturebeat.com/2021/07/13/brian-bowman-apples-idfa-change-has-triggered-15-to-20-revenue-drops-for-ios-developers/.

targeted look different. They have different profiles, because again, you're not able to do that user level targeting anymore to get hyper relevant subgroups of people, you're getting much coarser traffic, you're getting much broader traffic. So if your app or your [direct-to-consumer (DTC)] products or your e-commerce store was very dependent on getting those very relevant people that are primed to purchase things that are the things that you sell, then the composition of your traffic is going to change fundamentally, and so you need to just go to zero and rebuild the model from zero, because your model was predicated on a user looking a certain way and having a certain level of relevance for your product. . . . If you're a three-person DTC company, forget about it."[27]

- ○ Even as it has made mobile advertising markedly less efficient—creating higher costs for advertisers, lower revenues for publishers, and less relevant ads for consumers—the ATT framework has proven a bonanza for Apple's ad services.

  - ■ As ATT hobbled Apple's competitors, ASA experienced "explosive growth"; market research firm Omdia estimates that ASA's revenues grew nearly 250% from 2020 to 2021.[28]

  - ■ By October 2021, ASA was responsible for 58 percent of all iPhone app downloads resulting from an ad click, compared to 17 percent one year earlier, prompting an analyst to comment that ASA had "gone from playing in the minor leagues to winning the World Series in the span of half a year."[29]

  - ■ At the same time, ASA conversion prices rose to $3.64 in Q4 2021—a 64% increase from Q1 2021.[30] Thus, in the wake of ATT, ASA experienced dramatic growth, even as its services became considerably more costly for advertisers.

  - ■ Analysts project that the ATT framework will continue to benefit Apple's ad business in years ahead. Evercore ISI projects that Apple's revenue

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[27] Ben Thompson, *An Interview with Eric Seufert About the Post-ATT Landscape*, STRATECHERY (May 19, 2022), *available at* https://stratechery.com/2022/an-interview-with-eric-seufert-about-the-post-att-landscape/.

[28] *See* Atkinson & O'Reilly, *supra* note 10.

[29] Patrick McGee, *Apple's Privacy Changes Create Windfall for Its Own Advertising Business*, FIN. TIMES (Oct. 17, 2021) (quoting Alex Bauer, head of product marketing at Branch), *available at* https://www.ft.com/content/074b881f-a931-4986-888e-2ac53e286b9d.

[30] *See* Laurie Sullivan, *Apple Search Ads Conversion Price Skyrockets In Q4 2021*, MEDIAPOST (Mar. 31, 2022), *available at* https://bit.ly/3sQNK9d.

from ASA will increase from roughly $2 billion in 2020 to $20 billion by 2025.[31]

- The ATT framework also promises to benefit Apple in the long run by raising barriers to switching among mobile operating systems.

    ○ By making ad-based monetization less attractive than it would otherwise be, the ATT framework has prompted some app developers to shift from ad-based to fee-based monetization.[32]

    ○ This shift, in the long run, stands to benefit Apple by raising the costs to consumers of switching from Apple to non-Apple mobile devices. Unlike ad-supported apps, which lower switching costs by allowing consumers seamlessly to transition between mobile operating systems, paid apps often raise switching costs: consumers switching mobile operating systems must often repurchase paid apps, forfeit in-app purchases and subscription fees, or expend time and effort canceling current subscriptions and re-subscribing through a different provider.[33]

    ○ Moreover, because most consumers are willing to maintain only a limited number of standalone app subscriptions,[34] an increasing number of app developers will face pressure to distribute their apps through one of Apple's proprietary aggregation services (such as Apple Arcade or Apple News+). This pressure further raises the costs to consumers of switching from Apple to non-Apple mobile devices, as Apple's proprietary services are generally accessible only on Apple devices.

b. How do the policy decisions affect or limit the feasibility or availability of alternative models of app development (e.g. open source), delivery (e.g. browser-based apps), or funding (e.g. non-commercial or donation-based models)?

- Apple's policies and restrictions on web browsers stifle innovation and competition, and raise barriers to switching from iOS to non-iOS devices by preventing web apps

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[31] Jason Aycock, *The Tech Giant with the $20 billion Ad Opportunity*, SEEKING ALPHA (Aug. 25, 2021), https://seekingalpha.com/news/3733780-the-tech-giant-with-the-20-billion-ad-opportunity-evercore.

[32] *See* Reinhold Kesler, *The Impact of Apple's App Tracking Transparency on App Monetization* (Apr. 29, 2022), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4090786.

[33] *See, e.g.*, CMA MOBILE ECOSYSTEMS MARKET STUDY INTERIM REPORT, *supra* note 9, ¶ 3.120 (Dec. 14, 2021) (explaining that "those switching devices . . . lose a significant degree of control over the ability to manage subscriptions bought on another mobile ecosystem. This could impose significant time costs for some users as they migrate subscriptions to their new device, plus financial costs where this process requires them to re-purchase for example, annual subscriptions.").

[34] IAB EUROPE, WHAT WOULD AN INTERNET WITHOUT TARGETED ADS LOOK LIKE? 6 (Apr. 23, 2021), https://iabeurope.eu/wp-content/uploads/2021/04/IABEurope_What-Would-an-Internet-Without-Targeted-Ads-Look-Like_April-2021.pdf.

(products and services built on the Web instead of native platforms) from emerging as viable, cross-platform alternatives to native apps on iOS.

- Apple restricts the functionality of web pages and web apps on iOS in ways that have impacted their suitability as alternatives to native apps:

  o Apple's Safari browser degrades the functionality of web apps on iOS; and

  o Apple uses its control of iOS to prohibit third parties from offering mobile web browser alternatives to Safari that would support enhanced web app functionality.

- Safari, Apple's default mobile web browser, incorporates many restrictions that ensure that web pages and web apps are not suitable alternatives to native apps in iOS.

- While other mobile browsers (e.g., Chrome) are available on the App Store, Apple requires these mobile web browsers to use WebKit, a degraded version of Apple's Safari browser, to render web pages. This restriction, implemented via Apple's App Store Review Guidelines, limits the capabilities of third-party web browsers to compete against Safari.

- Restrictions applicable to Safari and to other iOS web browsers that impair web app functionality include those that:

  o *Prevent developers from offering full-screen mode:* This results in a worse consumer experience as any content has a web browser around the outside of the screen, making the design interface confusing and less appealing to consumers.

  o *Do not readily allow prompts to consumers to add sites to their home screens:* While Apple technically does enable this feature, it has been implemented in such a way that it is not usable. Apple requires that consumers go through multiple menus to access this feature, which makes for a bad user experience. In addition, this feature is only supported by Safari—Apple's own browser—and not other browsers offered on iOS. This ensures that other browsers cannot make it any easier for consumers to add sites to their home screens—e.g., by prompting and explaining the process to them—and are prevented from building innovative features on that functionality.

  o *Do not support notifications:* Apple does not support notifications for mobile Safari. This breaks consumer re-engagement on the web and prevents web apps from gaining consumer traction. Further, some products and services are largely useless without notifications. For example, if a messaging service cannot offer notifications (e.g., a count of new incoming messages), consumers will not learn of newly received messages unless they continuously access the web page.

  o *Do not allow lock screen rotations:* Without the ability to lock the screen rotation, many use cases—including horizontal game play, long-form reading, and document review—are frustrated.

o *Do not provide modern APIs for measuring web performance:* Performance APIs enable developers to get user-specific feedback from their web pages or web apps—for example, alerting the developer when a web page is out of memory or to allow a web page to respond to a user click. Without access to these key features, improving product performance and fixing issues experienced by consumers become significantly more difficult. As a result, any web page is immediately less interactive and offers fewer experience-enhancing functionalities.

o *Block persistent storage:* Safari provides very limited support for persistent storage. Without persistent storage, web pages and web apps, unlike native apps, cannot store consumers' use information—e.g., the level of game play reached by a user or a user's message history. As a result, entire categories of use cases simply cannot be built on the web on iOS. Encrypted messaging services (like WhatsApp) are one example.

- Web browsers on Android are not subject to any of the restrictions above.

- By implementing these restrictions, Apple incentivizes developers to focus on creating native apps rather than building great mobile web pages or web apps. As the functionality restrictions make the user experience much worse, the restrictions lead to lower consumer traction on these formats. Developers then reduce their investment in the web experience, leading to further reductions in consumer traction. For that reason, both the Facebook and Instagram web page formats nudge consumers to use the native app version of these products as they offer consumers a better experience. These restrictions collectively prevent web pages and web apps from providing a robust consumer experience, and prevent them from emerging as viable alternatives to native apps on iOS.

- Apple's web browser policies prevent developers from offering consumers innovative, cross-platform apps and insulate Apple from a range of competitive threats:

  o The web browser policies eliminate any competition to Safari, and ensure that Safari—along with its many limitations—acts as a functionality ceiling for any alternative browser offered on iOS;

  o The web browser policies prevent developers from creating web pages and web apps that offer consumers robust, operating system-agnostic experiences; and

  o The web browser policies make it more difficult for developers to offer services competing with Apple's own apps in a non-native app format—therefore curtailing competition in an environment where Apple's position as owner and regulator of the App Store gives it substantial competitive advantage.

Avenues for App Distribution

Response to Question No. 17a

17. Mobile app stores act as initial screeners and responders for concerns about mobile app content, such as fraudulent apps and malware. Similar issues for screening and responding exist in other contexts, such as website hosting and search engine retrieval. What empirical data is there analyzing any unique content screening issues related to mobile app stores that affect competition?

a. Is there evidence of legitimate apps being rejected from app stores or otherwise blocked from mobile devices? Is there evidence that this is a common occurrence or happens to significant numbers of apps?

- Apple's restrictive policies on HTML5 code distribution and cloud gaming services, which Apple has cited in rejecting updates to Meta's apps, offer examples of policies that deny users of iOS devices access to innovative services while raising their costs of switching to other devices. HTML5 code distribution and cloud-gaming services allow consumers to access games across devices and operating systems. Absent Apple's restrictive policies, these technologies would empower users to play games across devices, reduce the importance of a consumer's device, and facilitate switching among devices.

  Instant Games

- Meta (then Facebook) launched Instant Games in November 2016 on Messenger and Facebook. Instant Games allow consumers to play games within the Facebook app or website. Instant Games run in an HTML5 environment; they allow developers to make games available to consumers across different mobile devices and computers without creating separate apps native to each operating system.

- In June 2017, Apple adopted App Store Review Guideline 4.7, which prohibits apps for which HTML5 code distribution is the "main purpose" of the app and prevents apps from using a "store-like" interface to categorize and merchandise HTML5 games.

  - Apple's prohibition on HTML5 games appearing in a "store-like" interface cements the App Store as the only avenue for discovering and distributing mobile applications on iOS. Further, Apple's requirement that games be displayed in a "flat list" greatly inhibits the ability of consumers to discover these games.

  - Apple also relied on Guideline 4.7 to reject a proposed update to Instant Games that would have allowed developers access to in-app purchase functionality. Although Meta has offered to pay Apple's 30% commission on all in-app purchases within Instant Games, Apple has never changed its position and has consistently refused to allow Meta this functionality. This restriction has narrowed the monetization opportunities that Meta can offer developers of Instant

Games and hampered their growth. On Android, developers can monetize Instant Games through in-app purchases. Apple's refusal to allow the same on iOS, however, makes it harder for users of iOS and Android devices to play Instant Games together, as Android users may be able to buy digital goods that iOS users cannot.

- ○ Apple also relied on Guideline 4.7 to repeatedly reject the inclusion of Instant Games within Meta's standalone Facebook Gaming app. Apple claimed that the Facebook Gaming app's primary purpose was to distribute HTML5 games, although Meta (then Facebook) demonstrated that the majority of activity on the app's Android version involved watching gaming video livestreams.[35]

- ○ In 2020, Meta launched the standalone Facebook Gaming app on iOS without game play enabled; the removal of game play has limited the app's value to the gaming community, including Meta's key customer base and third-party developers.

Cloud games

- Cloud games, like Instant Games, allow consumers to play games across devices and operating systems. Cloud-gaming services stream games from the cloud to a consumer's device. Cloud games diminish the importance of the consumer's device and operating system because they rely on the processing power and storage of the cloud. As a result, a consumer who switches from a high-end to a low-end device can continue to enjoy the same, high-quality, cloud-gaming experience. Apple's restrictions on cloud games have inhibited their development and prevented them from emerging as viable alternatives to native apps.

- ○ For example, Guideline 4.9.1 requires that "[e]ach streaming game must be submitted to the App Store as an individual app." This restriction forces developers to expend time and resources to program two versions of the same game. In some cases, it may even be technologically infeasible to program a native-app version of a cloud game, as the very purpose of cloud gaming is to allow users to play games that their local devices may not have the processing power to run or local storage to download. The guideline also undermines an additional benefit of cloud-gaming services, which would otherwise enable people to play a wide range of games instantly from a single app.

- ○ The CMA recently recognized the adverse effects of this restriction on consumers and ecosystem innovation: "[T]hrough its control of the App Store, Apple has been able to block the emergence of cloud gaming on the App Store, which is currently permitted on Android. Cloud gaming is a potential threat to the model of accessing native apps through app stores, since it represents an alternative method of game discovery and distribution. Apple's policy may also protect its

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[35] Seth Schiesel, *Apple Rejects Facebook's Gaming App, for at Least the Fifth Time*, N.Y. TIMES (June 18, 2020), *available at* https://www.nytimes.com/2020/06/18/technology/apple-ios-facebook-gaming-app.html.

competitive position in mobile devices and operating systems, as cloud gaming services may reduce the importance of high-quality hardware and make it easier for users to switch between platforms."[36]

○ In 2020, Meta launched a cloud-gaming service on the main Facebook app so players could enjoy more games without downloading them as individual native apps. The service launched only on Android and desktop at the time, limiting the reach and value for developers.

○ Apple's restriction of cloud games in native apps on the App Store forced Meta to launch only a web app for cloud games on iOS nearly a year later in 2021. But a web app cannot provide users of iOS devices the experience that a native app could offer, given the limitations of Safari and WebKit detailed in Meta's answer to No. 11b above. These limitations have curbed Facebook Gaming's growth and prevented it from emerging as a robust competitor to Apple in game discovery and distribution.

○ Microsoft's Game Pass, Google's Stadia, and Amazon's Luna also have faced restrictions from Apple and are not available to users as fully-featured native apps on iOS devices.[37]

● Apple's restrictions serve to maintain the App Store as the primary place for users to discover and access games on iOS devices. They also have the effect of maintaining high barriers to switching to an Android device, because users' game data will often be stored in native iOS game apps and cannot be easily transferred outside of the Apple ecosystem, whereas Instant Games and cloud gaming services would allow for a seamless transition between iOS and Android devices.

App Users

Response to Question No. 20

20. What research exists regarding the number of active apps consumers have on their mobile devices at any one time and how often they try new ones?

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[36] CMA MOBILE ECOSYSTEMS MARKET STUDY INTERIM REPORT, *supra* note 9, ¶ 6.367.

[37] *See* Nick Statt, *Apple Confirms Cloud Gaming Services like xCloud and Stadia Violate App Store Guidelines*, VERGE (Aug. 6, 2020), https://www.theverge.com/2020/8/6/21357771/apple-cloud-gaming-microsoft-xcloud-google-stadia-ios-app-store-guidelines-violations; Sean Hollister, *Microsoft Quietly Told Apple It Was Willing To Turn Big Xbox-Exclusive Games into iPhone Apps*, VERGE (Dec. 9, 2021), https://www.theverge.com/2021/12/9/22826297/microsoft-xbox-xcloud-streaming-exclusives-iphone-ipad-gamepas.

- Per a 2021 report produced by data.ai (formerly AppAnnie), in the second half of 2020, the average consumer had 110 apps installed, an increase from 87 apps during the same period 2 years ago, and used 46 apps per month.[38]

IV.   Conclusion

Meta appreciates this opportunity to provide perspective as both the operator of some of the most popular free apps in the world as well as a third-party developer at the mercy of Apple policies that gate our access to people, creators, and businesses who enjoy and value our mobile applications. In identifying areas of focus in its forthcoming report, NTIA should consider specific and actionable harms including those documented above and assess policy solutions incorporating a whole-of-government approach to remedy the competitive harms so identified.

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[38] App Annie (now data.ai), *Similar Apps Usage Trends* at 6 (2021) (report commissioned by Meta), *available at* https://www.data.ai/en/insights/market-data/similar-apps-report/.