

Mobile Advertising and the Impact of Apple's App Tracking Transparency Policy

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I. Executive summary

Apple's introduction of App Tracking Transparency ("ATT") has drawn substantial commentary. Some see ATT as disruptive and self-serving, while others view it as a privacy-preserving tool that is ushering in a new era of advertising. However, the commentary often betrays a lack of understanding of what ATT is and what it is not, and draws speculative conclusions about its impact.

I will first explain the context into which Apple introduced ATT. The \$300 billion mobile advertising industry relies on vast amounts of consumer data to serve targeted ads. Companies may target ads based on the content of the webpage or the app in which ads are placed, or target ads based on input such as search terms provided by consumers. They may also target ads based on demographic, psychographic, behavioral, or other personal information about specific consumers. These data come in many forms and are gathered in different ways, but are broadly classified as:

- **First-party data:** data gathered by a company on consumers' activities on that company's online or offline properties.
- **Third-party data:** data on consumers' activities shared or purchased across companies, or linked by third parties across different companies.

While consumers may expect that their direct interactions with a company would result in the collection of first-party data, consumers seem to be largely unaware of the extent to which third parties link data on their activities across different companies.¹ With the growing use of personal data for targeted advertising, consumers increasingly want transparency and control over how their personal data are used, and in particular, how third-party data are used. Evidence suggests that consumers have a more negative view of the use of third-party data for ad targeting compared with the use of first-party data. Yet, their choices to control the use of third-party data have been limited.

Apple began enforcing ATT in April 2021 against the backdrop of this consumer sentiment. ATT requires apps to prompt users of iOS devices² to give permission before companies can start "tracking" them, i.e., linking data collected from one app with data collected from other companies' apps or properties, or sharing data with data brokers.³ Other platforms that I know of do not require apps to actively prompt users regarding use of third-party data, nor do other large companies that I know of actively prompt users in their own apps unless required by ATT or local laws. Instead, third-party data are allowed to be used or are used by default, and only some companies offer users the option to turn off third-party data use for advertising. It is worth emphasizing that **ATT only applies to third-party data** and has no bearing on the use of first-party data for any company. Companies that do not use third-party data for advertising, do not track users, and do not share data with data brokers do not need to request permission from users under ATT. Apple is one such company.

While ATT places **no restrictions on other companies' use of first-party data**, Apple applies a higher standard to itself for the use of first-party data. For years, Apple has given its users control over personalization of ads in Apple's own apps. In September 2021, Apple went a step further by actively prompting users to choose whether to permit ad personalization in Apple's own apps (among users who to that point had allowed it). This prompt appears to be in line with Apple's other policies that offer users control over the use of their data. Other large advertising platforms typically do not prompt users to grant permission before using first-party data for ad targeting. Some do not give users *any* option to turn off ad targeting based on first-party data, while others give users an option, but default to using first-party data for ad targeting.

Public commentators seem to ignore the fact that ATT is one among several privacy-preserving technologies introduced by Apple in recent years and suggest that Apple launched ATT to benefit its ads business. They claim that most of the revenue that companies such as Meta allegedly lost due to ATT directly benefitted Apple. I find this claim to be speculative for several reasons.

- First, as mentioned above, ATT does not affect apps' ability to collect and use first-party data. Therefore, any company offering effective targeted advertising primarily using first-party data would experience limited, if any, impact of ATT. In fact, any such company would stand to benefit from ATT (not just Apple) as advertisers sought effective ad targeting based on first-party data. It seems unlikely that most of the ad dollars supposedly lost by companies that rely heavily on third-party data (such as Meta) would move specifically to Apple—which according to several third-party estimates accounts for only a small percentage of world-wide mobile advertising—when there are several other alternatives. Indeed, at the current estimated ad supply levels on Apple Search Ads, it seems unlikely that it would be able to absorb billions of dollars of displaced advertising revenue and still deliver effective return on investment to advertisers.
- Second, Apple Search Ads grew for a variety of reasons unrelated to ATT—it is a relatively new entrant in a fast-growing space, certain app categories grew substantially in 2021, and it launched in a large market (China) in 2021.
- Finally, Apple offers users an active choice of whether to turn off personalized ads on Apple's apps in the form of the Personalized Ads prompt. Users who choose to turn off personalized ads on Apple's apps would receive only contextual ads. This has the potential to make Apple Search Ads at least somewhat less attractive to advertisers, which calls into question the notion that Apple introduced ATT to attract billions of ad dollars from other companies to Apple Search Ads.

In sum, I find claims that Apple captured billions of advertising dollars from other companies as a result of ATT to lack supporting evidence.

II. Targeted advertising and consumers' sentiments around use of their personal data

Apple's introduction of App Tracking Transparency ("ATT") in June 2020 and its subsequent enforcement in April 2021⁴ sparked a wide-ranging discussion about privacy and competitive dynamics in the mobile advertising industry,⁵ a \$300 billion industry growing in excess of 25% per year.⁶ Some see ATT as disruptive, while others see it as a privacy-preserving tool that is ushering in a new era of advertising.

Before assessing the impact of ATT on the mobile advertising industry, it is helpful to understand the context into which Apple introduced ATT. To that end, I will briefly provide some background on data use in advertising, and consumers' sentiments regarding use of their personal data for advertising.

A. Data use in targeted advertising

Advertisers typically attempt to direct ads to specific groups of people that are appropriate audiences for the products and/or services being advertised. This is called "targeting."

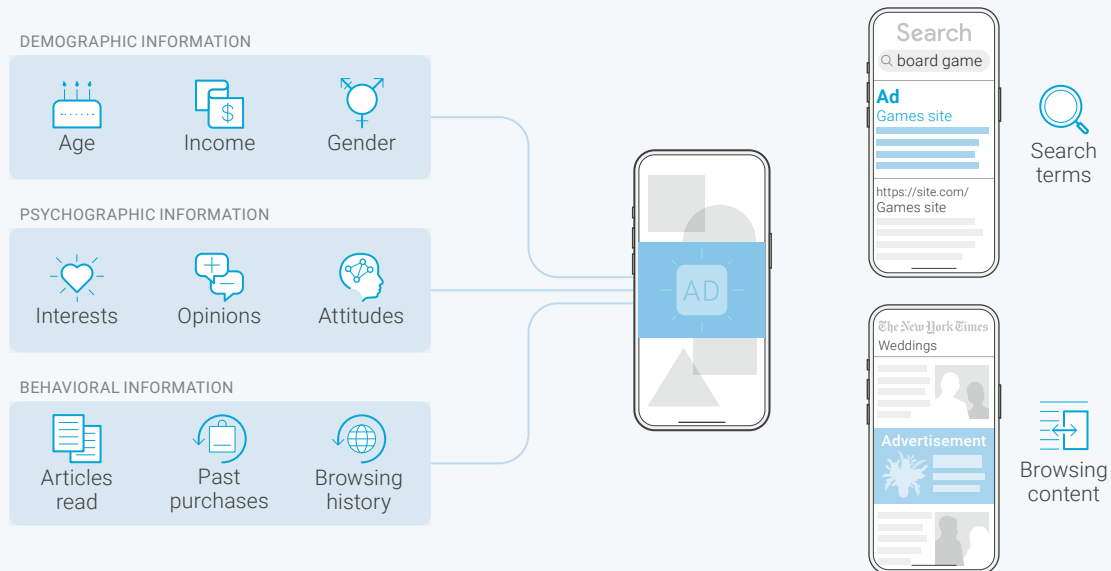
Targeting may be contextual, where the content of the ad is related to the content of the webpage or app on which it is placed.⁷ For example, ads for wedding dresses may be displayed alongside wedding announcements on the *New York Times*. Consumers may also provide direct input expressing interest in a particular product or service that can be used as context to serve ads. For example, an individual submits a query for "board games" on a search engine, and sponsored listings for games or gaming apps are returned alongside organic search results.

Advertisers may aim to target ads based on demographic, psychographic, behavioral, or other personal information about a specific consumer. For example, advertisers may understand the audience for their products to be men between the ages of 20 and 30 (demographic information) or individuals with certain attitudes, interests, and opinions (psychographic information), and target ads toward them accordingly. A 25-year-old male who belongs to several board game groups on social media may see ads for board games on social media, in other apps, or on other websites.

Advertisers could also use information such as an individual's past purchases, articles read, or browsing histories (behavioral information) to infer what products or services the individual may be interested in.⁸ For example, an individual who frequently plays games in the *New York Times* app may see ads for other games when reading news articles in the app. Or an individual who frequently visits a blog about board games may see ads for games in apps or on other websites. An individual's past behavior—such as clicking on an ad or review for a particular product—could be used by an advertiser to "retarget" the individual by serving that person another ad for the product later on.⁹ For example, an individual who clicked on an ad for a board game on social media may see ads for that game, similar games, or complementary items like expansion packs in his or her social media feed, in other apps, or on other websites.

How Ad Targeting Works

Advertisers typically attempt to direct ads to specific groups of people that are appropriate audiences for the products and/or services being advertised. These targeted ads may be contextual, in response to user input such as a search query, or based on demographic, psychographic, behavioral, or other personal information about the user.



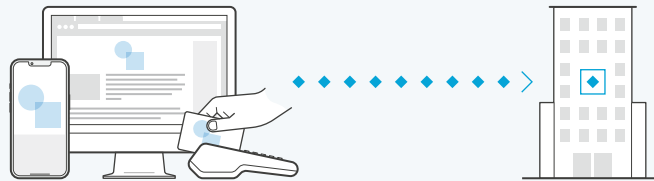
As these examples illustrate, many different forms of data can be used to target ads. Companies can gather data from their own interactions with consumers, or they can share or purchase data about consumers and link those datasets to build more complete profiles of individuals.^{10,11} Academics and industry participants broadly classify consumers' data used for advertising as:

- **First-party data:** Information collected by a company about consumers, based on activities on that company's online and offline properties, such as in apps, on websites, or in physical stores.¹² For example, the information collected by a news app as an individual reviews different articles and visits different sections of the news app.
- **Third-party data:** Information shared or purchased and linked across companies, including information about consumers' activities across online and offline properties, such as in apps, on websites, or in physical stores.¹³ For example, the information collected by a news app on an individual's interactions with the news app, which is linked with information collected about the individual's interactions with an unrelated travel app and a gaming app.

Types of User Data Collected

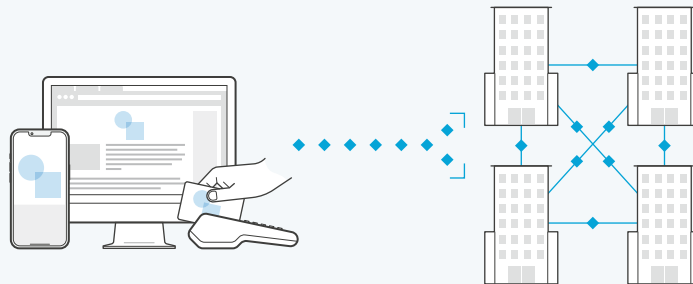
First-Party Data

Information collected by a company about consumers, based on activities on that company's online and offline properties, such as in apps, on websites, or in physical stores.



Third-Party Data

Information shared or purchased and linked across companies, including information about consumers' activities across online and offline properties, such as in apps, on websites, or in physical stores.



Advertisers perceive that ads must be sufficiently targeted to the right audience in order for them to be effective,¹⁴ which may motivate them to use third-party data. However, studies have shown that third-party data brokers that provide consumer profiles for targeting only marginally improve advertisers' ability to target the intended audience.¹⁵ The high cost of obtaining these consumer profiles may outweigh any efficiency gains for advertisers, making third-party data economically unattractive.

B. Consumers want transparency and control over the use of their data, especially third-party data

The increased use of personal data for targeted advertising has been accompanied by increased concern from consumers.¹⁶ According to a 2019 Pew survey, roughly four in five consumers are concerned about data collection by companies and feel they have little or no control over their data.¹⁷ Consumers feel they lack control over how their data are used, and would support laws that would give them more control.¹⁸ It is not surprising that regulators around the globe have enacted measures that limit how consumers' personal data can be used to target ads.^{19,20}

Consumers seem to be particularly concerned about third-party data use. For example, participants in a 2018 study had a more negative view of firms using cross-website user information for ad targeting (i.e., use of third-party data) than they did of firms using information collected on the same website (i.e., use of first-party data).²¹ According to a 2015 study, consumers can react negatively when they perceive ads to be overly personalized, particularly if the ads are based on information gathered from consumers' social network communications.²²

Consumers also seem to be unaware of the extent to which third parties collect data on them and how third parties use their data. For example, an FTC report in 2014 found that consumers are largely unaware of the fact that data brokers collect and piece together information about consumers' activities from various entities.²³ According to another FTC report in 2017, consumers may not be aware of "the myriad entities that have access to, compile, and share data in the tracking ecosystem."²⁴ More recently, a 2021 study found that after the introduction of the EU's General Data Protection Regulation ("GDPR"), a focus group of Swedish consumers did not have a strong understanding of third-party data collection even with the relevant required disclosures.²⁵ Despite these concerns, consumers' choices are limited in controlling how third parties obtain and use their data.

Some companies have responded to consumers' concerns regarding third-party data use. Apple has a long history of giving consumers control over the collection and use of third-party data—from introducing technology to block cookies with the release of Safari 1.0 in 2003 through the introduction of Intelligent Tracking Prevention in 2017.²⁶ These measures align with Apple's public commitments to privacy as a human right.²⁷ Other companies have also announced privacy-preserving initiatives pertaining to the use of third-party data, such as Google's Privacy Sandbox, though many of the proposed technologies have yet to be released.²⁸

Apple introduced ATT against this backdrop. It is another step in the direction of providing consumers a choice in how third-party data are gathered and used. Next, I will explain how ATT provides that choice.

III. ATT provides users of iOS devices control over the use of third-party data for advertising in iOS apps

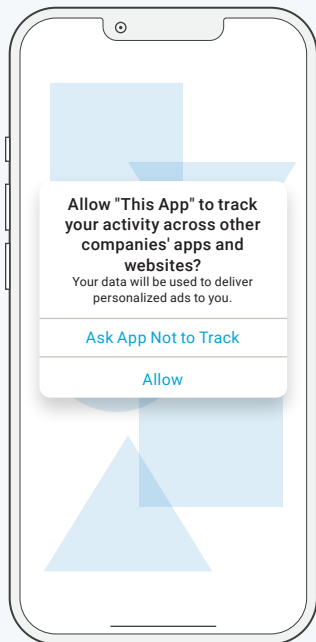
Apple is a provider of a mobile operating system (iOS) for which app developers can create apps and serve ads within those apps. As I explained earlier, many apps use third-party data to target ads to consumers, often without their knowledge or explicit permission. Apple began enforcing ATT as part of iOS 14.5 in April 2021 to provide users of iOS devices more control over the use of third-party data for advertising in all iOS apps.²⁹

A. ATT requires iOS apps to receive users' permission before linking data collected by other companies for targeted advertising

ATT requires all iOS apps to "receive the user's permission ... in order to track them or access their device's advertising identifier."³⁰ Tracking could colloquially be understood in many ways. Apple defines the term "tracking" specifically to refer to the act of linking user-level or device-level data from one app with user-level or device-level information from another company's apps, websites, or offline properties for advertising targeting or measurement purposes.³¹ Under ATT, companies are required to ask users' permission before, for example:

- Displaying targeted ads in an app based on user data collected from apps or websites owned by other companies;
- Sharing device location data, email lists, advertising IDs, or other IDs with a data broker or with a third-party ad network that uses the data to retarget those users in another developer's app or find similar users; and
- Including code from a third party in an app that combines user data from the app with user data from other developers' apps to target advertising or measure advertising efficiency.³²

Prior to ATT, Apple provided users with an option in settings called “Limit Ad Tracking” to impede apps from tracking them for targeted advertising using the identifier for advertisers (“IDFA”).³³ Under ATT, companies are required to prompt users to choose whether users want to allow an app to track them in order to serve and measure targeted ads.³⁴ For users who had selected Limit Ad Tracking in settings before updating to iOS 14.5, apps cannot even prompt them for permission to enable tracking (but users can always change this in settings if they choose).³⁵



B. ATT does not restrict iOS apps' ability to collect or use first-party data

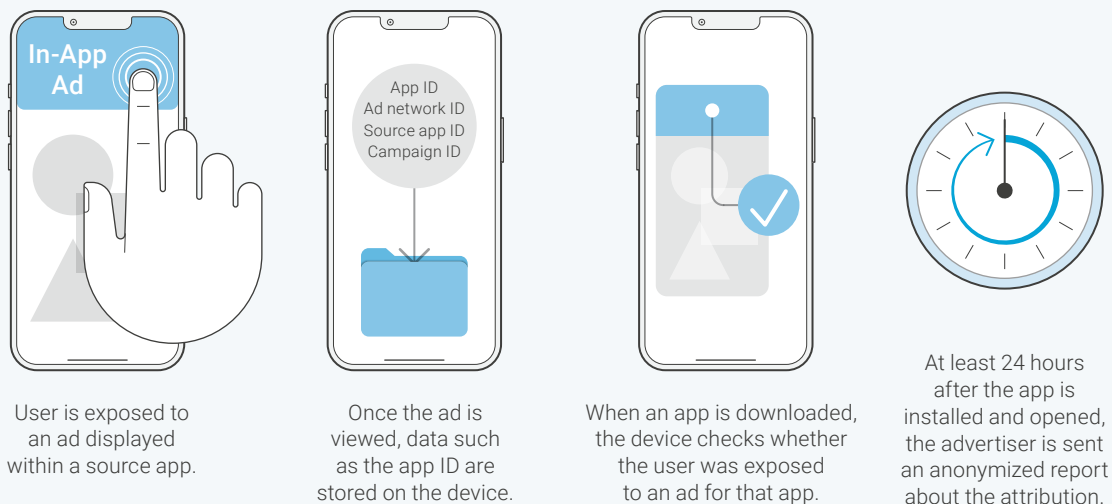
ATT only applies to third-party data and has no bearing on the use of first-party data. ATT does not place any restrictions on iOS apps' use of first-party data. ATT does not in any way prohibit companies from collecting first-party data, even when users decline permission for tracking. iOS apps can serve users targeted ads, measure the effectiveness of ad campaigns, and otherwise use any first-party data they collect without prompting users for permission to track. They can do this with first-party data collected either within an app or across different apps owned by the same company.³⁶ This means that companies that do not use third-party data for advertising are not impacted by ATT at all.

SKAN (StoreKit AdNetwork)

Advertisers want to understand the returns their marketing investments generate. One way they evaluate the effectiveness of ads is by assigning credit (or “attribution”) for a click on an ad, a download of an app, or a purchase of a product to a particular ad. Advertisers have typically used third-party data for attribution because consumers may view ads on one company’s app or website, but the consumer response of interest occurs outside this app or website, e.g., an app download occurs separately, or a product purchase may occur on a different company’s website. In the context of iOS apps, advertisers historically have used the IDFA, a unique identifier generated by a device, for attribution.

ATT prompts users to choose whether they want to prevent iOS apps from tracking them and using third-party data for advertising. When users select “Ask App Not to Track,” advertisers cannot use the IDFA to link users’ data across different companies’ apps.³⁷ However, limiting tracking could also potentially limit advertisers’ ability to measure ad effectiveness.

To help advertisers evaluate the success of their ad campaigns for iOS apps while protecting user privacy, Apple created an ad network API called StoreKit AdNetwork (“SKAN”).^{38,39} This tool is free for advertisers to use and does not require permission to track.^{40,41} There are three relevant players in measuring ad effectiveness: “source apps” which sell ad space, advertisers who buy the ad space, and ad networks, which act as brokers between source apps and advertisers.⁴² SKAN enables the temporary storage of data on a user’s device about ads in iOS source apps to which the user was exposed.⁴³ The ad network gets anonymized reports on downloads of apps for which users have been exposed to an ad. Importantly, the information sent to the ad network does not include user- or device-specific data, and it is sent after a period of time has passed once attribution occurs. Further, specific details of the attribution are supplied only if a sufficiently large number of other similar attributions have also been detected.⁴⁴ The time delay and the limited scope of information provided to the ad network prevents the ad network and the advertiser from linking activity they observe in their app with the attribution report received. This allows advertisers to evaluate the effectiveness of the ads without tracking individual users across apps or websites.⁴⁵



IV. Apple offers greater privacy options in its own apps than is required under ATT

Criticism of Apple's motives for enforcing ATT would be more persuasive if ATT were contradictory to Apple's own handling of personal data for advertising purposes. However, as my analysis reveals, Apple acts consistently with ATT, and offers more privacy options for advertising on its own apps than is required by ATT.

Among its own apps, Apple currently serves ads on the App Store (through a service called Apple Search Ads), Apple News, and Stocks.⁴⁶ In serving ads on these apps, Apple holds itself to a higher privacy standard than any other large company I am aware of (including Meta,⁴⁷ Google, Amazon, Snap, and Twitter)⁴⁸ in three ways:

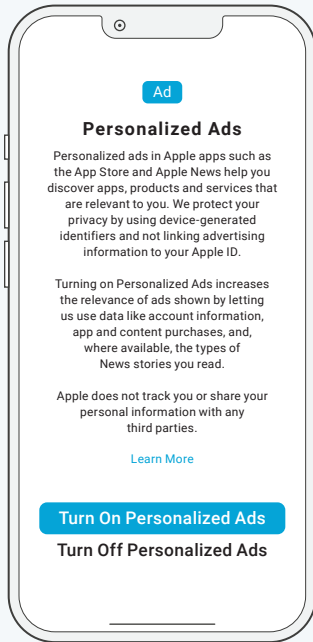
- Apple **does not use third-party data** for advertising on its own apps.
- Apple **actively prompts users to choose** whether Apple can use first-party data to serve them personalized ads.⁴⁹
- Even when serving personalized ads on its own apps, Apple **does not allow for targeting of groups smaller than 5,000 users**.

A. Apple does not use third-party data for advertising on its own apps

ATT is applied universally to all iOS apps, including those developed by Apple, but it does not impose a prompt on apps that do not use third-party data. Apple does not use third-party data to deliver targeted ads or measure ad effectiveness, or sell any user information to third parties such as data brokers.⁵⁰ This means that the ATT prompt that is used to obtain permission from users before tracking is not required on Apple's apps.

Other platforms that I know of do not require apps to actively prompt users regarding use of third-party data, nor do other large companies that I know of actively prompt users in their own apps unless required by ATT. Outside of their iOS apps, Google, Amazon, Twitter, and Snap serve users targeted ads using third-party data by default, subject to local laws regarding use of those data.⁵¹ They allow users to block third-party data use for ad targeting through their respective settings menus.^{52,53} Meta does not allow users to turn off all targeting based on third-party data,⁵⁴ and in fact delivers targeted ads to users leveraging third-party data collected through the Meta Audience Network.⁵⁵ This audience network allows publishers and advertisers to link users' information from their Facebook (and/or Instagram) profile and activity to activity on sites across the Meta Audience Network.⁵⁶ As discussed above, all of these companies must prompt users before linking third-party data for the purpose of delivering targeted ads in their iOS apps under ATT because they track users.

It is worth noting that by choosing not to use third-party data entirely, Apple is giving up all potential additional advertising revenue it could gain by tracking users. Therefore, Apple has voluntarily taken on 100% of the revenue penalty that ATT could have imposed on its advertising business. In percentage terms this is likely larger than any revenue penalty that ATT could have plausibly imposed on other companies because these companies could still use third-party data for users who permitted tracking.



B. Apple actively prompts users before using first-party data for advertising on its own apps

Consistent with its publicly stated positions on privacy, Apple also offers users a choice regarding first-party data use for advertising on its own apps—an option Apple has allowed since at least 2015.⁵⁷ Starting in September 2021 (with the launch of iOS 15), it actively prompts users to choose whether they want to enable the “Personalized Ads” setting.⁵⁸ When users turn the Personalized Ads setting on, Apple uses first-party data it collects to serve individuals targeted ads; when it is off, users do not receive ads from Apple based on information such as their past download categories or the articles they have viewed.⁵⁹ It is noteworthy that this feature only limits Apple’s ability to serve Personalized Ads with respect to its own apps. It does not place any restrictions on other iOS apps regarding their use of first-party data.

Prior to the Personalized Ads prompt, targeted ads based on first-party data were enabled by default on iOS. Users could choose to turn off targeted

ads based on first-party data through the Limit Ad Tracking option in settings. In effect, Apple now disables ad targeting based on first-party data on its own apps by default unless a user explicitly agrees to enable it.

Other large advertising platforms typically do not actively prompt users to grant permission before using first-party data for ad targeting. As mentioned earlier, Apple does not require other companies to seek permission from users on the use of first-party data for ad targeting in iOS apps. Google and Amazon both allow users to restrict the use of first-party data used to serve ads. However, unless an individual actively changes the settings, the default is for these companies to use first-party data for ad targeting.⁶⁰ Meta, Snap, and Twitter do not give users any option to turn off ad targeting based on first-party data.⁶¹ It is noteworthy that even before offering the Personalized Ads prompt, Apple was offering users more control over their first-party data with the Limit Ad Tracking feature than Meta, Snap, or Twitter offered.

C. Even when serving personalized ads on its own apps, Apple does not allow targeting of ads to small groups of users

Advertisers can target segments of users who enable Personalized Ads based on characteristics informed by individuals’ account information, download and purchases history, stories and publications followed on Apple News and Stocks, and past interactions with ads.⁶² However, this feature only allows advertisers to target groups of users if the combination of targeted traits

forms a segment of 5,000 or more individuals.⁶³ This means that advertisers cannot use targeting characteristics to identify a particular user. Other large advertising platforms do not to my knowledge offer similar features to prevent targeting based on characteristics that could identify substantially narrower groups of individuals.⁶⁴

Overall, Apple's policies regarding use of first-party data for advertising on its own apps and use of third-party data by other apps under ATT are in line with its stated commitment to privacy. These policies meet a higher standard than other large companies I am aware of. Next, I comment on the claims that Apple introduced ATT to capture advertising revenue from other companies.

v. Claims that billions of advertising dollars moved from companies like Meta to Apple due to the introduction of ATT are speculative

Public commentators suggest that Apple launched ATT to benefit its ads business, but these claims are speculative. One widely-cited article suggested that almost \$10 billion in revenue “evaporate[d]” from Facebook, Snap, YouTube, and Twitter in the second half of 2021 after the introduction of ATT.^{65,66} Another suggested that ATT resulted in a “windfall” for Apple's ads business.⁶⁷ A third article noted that Meta, YouTube, Snap, and Twitter were expected to lose almost \$16 billion in revenue in 2022.⁶⁸ If ATT did lead to a massive revenue reduction for a number of prominent advertising platforms, it is unlikely—as I discuss below—that Apple would be the significant beneficiary. And if the vast majority of the revenue lost would be likely diverted to Apple's competitors, it calls into question the notion that Apple introduced ATT to benefit its ads business.

A. Apple is unlikely to have significantly benefitted from ATT because Apple Search Ads is a small part of the overall mobile advertising market, and because displaced advertising spending could move to many other companies that effectively leverage first-party data for advertising

As I previously discussed, ATT does not affect apps' ability to collect and use first-party data. Therefore, any company offering effective targeted advertising primarily using first-party data would experience limited, if any, impact of ATT. For example, Twitter was reportedly “less affected by Apple's policies because its ads rely more on context and branding than on tracking consumers' mobile habits.”⁶⁹ Similarly, the impact of ATT on YouTube was “limited,” according to a Google executive.⁷⁰

In fact, other companies that offer effective targeted advertising using first-party data would stand to benefit from ATT, not just Apple. Indeed, commentators have noted a shift away from ad spending at Facebook and Instagram to companies such as Google, Amazon, TikTok, and Walmart,⁷¹ without mentioning a shift in ad spending to Apple. According to various industry analysts, Apple

had a low single-digit share of the \$300 billion global mobile advertising industry in 2021.^{72,*} Therefore, it seems unlikely that a large portion of the ad spending that allegedly disappeared from companies like Meta due to ATT flowed to a relatively small player like Apple when there are many alternatives available.

Further, while advertising on Meta and other companies that supposedly lost \$10 billion in ad revenue covers a wide variety of products, Apple Search Ads, which currently appears to account for the bulk of Apple's ad revenue, focuses on app install advertising.⁷³ It seems unlikely that advertisers would have moved ad dollars for products and services such as shoes, apparel, and travel from Meta and others to app install advertising on Apple Search Ads.

Even if advertisers were to contemplate shifting ad dollars to Apple Search Ads, their ability to do so profitably would be limited by the supply of ad space. Prices for ads on Apple Search Ads would rise substantially if advertisers attempted to inject \$10 billion into Apple Search Ads without a significant increase in the supply of ad space. Such a large increase in prices would decrease the return on investment for Apple Search Ads. At the current ad supply levels, it seems unlikely Apple Search Ads would be able to absorb billions of dollars of displaced advertising revenue and still deliver effective return on investment to advertisers.

B. Growth in Apple Search Ads predated the introduction of ATT and is likely driven in part by other factors

Some observers have pointed to the growth in Apple Search Ads that coincides with the launch of ATT in 2021 as evidence that Apple introduced ATT to benefit its own ads business.⁷⁴ However, there are other explanations for growth in Apple Search Ads unrelated to ATT.

First, Apple Search Ads is a relatively new service that was growing even prior to the introduction of ATT. It launched in 2016, and revenues are estimated by industry analysts to have grown into the low single-digit billions.⁷⁵ The cost per "tap" on a mobile ad is also estimated to have grown over time,⁷⁶ suggesting that advertisers value Apple Search Ads. I have seen no evidence to believe these trends would not suggest further growth in 2021 and beyond, growth which would have occurred even without the introduction of ATT.

Second, general industry trends and other decisions made by Apple may have contributed to the growth of Apple Search Ads in 2021:

- **Continued overall growth of mobile ads and app install ads.** Mobile advertising grew by 27% and app install advertising was projected to grow by 28% in 2021.⁷⁷ It should not be a surprise that Apple Search Ads also grew as part of a growing mobile advertising industry.
- **Growth of ads in certain app categories.** Finance app downloads grew by 19% in 2021,⁷⁸ fueled in part by growth in crypto app downloads which were estimated to have grown by 560% in 2021.⁷⁹ Industry reports suggest finance apps raised their ad spending on Google Play Store and Apple App Store by as much as 51% between 2020 and 2021 in the US.⁸⁰ The surge in demand for finance apps led advertisers to spend nearly \$3 billion globally in app install advertising in 2020, and the spend in 2021 was estimated to be substantially higher.⁸¹ This growth is also reflected in the increased cost of advertising for finance apps.⁸² Another app

* In this paper, I have relied on external sources and estimates about the Apple Search Ad business. My inclusion of figures from these sources does not validate or otherwise suggest accuracy of their estimates.

category that appears to be growing is sports betting. Sports betting apps posted another record year in 2021, with downloads growing an estimated 177% year over year as of Q3 2021.⁸³ This has led to an explosion in advertising for sports betting,⁸⁴ with an estimated 29% of all ad spending for this category going to digital formats.⁸⁵

- **The launch of Apple Search Ads in China.** Apple Search Ads launched in China in July 2021.⁸⁶ According to industry reports, China represented nearly a quarter of the worldwide market for both mobile ads and app install ads.⁸⁷ This likely boosted the growth in Apple Search Ads in the second half of 2021, which was unrelated to ATT. Moreover, Facebook and Instagram were not in China,⁸⁸ meaning none of the revenue Apple Search Ads gained in China could have been the result of lost advertising revenue from Facebook or Instagram.

Therefore, it is speculative to attribute the growth in Apple Search Ads in 2021 to the introduction of ATT without accounting for each of these factors.

C. Offering users an active choice in the Personalized Ads prompt calls into question the notion that Apple introduced ATT to benefit its ads business

As discussed earlier, Apple offers users the active choice of whether to turn off personalized ads on Apple's apps in the form of the Personalized Ads prompt. Such users receive only contextual ads. To the extent that users had a similar or higher take-up rate of this option than ATT, advertisers would perceive Apple Search Ads to be at least somewhat less effective. This perception may cause some advertisers to decrease ad spend on Apple Search Ads. If Apple wanted to attract ad dollars moving away from the likes of Meta and Snap due to the introduction of ATT, one has to consider whether Apple would have the incentive to risk driving at least some of those dollars away by offering users the Personalized Ads prompt. While I am not privy to the various considerations behind Apple's decision to offer the Personalized Ads prompt, its availability to users calls into question the notion that Apple introduced ATT to benefit its ads business.

Endnotes

- 1 For the purpose of this paper, I am focusing on legal data collection and data linkages. Both first-party and third-party data collection are currently legally allowed, though restrictions on the collection and use of these data vary by jurisdiction.
- 2 Throughout this paper I will use "iOS" and "iOS devices" to refer to both iPhones running iOS, iPads running iPadOS, and Apple TV devices running tvOS.
- 3 "Tracking" could colloquially be understood in many ways. Apple defines tracking as "the act of linking user or device data collected from your app with user or device data collected from other companies' apps, websites, or offline properties for targeted advertising or advertising measurement purposes. Tracking also refers to sharing user or device data with data brokers." I will use Apple's definition in this paper. <https://developer.apple.com/app-store/user-privacy-and-data-use/>
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