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Online Advertising

CPI COMPETITION POLICY® INTERNATIONAL

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LETTER FROM THE EDITOR

Dear Readers,

This edition of the Chronicle deals with the antitrust responses to one of the most ubiquitous, and complex phenomena in online commerce: online ads.

Today, it is almost quaint to consider that online advertising was strictly banned at the dawn of the Internet, as indeed was any "use for commercial activities by for-profit institutions." From the lifting of this ban in 1991 to today, spending on online advertising has grown to far surpass that spent on traditional outlets such as print, TV, and other broadcast and physical media. Online advertising is multifaceted, and covers many types of online media, including email, search engines, social media, video advertising on online streaming platforms, traditional web banner advertising, and mobile advertising.

Advertising on each of these media types is itself a multi-level industry, comprising the advertisers themselves, ad agencies, ad exchanges, and a plethora of intermediaries and data brokers that automate which ads are shown to which consumers and when, usually in a programmatic auction-based system (all of which together is sometimes put under the collective umbrella term "ad tech.")

While online advertising undoubtedly has produced efficiencies compared to older techniques, antitrust issues inevitably arrive at key bottlenecks in the chain that leads to a particular ad being targeted at a particular consumer. This technology and market structure is constantly evolving, and has been subject to numerous market studies, antitrust actions, and contested merger decisions in recent years. The pieces in this Chronicle throw a critical eye on the application of antitrust and economic principles to this ever-changing sector.

As the world's leading online search (and search advertising) provider, Google has inevitably been subject to intense scrutiny. **Alexander Witte & Jan Krämer** open this Chronicle by discussing Google's practices in the ad tech industry and explore potential policy interventions that would combine structural separation of Google's ad server function from its remaining ad tech services and ensuring non-discriminatory access to essential inputs on the demand-side. As the authors note, implementing such policy interventions would require regulators and policymakers to carefully balance the promotion of competition against the potential costs of disrupting efficiency gains and technical synergies offered by Google's integrated services, ultimately aiming for a more transparent, competitive, and innovative ad tech landscape that serves the best interests of all stakeholders.

As **Thomas Hoppner & Philipp Westerhoff** note, data is the lubricant of the online advertising world, and access to data has become a central competitive factor in the advertising business. The importance of data for a publisher, an advertiser, or an ad tech intermediary varies significantly depending on the advertising format in question. The authors outline the relevance of data for competition on the various sub-markets of online advertising and their respective significance for the digital ecosystem. It concludes that because the most sustainable positive effects emanate overall from behavior-based advertising, competition authorities must pay particular attention to any measures by dominant companies to artificially restrict access to data required for behavioral advertising.

Returning to first principles, **Kenneth C. Wilbur** considers how textbook microeconomic techniques, particularly "revealed preference theory," should be applied in online advertising markets. The piece argues that the necessary conditions for classic revealed preference theory fail for most advertisers, due to incentive misalignments, ambiguity about available advertising opportunities, and fundamental challenges in estimating causal advertising effects. It also argues that some advertisers' choices may reveal preferences, particularly those who pursue performance advertising objectives, buy their own media, and try to estimate incremental advertising effects. Finally, the paper argues that revealed preference theory can, however, apply to consumers and creators with appropriate model specification.

Delving further into the economics of online advertising, **Sean F. Ennis** draws a useful comparison between the economics of traditional print-based media (the "yellow pages") and the techniques employed to advertise on search engines. The author argues that that this shift has been accompanied by fundamental changes in the advertising model firms employ due to three main differences between media technologies: content "depth," display space, and cost structure. The printed yellow pages are unconstrained in paper space, as new pages are easily added, so pricing was based on the size of the ad. Search engines have a different problem, to allocate scarce space on a screen to its best use, auctioning off scarce screen space and clicks. But while auctions by click price expand opportunities for advertisers who could not cover the price of printed ads, the aggregate effect of the move to search engines must account for screen scarcity, content detail and the ability to extract higher value from higher value ads.

Finally, **Holger Dubberstein** looks at technological developments since the German Bundeskartellamt's August 2022 Discussion Report into non-search online advertising. The piece outlines these developments and relates them to the Discussion Report's findings regarding the market structure, the dispute about the use of personal data for advertising purposes, and effective competition oversight in a highly complex, technically fast-moving and (to many) opaque sector.

As always, many thanks to our great panel of authors.

Sincerely,

CPI Team

SUMMARIES

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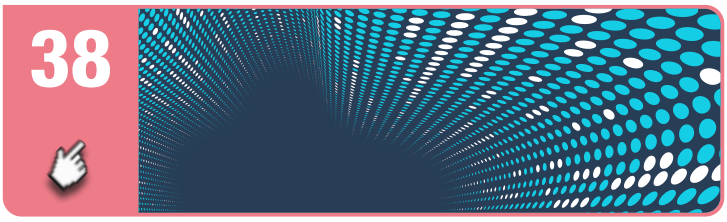

A BRIEF LOOK AT RECENT MARKET DEVELOPMENTS SINCE THE BUNDESKARTELLAMT'S SECTOR INQUIRY INTO ONLINE ADVERTISING AND AD TECHNOLOGY

By Holger Dubberstein

In a Discussion Report published in August 2022 the Bundeskartellamt outlined the findings of its sector inquiry into non-search online advertising and presented them to market participants and observers for discussion. About one year after the editorial deadline of the Report, this article discusses some market developments which have become observable in the meantime and relates them to the Discussion Report's findings regarding the market structure, the dispute about the use of personal data for advertising purposes and effective competition oversight in a highly complex, technically fast-moving and opaque sector in which one player is in a very special position.

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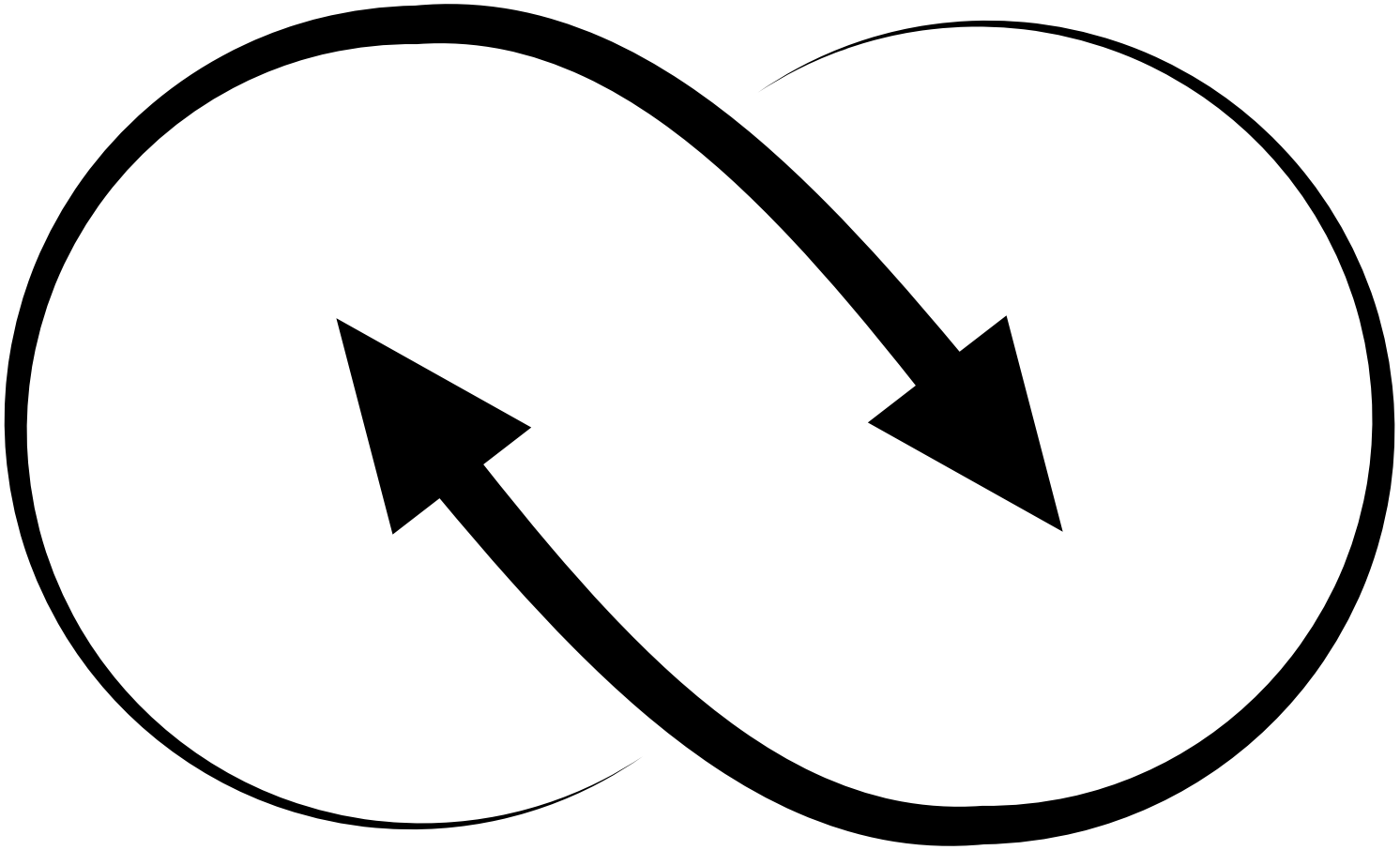
THE OPEN DISPLAY ADVERTISING ECOSYSTEM: COMPETITION CONCERNS AND POLICY INTERVENTIONS



BY ALEXANDER WITTE & JAN KRÄMER[1]

1 Alexander Witte is a doctoral candidate at the Chair for Internet and Telecommunications Business and the Research Training Group Digital Platform Ecosystems ("DPE") at the University of Passau and may be reached at alexander.witte@uni-passau.de. Jan Krämer is a professor of Information Systems and head of the Chair for Internet and Telecommunications Business as well as director of the DPE. He is also Academic Co-Director at the Centre on Regulation in Europe ("CERRE"), a Brussels-based think tank. He may be reached at jan.kraemer@uni-passau.de. The authors declare that they do not have any conflicts of interest and gratefully acknowledge funding by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) – Project number 443732464.

I. INTRODUCTION

Online advertising has transformed the way businesses promote products and services, allowing for precise targeting and real time optimization. The open display advertising ecosystem, which involves the buying and selling of ad inventory on websites and mobile apps, is a critical component of this landscape. Most online content providers, henceforth publishers, do not have the resources to run their own infrastructure to facilitate display ad transactions – unlike large platforms such as Facebook.[2] Instead, these publishers, ranging from major news companies to small blog owners, rely on a complex supply chain – the so-called "ad tech stack" – to sell ad placements to advertisers and use the revenue to sustain the provision of content to consumers.

The ad tech industry has recently attracted regulatory attention due to concerns over market concentration, particularly with Google's dominance.[3] This concentration poses risks not only to stakeholders in the ecosystem, but to society at large. High prices for ad intermediation can lead to higher retail prices, or more limited access to free, high-quality content.[4] Lack of competition may also delay or foreclose efficiency-enhancing innovation.

In response to these concerns and following its own assessment, the United States Department of Justice ("DOJ") filed a complaint against Google for monopolizing the ad tech industry in January 2023,[5] citing self-preferencing behavior to foreclose rivals and conflicts of interest arising from vertical integration. Google owns the largest ad exchange platform ("AdX"), for which it provides the largest access tools to both advertisers and publishers, while also directly competing with publishers for advertiser demand.[6] Similarly, the French Competition Authority ("FCA") has handed out a €220 million fine to Google for favoring its own services in ad tech in France.[7]

To foster competition and innovation in the ad tech ecosystem, new regulatory policies have been introduced or proposed, such as the *Digital Markets Act* ("DMA"), which entered into force in November 2022, and the proposed *Advertising Middlemen Endangering Rigorous Internet Competition Accountability Act* ("AMERICA Act"). These policies focus on prevention of anticompetitive practices and eliminating conflicts of interest among large tech platforms, the latter exclusively in ad intermediation.[8]

This paper aims to examine the (anti-)competitive environment in ad tech and to discuss possible impact of potential policy interventions. The paper is structured as follows: Section II reviews the ad tech ecosystem, provides background on its key players and their interactions,

2 Social media platforms typically sell their inventory through proprietary self-service interfaces to advertisers. For instance, advertisers can use the *Ads Manager* to launch ad campaigns exclusively on Meta's platforms, such as Facebook, Messenger, or Instagram. See Facebook Business, *Ads Manager*, FACEBOOK, https://www.facebook.com/business/tools/ads-manager (last visited May 10, 2023).

3 For instance, in 2020 and 2021 respectively the United Kingdom Competition and Markets Authority ("CMA") and the Australian Competition and Consumer Commission ("ACCC") launched studies to examine the state of competition in online advertising at large, the latter focusing exclusively on ad tech. See Competition & Mkts. Auth., *Online Platforms and Digital Advertising Market Study* (2020), https://www.gov.uk/cma-cases/online-platforms-and-digital-advertising-market-study (last visited May 10, 2023); Austl. Competition & Consumer Comm'n, *Digital Advertising Services Inquiry* 2020-21 (2021), https://www.accc.gov.au/inquiries-and-consultations/finalised-inquiries/digital-advertising-services-inquiry-2020-21 (last visited May 10, 2023).

4 Brands likely pass on marketing expenses to consumers in form of higher retail prices. Many publishers rely on advertising revenue to sustain provision of content to consumers at zero cost.

5 DOJ Complaint (2023), *United States v. Google LLC*, No. (not yet assigned) (N.D. Cal. 2023).
In Europe, the French Competition Authority ("FCA") "Autorité de la Concurrence" made a similar, albeit less extensive litigation in 2021, while European Commission has announced a yet to be concluded antitrust investigation of Google's conduct in ad tech in the same year. See FCA (2021), Autorité de la concurrence, Decision No. 21-D-11, *Regarding Practices Implemented in the Online Advertising Sector* (2021), https://www.autoritedelaconcurrence.fr/en/decision/regarding-practices-implemented-online-advertising-sector. Press Release, European Commission, *Antitrust: Commission Opens Investigation into Possible Anticompetitive Conduct by Google in the Online Advertising Technology Sector* (June 22, 2021), https://ec.europa.eu/commission/presscorner/detail/en/ip_21_3143 (last visited May 10, 2023).

6 As revealed by the DOJ Complaint (2023), one of Google's own executives posed that "[t]he analogy would be if Goldman or Citibank owned the NYSE." Compl. *Supra* note 5 at 3, ¶ 6.

7 Press Release, Autorité de la concurrence, *The Autorité de la concurrence Hands Out a €220 Millions Fine to Google for Favouring Its Own Services in the Online Advertising Sector* (June 7, 2021), https://www.autoritedelaconcurrence.fr/en/communiques-de-presse/autorite-de-la-concurrence-hands-out-eu220-millions-fine-google-favouring-its (last visited May 10, 2023).

8 The DMA defines obligations for digital gatekeepers that seek to prevent anticompetitive practices. Gatekeepers in the sense of the DMA are "digital platforms that provide an important gateway between business users and consumers, […] thus creating a bottleneck in the digital economy." Press Release, European Commission, *Digital Markets Act: Rules for Digital Gatekeepers to Ensure Open Markets Enter into Force*, ¶ 2 (Oct. 31, 2022), https://ec.europa.eu/commission/presscorner/detail/en/ip_22_6423 (last visited May 11, 2023). The AMERICA Act is a bill proposed by eleven U.S. Senators in March 2023 that seeks to restore competition in digital advertising by eliminating conflicts of interest of major (processing >$5 billion in ad transactions) advertising platforms, mainly through separational remedies (divestiture for companies processing >$20 billion in ad transactions) and transparency obligations. *The AMERICA Act: Lee Introduces Bill to Protect Digital Advertising Competition*, March 30, 2023, U.S. SENATOR MIKE LEE, https://www.lee.senate.gov/2023/3/the-america-act (last visited May 11, 2023).

and examines the current state of competition. Section III showcases the potentially anticompetitive practices of Google, particularly leveraging and self-preferencing, that may have contributed to its dominance over rivals. In Section IV we discuss possible policy interventions such as access and separation remedies. Finally, Section V concludes.

II. BACKGROUND ON THE ONLINE ADVERTISING SUPPLY CHAIN

A. How Display Advertising Inventory is Sold Through the Ad Tech Ecosystem

The ad tech ecosystem comprises a supply chain of computerized intermediaries that automate the transaction process between advertisers and publishers in real-time, either directly or through programmatic "on-the-spot" auctions using the Real-time Bidding ("RTB) protocol. Programmatic advertising enables publishers and advertisers to optimize transactions using real-time information about users and ad placements to maximize ad revenue or returns on advertising campaigns.

The ad tech ecosystem is complex and involves a plethora of different actors that interact with each other at different layers of the supply chain. At some level of abstraction, the process involves the following steps.[9]

1. When a user visits a webpage (or mobile app),[10] the browser requests ads from the publisher ad server while loading the site's first-party content.
2. The publisher ad server, a central management and reporting hub, decides which ad to serve for each ad slot. It typically prioritizes offering ad inventory to specific advertisers with whom a publisher has closed direct deal contracts. After serving these contracts, the ad server instructs the browser to call ad exchanges for unsold inventory.[11]
3. Ad exchanges, or supply-side platforms ("SSPs"), carry out real-time ad auctions. They enrich ad opportunities with user information and send bid requests to demand-side platforms ("DSPs").[12]
4. DSPs automate ad purchase decisions across multiple ad exchanges. Upon receiving a bid request, a DSP evaluates the ad opportunity based on campaign parameters and calculates an appropriate bid on behalf of its advertising customers.[13]
5. The exchange hosts an auction among all bids received and selects the winner. Each exchange forwards its local auction's clearing price, net of its fees, to the publisher ad server.[14]
6. The publisher ad server selects a winner among all bids received according to yield optimization rules and returns its decision to the user's browser.
7. The browser requests the ad content from the advertiser's ad server, which serves the winner's ad content along with advertiser tracking code on the website.[15]
8. The publisher receives the winning advertiser's bid net of the fees charged by the various intermediaries involved in the transaction.

DSPs and ad exchanges typically charge their respective customers a percentage commission deducted off the gross bid received before submitting it to the subsequent auction stage. Ad servers charge a flat volume-based fee.[16]

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9 We chose to refrain from outlining the technical details of the programmatic transaction process within the scope of this article. Also note that there exist a multitude of variations to open display transactions, such as private marketplaces, automated guaranteed deals, programmatic direct deals, etc. A detailed explanation of the peculiarities of each is beyond the scope of this article.

10 For the purpose of this paper, we will not delineate between transaction and ad serving process for web and mobile environment.

11 See Maciej Zawadziński, *What is an Ad Server and How Does It Work?*, CLEARCODE (2018), https://clearcode.cc/blog/what-is-an-ad-server (last visited May 11, 2023).

12 Note that, similar to market studies of public authorities in open display advertising, see ACCC (2021); CMA (2020), *supra* note 3, we include ad networks in our definition of DSPs. The reason is that modern ad networks usually do no longer operate distinctively to DSPs.

13 DSPs typically coordinate on a single bid among their customers to avoid self-competition in the auction hosted by the exchange. See Amine Allouah & Omar Besbes, *Auctions in the Online Display Advertising Chain: A Case for Independent Campaign Management*, 17-60 Colum. Bus. Sch. Research Paper (2017).

14 Historically, exchanges would perform second-price auctions. Nowadays, most exchanges have transitioned to a first-price auction model. See CMA (2020), *Appendix M, infra* note 22, at 11, ¶ 38.

15 Advertisers use ad servers for similarly to publishers as a management hub of their campaigns, managing creatives, tracking, and reporting. See Zawadziński (2018), *supra* note 11.

16 DOJ Complaint (2023), *supra* note 5, at 22, ¶ 57.

B. Market Concentration

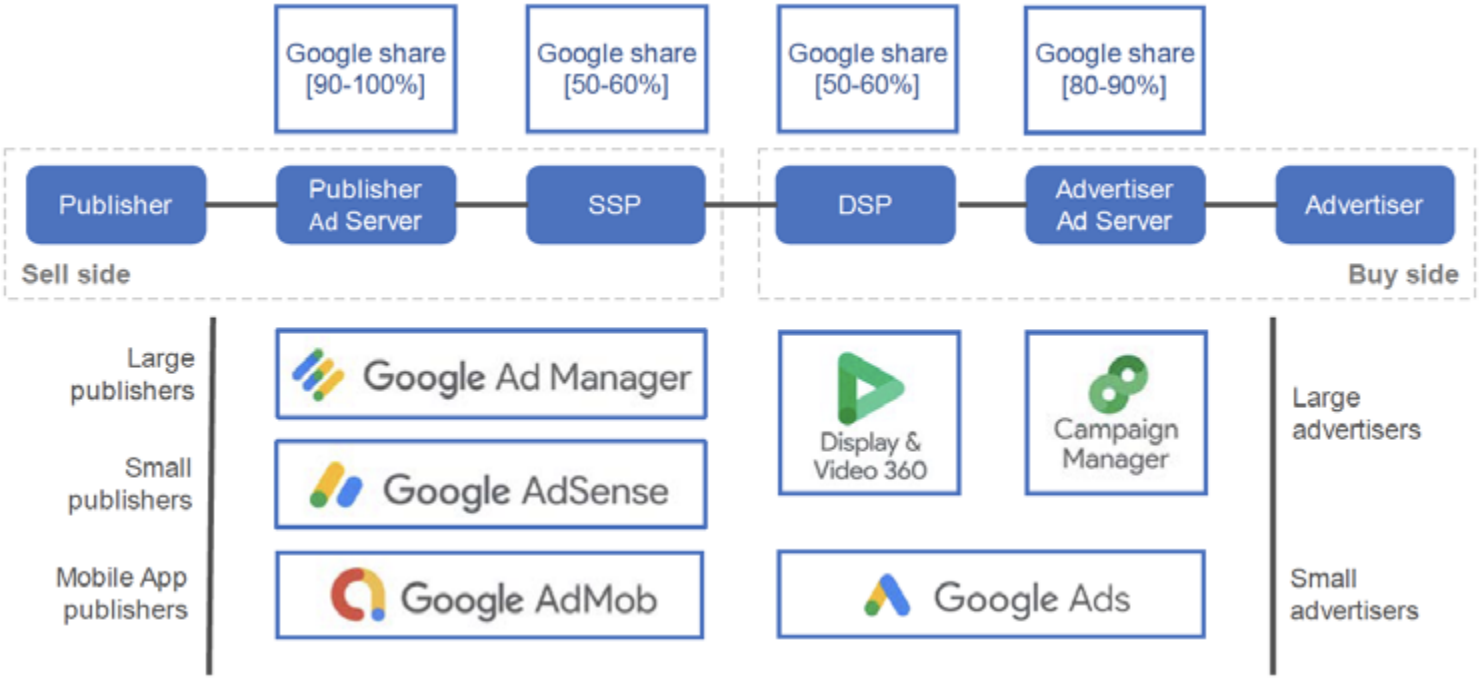

Figure 1: *Illustration of Google's products and estimates of its market share in ad tech in the United Kingdom as of 2019. Ad server market shares are in terms of volume of impressions. SSP and DSP market shares are in terms of value of impressions. Source: CMA (2020).*

Various reports on competition in ad tech over different geographical regions have found Google to be the largest player at every step of the ad intermediation value chain.[17] Figure 1 illustrates the CMA's estimates of Google's market share in the United Kingdom in 2019.[18] The publisher ad server market is particularly concentrated, with more than 9 out of 10 impressions being served by Google's product *Google Ad Manager* ("GAM"), formerly *DoubleClick for Publishers* ("DFP").[19] In the ad exchange market, 50-60 percent of the value of ads flows through Google's product *AdX*, since 2019 bundled with DFP as GAM.[20] Similarly, estimates for combined market share of Google's DSP products *Google Ads*, formerly *AdWords*, and *Display & Video 360* ("DV360"), formerly *DoubleClick Bid Manager*, is 50-60 percent of the value of impressions. Google's advertiser ad server product *Campaign Manager* serves 80-90 percent of impressions.

Google's extent of vertical integration, built through a series of acquisitions,[21] incentivizes leveraging market power from dominated markets into adjacent layers of the value chain. Such market power is rooted in self-reinforcing power of cross-side network effects, which Google leverages through its vertically integrated product suite thereby potentially foreclosing competition by smaller rivals.

17 ACCC (2021), *supra* note 3, at 54; CMA (2020), *supra* note 3, at 266, ¶ 5.213; DOJ complaint (2023), *supra* note 5, at 3, ¶ 6; FCA (2021), *supra* note 5, 72-73.

18 Estimates in other geographical regions are qualitatively similar. See ACCC (2021), *supra* note 3, at 54.

19 In 2019, Google rebranded most of the products in its ad tech suite. However, DFP and *AdX*, now both bundled as the GAM product, are commonly still addressed by their former names to delineate the different roles of ad server and ad exchange. We hereinafter follow suit.

20 The CMA (2020), *supra* note 3, at 266, n.387, includes Google's ad networks for mobile ad serving, *AdMob*, and web ad serving, *AdSense*, in its definition of SSPs. Modern ad network products for publishers are distinct from ad exchanges like *AdX* in that they generally serve smaller publishers, who do not meet the required impression volume to connect to *AdX*. Instead, they offer simple plug-&-play solutions, albeit at higher cost and less control. *AdSense* for instance, does not serve ads from third-party demand sources, only from Google's DSPs. Moreover, estimates suggest *AdSense* charges 32 percent revenue share homogeneously across all publishers compared to *AdX* average 20 percent take rate. Google, *AdSense revenue share - AdSense Help*, GOOGLE SUPPORT, https://support.google.com/adsense/answer/180195?hl=en&ref_topic=1319755&sjid=9467060323509428 38-EU (last visited May 10, 2023) (stating *AdSense*'s revenue share); DOJ Complaint (2023), *supra* note 5, at 53, ¶ 122 (stating *AdX*'s revenue share).

21 In 2007 Google acquired *DoubleClick*, the leading publisher ad server by the time and with plans to launch an ad exchange *DoubleClick Ad Exchange* or *AdX*. In 2009 Google acquired *AdMob*, its current network to serve ads on mobile apps. In 2010 it acquired Invite Media, which formed the basis for its DSP product DV360. One year later in 2011, Google acquired *AdMeld* and integrated its technology for yield optimization into its ad exchange *AdX*. See ACCC (2021), *supra* note 3, at 76; CMA (2020), *supra* note 3, at 272; DOJ Complaint (2023), *supra* note 5, 31-36, ¶ 76 – 89.

III. ANTICOMPETITIVE PRACTICES

A. Leveraging Practices to Launch Network Effects and Gain Market Power

1. Leveraging Market Power from Consumer-facing Services into the DSP Market

Google exploits its market power as a search engine and video streaming publisher (e.g. *YouTube*) to influence the DSP market. Advertisers, especially smaller ones, typically only use a single DSP to purchase ad inventory.[22] Moreover, advertisers value access to the large user base and unique advertising formats, such as search and in-stream videos, on Google's consumer-facing services.[23] Thus, by exclusively tying access to Google *Search* and *YouTube* to its DSP services, advertisers have strong incentives to adopt Google's DSPs over services offered by competitors. If an advertiser wants to include Google's first-party inventory with third-party inventory of other publishers in the same advertising campaign, it *must* launch that campaign through Google's DSPs.

2. Leveraging Market Power from the DSP to the Ad Exchange Market

By virtue of cross-side network effects between publishers and advertisers, Google's large advertiser base using its DSP products makes access to them attractive for publishers.[24] Publishers access DSP demand by offering inventory on exchanges, often adopting multiple exchanges (multi-homing) to maximize demand per impression. DSPs also multi-home, integrating and bidding across multiple exchanges for efficient access to publisher inventory. While single-homing on both market sides leads to a "winner-takes-all" dynamic in two-sided markets, i.e. users on both sides flock to whichever platform offers them access to the largest share of a complementary user group, launching a virtuous feedback loop in favor of a single platform, multi-homing enables platforms to grant access to shared users, mitigating the network effects' competitive implications.

An effective strategy to counteract multi-homing's pro-competitive effects is exclusive dealing, which leads to a "competitive bottleneck" whereby a platform that acts as the bottleneck for its set of single-homing users on one side of the market, gains market power over multi-homing users on the other market side.[25] Thus, if one exchange would be able to offer exclusive access to a particular set of DSPs, and publishers sufficiently value access to that set, that exchange will gain market power over publishers despite the presence of multi-homing.

Google creates such a bottleneck by tying its DSP services to its ad exchange, thereby gaining market power over publishers. For publishers to access Google's significant advertiser base, they must adopt Google's exchange, *AdX*. Google achieves this through preferentially routing bids from Google's DSPs to *AdX*.[26] Note that such exclusive routing of bids goes against advertisers' interest, who would prefer a larger variety of supply, but face high switching costs due to Google's market power in the DSP market.

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22 There are strong incentives for advertisers to use a single DSP within any single campaign. First, DSPs operate on different user IDs. Therefore, advertisers that use multiple DSPs for a particular campaign would not be able to apply frequency capping, i.e. limiting the amount of ad exposures on a particular user, and would face additional costs for reconciling performance reports and metrics on the user-level. Moreover, there could be scenarios in which the same advertiser, by using multiple DSPs for the same campaign, competes against itself in auctions and thereby drives up costs. Competition & Mkts. Auth., *Online Platforms and Digital Advertising Market Study. Appendix M: intermediation in open display advertising* ¶ 189 (2020), https://www.gov.uk/cma-cases/online-platforms-and-digital-advertising-market-study (last visited May 10, 2023); Moreover, DSPs other than *Google Ads* usually cater towards larger advertisers or media agencies due to specialized and complex functionalities for e.g. custom targeting, and relatively high minimum spend requirements. Meeting such spend requirements or thresholds for volume-based discounts further incentivizes ad buyers to use only a single DSP.

23 While the importance for advertisers to access to Google *Search* is arguably undisputed, the market power of *YouTube* over advertisers may be less obvious. The CMA (2020) finds that video advertising is the largest display advertising format (around 40 percent) in the United Kingdom with *YouTube* being the largest video publisher. The CMA (2020) estimates that *YouTube* reaches 90 percent of all users in the United Kingdom every month across all age segments, and that users spend about twice as much time on *YouTube* compared to *Facebook*. See Competition & Mkts. Auth., *Online Platforms and Digital Advertising Market Study. Appendix ZA: assessment of potential pro-competition interventions to address market power in open display advertising*, at 33, ¶ 149 (2020), https://www.gov.uk/cma-cases/online-platforms-and-digital-advertising-market-study (last visited May 10, 2023).

24 Cross-side network effects between publishers and advertisers significantly impact competition between ad tech platforms. Publishers benefit from more advertisers bidding on their inventory, while advertisers gain from a larger publisher base, increasing their audience reach. Thus, an ad tech provider becomes more attractive with a higher customer base on each market side, everything else being equal.

25 See Mark Armstrong, *Competition in Two-Sided Markets*, 37 RAND J. ECON. 668 (2006); Mark Armstrong & Julian Wright, *Two-Sided Markets, Competitive Bottlenecks and Exclusive Contracts*, 32 ECON. THEORY 353, (2007).

26 To provide some order of magnitude, the FCA (2021), *supra* note 5, at 52. ¶ 227, shows in its complaint, that in 2019, 60-80 percent of impressions offered on Google's ad exchange, the largest ad exchange in the market, is bought by either Google Ads or DV360. One publisher stated that demand from *AdX* yields 40 to 90 percent of its programmatic revenues. *Id.* at 54, ¶ 231.

3. Leveraging Market Power from the Ad Exchange to the Publisher Ad Server Market

Google's ad exchange's large share and value of bids make it attractive for publishers, who typically use a single ad server to connect with multiple exchanges, i.e. multi-home.[27] However, discrimination between ad server providers by an exchange with market power can steer publishers toward a specific provider by creating a bottleneck. Google establishes discriminatory access by limiting interoperability between its exchange and third-party ad servers, granting only its own ad server DFP real-time access to its demand. Publishers' choice of using *Google Ad Manager* (formerly DFP) is primarily driven by this unique ability to provide efficient access to *AdX*. Because publishers employing third-party ad servers face opportunity costs from not accessing *AdX*'s demand in real-time, this strategic denial of interoperability forecloses competition in the publisher ad server market.[28]

While leveraging practices impact advertisers' and publishers' choice of service providers, adoption alone isn't sufficient for ad tech platforms to be profitable. They compete on two layers: adoption and winning impressions, with commissions earned from forwarding winning bids.[29] This commission-based model incentivizes providers with market power in the publisher ad server market to discriminate against independent demand sources when executing its "final say" to decide which ad to serve.

B. Self-preferencing of Integrated Demand Sources to Win More Auctions

Google has used its market-leading publisher ad server to discriminate against rival bidders through various practices for over a decade. However, self-preferencing manifestations have changed due to market conditions and rivals' innovations countering Google's advantageous conditions.

Non-Google exchanges generally have three options to buy from Google's publisher ad server DFP: integrating through the waterfall setup, *Header Bidding* auction, or *Open Bidding* auction. All these options are inferior to the way *AdX* buys from DFP.

1. The First Look Advantage over Waterfall Bidders

Third-party exchanges using the Waterfall setup are contacted sequentially, based on decreasing average historic yield. Google's ad server does not allow non-Google exchanges to bid on every impression in real-time. Conversely, Google's own exchange benefits from a feature called *Dynamic Allocation*, contacting it for every impression before waterfall-integrated exchanges, using the highest priority waterfall exchange's static bid as a price floor. This process prevents exchanges with potentially higher bids from competing, depriving rivals and publishers of revenue.

2. The Last Look Advantage over Header Bidders

Dissatisfied with the waterfall setup and the inherent "first look" advantage of Google's exchange the industry developed *Header Bidding*: Publishers use the client's browser to insert third-party exchange bids into Google's ad server before calling its own exchange through *Dynamic Allocation*. The "first look" advantage transformed into a "last look" advantage. *Header Bidding* increased competitive pressure on Google's exchange by allowing rivals to submit real-time bids, raising the "price-to-beat." However, Google's exchange still enjoyed a competitive advantage by operating a second-price auction, buying impressions at an increment over the runner-up bid from a rival exchange, if only a single buyer on Google's exchange would bid higher. *Header Bidding* significantly improved publisher revenue,[30] but direct competition with Google's exchange bids could have yielded more. Estimating actual revenue foregone due to the last look is challenging due to the lack of a counterfactual scenario and changes to bidders' strategies in that case.[31] Nevertheless, the FCA estimates that in the absence of the last look, rival exchanges would have won a significantly larger number of auctions.[32]

27 Using a single ad server is efficient for publishers as it serves as the central management hub to streamline operations and reporting across possibly multiple webpages and mobile apps. CMA (2020), *Appendix M, supra* note 22, at 65, ¶ 264; FCA (2021), *supra* note 5, at 74, ¶ 330.

28 For magnitude of opportunity costs, see *supra* note 26. For discussion of reasons of why the majority of publishers chooses to adopt GAM as their ad server, see CMA (2020), *Appendix M, supra* note 22, at 112, ¶ 445.

29 DOJ Complaint (2023), *supra* note 5, at 29, ¶ 73.

30 Publishers that adopted *Header Bidding* report revenue gains of 30 percent or even up to 50 percent. See Ricardo Bilton, *With Header Bidding, Publishers are Boosting CPMs by as Much as 50 Percent*, DIGIDAY (November 12, 2015), https://digiday.com/media/header-bidding-publishers-boosting-cpms-much-50-percent/ (last visited May 10, 2023).

31 For instance, in absence of the right of last look, Google's exchange may have changed to a first-price auction model, in which the highest bidder pays its bid, to submit a higher bid in the subsequent competition with rival exchanges. However, in first-price auctions, it is optimal for a bidder to bid lower than its true valuation to be able to realize a buyer surplus (see for instance, Paul Klemperer, *Auction Theory: A Guide to the Literature*, 13 J. ECON. SURVEYS 227 (1999)). Thus, in case Google's exchange had hosted a first-price auction, it may have been that bidders had bid lower. The harm inflicted on publishers therefore depends on the extent to which the resulting clearing prices of auctions in such a hypothetical scenario would actually exceed the clearing price of auction instances where Google's exchange won the impression at an increment of the highest bidding rival by virtue of the right of last look. See FCA (2021), *supra* note 5, 41 – 43, ¶ 170 – 181.

32 FCA (2021), *supra* note 5, at 42, ¶ 177.

3. The Interaction Between Last Look and Dynamic Revenue Share

Google further increased its win rates over rival exchanges by dynamically adjusting its revenue share to win more impressions.[33] Exchanges forward bids to publisher ad servers net of their revenue share, so the exchange with the lower revenue share wins the auction, all else being equal. The right to a "last look" uniquely enables Google's exchange to precisely determine the revenue share needed to win an auction. Publishers still receive the contractually agreed-upon revenue share on average, as Google demands a higher share during low competition and subsidizes instances where it lowers its share to beat rivals. This strategy effectively forecloses rival exchanges from winning impressions, even in cases where they could have outperformed Google's exchange despite the "last look" advantage.

4. Open Bidding and the Advantageous Conditions for AdX

Google launched its own version of *Header Bidding called Open Bidding* (formerly *Exchange Bidding*). *Open Bidding* is a "server-side" version of *Header Bidding*, granting publishers the ability to offer inventory to exchanges in *Open Bidding through Dynamic Allocation*, giving them the "right of last look" too. This feature, alongside other benefits like reduced latency by not using the client's browser but Google's server to host the auction, incentivizes publishers to adopt *Open Bidding*, potentially even over independent *Header Bidding* implementations. However, despite the advantages it offers, Google discriminates against rivals in *Open Bidding* to increase its expected probability of winning.

First, Google charges rival exchanges an additional 5-10 percent commission to further reduce their net bids by raising their costs. Second, *Open Bidding* disallows vertically integrated rival exchanges from forwarding bids from their DSPs, depriving them of technical efficiency gains like deterministic user identification and latency advantages between vertically integrated DSPs and exchanges.[34] This impacts their competitiveness in the auction, reducing average bid amounts and increasing the probability of exclusion due to auction timeout thresholds.[35]

5. Project Poirot – How Google's Display & Video 360 discriminates against Rival Exchanges

Google allegedly reduces the bids submitted by its DSP DV360 into rival exchanges by 10-90 percent, weakening their competitiveness against its own ad exchange in the final auction.[36] Google officially states that this practice is due to an increasing number of exchanges running first-price auctions to increase the clearing prices of their local auctions and thereby increase competitiveness at the subsequent ad server level. To protect its buyers from overpaying in such first-price auctions DV360 shades bids, which would indeed be in advertisers' best interest. However, the DOJ, citing internal documents, claims that this practice, at Google internally dubbed "Project Poirot," intentionally aims to reduce the competitiveness of rival exchanges and route more bids through Google's own exchange.[37]

33 DOJ Complaint (2023), *supra* note 5, 86-90, ¶ 198-207.

34 User identification in web-based environments usually happens via user IDs stored in cookies, i.e. small text files stored on the user's device. Whenever the browser contacts a domain, e.g. that of an exchange to sell ads, the domain can read the cookie to identify the user. However, DSPs typically connect to exchange through a server-side connection, i.e. they do not have access to their user IDs stored on the client when receiving a bid request. Instead, DSPs receive the user ID of the exchange as part of the bid request and must match the user ID of the exchange with their own, to reidentify the user and evaluate the ad opportunity. Because this process, called cookie syncing, is error prone, user identification is stochastic. Cookie match rates vary between ad tech providers. As a rule of thumb, being able to identify the user in less than 40 percent of cases is considered "poor matching," whereas anything above 60 percent is already considered "decent matching." See Maciej Zawadziński, *What is Cookie Syncing and How Does it Work?*, CLEARCODE (June 7, 2022) https://clearcode.cc/blog/cookie-syncing/ (last visited May 11, 2023). Failed cookie syncing means that the user can't be identified and ads can't be targeted according to user characteristics, hence reducing advertisers' bids. However, a vertically integrated DSP would not need to sync their cookies as it operates on the same domain as the exchange and therefore shares the same user IDs. Thus, everything else being equal, an integrated DSP would be expected to submit higher bids and therefore have a higher expected winning probability than rivals on its own vertically integrated exchange.

35 Publishers implement such timeouts to avoid adverse effects on load time of ad content, which could decrease user experience or even revenue, if the ad has not been visibly displayed.

36 DOJ Complaint (2023), *supra* note 5, 90-101, ¶ 208-230.

37 To illustrate the advantage given by DV360 to *AdX* under Project Poirot, consider the following example: DV360 has a bidder with $1CPM valuation for a specific impression. It bids into one rival exchange which demands a 10 percent revenue share and holds a first-price auction. The clearing price is $0.90 which is, by virtue of "last look," also the price to beat for Google's exchange. Google's exchange in this case, however, could not beat this price since itself demands a 20 percent revenue share (assuming it doesn't adjust it dynamically), i.e. only has a net bid of $0.80 coming from DV360. However, by bidding e.g. 50 percent lower into the rival exchange, the price-to-beat for *AdX* becomes $0.45. *AdX* wins, the auction clears at $0.46 paid to the publisher and the *AdX* charges DV360 20 percent more, i.e. $0.55 for the impression. By reducing the amount bid into rival exchanges, *AdX* can maintain its high revenue share without risking losing impressions to rival exchanges. To provide an order of magnitude, through Project Poirot, rival exchanges allegedly experienced 22 to 42 percent decline in advertiser spend coming from DV360. Given the large share of advertiser demand represented by DV360 this allegedly lowered their win rates by 10 percent. *Supra* note 5, at 100, ¶ 228.

6. Unilaterally Deployed Changes to Auction Rules to Further Discriminate Against Rivals

Since September 2019, Google has been running a first-price unified auction ("FPUA").[38] Here, "unified" means that Google's exchange does no longer run a separate auction. Instead, buyers formerly bidding into the second-price auction hosted by Google's exchange, called *Authorized Buyers*, now directly bid into a first-price auction hosted by Google's ad server, along with exchanges bidding through *Open Bidding*, called *Yield Partners*, and the winning exchange from the *Header Bidding* auction. Industry commentators state that by transitioning from a first-price auction to a second-price auction, Google has ceded its advantage from having the "last look." The advantage does however not originate from the second-price auction mechanism, but rather from the advantage of observing the price to beat *ex ante*, i.e. before deciding on the bid.[39] In fact, for first-price auctions, economic theory would predict that the incentive to observe the price to beat is even larger. By knowing the other bidders' bids, buyer surplus can be maximized, and winner regret can be minimized (i.e. the opportunity cost equal to the difference between the price the winner has paid, and the price that would have been sufficient to beat the next highest bidder), by bidding just slightly higher than the next highest bid. While there is currently no data available to support the claim that Google retained its "last look" advantage, it has an even greater incentive to do so under a first-price auction when it is operating the auction platform and acting as a bidder on that platform. Such "unsealing" could happen either stochastically by algorithmic prediction of the clearing price based on historical data,[40] or – as was the case under "last look" – deterministically. The latter could be operationalized by Google if it simply observes rivals' bids and bids microseconds later. Publishers would not be able to notice such difference in timing of bid submissions as Google has changed its reporting of auction timestamps in the log files provided to publishers by rounding them from previously reported microsecond to the nearest hour.[41] While the retainment of the "last look" advantage is not verifiable without access to raw auction data, two other changes accompanying FPUA – *Minimum_bid_to_win* ("MBTW") feature and *Unified Pricing Rules* ("UPRs") – warrant scrutiny.

MBTW shares the price-to-beat post-auction with *Authorized Buyers* and *Yield Partners* but not *Header Bidding* exchanges. Sharing such information makes the auction more efficient in general by reducing the risk of overpaying for impressions and thereby incentivizing participation. However, sharing it selectively, disadvantages those without access, i.e. the exchanges participating in independent *Header Bidding*, and thus makes bidding on the latter relatively less attractive than bidding through alternative channels such as Google's exchange or Google's *Open Bidding*.[42] After claiming technical infeasibility of sharing MBTW with *Header Bidding* participants, Google agreed to share the information with all exchanges as part of binding commitments to the FCA in 2021.[43]

UPRs prevent publishers from setting buyer-specific reserve prices in FPUA. Public authorities concur that UPRs aim to increase win rates for Google's exchange and DSP services. Publishers would set differential price floors primarily to account for competitive advantages of buyers and thereby increase revenue.[44] A buyer holding a competitive advantage can be expected to have a wider distribution of maximum bids.[45] By applying a higher price floor to demand sources with such a competitive advantage, i.e. Google's DSPs or exchange,[46] the publisher can increase yield in instances of second-price auctions where the higher price floor reduces the extent of bid attenuation. However, such differential floors reduce the winning probability of the subjected demand source. By depriving publishers of the ability to set higher price floors to account for its competitive advantage, Google can increase its services' win rate, contrary to publishers' interest.

38 Jason Bigler, *An update on first price auctions for Google Ad Manager*, GOOGLE BLOG (2019), https://www.blog.google/products/admanager/update-first-price-auctions-google-ad-manager/ (last visited May 11, 2023).

39 Damien Geradin & Dimitrios Katsifis, *"Trust me, I'm fair": analysing Google's latest practices in ad tech from the perspective of EU competition law*, 16 EUROPEAN COMPETITION JOURNAL 11 (2020).

40 DOJ Complaint (2023), *supra* note 5, 113 – 116, ¶ 256 – 261 (noting that Google allegedly replaced last look by training a "rival bid" prediction algorithm called "Smart Bidding" based on the data over the distribution of bids collected over a whole decade – trillions of data points); CMA (2020), *Appendix M, supra* note 22, 125 – 126, ¶ 487 – 490. (Similarly stating that Google's superior access to auction data may provide the ability and incentive to algorithmically predict the "price-to-beat" in FPUA).

41 See Google Ads Manager Help, *Explore Data Transfer fields*, GOOGLE, https://support.google.com/admanager/table/7401123 (last visited May 11, 2023); Dina Srinivasan, Why Google dominates advertising markets, 24 STAN. TECH. L. REV. 55 (2020), at 135.

42 CMA (2020), *Appendix M, supra* note 22, at 124, ¶ 482.

43 Maria Gomri, *Some changes to our ad technology*, GOOGLE (June 7, 2021), https://blog.google/around-the-globe/google-europe/some-changes-our-ad-technology/ (last visited May 11, 2023).

44 Other reasons to set differential price floors may be steering of inventory to certain demand sources. For instance, publishers have an incentive to steer a certain number of impressions to an exchange, if that exchange offers a volume-based discount. DOJ Complaint (2023), *supra* note 5, at 102, ¶ 234.

45 Two mechanisms can lead to such a wider distribution of maximum bids. Either, the buyer, e.g. a DSP, represents a larger share of demand and thus makes the auction "thicker," or the buyers on the DSP have more information than others and adjust bids upwards accordingly. CMA (2020), *Appendix M, supra* note 22,, 119 – 120, ¶ 470.

46 Note that Google's DSPs tend to be the highest bidders on its vertically integrated exchange due to minimal cookie syncing losses (*supra* note 42,43), or allegedly due to the implementation of Project Poirot.

C. Impact on Competition

Google's extent of vertical integration has brought efficiency gains for publishers and advertisers, among other things, a unified end-to-end platform that offer data synergies and better user identification, or reduced latency which enhances user experience and may increase return on advertising investments.[47] Especially smaller advertisers benefit from efficient "one-stop-shop" solutions offered by Google's DSP *Google Ads*, that allows launching ad campaigns of various formats to a large proportion of Internet users at no explicit cost and without entry requirements.

However, its extent of vertical integration has also enabled and incentivized Google to leverage network effects and the resulting market power through tying its services, resulting in decreased adoption of rival services by advertisers and publishers. Simultaneously, Google diminishes pro-competitive effects of multi-homing by using its leading ad server to grant favorable conditions to its own services in most display ad auctions. Ad tech platforms, due to their commission-based business model, compete not only for adoption but also for winning auctions.[48] Self-preferencing in auctions lowers rivals' win rates, effectively depriving them of scale despite multi-homing.

Such anticompetitive practices in ad tech create barriers to entry and distort competition, harming stakeholders. These practices may have resulted in higher ad intermediation prices due to limited competition, negatively affecting publishers' revenues, advertisers' costs, and indirectly, consumers. Higher marketing costs may raise retail prices, while reduced ad revenue can compromise freely accessible online content.[49] Moreover, by foreclosing competition, Google may have been reducing choice and stifling innovation in the online advertising supply chain.[50] Lastly, the absence of competition enables Google to maintain opaque operations, such as blackbox auctions and unclear fees, without the risk of losing customers. This lack of transparency risks moral hazard and opportunistic behavior, potentially eroding trust in the ad tech ecosystem and harming all stakeholders.[51]

IV. DISCUSSION OF POLICY INTERVENTIONS

Considering the challenges and the resulting harm posed by Google's anticompetitive practices in the ad tech industry, it becomes evident that policy inventions are necessary to address these issues and foster a more equitable, competitive landscape. Google is the largest agent for buyers, provides the largest marketplace, acts on behalf of sellers, and competes with them at the same time. Such extensive vertical integration creates several conflicting incentivizes that promote leveraging practices and self-preferencing. First, a vertically integrated seller with market power (e.g. *YouTube*) has an incentive to discriminate against independent buy-side agents, i.e. DSPs, e.g. by refusing to deal/provision of access. Second, a vertically integrated buy-side agent with market power has an incentive to discriminate against marketplaces, e.g. by preferential and/or exclusive routing of bids. Third, a vertically integrated marketplace, i.e. ad exchange, with market power has an incentive to discriminate against independent sell-side agents, i.e. ad server, e.g. by refusing to deal/provide imperfect interoperability. Fourth, a vertically integrated sell-side agent with market power has an incentive to discriminate against independent marketplace and/or buy-side agents by providing advantageous transaction conditions for its own services (e.g. unsealing the auction, i.e. first look and/or last look, raising rivals' costs and depriving vertically integrated rivals from the resulting efficiency gains, i.e. *Open Bidding* rules, establish price parity clauses, i.e. UPRs, or selectively share valuable information, i.e. MBTW).

As Google is fully integrated along the entire ad tech value chain, behavioral remedies, such as transparency obligations or a ban of self-preferencing, are likely not sufficient and difficult to monitor and to enforce. In our view, addressing these conflicts requires policy interventions that focus on altering the underlying structure incentivizing such behavior while maximizing the difference between benefits and costs. We think that a combination of separating ad server functions and providing access to valuable inventory at the DSP level may yield the best outcome, preserving important efficiency gains between other vertically integrated layers of the value chain.

47 See e.g. *How Network Latency Affects the RTB Process for AdTech*, DATAPATH (Apr. 21, 2016), https://medium.com/@datapath_io/how-network-latency-affects-the-rtb-process-for-adtech-6ecbf29d025 (last visited May 12, 2023) (stating that high latency may lead to advertisers being charged for serving the impression without the user actually seeing the ad); Tejaswini Tilak, *NEED FOR SPEED: Why the Online Ad Industry Is Converging on Equinix*, EQUINIX (Nov. 18, 2013) https://blog.equinix.com/blog/2013/11/18/need-for-speed-why-the-online-ad-industry-is-converging-on-equinix/ (last visited May 12, 2023) (showing anecdotal evidence of how improved latency has increased bid rates on an exchange, which is ultimately benefiting publishers).

48 DOJ Complaint (2023), *supra* note 5, at 29, ¶ 73.

49 *Id.* 116 – 121, ¶ 262 – 273.

50 *Id.* at 121, ¶ 274, and at 122, ¶ 277.

51 *Id.* at 122, ¶ 276.

A. Structural Separation to Address Conflicts of Interests

Structural separation, though intrusive, addresses self-preferencing and coordinated behavior by breaking up Google's vertically integrated business. This one-off intervention requires no ongoing monitoring and can yield long-term benefits.[52] However, it is crucial to assess which services or functions should be separated to maximize effectiveness and minimize market impact.

Separating buy-side agent function promotes local competition among DSPs but may not extend beyond that. Google's DSPs would lose the exclusive access advantage, giving advertisers more choices. Competitive pressure at the DSP level would also discourage Google from preferentially routing bids to its exchange, reducing its market power over publishers. However, Google might still retain some ability to discriminate against independent exchanges for a large volume of auctions due to publishers' high switching costs in the ad server market.[53] Moreover, requiring separation between exchange and DSP would deprive advertisers and publishers from significant technical efficiency gains for advertisers and publishers when transacting over a vertically integrated exchange and DSP, e.g. minimal cookie syncing losses and reduced latency.[54] Separating the marketplace function, i.e. ad exchange, thus has similar considerations, depriving efficiency gains while leaving incentives for favoring integrated demand sources.

We think that separating the ad server from other ad tech services offers the most significant benefits while preserving technical efficiency gains. An independent ad server would have an incentive to act in the best interest of publishers, promoting multi-homing and non-discriminatory treatment of demand sources. Moreover, exchanges would have an incentive to become interoperable with any publisher ad server to maximize access to supply, increasing competitive pressure in the market and facilitate entry.

However, Google's DSPs might still preferentially route demand to its integrated exchange, preserving market power over publishers. To address this, separating the publisher ad server could be combined with addressing leveraging abilities on the demand side. If Google's DSPs lose market power over advertisers, preferential routing would prove detrimental. Advertisers could discipline Google by adopting rival services. One potential approach is to untie exclusive access to first-party inventory from Google's DSP services.

B. Access to Essential Inputs of Demand-side Services

Untying *YouTube* inventory from Google's DSP services could involve allowing third-party DSPs to sell *YouTube* inventory on non-discriminatory terms or disallowing Google from selling first- and third-party inventory through the same service.

Mandating access to *YouTube* inventory for third-party DSPs may involve significant costs that need to be outweighed by benefits to justify such a policy intervention. Google cites privacy protection and ad quality concerns as reasons to exclude third-party DSPs from selling *YouTube* inventory.[55] However, it remains unclear why Google, as a publisher, cannot blacklist malicious ads or obtain user consent for information sharing, as is common practice to comply with privacy law. Alternatively, disallowing sales of first-party and third-party inventory through the same service could create a level playing field for DSP providers but may result in efficiency losses for advertisers due to issues reporting and frequency capping when using multiple DSPs for the same campaign.[56] Moreover, such separation would also prevent smaller advertisers using *Google Ads* from benefits of a simple "one-stop-shop" solution to buy ad inventory that reaches the majority of Internet users. These costs must be weighed against potential benefits of increased competition.

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52 An alternative to structural separation may be operational separation, whereby functions such as ad serving, ad intermediation, and ad buying would be operationally independent, with separate management, staff, and decision-making processes, without changing the ownership structure. Such operational separations may be encountered for instance in financial industries, where, to prevent conflicts of interests, service providers are legally prohibited from acting on both sides of any particular transaction. However, given that Google represents the sell-side on more than 9 out of 10 transactions, Google would be de facto required to separate the ownership of the buy- from sell-side service to continue its operations. Thus, such functional separation would not be different from ownership separation. CMA (2020), *Appendix ZA, supra* note 23, at 18, ¶ 79. Moreover, according to Google, its services on the buy- and sell-side are already materially functionally separated. Thus, ongoing monitoring of adherence to regulatory obligations may prove costly for the regulator. *Id.* at 7, ¶ 9. Moreover, the unquestionable complexity of the ad tech industry may make monitoring virtually impracticable. This would ultimately make such less-intrusive remedies ineffective.

53 As industry blog comments on the switching costs in the publisher ad server market: "As a publisher, replacing your primary ad server is not a trivial task. Think of it like doing a mid-flight engine swap on an airplane. Except that it's your revenue engine. It's hard to imagine many publishers wanting to take such a risk." Ratko Vidakovic, *The Beginner's Guide to Header Bidding*, ADPROFS, https://adprofs.co/beginners-guide-toheader-bidding/ (last visited May 11, 2023). Moreover, see CMA (2020), *Appendix M, supra* note 22, at 65, ¶ 263 (discussing switching costs in the ad server market).

54 *Supra* notes 42 and 43.

55 CMA (2020), *Appendix M, supra* note 22, at 30, ¶ 136.

56 Advertisers would likely use a separate DSP by Google selling only its first-party inventory, in parallel with a DSP selling third-party inventory. In such a scenario, advertisers would face the inefficiencies of multi-homing across DSPs as discussed in *supra* note 22.

Unbundling first-party inventory from a DSP service might only promote local competition in the DSP market, with uncertain effects on the sell-side. Therefore, we think that structural separation of the ad server in combination with non-discriminatory access provisions to limit demand-side market power may effectively address Google's market power while preserving efficiency gains benefiting publishers and advertisers. The resulting competitive pressure could facilitate entry, spur innovation, and decrease price levels.

V. CONCLUSION

In this paper, we have highlighted the anticompetitive effects of Google's current and past practices in the ad tech industry, including self-preferencing, discrimination against rivals, and leveraging its dominance in various markets. These practices stem from Google's vertically integrated structure, creating barriers to entry, distorting competition, and negatively affecting rivals, publishers, advertisers, and consumers in the process.

To address these issues and foster a more equitable and competitive landscape, we propose policy interventions that combine structural separation of Google's ad server function from the remaining ad tech services and ensuring non-discriminatory access to essential inputs on the demand-side, such as untangling exclusive access to first-party inventory from Google's DSP services. While arguably being a strong policy intervention, we argue that this is required and proportionate to address the competitive issues in the ad tech value chain. Implementing these measures is expected to effectively mitigate market power, preserve efficiency gains from vertical integration, and benefit publishers and advertisers. Increased competitive pressure for exchanges and DSPs will likely spur innovation and decrease price levels.

Implementing these policy interventions requires regulators and policymakers to carefully balance the benefits of promoting competition with the potential costs of disrupting efficiency gains and technical synergies offered by Google's integrated services, ultimately aiming for a more transparent, competitive, and innovative ad tech landscape that serves the best interests of all stakeholders.

THE ROLE OF DATA FOR COMPETITION IN ONLINE ADVERTISING

BY THOMAS HOPPNER & PHILIPP WESTERHOFF[1]

1 Thomas Hoppner is a partner, Philipp Westerhoff a Senior Associate at Hausfeld, Berlin. Hausfeld is representing complainants in competition proceedings against Apple and Google concerning online advertising.

I. DEBATES AROUND DATA FOR ONLINE ADVERTISING

The European Commission[2] and the British Competition and Markets Authority ("CMA")[3] are currently investigation whether Google's removal of third-party cookies anti-competitively deprives publishers and advertisers of access to data that is required for effective advertising. Similarly, the competition authorities in France,[4] Germany,[5] Poland,[6] and Italy[7] have opened probes whether Apple's App Tracking Transparency Framework ("ATTF") restricts competition by making it more difficult for third parties to collect advertising-relevant data within Apple's ecosystem. Conversely, some data protection authorities have advocated to further restrict third-party access to data for advertising purposes. All these proceedings ultimately evolve around a central question: how relevant is data for an effective online advertising ecosystem?

II. IMPORTANCE OF DATA

A. Data for Search-Based Advertising

Search-based advertising is the most profitable form of advertising. One of the reasons is that the format works without the provider needing any further data regarding consumers or their devices. A user's own search query provides the most relevant and personalized date. The more a search query implies that the searcher would currently be receptive to a particular product advertisement, the more advertisers are willing to bid for an ad space.

A search service can further increase the relevance of ads by using additional data regarding the searcher or his or her device beyond the search query. A user's previous search and click history allow significant conclusions to be drawn about his or her likely future behavior. For example, if in parallel to entering a search query for "Bosch," a user watches a YouTube cooking video, ads for *Bosch* cooking appliances are likely to be more relevant than ads for *Bosch* washing machines. Geodata regarding a user's current location or general place of residence can also help to select more relevant ads from the pool of available ads, for example by giving preference to local providers. While such data can make advertising even more relevant, search-based advertising also works very well entirely without such data. This can be seen, for example, in the revenues of search engines, which advertise that they do not collect or use personal data at all.

B. Data for Context-based Advertising

The relevance of (personal) data for context-based advertising is comparably subordinate. In case of context-based advertising, the targeting is based on the content that is published on the website or app that a user visits, rather than on the person or the device of the recipient. Accordingly, in theory, for such targeting no further (personal) data is required.

In practice, however, it has been shown that purely context-based online advertising, without any information regarding the user, performs significantly worse in terms of all key performance indicators ("KPIs") that matter to advertisers as compared to solutions that use additional data. Regardless of how specific the content visited by the user is, each publisher can display significantly more relevant ads in the proximity of such content if important parameters regarding the user are known (age, gender, and location in particular). The more additional data the publisher, advertiser or their respective advertising intermediaries have regarding the user, the more relevant context-based ads can be served to them.

The bottom line is that, today, context-based advertising is enriched with data wherever possible to achieve a level of personalization. In principle, the same data is used for such combination of received content and information about the user as is also used for purely behavior-based targeting.

However, the use of user data in context-based advertising is not only important for the display of more relevant ads. As with all online advertising formats, advertisers attach great importance to measuring and optimizing the performance of their ads. At least for this purpose,

2 https://ec.europa.eu/commission/presscorner/detail/it/ip_21_3143.

3 https://www.gov.uk/cma-cases/investigation-into-googles-privacy-sandbox-browser-changes.

4 https://www.autoritedelaconcurrence.fr/en/communiques-de-presse/targeted-advertising-apples-implementation-att-framework-autorite-does-not.

5 https://www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2022/14_06_2022_Apple.html.

6 https://uokik.gov.pl/news.php?news_id=18092.

7 https://www.agcm.it/media/comunicati-stampa/2023/5/A561.

market participants will once again need access to relevant user data (see below at E.). This means that even (effective) context-based advertising cannot do without access to data.

C. Data for Behavior-based Advertising

Finally, when it comes to behavior-based advertising, access to data is indispensable. If the current or at least general interest of a consumer cannot be guessed either from a search query entered or from the context of the website or app visited by the user, advertising inefficiencies due to wastage can only be avoided by using data regarding the user; data that allows conclusions to be drawn about his or her likely interests. Such conclusions can be drawn primarily from previous behavior of the user, such as his or her browsing, clicking and engagement history. Such behavior-based targeting stands and falls with access to such data.

D. Data for Programmatic Advertising in the Open Display Market

The importance of data for programmatic advertising in the open display market[8] is particularly obvious. To effectively market its inventory via programmatic advertising, a publisher must enable advertisers (and the intermediaries they use) to assess the value of an ad slot on a particular website or app that a user visits. For this purpose, information regarding the context (the content) on the medium and/or information regarding the user, which allows conclusions to be drawn about probable interests, must be provided. The more such information that can be provided, the more accurately the algorithms of the companies involved can predict whether a user will be amenable to a particular advertising message or will find such a message annoying. The more precise the calculation and the higher the probability of a positive response to an ad, the more advertisers will bid for the ad slots. Without relevant data, on the other hand, the bids and thus the prices for ads are significantly lower, as the risk of wasted coverages (scuttering losses) increases. Beyond purely context-based advertising, the programmatic distribution of advertising inventory without relevant user data promises no success. Without data, you can't reasonably price ads because advertisers don't bid high "out of the blue."

E. Data for Online Advertising Support Services

Access to user data is not only essential for the delivery of personalized advertising, particularly in the open display market. Many technical support services that are essential components of successful advertising models also depend on access to data. In particular, important functions such as attribution, frequency capping and ad fraud prevention cannot work without access to data:

- **Data for attribution of advertising budgets**: After the display of (personalized) ads, advertisers want to know how the user reacted to the ad or what actions were subsequently taken. This is the only way to determine, for example, how many transactions (for instance, app downloads) came about organically and how many were based on the placement of an ad. Such attribution requires tracking a user's behavior across multiple websites and/or apps. When a user purchases a product on a merchant's website, the merchant rightly wants to know how that purchase came about – whether the user come to the website directly through the browser or through a generic search result, or whether an ad on another website lead him or her to the merchant. This can only be tracked if it can be determined which website a user visited and which ads he or she actually saw there before ending up at the retailer and carrying out a transaction there. It becomes even more complex when the user may have been exposed to multiple advertising campaigns from the same merchant. In order to allocate advertising budgets appropriately, it is then necessary to track which medium was used to acquire the user. To do this, the data regarding the publishers visited by a user and the ads there must be combined and analyzed programmatically.

- **Data for frequency capping:** Consumers perceive seeing the same ad continuously – across multiple websites and/or apps – as a nuisance. Regardless of the relevance of the ad, they may feel downright "stalked" by a frequent insertion. The feeling of being followed by advertisements is one of the main reasons for using ad blockers. The frustration triggered can damage the advertiser's brand. This would make an advertising campaign counterproductive. The most effective remedy is frequency capping, the technical limitation of how often a particular ad is shown to a user. In order to limit the frequency with which the same ads are displayed, advertisers must be able to track which user has already been shown the ad, how often and over what period of time. This is an extremely important step, above all in the programmatic display of ads across many intermediaries, in protecting consumers from an intrusive overload of ads. Technically, this requires that a user's devices can be identified and that the perception of certain ads can be tracked across multiple publishers.

8 Open display market refers to a sub-set of the display market, where (in contrast to owned-and operated platforms) publishers do not sell their ad inventory through their own ad tech interfaces but a complex chain of third-party ad tech intermediaries.

- **Data to prevent ad fraud:** Access to and the combination of data is also necessary to combat ad fraud. Ad fraud causes millions of dollars in damage to advertisers every year. This is based on the fact that, with display advertising, publishers are usually paid according to the number of impressions, but sometimes also according to the number of clicks on an ad or the subsequent conversion (for example, installation of an advertised app). This creates incentives and opportunities to technically manipulate such numbers. In particular, fake accounts can be used to artificially generate impressions, clicks, or installs. Publishers then have to pay for ads that did not reach real consumers. Verification services provide the most effective means against this. They check whether actions have been triggered by different, real users or whether there is a high probability that, behind an action, there is, for example, a fraudulent bot network with fake accounts. However, this verification requires access to usage data in connection with ads that have been placed. The better verification services can match IP addresses and track which IP addresses or devices visited which publishers, the more effectively they can combat ad fraud.[9]

III. ONLINE ADVERTISING WITHOUT ACCESS TO DATA?

As online advertising has grown, particularly the share of programmatic display advertising, the depth and scope of access to advertising-related data has also increased. This has led to concerns regarding data sovereignty and consumers' right to informational self-determination. Such concerns have led to a significant tightening of data protection law for advertising-related activities, in particular in Europe which now has one of the strictest frameworks in the world for online advertising. Nevertheless, some believe that the statutory requirements are still insufficient, and are calling for further restrictions on online advertising and the use of data in general. Demands range all the way to a ban on all targeted advertising, all data collection for advertising or even all real-time bidding for programmatic display advertising.

On closer inspection, however, many demands are unfounded, interest-driven, and counterproductive. They overlook the enormous benefits of using data for digital business models in general and online advertising in particular; not only for the economy as a whole, but also for each individual market participant, above all for consumers. Instead of only seeing risks and possible misuse of data and placing entire industries under general suspicion, the debate must focus more on balancing the interests involved and also appreciating the benefits of data.

A. Does Online Advertising Need any Data at all?

When assessing the role of data for advertising, one cannot consider particular interests in isolation. Everyone would feel more comfortable if less data concerning him or her were stored. Ideally, consumers would like to be able to use all the services in the world for free and without any advertising, without having to share a single piece of information about themselves. Actually, they would like to have everything in the world for free, at any time. Yet, for obvious reasons such land of milk and honey is just utopia. Someone needs to cover the costs.

1. Alternatives for Consumers

When it comes to using digital services in particular, an enormous mentality of "free" has established itself. Nobody wants to give anything in return. It is not surprising that consumers are fundamentally critical of the collection of data regarding them. All factors equal, consumers would also prefer avoiding advertising altogether. Yet, an economic system cannot function in this way. The same consumers who initially complain about the collection of data and advertising are likely to complain even louder when they suddenly receive fewer digital offers or those are becoming more and more expensive, for example because paywalls are introduced or subscription fees increased.

Critics of data-based advertising argue that any refusal by users to consent to data use for advertising purposes on end devices (for example, via Apple ATTF) implies a rejection of behavior-based advertising and a preference for subscriptions or other pay-for-performance financing. The same conclusions are drawn from studies in which users view personalized advertising as "annoying" or "predominantly critical."[10] Yet, these comparisons are flawed as they are based on incomplete choices. On closer sight, consumers have exactly four alternatives: (i) free service with a great deal of non-personalized advertising without data access, (ii) free service with less personalized advertising thanks to data access, (iii) paid service without advertising and without data access, (iv) no service. When consumers are presented with this choice, for most

9 See CMA, (fn. 7) Appendix O, at 45.

10 German Federal Cartel Office, *Sector Inquiry into Online Advertising. Discussion Report* (2022), at 240, 253, 319.

digital offerings the majority chooses option (ii) – free services with personalized advertising thanks to access to data.[11] Only few are willing and capable to pay for services that one can also have for free without a great deal of annoying advertising.

2. Advantages of Online Advertising

When weighing the pros and cons of accessing data, the economic benefits of online advertising in general and data-driven, behavior-based advertising in particular must also be considered.

Online advertising is the lifeblood of the exploding digital economy. It has enabled tremendous economic growth through the expansion of niche players, including Internet-native companies that rely entirely on marketing their offerings on the Internet. The core factor for this was and is access to user data. The most successful, and at the same time most significant and characteristic form of online advertising are not branding ads which aim at building a strong brand among a large share of the population and, because of the intended broad distribution, can largely do without any user data for personalization. Rather, online advertising became big through direct response ads, that is, targeted advertising that compresses the entire customer journey of a user (from creating awareness for a product to completing the transaction) in such a way that a single ad accompanies the consumer to the desired conversion. It is the direct response ads whose KPIs, including the return on investment, are much easier to measure and optimize than traditional advertising. And it is direct response ads that allow niche sellers to bid exactly as much for an ad as they can afford.[12]

Taking a closer look at direct response ads, there are only two ad formats that are suitable for this – (i) search-based advertising, where users express their current transactional intent directly through the search query (or prompt) they enter, or (ii) behavior-based advertising, where such intent can be inferred from preceding user behavior. Purely context-based targeting, that is, advertising that is geared to the content of the publisher visited, is only suitable for this in very rare cases (particularly with retail media). This is because without a robust database, it is completely unclear whether a user is only interested in the respective content by chance or in general, or whether it is based on a specific and current commercial interest. Beyond the special case of retail media, context-based advertising also primarily aims at the transfer of an image of the publisher or the presented content to the advertised product or company; not at the immediate entering into of a transaction. In any case, the need to create media content for an extremely homogeneous group for effective contextual targeting significantly limits the ability of publishers to generate direct response ads via this form of advertising. Thus, context-based advertising represents a market separate from behavior advertising.

Now, if we compare search-based advertising with behavior-based advertising (as options for direct response ads), there are clear differences in terms of the need for data. Search-based advertising requires even less user data than context-based advertising. However, as the following aspects will show, this does not allow the conclusion that access to user data could be reduced in general without having to fear significant economic disadvantages.

B. Isn't Search-based Advertising Without Data Sufficient?

- **Search-based advertising kicks in at the bottom of the marketing funnel.** Search advertising often only delivers (paid) results that the consumer would have found anyway (in the generic results of the search engine or marketplace). However, search advertising is poorly suited to cater for the preceding discovery process. Niche providers in particular need, at the very least, targeted advertising that starts at the top of the marketing funnel and creates initial awareness of a product among a target group. Specifically, they need forms of advertising that consumers can discover on websites and apps even before they have formed any particular purchase decision or even inclination to buy (that could be expressed in a search query). Only behavior-based targeting, and thus access to data, enables the presentation of products and services to users with a high probability of a user responding to the ad, regardless of the context in which an ad appears, even though the user has previously never heard of the products or services. If a publisher knows what the user has liked or bought in the past, there is little risk that ads for similar products will be met with rejection. It is just as unlikely that a user with a similar interest and usage profile will be interested in similar products.[13] This avoids inefficiencies

11 See OVK, *OVK Trend Study Paid Content* (2022) https://www.ovk.de/app/uploads/2022/03/OVK-Trendstudie_Paid-Content_202200309.pdf, p. 13; AdLucent, *71% of Consumers Prefer Personalized Ads*, (2022) https://www.adlucent.com/resources/blog/71-of-consumers-prefer-personalized-ads/, UID 2.0, Global Consumer Survey (2021) (February 23, 2021), https://www.thetradedesk.com/us/news/consumers-say-their-internet-experience-is-broken-heres-how-we-can-fix-it; Blockthrough, *The Rise of Content-based Advertising: 2021 PageFair Adblock Report*, (2021) p. 4.

12 Benjamin Thompson, *Online advertising in 2022*, Stratechery (August 8, 2022), https://stratechery.com/2022/digital-advertising-in-2022/.

13 Such use of customer data to identify customers with similar attributes is also called look-alike modeling. This opens up new target group segments that are similar to an existing customer base.

due to wastage and opens up advertising options for even the smallest companies. The growth of many Internet-native companies is based on this. Some of them would not exist if there was only pure search advertising, since such advertising requires the entry of a search term and thus a certain pre-knowledge of the offer and a general propensity to buy. For competition in the digital sector and the expansion of niche providers, behavior-based advertising is thus more relevant than search-based advertising.

- **Due to several economic factors, markets for search-based advertising are highly concentrated.** For the most significant channel for search-based advertising, general internet search, Google has a near monopoly. Google can almost do as it pleases in this area. To succeed with an ad, advertisers often need to bid to the limit of their profitability. Their margins are being sucked up by Google. Given the inflated prices, for many advertisers, search advertising on Google is not an alternative to behavior-based advertising. At present, despite the rise of AI chatbots and their integration into rival search engines, the only serious alternatives in the search-based advertising space are Amazon Ads for merchants in the Amazon Marketplace and Apple Search Apps for app developers in the App Store. Yet, the ads are only open to merchants and app developers on iOS devices respectively. Moreover, Amazon and Apple themselves are the leaders in their respective markets and control robust ecosystems around them. Therefore, such providers are only a limited alternative to search advertising on Google. In terms of competition policy, it would be a mistake to further strengthen the dominant positions of Google, Amazon, and Apple in search advertising on their closed platforms by removing the technical basis for effective (direct response) advertising from the only realistic alternative to search advertising, specifically access to relevant data for behavior-based advertising.

- **As a whole, the markets for online advertising are highly concentrated.** Google dominates search advertising, video display advertising (with YouTube) and the various levels of the placement of display advertising. Meta/Facebook dominates advertising on social networks; Amazon advertising on its Marketplace and Apple advertising on its iOS App Store. All four tech giants exclude third parties from placing ads on their inventory (walled gardens). What "remains" is competition for advertising space and its placement in the open display market. In particular, the growth of programmatic display advertising there is creating scope for competition from thousands of publishers and their intermediaries. However, programmatic advertising in the open display market in particular is primarily behavior-based and thus dependent on access to data. To be sure, context-based advertising is also conveyed in the open display market. However, the advertising model is not suitable for the majority of publishers – whose content is not product-related or does not allow the transfer of images.

C. Isn't Context-based Advertising Without Data Sufficient?

Even beyond direct response ads, there are no real alternatives for behavior-based targeting. Search-based, context-based, and behavior-based advertising differ technologically and functionally to such an extent that they can be assigned to different advertising markets. For advertisers, but also for publishers, they are only substitutable in marginal areas.

For most publishers, financing their offerings by displaying search-based advertising is not an option from the outset. Today, advertising finances far more than just search services. Context-based advertising is also not a viable advertising model for many publishers, namely those with content that does not lend itself for commercial ads. This is the case, for example, for most news portals as the reading of general daily news does not allow any conclusions about the reader's commercial interests. Therefore, many publishers can only make competitive advertising offers via behavior-based targeting. If the technical basis for this advertising model is removed by means that restrict access to relevant data, also the basis of business for publishers that rely on such advertising will be lost.

D. Aren't Payment Models Sufficient for Publishers?

Restricting access to data for behavior-based targeting is not mitigated by the fact that publishers could switch to a method of a direct payment of content by consumers. If free content is available at the same time, pure online subscription models have no chance of success. Even Netflix, a traditional subscription business, switched to a hybrid model with advertisement. In any event, the choice of a business model should remain with the publishers, and should not be dictated unilaterally by state authorities and certainly not by private gatekeepers that impose their business models on publishers.

E. Win-win Situation of Behavior (Data)-based Advertising for Market Participants

It has been shown that there is no alternative to behavior-based advertising that realizes the same macroeconomic benefits. However, behavior-based advertising requires access to usage data. Thus, the overall economic benefits of the advertising model also depend on such data access. All market participants benefit from such access (except ad blockers and dominant providers of search-based advertising and their revenue share agreement partners):

- **Data as tool to generate positive (indirect) network effects.** The better the match between consumers and advertisers, the stronger the positive (indirect) network effects that a publisher creates for its two user groups. If the publisher passes such size efficiencies on to its user groups, particularly by investing in high-quality content and lower costs for ads, the symbiosis represents a classic win-win-win situation. However, the quality of the intermediation of consumers and advertisers through behavior-based advertising now depends directly on the amount of data regarding the user that is available. This is because such data provides the only point of contact, the only means, for matching the user groups. As such, the strength of the positive network effects that a publisher can generate through behavior-based advertising also depends directly on the scope of access to data.

- **Consumers benefit from** access to their data by, among other things, (i) receiving more and a more diverse range of content and services for less money, (ii) having advertising that is more relevant and less annoying to them owing to personalization and (iii) publishers having to display less advertising overall to finance their services.

- **Advertisers benefit from** a robust data set, among other things, because their advertising campaigns become more effective since (i) they achieve better KPIs in particular, (ii) they are more measurable and budgetable (ii) consumers are less bothered owing to higher relevance and therefore (iii) fewer ad blockers, which render advertisers completely invisible, are used.

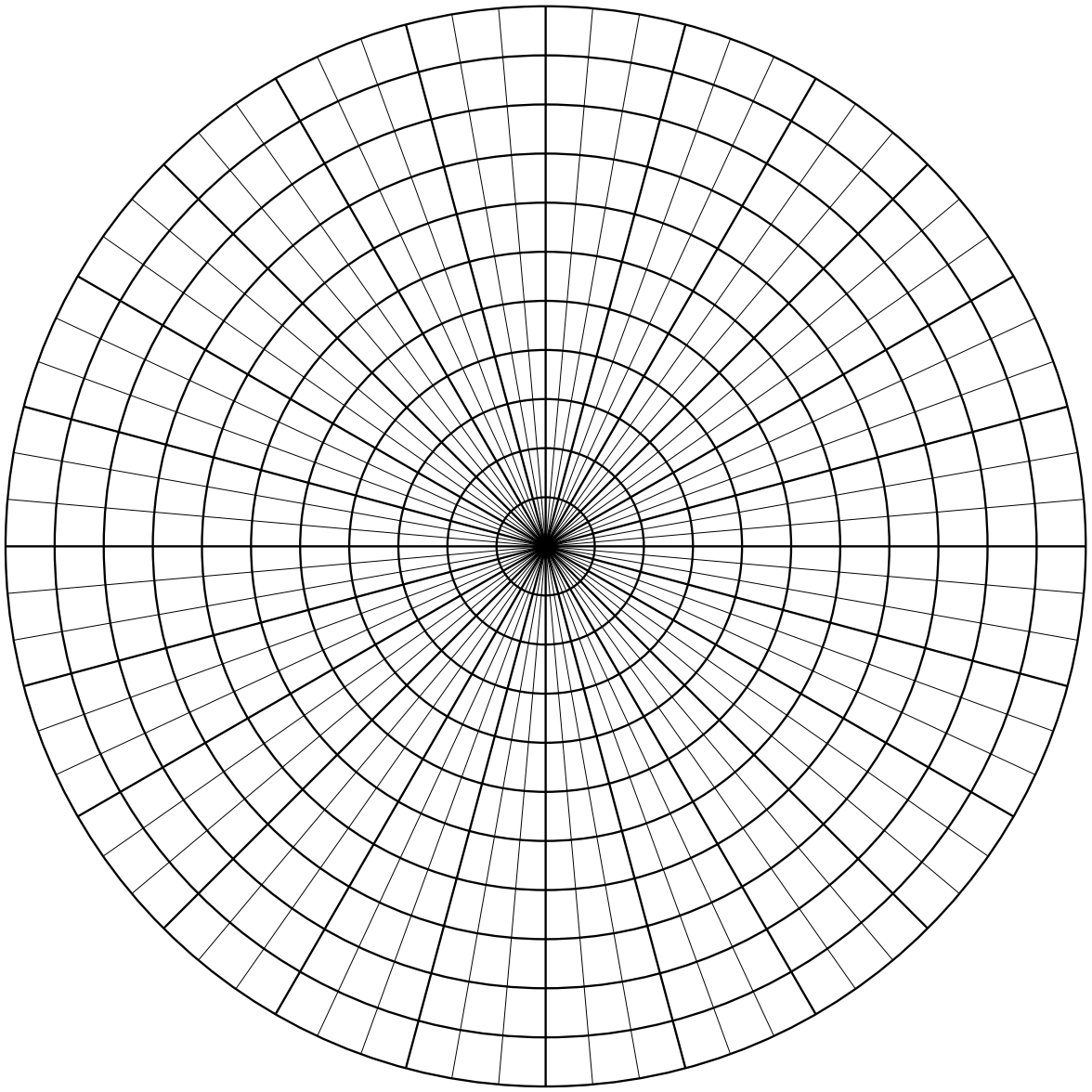
- **Publishers benefit** from a robust data set, among other things, because (i) their inventory achieves better KPIs, (ii) their inventory achieves higher ad rates in particular, (iii) fewer consumers switch media due to disruptive ads, and (iv) consumers use fewer ad blockers overall and (v) more advertisers adjust their budgets to online advertising.

- **Advertising intermediaries and providers of support services** benefit from a robust data set in part because data is essential for (i) programmatic display advertising, (ii) verification, (iii) attribution and (iv) measurement. Since only the placement of non-search-based advertising in the open display market is currently viable as a business model due to Google's walled garden, the intermediaries are left with few alternatives.

IV. CONCLUSIONS

Behavior-based advertising creates a win-win-situation for consumers, publishers, and advertisers. Any ban on behavior-based advertising or the collection of personal data to this end would unravel this win-win situation, to the sole benefit of ad blockers and market-dominant search engines, which would be delighted with more traffic and a higher share of the overall marketing budget being invested into search ads. The same is true for any measures by digital gatekeepers to artificially restrict the access to data for behavioral advertising beyond the limits imposed by privacy laws. The big winners of any such limitations would be Google, Amazon, and Apple. Everyone else would lose.

REVEALED PREFERENCE AND WELFARE CONSIDERATIONS IN ONLINE ADVERTISING MARKETS



BY KENNETH C. WILBUR[1]

1 Professor of Marketing and Analytics and White Chair in Management at the University of California, San Diego. Http://kennethcwilbur.com, kennethcwilbur@gmail.com.

Multi-sided platforms enable customers to exchange scarce resources like money, time and attention for products, services, information, entertainment, and other goods. Online advertising markets, in particular, facilitate exchanges of attention, entertainment, advertising and money between advertisers, consumers and creators.

Multi-sided platform markets continue to evolve, with new technological capabilities, user behaviors, pricing models, competitive dynamics, and other related topics. The academic literature is following that evolution, developing new theories, models, and findings.

This article briefly reviews a policy intervention in an important advertising market which may have mischaracterized the relevant welfare criteria. We discuss online advertiser welfare considerations in depth, hoping to help inform future policy interventions, and with pointers to relevant academic literature and measurement suggestions for relevant concepts. Then we discuss welfare considerations related to consumers and creators.

I. REGULATING ADVERTISING PLATFORMS: A CAUTIONARY TALE

In *U.S. v. National Association of Broadcasters* (1982), the U.S. Department of Justice aimed to invalidate several points in the broadcast television industry group's self-regulatory code.[2] The dispute was settled with a consent decree, which determined that banning promotion of multiple products within a single television ad was a per se illegal restraint of trade.

The U.S. also challenged two other points on antitrust grounds: a cap on the number of advertisements per hour, and a maximum of 9.5 minutes of non-program material per hour. The government theorized that limiting competing networks' advertising sales acted as an industry-wide output restriction, harming actual advertisers by driving up prices, and harming potential advertisers by limiting advertising opportunities. However, the consent decree did not resolve these two points.

With hindsight, the government's argument may have excluded some important welfare considerations. In particular, the government neglected how the advertising time restriction may have affected television viewers and television creators.

The consent decree did not ignore viewer welfare completely. It acknowledged the potential social benefits of limiting ad time during children's programming, but left the decision to individual television stations and the Federal Communications Commission. However, it failed to consider the possibility that limiting total advertising time during adult programming might be similarly desirable.

In fact, broadcast networks have increased national advertising minutes substantially from the 9.5-minute hourly limit they imposed on themselves in the 1970s. The four leading broadcast networks averaged about 15 minutes of non-programming time per hour in 2019, according to Kantar Media (2019).[3] National cable television networks aired even more, with about 16-17 minutes per hour given to paid advertising and other non-program material.

Television advertising time increases coincided with increasing competition for viewer attention and improved television advertising avoidance technologies (Wilbur 2008). This trend raises the possibility of market failure due to miscoordination between advertisers and viewers and may suggest a "circulation spiral" (Gabszewicz et al. 2007).[4]

The modern academic literature posits that advertising time and nuisance function as the attentional prices that viewers pay for consuming advertising-supported entertainment. Many economic models suggest that increasing ad time reduces audience size as marginal viewers tune away (Anderson & Coate 2005;[5] Anderson, Foros, & Kind 2018;[6] Wilbur 2008).[7] These theoretical models regularly predict that market competition may be insufficient to reach efficient outcomes, partly due to platform markets' winner-take-all nature.

2 *United States v. National Ass'n of Broadcasters*, 536 F. Supp. 149 (D.D.C. 1982).

3 Kantar Media. 2019. Kantar Media Ad Time Tracker. Accessed May 2023. https://web.archive.org/web/20190614085149/https://www.kantarmedia.com/us/thinking-and-resources/data-lab/kantar-media-ad-time-tracker.

4 J..J. Gabszewicz, P.G. Garella & N. Sonnac. 2007. Newspapers' market shares and the theory of the circulation spiral. Information Economics and Policy, 19(3-4): 405-413.

5 Anderson, Simon & Stephen Coate. 2005. Market provision of broadcasting: A welfare analysis. Review of Economic Studies. 72(4): 947-972.

6 Anderson, Simon, Øystein Foros & Hans Jarle Kind. 2018. Competition for advertisers and for viewers in media markets. Economic Journal 128(608): 34-54.

7 Wilbur, Kenneth C. 2008. A Two-Sided, Empirical Model of Television Advertising and Viewing Markets. Marketing Science, 27 (3): 356-378.

Small audience minorities may benefit from particular advertisements, but ample empirical work supports the notion that ad time is an "attentional price" for consuming "free" programs. About 27 percent of TV ad breaks are interrupted by channel changes (Wilbur 2015),[8] indicating frequent viewer disinterest in ads. McGranaghan et al. (2022) measured focal attention to television ads in a large panel of households paid to install cameras within their living rooms.[9] The cameras could identify viewer bodies, recognize viewer faces, and infer the moments when faces were pointed at the main television in the room. Channel switching disrupted just 4 percent of all potential advertising exposures, but viewers were absent from the room during 40 percent of potential exposures on average, and paid focal attention to just 12 percent of advertising time played on their television screens. The body of evidence raises the possibility that, from a viewing perspective, there may be an inefficiently high number of advertisements on television.

Hence, if viewing advertising is the "price" of watching a television program, an antitrust enforcement action may have increased this price. The price change exceeded 50 percent: from a maximum of 9.5 minutes per hour before the consent decree, to more than 15 minutes per hour in 2019. Today, mainstream economic analysis would understand that television networks charge both advertisers and viewers. Most economists would agree that advertiser welfare should be considered alongside competing outcomes, such as viewer welfare and creator welfare (Gentzkow et al. 2022; Wilbur 2008).[10]

II. ADVERTISER-RELATED WELFARE CONSIDERATIONS IN ONLINE ADVERTISING MARKETS

Welfare analysis is more complicated in multi-sided markets than in traditional supply-and-demand markets. Moreover, welfare analysis of *advertising purchases* is even more intricate than traditional consumption contexts.

Economic theory provides necessary conditions for economic actions to reveal consumer welfare, also known as revealed preference. Economic analyses often assume the rational consumer model applies and erroneously conclude that observed actions always reveal preferences. In fact, there are several well-founded reasons to question the application of revealed preference theory in online advertising markets.

Revealed preference theory requires that agents are self-interested, well-informed about available goods, and make choices freely. Under those conditions, agent actions are assumed to maximize utility, and therefore directly reflect agent welfare. However, if these conditions are not met, actions may not always reveal preferences.

All three necessary assumptions can be challenged in the context of online advertising markets. We focus on each in turn.

A. Advertiser Self-interest

Advertiser profit maximization may be disrupted by three types of incentive misalignments (Gordon et al. 2021).[11] First, firm management may not fully coordinate distinct groups that operate within the firm.

A common example appears in setting advertising budgets. Often, the finance department determines the advertising budget, with annual revisions based on advertising effectiveness estimates. One flaw in this process is that most advertisers are unable to estimate precise causal advertising effects (Gordon et al. 2021).[12] Typically, the firm's marketing executives present correlational evidence, alongside a belief that all "credit" for any advertising-linked sales should accrue solely to the advertising.

Finance and marketing executives both understand that the principal/agent problem can distort the advertising budget away from the optimum. Yet the arrangement often persists anyway. A few corporations have moved responsibility for advertising effect estimation from the marketing team to the finance team, to reduce the severity of the potential internal miscoordination.

8 Wilbur, K.C. 2015. Advertising Content and Television Advertising Avoidance. Journal of Media Economics, 29 (2): 51-72.

9 Matthew McGranaghan, Jura Liaukonyte & Kenneth C. Wilbur. 2022. How Viewer Tuning, Presence and Attention Respond to Ad Content and Predict Brand Search Lift. Marketing Science, 41(5): 871-1027.

10 *Supra*, nn. 4 and 7.

11 Gordon, Brett, Kinshuk Jerath, Zsolt Katona, Sridhar Narayanan, Jiwoong Shin & Kenneth. C. Wilbur. 2021. Inefficiencies in Digital Advertising Markets. Journal of Marketing, 85 (1): 7-25.

12 Ibid.

Second, marketing organizations often contract with a variety of specialist advertising agencies to design, purchase, monitor and evaluate advertisements. Advertising agencies offer valuable expertise but they seek to maximize their own profits, more so than the advertiser's. As the word "agency" suggests, this potential principal/agent problem offers a second type of incentive misalignment.

Marketing organizations can resolve agency miscoordination with contracts that align the two parties' incentives. For example, they may write a contract that ties the agency's compensation directly to the marketer's incremental profits from advertising campaigns. However, the statistical difficulty of estimating precise, causal advertising effects can make such compensation functions too uncertain. Such incentive-compatible contracts can sometimes be observed in practice, but they are not standard.

Another approach is to start an "in-house" agency rather than relying solely on external specialists. This avenue is feasible for firms who buy enough advertising to justify the fixed cost and risk of starting and staffing a dedicated internal unit. Horsky (2006) analyzed the economics of using in-house agencies.[13]

One way to measure the empirical importance of agency expertise is to look at the proportion of marketers who use platforms' self-service interfaces to purchase advertising, rather than relying on external agencies to purchase it for them. A related metric might be the typical fees, markups or commissions charged by specialist agencies serving a particular online advertising market. Higher commissions suggest greater importance of agency specialization and more challenging oversight.

Third, online advertising markets enable miscoordination among channel partners. For example, hotels that offer direct reservations might compete for online ads with the travel search engines they pay for generating reservations. That competition can increase advertising costs and lead to excessive advertising spending. Again, contractual remedies exist, yet distribution channel partners often compete in well targeted advertising environments, as enforcement and monitoring are costly and imperfect.

The extent of such miscoordination can be measured by the frequency of brand/partner competition in advertising auctions, as opposed to competition with rival products and services. For example, if Radisson's most frequent rivals in the "hotels los angeles" keyword auction are Expedia and Booking.com, then the assumption of self-interested advertisers might be questionable. However, if Radisson's most frequent rivals in the same keyword auction are Hilton and Sheraton, then revealed preference theory would be more appropriate.

B. Advertiser Information

Revealed preference theory assumes that economic decision makers observe the properties of the goods they purchase. However, online advertisers face both uncertainty and ambiguity about key attributes of online advertising opportunities. Important unknowns include the accuracy of consumer targeting, the ratio of humans to machines among ad recipients, the response to advertising, and the incremental effects of advertising on sales, revenue, and profit.

Two related factors can indicate advertiser knowledge of online advertising characteristics. The first is advertising objectives. The second is how the advertiser estimates incremental effects of advertising on sales.

Broadly speaking, there are two types of advertising objectives. Brand advertising campaigns buy ads to influence consumer awareness, perceptions and/or attitudes–results that are typically infeasible to directly attribute to ads (Du et al. 2019).[14] Therefore, branding campaigns typically focus on audience, audience characteristics, and costs as the outcomes of interest. Performance advertising campaigns buy ads to stimulate measurable behaviors, such as clicks, leads or sales.

The two advertising objectives lead to different testing methods. Brand advertisements are more often tested *prior* to placement in the market, using copy testing and related services; performance ads are more often tested *after* placement in the market, by comparing measurable objectives between those exposed to different creatives, or not exposed to advertising. Correlational estimates of performance advertising effectiveness is common, whereas causal estimation of performance advertising effects is possible but infrequent (Gordon et al. 2021).[15]

13 Horsky, Sharon. 2006. The changing architecture of advertising agencies. Marketing Science, 25 (4), 367-383.

14 Du, Rex, Mingyu Joo, & Kenneth C. Wilbur. 2019. Advertising and Brand Attitudes: Evidence from 575 Brands over Five Years. Quantitative Marketing and Economics, 17 (3): 257-323.

15 *Supra*, note 11.

Most large advertisers do not fall neatly into a binary brand/performance classification. Instead, most large advertisers run numerous brand campaigns and numerous performance campaigns, with distinct teams typically involved in each. A common question is how to divide the total advertising budget between brand and performance campaigns.

Performance advertising offers advertising response data, so it is typically thought to be the more objectively measurable of the two types. This is partially true. The incremental measurability is more likely under certain conditions, such as: (i) zero actions without advertising, as this provides a stable baseline against which ad effects may be reliably measured; (ii) relatively few false positives in the response data, and (iii) sufficient exogenous variation and transparency in the advertising purchasing process. When all 3 conditions apply, it may be that simple correlations indicate incremental effects of advertising on performance outcomes, and advertisers are well informed about advertisement attributes. However, such co-occurrences are not typical.

More commonly, performance advertisers run into some significant challenges:

i) Large advertisers have non-zero baseline performance objectives. Performance advertising objectives may be affected by past customers' repeat purchases, word-of-mouth, or other promotional efforts like publicity or offline advertising (Liaukonyte et al. 2015).[16]

ii) Online advertising fraud can lead to untrustworthy estimates of advertising audience, clicks, and conversions. Most industry estimates indicate that 10-30 percent of online advertising expenditure is lost to fraud (Gordon et al. 2021).[17] Fraudulent techniques can include generating false performance outcomes, especially with regards to clicks, but also sales leads and even phone calls (Bowen 2022).[18] Furthermore, platform opacity and consumer privacy regulations often hinder advertisers' ability to verify performance outcomes.

iii) Exogenous variation depends on the marketer's willingness to experiment to learn advertising effects. Unfortunately, many marketing executives are reluctant to run experiments (Nosko, Rao & Simonov 2018),[19] likely due to adverse perceptions about methodological difficulty, inconclusive policy guidance, potential time delay, financial cost of running suboptimal conditions, and career risk if past campaigns are shown to be suboptimal. Some advertising platforms offer experimentation tools to client advertisers, so advertisers' frequency and intensity of experimentation may measure advertiser knowledge of ad effects.

Advertisers will likely know advertising characteristics when (a) they run frequent experiments; (b) they manage their own campaigns, rather than relying on external agencies; (c) they focus on measurable performance objectives; (d) advertising supply chains offer transparent, exposure-level data and are externally audited; and (e) response data indicate high levels of true positives and low levels of false positives. Although these are not the most likely conditions in the online advertising market, there may be well-informed advertisers in any sufficiently large group of online advertising purchasers. Particularly well-informed advertisers may offer insights into quality measurement of online advertising inventory.

C. Competitive Supply of Advertising

Revealed preference theory requires a decision maker who makes a free choice among competing alternatives. However, this contradicts the canonical "competitive bottlenecks" theory of multi-sided platforms presented by Armstrong (2006). Armstrong (2006) analyzes an equilibrium in which competing platforms each offer exclusive access to different segments of the consumer market, and in which an advertiser who seeks to reach the entire market has no alternative but to purchase from both competing platforms.

As a more concrete example, it may be the case that some consumers multi-home across advertising-supported platforms. For example, some consumers use both YouTube and Tiktok, or Instagram and Snapchat, or Google and Bing. However, many consumers focus most of their usage within a single digital service. The degree, regularity, depth, and proportions of consumer overlap across competing platforms may indicate how competitive the supply of online advertising is.

A related measurement is how many advertisers respond to meaningful changes in platform advertising pricing terms. For example, a common pattern among online advertising sellers is to stimulate growth early on by introducing numerous advertiser-friendly features. Then, once advertiser adoption starts to level off, a platform may increase monetization of advertising sales by altering various levers to better exploit advertising demand.

16 Liaukonyte, Jura, Thales Teixeira & Kenneth C. Wilbur. 2015. Television Advertising and Online Shopping. Marketing Science, 34 (3): 311-330.

17 *Supra*, note 11.

18 Bowen, Pete. 2022. Getting a lot of junk leads from Google Ads? Accessed May 2023. https://web.archive.org/web/20221110213833/pete-bowen.com/getting-a-lot-of-junk-leads-from-google-ads.

19 Simonov, Andrey, Chris Nosko, Justin M. Rao. 2018. Competition and Crowd-Out for Brand Keywords in Sponsored Search. Marketing Science, 37(2): 200-215.

Advertisers in a competitive marketplace should reduce their advertising budgets, perhaps all the way to zero, when advertising prices rise. They should behave similarly when other advertiser-friendly features are removed or made less favorable. The degree to which this happens may indicate how substitutable the particular form of advertising is with available alternatives. The platforms that gain business in response to a focal platform's price change likely consist of the relevant competitive set. Such substitution may change over time as the platform matures and as advertisers develop their understanding of the platform and its consumer market.

One way to measure substitution across online advertising platforms is to look at quasi-experimental data showing how platform feature changes and advertising pricing terms predict advertiser usage. When advertisers tend to respond to platform changes in ways that are consistent with canonical consumer choice theory, we should have a greater presumption that revealed preference may indicate advertiser welfare.

However, if a platform were to alter its pricing or services and we do not observe much variation in advertisers' identities or expenditures, that may indicate a setting in which the platform is offering substantially differentiated advertising services that are difficult to realize elsewhere. In such cases, if the advertising platform has such a unique hold on its consumers that it imposes a "toll" on brand/consumer interactions, it may be that revealed preference is a poor indicator of advertiser welfare.

III. CONCLUSION: CREATOR AND CONSUMER WELFARE CONSIDERATIONS

Traditional economic analysis may be directly applicable to study creators and consumers in online advertising markets. However, certain aspects can be nonstandard or present challenges.

Online advertising markets often support various types of valuable content, such as text, images, videos, audio, or combinations. Consumer data are used to rank this content, which may be duplicated across different platforms. Traditional economic analysis should reflect the "experience good" nature of digital content markets — consumers often do not realize the value of the content until after they have started consuming it. Additionally, a measure of platform quality is available in the proportion of content available on a platform that is designed expressly for that platform's format, and remains unduplicated across competing platforms.

Consumer utility of online advertising platform usage may depend on several factors including the volume and quality of content, network effects from friends' usage, the amount of advertising embedded in the content, direct payments to creators or the platform, and valuable advertisements leading to purchases. Creator utility of online advertising platform usage may depend on financial compensation for content, content exclusivity on the same platform and across rival platforms, total audience response, and other forms of monetization such as through affiliate marketing or direct sales.

Unlike advertiser welfare, the consumer and creator welfare of using online platforms is likely estimable using revealed preference theory. However, it still requires proper specification of consumer and creator welfare functions, and therefore may not always be straightforward.

IV. CONCLUSION

We question the application of revealed preference theory to all advertisers in online advertising markets. We think it applies to some advertisers, but probably not to the modal advertiser. However, we do think revealed preference theory may be applied to estimate consumer and creator welfare functions, conditional on proper model specification. We have suggested measurement possibilities throughout to help gauge market efficiency and to evaluate necessary conditions for revealed preference theory.

We believe that economic policies and regulations can help to maximize market efficiency and reduce market failure, so long as policy objectives are properly formulated and reflect institutional practices. We hope the points we raise may offer helpful signposts for policymakers.

A COMMERCIAL ADVERTISING REVOLUTION: FROM YELLOW PAGES TO SEARCH ENGINE

BY SEAN F. ENNIS[1]

1 Sean F. Ennis, University of East Anglia, Centre for Competition Policy, and Norwich Business School. s.ennis@uea.ac.uk. Many thanks to colleagues for helpful conversations on this topic.

The medium is the message.
-Marshall McCluhan

I. INTRODUCTION

Over the last three decades, search engines have largely replaced yellow pages as sources of information on commercial sellers. This gradual change for users heralded a dramatic change in business model despite the consistency of media technologies being two-sided platforms. Counter-intuitively, this change reduced the information available in the advertising medium as yellow pages permitted large and detailed advertisements that are not generally possible in the constrained space of screens. The evolution involved substantial learning and business exploration, as new alternatives to provide results of commercial search were accompanied by an alteration in the method and source of advertising revenue from these media. In order to understand the current approaches of online search advertising, it is worth focusing on how differences between the new and traditional media impact the associated advertising model. I take seriously the idea that many of the changes from the introduction of online search inevitably led to the need for a new model of advertising revenue. This does not mean, however, that the selected new model, which has largely been created by search companies, is optimal from the perspective of consumer users or business users, even though there may be consumer and business benefits from the new technology.

This note introduces a categorization of the qualitative differences between the old and new commercial search media. I suggest a typology for three different models: yellow pages, internet directories, and search engines. This typology then flows into hypotheses about impacts of the changes on advertising technologies on the pricing model for advertising. The internet directory product merits attention in this context because it achieved success in the U.S. prior to free-text search's takeover, which was the curated directory at the origin of Yahoo!, in which Yahoo! made judgements over how to categorize options and placed them into a hierarchy of subject orders, much like the subject index of libraries.

The approach used in the paper is one of abstraction from narrow product details towards core product features. As part of this abstraction, numerous real and important features of the sale of advertising are ignored, including the vertical chain of sales of advertising, the diverse types of internet advertising[2] and the role of non-search based advertising.[3] Dominance or monopoly is not an explicit focus here, though it may be important both in the original yellow page market (despite the fact that many markets had competing yellow page services)[4] and in the subsequent commercial search markets. Thus, I focus on users who are explicitly searching for a supplier and who use media specifically capable of performing such searches.[5]

II. STAGES OF EVOLUTION

The replacement of yellow pages by internet search has both created a new customer search process and changed the way that companies advertise themselves to users.

For clarity, I begin by describing what is meant by the phrase "yellow pages" in this note. Yellow pages are paper-based guides to corporate presence, including contact information (phone) and physical address of companies.[6] They show information on all businesses that subscribe to a business telephone line.[7] This "basic" business information is provided free of charge to customers. The main focus here, though, is on the supplemental information, or commercial advertising, that yellow pages made available to companies. This supplemental information included boxed display advertising designed for the advertiser and which does require payment by the advertiser.[8]

2 These include information, brand, and price advertising in addition to core commercial advertising for finding sellers and learning how to contact or visit them.

3 Much advertising comes when users are not explicitly seeking the advertised information, such as fashion advertising whether it is delivered in a magazine or on an internet application.

4 Yellow Pages were produced both by primary companies, such as telephone companies and, in the U.S., by competitors that also delivered free yellow pages to homes. (For a valuable analysis of this competition, see Rysman, M. (2004). Competition between Networks: A Study of the Market for Yellow Pages. *The Review of Economic Studies*, 71(2), 483–512. http://www.jstor.org/stable/3700635.).

5 The media may also be capable of other types of searches.

6 We are not here focusing on yellow pages as separate internet products, though these do exist. Not only have they been generally less successful than search engines, they may around 2001 have accounted for as much as 5% of advertising revenues for internet search engines, suggesting that they were not necessarily the first port of call for commercial searches over the internet.

7 Businesses did have an option not to appear in the yellow pages.

8 The sizes of ad boxes ranged from small numbers of extra words in an ad to one full page, and thus included a great range of advertising size options.

The development of alternative sources of information provided over the internet has changed the provision of yellow pages. These have generally ceased printing and distribution, such as Yell in the UK which announced in 2017 its plans to cease paper production. While some yellow page related websites do exist, such as yellowpages.com (U.S.) and pagesjaunes.fr (France), these sites are now believed to be relatively modest sources of commercial information compared to during the period before free-text search.

The first major internet innovation in commercial search was the introduction of a curated directory of information. This was most emblematically developed and made available by Yahoo!.[9] Their site presented information, and allowed finding of products and companies, based on a model in which Yahoo determined a fixed hierarchy of data under high-level categories such as arts, news, education, regional, etc.[10] This form of ordering of information allowed relatively quick search for a user, by typing their search terms into the text box on the page which would show multiple pages of the directory as options. The cost of producing this hierarchical organization was high due to the rapid growth in the number of products on web pages, which required regular adjustments in the content and organization of the hierarchy. Furthermore, the pre-established directory structure did not respond easily to the evolution of user interests and could not easily learn from their choices. This cost and complexity of curated internet directories made the structure relatively expensive to implement even if the variable costs of any individual search were moderate. The key features of this difference from the yellow pages were:

- the geography covered with yellow pages being exclusively local;
- the number of information categories, which was much greater; and
- depth of information provided in each category as information could be much more narrow, granular, and detailed than in a single printed book.

Figure 1. Yahoo! Home Page in 1996

Source: *Yahoo! IPO Prospectus, 1996*

9 Other versions of electronic directories existed earlier, such as the French Minitel version of the Pages Jaunes (yellow pages).

10 In many respects, this curated structure could be considered inspired by the Library of Congress Classification or Dewey Decimal Classification.

The second major innovation in commercial search is free-text search. Free-text search is the type of search popularized by Google that allowed free text entry in a search to return an ordered list of web content. The internet search provider presents pages relevant to the user search terms, according to a page-ordering algorithm. The algorithm initially delivered suggestions based on assessments of relevance to the search based on link strength. Later versions of page ranking also rapidly learned average consumer interests from user selections from the search engine response in order to revise the page order of natural results. Yahoo! included Google as its source of free-text search in 2000. Google equaled Yahoo! as a source of search revenue by 2003 - 2004.[11]

The key differences between free-text search and yellow pages include the much greater "coverage" that applied geography, breadth of topics, and detail on each topic. The key differences between curated directory and free text search include the fast-evolving response structure to commercial questions of interest which learned from prior users' areas of interest and allowed for fast responses to new interests[12] and to the provision of new information on websites that were catalogued by search engines.[13]

The differences in features of the different models for information provision resulted in a user movement from yellow pages to curated directories and then to the free text search model built around a page-ranking algorithm. Ultimately, the most successful model has been the free-search model, eclipsing both the paper and internet directory approaches.

III. TYPOLOGIES OF FEATURES AND ADVERTISING MODELS

The change in the structure of information provision has been followed by changes in the structure of advertising delivery. I limit the focus here to searches by consumers that are intended to find a commercial seller. These types of searches have been performed with traditional yellow pages, internet directories, and search engines.

The move from Yellow Pages towards internet directories changed the type of advertising, featuring display ads, which would contain a rectangular ad, and ad boxes (often placed to the right of search results, to distinguish them from more natural hierarchical directory results). Although these advertisements are not shown in Figure 1, they were present more generally at the top and side of the screen's main content.

It is worth emphasizing that the utility of the internet search mechanisms is much broader than that of Yellow Pages, due to the possibility of information provision in addition to product information. Thus, in addition to this commercial search objective, both internet directories and search engines provide advertising in response to non-commercial searches. A non-commercial search is one that begins without an explicit purpose to find a supplier. Some non-commercial searches do not have advertising, while some do. Providers such as Google note that a high percentage of searches yield no advertising, and thus no direct advertising revenue. Delivering good results on non-commercial searches enhances user loyalty which then pays off for the search engine providers when users are either performing non-commercial searches, but with an advertiser present, or when performing commercial searches.

The key characteristics of the typology of different commercial search mechanisms are presented in Table 1. These features will then be correlated with the advertising solutions adopted by each mechanism.

Table 1. Typology of Commercial Search Features by Technology

		Yellow pages	Internet directory	Free word search
Detail	Content depth	High-level	Medium	Narrowest
Space	Display space	Unlimited	Limited	Limited
Focus	Geography	Narrow	Narrow-Wide	Narrow-Wide
Dynamics	Adjustment speed	Slow	Medium	Fast
Cost	Variable costs	High (er)	Low	Low
	Fixed Costs	Modest	High	Low

Source: *Author*

11 It is worthy of note that Yahoo! turned down opportunities to purchase Google for $1 million in 1998 and for $5 billion in 2002 both of these offers occurring at times when Yahoo had a higher market value than Google.

12 New interests might arise from news, sports events, and many other sources of changing focus in search over time.

13 The updates of web pages and the creation of new pages and websites require regular collection of information form the internet.

One core observation in this typology is that a narrower focus is associated with success over the prior model. This is in part because a narrower focus could co-exist with a broader focus, and thus serve narrow and broad commercial searches with the same interface.

A key feature for the products in this typology is that commercial advertising on the internet is generally more constrained for space than commercial advertising in the yellow pages. Other outcomes of note include that much more customized and lower total cost of advertising is available for a small company with a targeted customer approach. Such targeting was not possible on yellow pages, which thus made yellow pages expensive for advertising to narrow groups.[14] Companies often sought to distinguish themselves from others by the size of their advertising. This meant that in crowded product spaces with many sellers, such as auto dealers, many large ads would be bought.

Another key feature is the dynamics of content adjustment of the search content. In part due to faster and more detailed updates, the user demand moved towards free word search.

The variable costs of the search model are built around the costs of gathering, sorting, and presenting information, which have a low marginal cost per search, compared to yellow page variable costs, which were built largely around the cost of printing and contracting. The different cost and production model for search has been followed by the internet's introduction of payment by click for a limited number of "preferred" options presented in one search, and with low visual distinctiveness from "natural" search results. This auction approach for positioning helps prioritize those that can receive attention within a much more limited visual space than is found in yellow pages. Although yellow pages can expand their presentation space to meet increased demand, internet directories and searches cannot do this. The individual user focus of search engines nevertheless increases the capacity for small and medium-sized enterprises to raise their profile to specific categories of consumers through advertising even if the enterprises have a narrow customer base.

Advertisers do not always benefit from the ability to focus on narrow customer groups. One reason is that the auction for right to have clicks also raises the cost of advertising for certain activities, compared to a space on a printed page cost model, because of the increased scarcity of possibilities for high-demand space. Movement to small screens, as computer usage is substituted for by smartphones, increases the space scarcity and could increase the scarcity premium that advertisers must pay. Another reason is that advertisers that had poor return on investment in yellow pages (such as those that advertised with a low marginal profit gain from the ad lower than the cost of their ad), can, ironically, even be worse off after yellow pages are eliminated. The reason is that enterprises may have better discovery rates by customers prior to the introduction of the internet; the increasing use of the internet by larger segments of potential customers then steers even more customers to other sellers if no internet advertising is undertaken by the company in question.

Table 2 shows the typology of commercial search advertising models. The hypothesis of this paper is that the models for monetization of the advertising platform follow from the typology of technology characteristics described in Table 1.

Table 2. Typology of Commercial Search Advertising Models

	Yellow pages	**Internet directory**	**Free word search**
Content depth	Basic information content	Medium level of information content	Very narrow searches permitted, allowing greater advertiser participation especially by SMEs
Display space	Unlimited. Advertisers choose the size of ad	Limited, if many advertisers for a specific customer type, not all companies wishing to advertise can be simultaneously presented	Limited, if many advertisers for a specific customer type, not all companies wishing to advertise can be simultaneously presented
Geography	Local advertising by metropolitan area or narrower geography	Ads can be tailored to geography or individual features	Ads can be tailored to geography or individual features
Pricing	Price list, ad size-based. Pricing must cover printing costs for the size of ad and include yellow page markup for reaching the customer	Charge Per Display, Charge Per Click, Auction (evolving over time)	Auction based on bid price per click, or commission on observed sale
Viewer customization	Low	Medium	High
Advertising episodes	Low	Medium	High
Surplus extraction	Modest	Greater	High (margins up to 90% from low marginal costs and auctions + scarcity)

Source: *Author*

14 The cost of advertising was nonetheless much lower for smaller ads than larger ones.

Certain advertisers have undoubtedly benefitted from the introduction of more narrowly tailored advertising, even if auctions may generally require sharing higher levels of surplus to the advertising medium than under a fixed price scheme available to paper-based advertising models. Small businesses and businesses with narrow niches can benefit from this change.[15] Small and medium-sized enterprises can successfully advertise over such a medium, while they may have found advertising in yellow pages prohibitively expensive. Businesses can also reach customers more easily while starting up, compared to a commercial advertising model with slower information spread.[16]

Nevertheless, some businesses may be worse off under internet search than under the prior model, notably to the extent that a higher portion of their surplus goes towards advertising. The advertising cost of some businesses is extremely high. For example, Booking.com has been reported to pay as much as 50 percent of its revenue to search engines.[17]

Even absent the greater ability to engage in surplus extraction from auctions compared to fixed prices for advertising, a key variable, for determining whether advertisers may be better off with internet advertising, is how frequently the advertiser's businesses is found in the absence of internet advertising and how frequently it is found under the changed model (both when they advertise on the internet and when they do not advertise on the internet). That is, the internet may have higher usage for commercial purposes than prior media. This might be reflected, for example, in high numbers of commercialized search opportunities from search engines, meaning more searches lead to advertising. This increase in turn may (or may not) result in lower prices per click. The higher consumer dependence on the internet than yellow pages may reduce the frequency with which businesses would make a sale who do not use any advertising at all.

The balance of impacts from change in commercial advertising technologies is complex. While the focus here is on commercial advertising, the distinction between this and other forms of advertising may have become fuzzier with the introduction of internet search advertising;[18] thus, while yellow pages may have a greater immediate ability to provide detailed content to users, because of larger ad sizes that permit provision of more information to customers, the market outcome has moved away from greater information provision to less, taking account of screen space constraints. The use of screens shrinks the immediate availability of information and replaces that with likely much greater commercial information provided over a separate advertiser-operated website, to which users go by a click from the short-form advertisement. However, the success of the different advertising technologies ultimately reflects an evolution in the underlying consumer preferences. These preferences may include a desire for immediate access to highly detailed information, a preference which is arguably best served by internet search, second best served by curated internet directories, and least well served by static yellow pages. The evidence for this ordering lies in how usage patterns of the three media changed over time, as each of the first two lost usage to the subsequent medium.

15 Previously, limited ability to target advertising narrowly restricted opportunities for narrowly focused advertisers.

16 The time needed for advertising to appear in yellow pages could be as. Much as 18 months after the decision to undertake advertising, due to the annual production schedule of yellow pages and their lead times for contracting and production.

17 This example is not intended to suggest that most advertisers spend 50 percent of their revenues on search advertising.

18 For example, the distinction between commercial advertising and brand advertising may be less clear.

A BRIEF LOOK AT RECENT MARKET DEVELOPMENTS SINCE THE BUNDESKARTELLAMT'S SECTOR INQUIRY INTO ONLINE ADVERTISING AND AD TECHNOLOGY

BY HOLGER DUBBERSTEIN[1]

1 Senior Case Officer (Rapporteur), Bundeskartellamt, The text reflects the personal point of view of the author, not necessarily that of the Bundeskartellamt.

In August 2022 the Bundeskartellamt published a Discussion Report summarizing the findings of its sector inquiry into online advertising.[2] Based on a number of interviews with market participants with different positions in the online advertising value chain and on several hundred responses to written questionnaires sent out to advertisers, media agencies, publishers and ad technology providers, the Report undertook to describe the value chain and its technical elements, discuss plausible market definitions, and identify market positions and the factors which are likely to influence them.

Extending the view beyond the situation at the time, the Report's two final chapters were each devoted to possible changes in the landscape: One analyzed, amid lasting discussions about the industries' data-gathering practices, what more restrictions on access to personal data could mean from a competition point of view for a sector as data hungry as this one. The other chapter discussed whether, in an industry exhibiting those special features so far defining the non-search online advertising sector, competition really can be preserved – or, if considered necessary, restored – with the instruments currently available to competition authorities and regulators. And what could be done if this is not the case.

The Discussion Report was meant to start a discussion with the industry and market participants were offered the possibility to submit written comments, which a number of them did. The individual submissions as well as a Final Report providing a summary of the comments (in German only) are available on the Bundeskartellamt's website.[3]

Nearly a year after finalizing the Discussion Report and given the fact that online advertising can rightfully be considered a rather fast-moving industry – at least as far as technology is concerned – it seems like the right time to take a short look at some developments that can be observed in the market, the relevant regulatory and legal landscape and how they relate to the Discussion Report's findings. Just like the Report, this is unavoidably based on a somewhat German and European perspective. But first, slightly more context is provided for those new to the topic.

I. ONLINE ADVERTISING MAY MEAN DIFFERENT THINGS – THE SCOPE OF THE SECTOR INQUIRY

Not all online advertising is the same and different parts of the industry raise different questions. For many people the first association that comes to mind when thinking of online advertising might be what competition authorities and market participants usually call online search advertising – those little ads that appear after entering a query into a search engine. The sector inquiry, however, did not focus on this form of advertising, even though one undertaking, Alphabet (aka Google), commands a strong market position[4] in this context.[5] But there is also another sector of the online advertising industry that seems worth a closer look: non-search online advertising. This term is used to describe all those ads that appear when opening a web page, starting an app on a mobile phone or plunging into watching some videos on ad-powered platforms like YouTube. It is this form of advertising that currently finances or co-finances a large number of websites, including most news media sites and also a large number of mobile apps.

A first still rather superficial look at this sector shows a high degree of technical complexity with trading structures somewhat resembling those of high-frequency stock market trading and a market structure which is seemingly more complex than the one found in search advertising. However, it also shows that there is an ongoing discussion about competitive deficiencies mostly related to the influential role of a few

2 Bundeskartellamt, *Sektoruntersuchung Online-Werbung, Diskussionsbericht* (August 2022), https://www.bundeskartellamt.de/SharedDocs/Publikation/DE/Sektoruntersuchungen/Sektoruntersuchung_Online_Werbung_Diskussionsbericht_lang.html (in German only); an English version of the Executive Summary can be found at https://www.bundeskartellamt.de/SharedDocs/Publikation/EN/Sector%20Inquiries/Sektor_inquiry_online_advertising_report_discussion_summary.html.

3 Bundeskartellamt, Sektoruntersuchung Online-Werbung, Zusammenfassender Abschlussbericht (May 2023), https://www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2023/31_05_2023_SU_online_Werbung.html?nn=3591568 (Report) and https://www.bundeskartellamt.de/DE/UeberUns/Publikationen/Sektoruntersuchungen/Online_Werbung_Stellungnahmen/stellungnahmen_node.html (comments).

4 Cf. Bundeskartellamt, *Google: Determination of paramount significance for competition across markets*, case B7-61/21 (Decision of December 30, 2021), Nos. 308 et seq., https://www.bundeskartellamt.de/SharedDocs/Entscheidung/EN/Entscheidungen/Missbrauchsaufsicht/2022/B7-61-22.html.

5 Relatively recent developments in Artificial Intelligence ("AI"), which have been the subject of hype for about two years now, *might* in the medium to long term bring about some change in this context. In particular, Microsoft's strategic move to integrate AI-powered chat capabilities into its "Bing" search engine seems to be perceived as a potential threat to Google's core business (cf. e.g. Nico Grant & Karen Weise, *In A.I. Race, Microsoft and Google Choose Speed Over Caution*, The New York Times (April 7, 2023), https://www.nytimes.com/2023/04/07/technology/ai-chatbots-google-microsoft.html or Benj Edwards, *Fearing ChatGPT, Google enlists founders Brin and Page in AI fight*, Ars Technica (January 24, 2023), https://arstechnica.com/information-technology/2023/01/fearing-chatgpt-google-enlists-founders-brin-and-page-in-ai-fight/). But keeping in mind the famous Gartner Hype Cycle, it seems still too early to judge the role AI-powered natural language processing and generation will play for searches in the long run, Google's capabilities to copy or even outdo Microsoft's move and the effect that upcoming legislation, such as the planned AI Act of the European Union, might have on the race.

large providers of ad space and technical services, in particular – again – Alphabet/Google. So it was this part of the online advertising sector, which is usually considered to be part of a different market than online search advertising and with regard to which further sub-segmentation is sometimes being debated, that the Bundeskartellamt decided to inspect more closely. In this context, a particular focus was placed on the highly complex technical side – those interlinked technical services on which this industry effectively runs.

Their main role is intermediation,[6] which essentially involves bundling the ad inventory of different publishers and also increasing the value of that inventory through data. Intermediation in online advertising can – in a simplified way – be split into two categories: integrated intermediation services (advertising networks) on the one hand and a relatively open system of different offerings grouped around digital marketplaces, so-called ad exchanges, on the other hand. This system is usually referred to as programmatic advertising. There are four, or rather five, services central to the system, with two of them specifically catering to the needs of publishers and another two catering to the needs of advertisers: publisher ad servers implement the publishers' sales strategy and deliver advertising media. Supply side platforms ("SSPs") offer advertising spaces for sale, in most but not all cases in the form of an auction. Demand side platforms ("DSPs") bid on ad spaces offered by SSPs according to a buying strategy specified by the advertisers or their media agency. Advertiser ad servers (also) implement such buying strategies, track campaigns and deliver advertising media.

The fifth technical service, conceptually positioned between publishers and advertisers/agencies, the marketplace (ad exchange) itself, is nowadays mostly a functionality of the SSP. The entire trading process takes place in fractions of a second after a user navigates to a web page or opens an app (so-called real-time bidding ("RTB")), and it can take place for each single ad space on a given web page or in a given app. In addition to these four/five core functions, there are further technical services that support their functioning. Data management platforms ("DMPs") assist in storing, organizing, and combining the different datasets used for targeting the advertisements and measuring their success. Anti-ad-fraud, brand safety and viewability measurement services, collectively often referred to as ad verification services, help to ensure that advertisers do not unwittingly pay money to criminals operating fake websites with fake audiences, that their advertisements do not appear in an environment considered unsuitable by the advertisers in one way or another (and that publishers can avoid ads considered unsuitable by them) and they help to determine to how many users their ads were presented and under what circumstances this happened.[7] Many times these additional services are at least partially integrated into offerings providing these four/five core services, but in principle they can also be sourced separately.

When looking at the situation described above from a market definition perspective, the Discussion Report tended to regard those technical services offered as part of integrated intermediation services as not belonging to separate technical services markets. In contrast, however, it considered it appropriate to define at least four separate technical services markets for those technical services offered for use in the programmatic advertising system: publisher ad servers, SSPs/ad exchanges, DSPs, and advertiser ad servers. DMPs may also be considered as belonging to a separate market. As regards ancillary services, such as ad verification, the Discussion Report identified more blurred boundaries so that it seemed more doubtful to assign them to their own markets. Ultimately, however, this question was left open to be answered when examining a specific case. It generally has to be born in mind that market definitions were only considerations based on tendencies here, that there are in any case technical and competitive relations between integrated intermediation services and the programmatic advertising system and also within the services which can be found in the latter, and that technical developments in the ad technology sector are rather dynamic, so that all considerations on market definitions in the Discussion Report were based exclusively on the situation at the relevant point in time.

With respect to the geographic market definition, the Discussion Report tended towards European if not world-wide markets. The most obvious argument for defining the markets as narrower, national markets would be strong dependencies potentially existing between the typically national markets for the ad spaces themselves and the ad tech markets, but the Report did not find that sufficient indications for that existed at the time.

II. THE COMPETITIVE LANDSCAPE

The one thing that stood out in the Discussion Report's analysis of the market structure for the various technical services was Google's special position: Google was by far the leading company for the provision of publisher ad servers in particular, but also for SSPs/ad exchanges, DSPs, and advertiser ad servers. This result was largely consistent with the findings of the UK's CMA, the Australian ACCC, the Spanish CNMC, and the Japanese JFTC in their respective sector inquiries and with various findings in individual proceedings conducted by the French AdIC and the

6 Technical services are nevertheless also used by publishers themselves, in particular big ones, to facilitate and automate what still qualifies as direct sales.

7 This is relevant to determine whether the advertiser actually received value for money. For example, an ad may have been integrated into a web page sent to a user's browser, but the user may never have scrolled down so far as to actually be able to see that ad.

European Commission. Apart from acting as an intermediary for third-party advertising space, Google also sells its own ad inventory via these and related in-house technical services, including the integrated Google Ads/AdSense/AdMob intermediation system, which is highly relevant particularly for smaller publishers and advertisers.

Regarding this general picture of intermediation for third-party publishers, no fundamental change can currently be seen on the horizon compared to last year. What can be observed, however, is that some big players are trying to get a slice of the cake by establishing their role as publishers. This is, for example, observable in the case of Netflix recently entering the video ads market with a new tier of its video streaming service. The company also attracted interest from a technical services/intermediation perspective because Netflix chose Microsoft as its ad tech and sales partner.[8] But it remains to be seen to what extent deals like these or Amazon's progress in its own ad space business translate into substantially increased dynamics in the "ad tech for intermediation" sector in the medium term.[9]

When considering the reasons for the current market structure, the Discussion Report reached the conclusion that apart from the quality of Google's technical services acknowledged/appreciated by various market participants, "leverage effects" emerging from Google's control over relevant advertising inventory and demand, Google's control over important data, and the links between individual technical services provided by Google are likely to play an important role. In any event, the overall result reached was that although in theory it would be possible in the programmatic advertising ecosystem to freely "mix and match" the services offered by several providers as needed, in reality there seem to be substantial restrictions. These restrictions exist either in the form of ties between the advertising space offered or demand represented by certain providers and their technical services. Or they occur in the form of ties between a provider's technical services which in principle could be separated. *Prima facie*, this seems to restrict the scope for competitive action by providers competing with Google.

At least two new efforts to address this situation could be observed in the last year, both of them in the U.S. In January 2023 the Department of Justice together with eight state attorney generals filed a civil antitrust suit against Google with respect to its practices around ad technology.[10] The complaint focuses on a diverse set of acquisitions and product design decisions by Google over more than a decade, which it sees as having the goal and effect of making the use of competing technical services unattractive or even impossible for its customers, thus depriving them of optimal transaction results while extracting rents at a supra-competitive level to the benefit of Google's own bottom line. The second measure was the (effective re-) introduction of an antitrust bill specifically aimed at the ad tech sector, the AMERICA Act, supported by senators from both parties.[11] This bill also referred to a (similarly-described) set of practices by Google which it classifies as anti-competitive. In the UK two civil lawsuits (in the form of group litigation, similar to U.S.-style "class actions") have been filed in recent months on behalf of publishers.[12] Both assert damages as a result of Google's behavior in the ad tech sector and seek compensation.

An interesting factual development against the background of the market structure described above are recent announcements by Google and Meta to take a (further) step in the creation of advertising material – this time using AI technologies to generate ads by remixing textual, graphical and other elements based on data about the audience.[13] Although the use of AI in ad technology and even the idea of using it to select the "right" advertising material is in principle not that new,[14] this move, if successful, could further deepen Google's vertical integration along the ad (technology) value chain and could offer the company an opportunity to leverage its particularly large trove of user data in a new way. Taken to its logical conclusion, the concept would allow for a complete individualization and personalization not only in terms of the targeting of advertising, but also in terms of the message conveyed and the media elements used to

8 Sarah Krouse & Suzanne Vranica, *Netflix Partners With Microsoft for New Advertising-Backed Option*, The Wall Street Journal (July 13, 2022), https://www.wsj.com/articles/netflix-partners-with-microsoft-to-launch-advertising-supported-plan-11657738975; Jon Brodkin, *Microsoft wins deal to serve ads on Netflix, edging out Comcast and Google*, Ars Technica (July 13, 2022), https://arstechnica.com/information-technology/2022/07/microsoft-wins-deal-to-serve-ads-on-netflix-edging-out-comcast-and-google.

9 There is already a discussion about Netflix possibly switching to its own technical services when the current contract with Microsoft expires, cf. Dan Meier, *Netflix with Ads is Delivering on ARPU but Password Crackdown is Kicked Down the Road*, Videoweek (April 19, 2023), https://videoweek.com/2023/04/19/47092/.

10 Press release, The United States Department of Justice, Justice Department Sues Google for Monopolizing Digital Advertising Technologies (January 24, 2023), https://www.justice.gov/opa/pr/justice-department-sues-google-monopolizing-digital-advertising-technologies.

11 Cf. press release, Mike Lee, The AMERICA Act: Lee Introduces Bill to Protect Digital Advertising Competition (March 30, 2023), https://www.lee.senate.gov/2023/3/the-america-act.

12 Competition Appeals Tribunal, *Application by Mr Claudio Pollack*, case 1572/7/7/22, https://www.catribunal.org.uk/cases/15727722-claudio-pollack; Chris Vallance, *Google faces new multi-billion advertising lawsuit*, BBC (March 31, 2023), https://www.bbc.com/news/technology-65115231.

13 Christina Criddle & Hannah Murphy, *Google to deploy generative AI to create sophisticated ad campaigns*, Ars Technica (April 20, 2023), https://arstechnica.com/information-technology/2023/04/google-to-deploy-generative-ai-to-create-sophisticated-ad-campaigns/.

14 Cf. e.g. Thomas H. Davenport *et al., How to Design an AI Marketing Strategy*, Harvard Business Review (July-August 2021), https://hbr.org/2021/07/how-to-design-an-ai-marketing-strategy; Bernard Marr, *How AI Is Transforming The Future Of Digital Marketing*, Forbes (October 18, 2021), https://www.forbes.com/sites/bernardmarr/2021/10/18/how-ai-is-transforming-the-future-of-digital-marketing/.

embed and support such adverts – perhaps a rather unsettling perspective in view of the additional manipulative possibilities that would go along with it.[15]

A related problem addressed by the Discussion Report was that of possible conflicts of interest in those cases where a provider/company is active both on the sell side and on the buy side, and in particular in those cases where providers of an SSP/ad exchange and a DSP are also relevant publishers seeking to optimally sell their own ad spaces. The proposed AMERICA Act mentioned above[16] makes measures aimed at eliminating such conflicts of interest – not only in the case of Google but in a generalized approach – an important part of its solution strategy. They include behavioral requirements as well as structural remedies.

III. RESTRICTIONS ON ACCESS TO PERSONAL DATA FOR ADVERTISING PURPOSES

Chapter D. of the Discussion Report gave an overview of the discussion about restricting access to personal data for advertising purposes and analyzed what the consequences would be from a competition point of view. It identified two main types of possible consequences, namely a less diverse and effective system of online advertising in general and a system becoming (even more) asymmetric to the benefit of large providers like Google. The Report contrasted these consequences with the substantial risks particularly for user privacy und autonomy that result from the current state of the online advertising ecosystem in which giant troves of user data are floating in a network of actors distributed worldwide and which makes effective control seem manifestly unrealistic.[17] It then discussed options to mitigate the risks for competition when restricting access to data as well as technical and legislative options to restrict access to data. As a result, the Report concluded that also from a competition point of view it can be considered whether, overall, it would not seem advisable to move away from a system of data-driven advertising such as the current one.[18]

The discussion is of course still ongoing, with a number of legislative steps having been taken in the past year, at least in Europe. The first example is the Digital Services Act ("DSA"), which prohibits the display of digital advertising based on profiling using the personal data of minors or particularly sensitive personal data in general. The DSA formally entered into force on November 16, 2022, and it will be fully applicable from February 17, 2024. The separate proposal for a regulation of the European Parliament and of the Council on the transparency and targeting of political advertising is currently (May 2023) still under discussion in the "trilogue," but an agreement is expected to be reached. The version adopted by the Parliament in February 2023[19] and the version adopted by the Council in December 2022[20] differ somewhat with regard to regulating the targeting of political advertising (and also algorithmic amplification), with the Parliament providing a rather complex set of provisions.

On the other hand, the legislative process towards replacing the E-Privacy Directive by a new E-Privacy Regulation to better complement the GDPR, which could include more effective restrictions on tracking if the tendency of the European Parliament's position

15 If one does not find this concept disturbing or – depending on one's perspective – promising enough, one can take it a step further and imagine a ChatGPT-style bot that – after clicking on or even just passing the mouse over the ad – engages the user in a fully automated and individualized sales conversation based on the data known about him or her. Using chatbots in marketing is not a completely new approach, but the new level of capabilities demonstrated by GPT-3 and ChatGPT as well as the latter's resonance with the public are creating an image on the horizon of a world in which every consumer comes across a variety of virtual salespeople who are all both well informed about them and equipped with the latest findings in sales psychology. The next but one step – when AI-powered, photorealistic, and convincingly animated avatars talking with a freely configurable voice become possible on scale – can be left to one's (sci-fi?) fantasies.

16 See press release, Mike Lee, note 11 above.

17 One of the latest examples is a company seemingly abusing data from the programmatic advertising ecosystem to offer worldwide location tracking of people through their mobile phones, cf. Ryan Gallagher, *Your Ad Data Is Now Powering Government Surveillance*, Bloomberg (May 11, 2023), https://www.bloomberg.com/news/articles/2023-05-11/surveillance-company-turns-ad-data-into-government-tracking-tool.

18 Critical of the current state of affairs of digital advertising also a recent study for the European Commission: Armitage *et al., Study on the impact of recent developments in digital advertising on privacy, publishers and advertisers* (Final report, 2023), https://op.europa.eu/en/publication-detail/-/publication/8b950a43-a141-11ed-b508-01aa75ed71a1/language-en.

19 European Parliament, *Amendments adopted by the European Parliament on 2 February 2023 on the proposal for a regulation of the European Parliament and of the Council on the transparency and targeting of political advertising* (COM(2021)0731 – C9-0433/2021 – 2021/0381(COD)), https://www.europarl.europa.eu/doceo/document/TA-9-2023-0027_EN.html.

20 Council of the European Union, *OUTCOME OF PROCEEDINGS* (16013/1/22, December 13, 2022), https://www.consilium.europa.eu/media/60812/st16013-re01-en22.pdf.

prevails against that of the Council, currently seems to have stalled in the "trilogue" procedure.[21] In principle, an approaching change in the legal framework for the transfer of personal data to the U.S. would also be of interest to the online advertising ecosystem – after all, a large number of providers in the field of online advertising and ad tech are based there. In 2020, the ECJ annulled for the second time the Commission's adequacy decision on the so-called "Privacy Shield," which was probably the most important legal basis for such data transfers.[22] The Commission is seeking to adopt a new adequacy decision shortly based on modified U.S. commitments, but its legality is also likely to be tested in light of ongoing discussions about whether this is actually "old wine in new bottles." Finally, in the medium term the proposal for an AI Act,[23] currently still in the midst of discussion in the EU legislative process, might also influence the mechanisms available for targeting advertising.

The dispute is also conducted before courts and authorities. In the U.S. the FTC started a procedure to possibly issue rules "concerning the ways in which companies collect, aggregate, protect, use, analyze, and retain consumer data, as well as transfer, share, sell, or otherwise monetize that data in ways that are unfair or deceptive," which could also cover personalized advertising.[24] In the EU, the privacy NGO NOYB filed 226 complaints with 18 different data protection authorities against cookie[25] banners[26] the design of which it considered to be in contravention of the GDPR.[27] The core issue here are design elements that do not seem to be "neutral" and seem to have been designed to nudge or even trick the user into granting consent to tracking for advertising and other purposes. The German consumer association vzbv has gone a different way and recently obtained a first instance civil judgment against the cookie banner of a major publishing house.[28]

On the technical side, the arms race between measures to limit the collection of personal data on the web or within apps on the one hand and strategies to circumvent these measures on the other hand continued. Mozilla, maker of the Firefox web browser, e.g. just recently activated improved protection by default against classic tracking via cookies.[29] In April 2023, a Swedish VPN provider released[30] a version of the Tor Browser, which is hardened against fingerprinting[31] and other tracking techniques, for broader use without the user having to rely on the Tor Network for connecting to the internet.[32] On the other hand, it is clear that measures against certain tracking technologies are prompting a number of publishers or ad tech providers to switch to other technologies. For example, according to a study of 1759 apps for iOS, the introduction

21 Cf. Luca Bertuzzi, *Leading MEP enraged by Swedish presidency's neglect of ePrivacy Regulation*, Euractiv (March 8 & 9, 2023), https://www.euractiv.com/section/data-privacy/news/leading-mep-enraged-by-swedish-presidencys-neglect-of-eprivacy-regulation/.

22 European Court of Justice, *"Schrems II"* case C-311/18 (Judgement of the Court (Grand Chamber) of 16 July 2020), https://curia.europa.eu/juris/document/document.jsf?docid=228677&mode=lst&pageIndex=1&dir=&occ=first&part=1&text=&doclang=EN. However, it seems rather likely that in practice the resulting legal problems were simply ignored by a number of companies concerned.

23 European Commission, Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL LAYING DOWN HARMONISED RULES ON ARTIFICIAL INTELLIGENCE (ARTIFICIAL INTELLIGENCE ACT) AND AMENDING CERTAIN UNION LEGISLATIVE ACTS (COM/2021/206 final, April 21, 2021), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0206.

24 Federal Trade Commission, *Advanced Notice of Proposed Rulemaking*, https://www.federalregister.gov/documents/2022/08/22/2022-17752/trade-regulation-rule-on-commercial-surveillance-and-data-security; cf. also press release, Federal Trade Commission, *FTC Extends Comment Deadline on Commercial Surveillance, Lax Data Security Practices Initiative Exploring Possible Rules* (October 14, 2022), https://www.ftc.gov/news-events/news/press-releases/2022/10/ftc-extends-comment-deadline-commercial-surveillance-lax-data-security-practices-initiative.

25 Cookies are small amounts of data, in practice often a unique identifier, that a website can send to a user's browser to have them stored there. When that browser visits the website again, the data is sent back to the website. This mechanism also works for websites that deliver elements to be embedded in other websites, like images, videos, or executable program fragments (scripts), which allows for tracking the browser's journey from website to website.

26 Cookie banners are prompts that appear when a website is accessed and are intended to obtain the user's consent to data storage in the browser or to various data collection and processing activities for advertising purposes, as required by the E-Privacy Directive and the GDPR.

27 Natasha Lomas, *Hold-outs targeted in fresh batch of noyb GDPR cookie consent complaints*, TechCrunch (August 9, 2022), https://techcrunch.com/2022/08/08/noyb-gdpr-cookie-consent-complaints/.

28 Torsten Kleinz, *Verbraucherschützer klagen erfolgreich gegen Cookie-Banner*, heise.de (December 2022, 19), https://www.heise.de/news/Verbraucherschuetzer-klagen-erfolgreich-gegen-Cookie-Banner-7408270.html (in German only).

29 Press release, Mozilla, Firefox rolls out Total Cookie Protection by default to more users worldwide (April 11, 2023), https://blog.mozilla.org/en/mozilla/firefox-rolls-out-total-cookie-protection-by-default-to-all-users-worldwide/.

30 Press release, Mullvad VPN, Mullvad VPN and the Tor Project team up to release the Mullvad Browser (April 3, 2023), https://mullvad.net/de/blog/2023/4/3/mullvad-vpn-and-the-tor-project-team-up-to-release-the-mullvad-browser/.

31 Fingerprinting uses properties of a browser or a device that can be read out by an app or a script in a website to calculate an identifier as unique as possible for that browser or device, which in turn can be used for tracking purposes.

32 The Tor Network is a project that tries to offer anonymous communication by routing the user's traffic through a network of relays, thus hiding the user's IP address.

of Apple's App Tracking Transparency ("ATT")[33] made tracking more difficult, but did not prevent a number of those apps from continuing to use other tracking techniques that are not effectively covered by ATT.[34]

In Europe, some large telecoms seized the opportunity they saw in cookies being more and more repressed as a means for tracking and established a joint venture for a technology called "TrustPID."[35] The project aims to provide publishers with a pseudonymous, publisher-unique ID of internet users that is calculated by retracing IP addresses to phone numbers. Google, as a particularly large provider of online ad space and ad tech but also as the maker of the most widely used web browser "Chrome," has a rather complex set of interests in this context. The company continues to work on its "Privacy Sandbox" project, which it says will eliminate tracking via cookies and replace that with more privacy-friendly technologies, which will still provide for some form of targeted advertising, although Google's original plans have been delayed after the CMA intervened.[36]

IV. ENFORCING COMPETITION LAW IN THE AD TECH UNIVERSE

The last chapter of the Discussion Report took a – one might say: holistic – look at the scope of the ad tech universe, its characteristics and, in particular, the role of Google. The scope is large and the system includes a variety of interacting components: it ranges from the user's browser or operating system to the complete ad tech stack described in section I to the booking interface for the advertiser. It is also highly dynamic because it is essentially software which can be updated in short cycles. The latter is particularly true for the various technical services that are usually provided in a software-as-a-service ("SaaS") model, implying that updates only need to be installed centrally on a limited number of servers. Another characteristic of the system is opacity combined with high complexity. Users of the system, i.e. advertisers and publishers and in some, mostly passive, way also natural persons surfing the web or using an app, can essentially only observe what the system does from the outside. This means that it can take a long time to even detect a change in behavior. At the same time, Google controls a large number of the system's components and is subject to a constant conflict of interests: on the one hand, it is an intermediary for the sale of third-party advertising space; on the other hand, it has an interest in selling its own advertising space in the best possible way.

The Report therefore raised the question of whether, in such a situation, individual interventions by a competition authority – in the sense of behavioral prohibitions and requirements – would actually be suitable for remedying potentially identified competition problems in the long term. After all, it seems plausible that Google could simply – and much more easily than other companies – economically compensate for the restrictive consequences of such individual interventions in the bottom line by making changes elsewhere. And the fact that many such changes will have Janus-faced effects would put an additional burden on proceedings aimed at implementing individual interventions.

Against this backdrop, the Report discussed possible more far-reaching interventions, ranging from procedural and substantive simplifications of imposing behavioral requirements, such as those underlying the new Section 19a of the German Competition Act ("GWB") and the conduct obligations of the even newer European Digital Markets Act ("DMA"), to structural measures. It concluded that if the promising new regulatory and competition law approaches of the GWB and the DMA and the experiences gathered in the application of these rules are in fact considered and the individual prohibitions by competition authorities and other individual specific behavioral rules still prove to have only a limited effect on the competitive process, the option to use more comprehensive interventions should become more central to the discussion.

It is therefore interesting to note that the idea of structural interventions has recently gained some ground again, for example in the U.S. Both of the initiatives mentioned in section II, the DOJ lawsuit against Google[37] and the proposed AMERICA Act,[38] incorporate structural measures

33 ATT is an Apple program to require the user's explicit consent before giving an app access to the unique identifier for advertising purposes on iOS devices; it was accompanied by mandatory "privacy nutrition labels" for apps.

34 Konrad Kollnig *et al., Goodbye Tracking? Impact of iOS App Tracking Transparency and Privacy Labels* (2022 ACM Conference on Fairness, Accountability, and Transparency (FAccT '22), June 20, 2022), https://doi.org/10.1145/3531146.3533116; studies on the extent to which certain fingerprinting methods are used can be found, for example, in Sebastian Neef, *Uncovering Fingerprinting Networks. An Analysis of In-Browser Tracking using a Behavior-based Approach* (Technische Universität Berlin, Master Thesis, March 29, 2021), https://arxiv.org/pdf/2210.11300.pdf, or in Imane Fouad *et. Al., My Cookie is a phoenix: detection, measurement, and lawfulness of cookie respawning with browser fingerprinting* (PETS 2022 – 22nd Privacy Enhancing Technologies Symposium, Sydney, Australia, February 24, 2022), https://hal.science/hal-03218403v2.

35 See press release, European Commission, Mergers: Commission clears creation of a joint venture by Deutsche Telekom, Orange, Telefónica and Vodafone (case M.10815, February 10, 2023), https://ec.europa.eu/commission/presscorner/detail/en/IP_23_721.

36 Ron Amadeo, *Google delays death of tracking cookies again, wants more time for "testing,"* Ars Technica (July 28, 2022), https://arstechnica.com/gadgets/2022/07/google-delays-death-of-tracking-cookies-again-wants-more-time-for-testing/; the latest reports by the CMA on the implementation of the commitments Google undertook in order to address the CMA's competition concerns can be found at https://www.gov.uk/cma-cases/investigation-into-googles-privacy-sandbox-browser-changes.

37 See press release, The United States Department of Justice, note 10 above.

38 See press release, Mike Lee, note 11 above.

into their approach to solving the problem they target. In the lawsuit the court is demanded to "order the divestiture of, at minimum, the Google Ad Manager suite, including both Google's publisher ad server, DFP, and Google's ad exchange, AdX, along with any additional structural relief as needed to cure any anticompetitive harm."[39] An earlier lawsuit filed by 17 Republican states against Google in 2020 and amended later[40] had already requested structural measures but without specifying them. Meanwhile, the proposal for the AMERICA Act seeks to generally establish a separation of functions for companies with a very large "digital advertising" business (more than US-$ 20 billion). Such companies may own a DSP or an SSP, but not both. If they own an ad exchange, they may not own either an SSP or a DSP. The same applies to buyers and sellers of digital advertising space, except for selling or buying ads for themselves. The latter may not own an ad exchange either.

V. CONCLUSION

While calls for structural solutions for the non-search online advertising and ad tech space have recently become somewhat louder, it seems not yet clear whether, to what extent and when they might be implemented. At the same time, fundamental change in the ad tech market without intervention still seems rather unlikely in the short to medium term. Disputes over individual actions by Google are therefore unlikely to diminish significantly in the foreseeable future and they will remain of high interest.

39 See press release, The United States Department of Justice, note 10 above, no. 342/6 of the complaint.

40 Press release, Ken Paxton, Attorney General of Texas, Paxton Files Third Amendment in Antitrust Lawsuit Against Google (November 16, 2021), https://www.texasattorneygeneral.gov/news/releases/paxton-files-third-amendment-antitrust-lawsuit-against-google.

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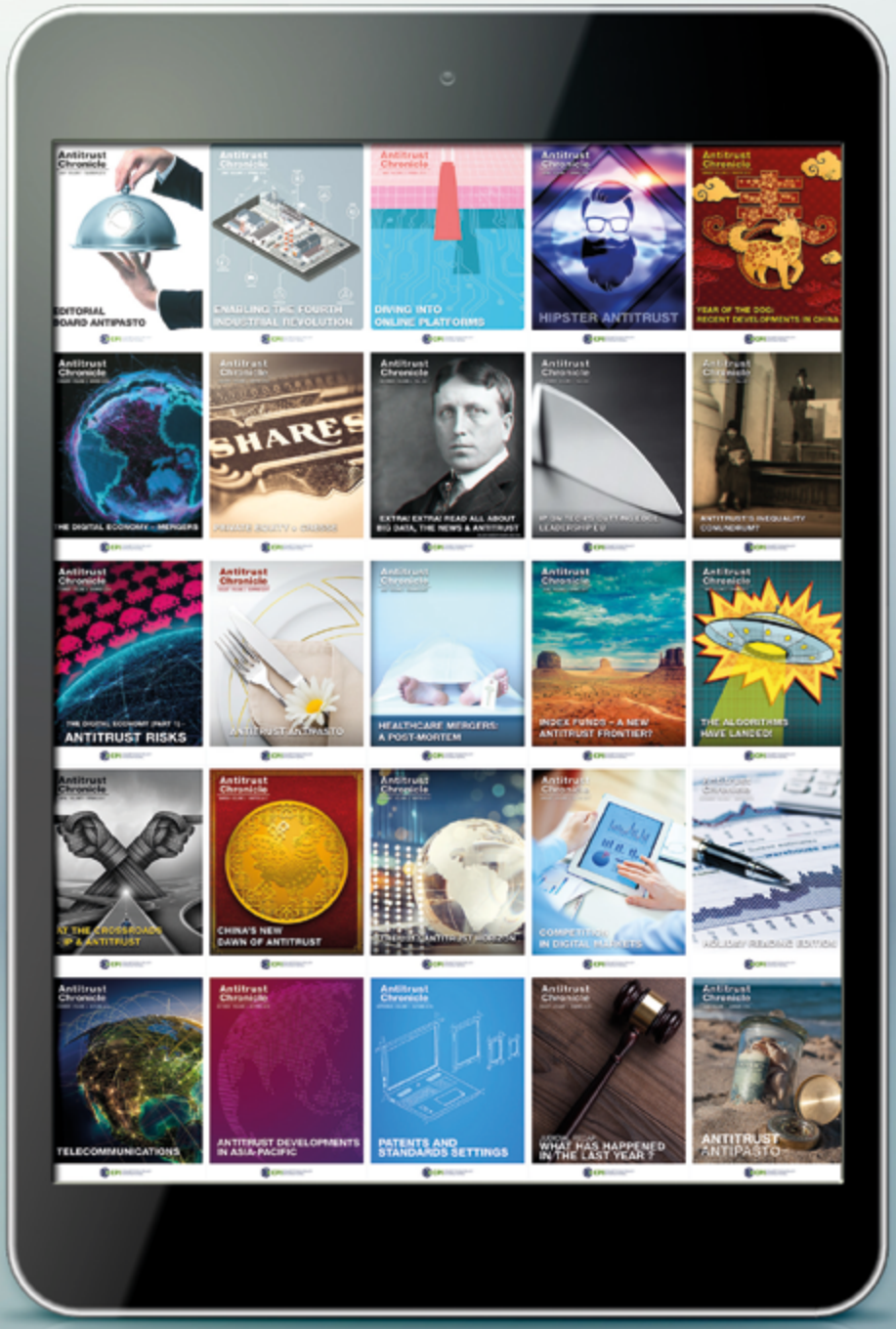


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